

AEROSPACE & AVIONICS



AVIX

A KYOCERA GROUP COMPANY

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INTRODUCTION

AVX is the world's leading manufacturer of passive electronic components. The demand for components for mission critical applications, aerospace electronics, and avionic instrumentation is constantly growing. The advancement and sophistication of these applications are driving demand for ever-improving quality of the individual components.

AVX provides a massive selection of components to meet the needs of today's advanced aerospace and avionic applications. The available products include MIL-qualified, COTS+, DSCC, ESCC, CECC, and many others. On top of this already extensive catalog of available products, AVX can meet the custom requirements of any customer, and the extensive array of test options means that parts can be developed to meet almost any mission critical requirement.



PROFESSIONAL/AUTOMOTIVE/HIGH TEMPERATURE

AT Series	FLEXISAFE	MH	RMM/SMM	AT Series
TRJ	TCR	THH	TMJ	TRM
TWM	Accu-P/Accu-L	“U” Series	MLO	Low Inductance
SQ Series		Feedthu Filters		

COTS-PLUS

APS	BC Coming Soon!	NBM	TBC	TBJ
TCB	NBS	TAZ	TWC/TWA	Low Inductance

DSCC/DLA/MIL-SPEC

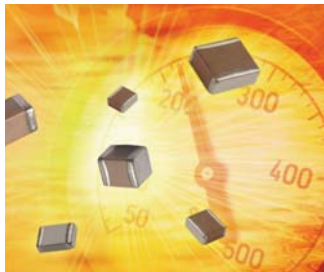
03029	05002	05007	03028	05001
05006	TCP	07016	95158	06022
High Voltage Radials	SIPs	87106	06019	88011
CDR	MIL-PRF-123	MIL-PRF-39014	MIL-PRF-11015	MIL-PRF-20
MIL-PRF-55365	CWR	EMI Filters	MIL-PRF-39006	CDR
MIL-PRF-55681	MIL-PRF-49470	MIL-C-28861	Accu-P DLA	

SPACE

Space BME	ESCC SMPS	TBC	TAJ	TBM
TCH	SRC9000	MIL-C-123	EMI Filters	NASA SSQ
MIL-PRF-49470		TAZ		

SURFACE MOUNT MULTILAYER CERAMIC CAPACITORS

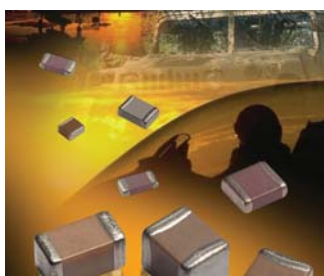
AT Series



- High Temperature C0G and VHT Dielectrics
- Tested to MIL-STD-202
- Ideally Suited for high temperature applications up to +250°C
- Life tested to 1000hrs @ 200% rated voltage and +250°C
- High Current handling, volumetric efficiency, and insulation resistance
- Very low ESR/ESL
- Pd/Ag and 100% Sn plated (RoHS Compliant) terminations available

Operating Temp	-55°C to +250°C
Case Size	0603 to 2220
Voltage	16V to 50V
Capacitance	100pF to 1μF

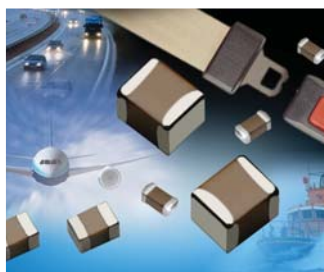
APS Series



- Extensively tested to ensure high reliability
- Ultralow failure rate, ≤1ppb
- Uses many tests prescribed in MIL-PRF-55681, enabling use in applications where high reliability is required
- Available with Fleixterm, Plated Ni and Sn, or min. 5% Pb termination options
- High CV range enables board space savings
- Available in NP0, X7R, X8R, and X8L dielectrics

Operating Temp	-55°C to +150°C
Case Size	0603 to 2220
Voltage	16V to 500V
Capacitance	10pF to 22μF

FLEXISAFE Series



- Developed specifically for safety critical applications
- Utilizes FLEXITERM layer in conjunction with a cascaded design
- Protected from mechanical stress, low insulation resistance, thermal stress damage, repetitive strike ESD, and placement damage
- Available in three failure rating: Commercial, Automotive, and APS

Operating Temp	-55°C to +125°C
Case Size	0603 to 1210
Voltage	16V to 100V
Capacitance	1nF to 470nF

CDR01-CDR06



- MLCCs designed to MIL-PRF-55681
- Wide range of termination finishes available, both RoHS compliant and with 4% minimum lead
- Selectable failure rate allows capacitors to be designed for mission critical applications
- Available in NP0 and X7R dielectrics

Operating Temp	-55°C to +125°C
Case Size	0805 to 2225
Voltage	50V to 100V
Capacitance	10pF to 470nF

CDR31 – CDR35



- MLCCs designed to MIL-PRF-55681
- Wide range of termination finishes available, both RoHS compliant and with 4% minimum lead
- Selectable failure rate allows capacitors to be designed for mission critical applications
- Available in NP0 and X7R dielectrics

Operating Temp	-55°C to +125°C
Case Size	0805 to 2225
Voltage	50V to 100V
Capacitance	1pF to 470nF

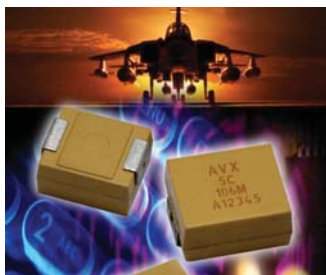
Space Level BME X7R MLCC



- X7R MLCCs designed to ESCC QPL 3009/041
- Higher CV Capability than PME capacitors resulting in reduced weight of components and reduction in PCB space required.
- Use of Flexitem technology for enhanced mechanical stress resistance
- Capacitance values up to 8.2 μ F available

Operating Temp	-55°C to +125°C
Case Size	0603 to 1812
Voltage	16V to 100V
Capacitance	2.2nF to 8.2 μ F

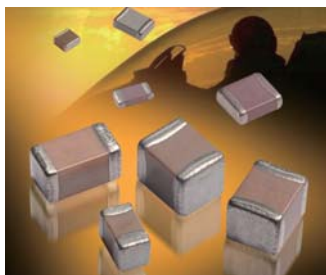
MH Series



- X7R high capacitance value ceramic capacitor in a surface mount precision made molded case.
- AEC-Q200 compliant
- Enhanced thermo-mechanical stress resistance
- Available in both Tin/Lead and RoHS compliant termination options
- Reduced piezo-electric noise when compared to traditional MLCCs
- Molded Case is UL90 V-0 flame retardant.

Operating Temp	-55°C to +125°C
Case Size	Special
Voltage	25V to 100V
Capacitance	2.2nF to 22 μ F

MIL-PRF-123/Chips



- MIL-qualified ceramic capacitors designed for high performance applications
- Available in BX voltage temperature characteristics for general purpose dielectric and in BP voltage temperature characteristics for temperature stable dielectric
- Offer proven technology in SMD packaging for space-level reliability.

Operating Temp	-55°C to +125°C
Case Size	0805 to 2225
Voltage	50V to 100V
Capacitance	1.0pF to 1.0 μ F

SMPS CAPACITOR PRODUCTS

RMM/SMM Series



- Stacked SMPS Capacitors
- X7R dielectric, high dielectric constant for an extended capacitance range
- Three termination footprints to fit many applications
- Available in both Tin/Lead (SMM) and RoHS compliant (RMM) varieties

Operating Temp	-55°C to +125°C
Case Size	Stacked SMPS
Voltage	50V to 500V
Capacitance	Max 120 μ F

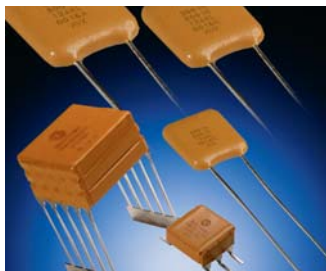
SMX Series



- Stacked SMPS MLCCs Designed for high temperature applications
- Very low ESR and low losses
- Excellent capacitance retention with frequency
- Excellent high frequency performance
- Low DC leakage current
- Very high current handling capability
- Available in COG and VHT (X7R) dielectric

Operating Temp	-55°C to +200°C
Case Size	Stacked SMPS
Voltage	50V to 500V
Capacitance	820pF to 180 μ F

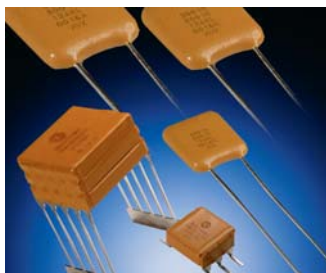
ESCC Qualified SMPS Capacitors



- Stacked SMPS MLCCs designed to meet ESCC Qualifications
- Available in surface mount, and leaded termination
- Available in both high voltage and high capacitance varieties
- Wide offering of capacitance values
- Wide range of voltage ratings

Operating Temp	-55°C to +125°C
Case Size	Stacked SMPS
Voltage	50V to 5000V
Capacitance	820pF to 180µF

CECC Qualified SMPS Capacitors



- Leaded SMPS Capacitors
- Designed to meet CECC Specifications
- Available in COG and X7R dielectric

Operating Temp	-55°C to +125°C
Case Size	Leaded SMPS
Voltage	50V to 500V
Capacitance	4.5pF to 18µF

SM Style / MIL-PRF-49470 / DSCC Dwg. #87106 & #88011



- Stacked SMPS Capacitors
- Available in COG, X7R, and Z5U Dielectrics
- Stacked geometry allows for high capacitance in relatively small package
- Available in Professional Quality or can be made to meet Military Specifications

Operating Temp	-55°C to +125°C
Case Size	Stacked SMPS
Voltage	50V to 500V
Capacitance	0.01µF to 1300µF

LEADED MLCC PRODUCTS

M123



- Leaded MLCC designed to meet MIL-PRF-123 qualifications
- Available in three lead styles: Radial, Axial, and 2-Pin DIP
- Available in two termination styles: solder coated copper or solder coated copper-clad steel.
- Available in two dielectrics, COG and X7R
- Extensive testing, well beyond requirements for MIL-PRF-39014, MIL-PRF-20, or MIL-PRF-55681

Operating Temp	-55°C to +125°C
Case Size	Leaded MLCC
Voltage	50V to 200V
Capacitance	1pF to 1µF

CKR04-CKR24



- Leaded MLCCs designed to meet MIL-PRF-39014 qualifications
- Available in three lead styles: Radial, Axial, and 2 Pin DIP
- Multiple dielectric options available

Operating Temp	-55°C to +125°C
Case Size	Leaded MLCC
Voltage	50V to 200V
Capacitance	1pF to 3.3µF

CK05-CK16



- Leaded MLCCs designed to meet MIL-C-11014 qualifications
- Available in two lead styles: Radial and Axial
- Two dielectric options available

Operating Temp	-55°C to +125°C
Case Size	Leaded MLCC
Voltage	50V to 200V
Capacitance	10pF to 3.3μF

CCR05-CCR79



- Leaded MLCCs designed to meet MIL-PRF-20 qualifications
- Available in two lead styles: Radial and Axial
- Two dielectric options.

Operating Temp	-55°C to +125°C
Case Size	Leaded MLCC
Voltage	50V to 200V
Capacitance	1.0pF to 0.1μF

SURFACE MOUNT TANTALUM CAPACITORS

TBJ / TBJ SRC9000 / CWR11



- Fully qualified to MIL-PRF-55365/8 with Weibull “B”, “C”, “D”, and “T” levels, with all surge options (“A”, “B”, & “C”) available
- Available in COTS-Plus, Space qualified (TBJ SRC9000), and Military (CWR11)
- Compatible with wave soldering, solder reflow, conductive epoxy, or compression bonding
- Molding compound meets requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of NASA SP-R-0022A

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D
Voltage	4V to 50V
Capacitance	0.1μF to 100μF

DSCC Drawings 07016 & 95158



- Based on CWR11 form factor
- High reliability encompassing the current range of EIA low ESR ratings
- 07016 is offered with Weibull Grade “B” and “C” reliability with all MIL-PRF-55365 Rev. G surge test options (“A”, “B”, and “C”)
- “E” and “V” case size components are considered to be MSL 3 in accordance with J-STD-020

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D, E, V
Voltage	4V to 50V
Capacitance	0.15μF to 1000μF

TRJ



- Improved reliability – 2x standard
- DCL reduced by 25% to 0.0075 CV
- Robust against higher thermo-mechanical stresses during assembly process
- CV range: 0.10-680μF / 4-50V
- 6 case sizes available
- 130 low ESR parts released
- Automotive, medical, aerospace, military and other high-end applications

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D, E, U
Voltage	4V to 50V
Capacitance	0.1μF to 680μF

TAJ CECC / ESCC



- Fixed, Surface mount capacitors designed to meet the qualifications of ESCC Space Program (according to ESCC Generic Specification 3012 and associated Detail Specification 3012/001) and CECC 30801-005 and 30801-011 (CTC4)

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D, E
Voltage	4V to 50V
Capacitance	0.10µF to 220µF

TMJ S1gma Series



- Next generation of statistical screening and process control enhancement of tantalum capacitors for professional applications
- Improved reliability and low DCL
- Available in three S1gma screening levels.

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D, E, U
Voltage	6.3V to 50V
Capacitance	0.22µF to 680µF

TBM / TBM SRC9000



- Screened to SRC9000
- Utilizes an internal multianode design to achieve ultra-low ESR
- Available with Weibull Grade “C” reliability and MIL-PRF-55365 Rev. G surge test option “C”
- Molding compound meets requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of NASA SP-R-0022A
- Considered MSL 3 in accordance with J-STD-020

Operating Temp	-55°C to +125°C
Case Size	D, E
Voltage	2.5V to 35V
Capacitance	22µF to 1500µF

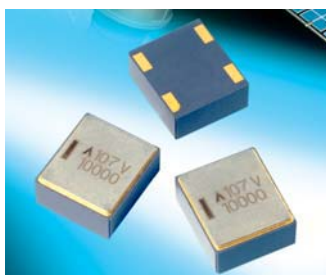
TRM Professional Multianode



- Improved reliability – 0.5%/1khrs (twice better than standard)
- DCL reduced by 25% to 0.0075 CV
- Robust against higher thermo-mechanical stresses during assembly process
- Multi-anode construction
- Super low ESR
- “Mirror” construction used with D case capacitors reduces ESL to half

Operating Temp	-55°C to +125°C
Case Size	D, E
Voltage	2.5V to 50V
Capacitance	4.7µF to 1500µF

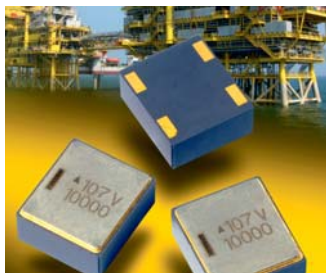
TCH Low ESR Hermetic



- Low ESR conductive polymer electrode
- Endurance up to 10 000 hrs. on selected codes
- Ceramic case hermetic packaging
- Stability under humidity and ambient atmosphere exposure
- Developed with ESA to suit aerospace applications
- Ongoing ESA qualification
- Manufacturing and screening utilizing AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operation life

Operating Temp	-55°C to +125°C
Case Size	9
Voltage	10V to 100V
Capacitance	15µF to 680µF

THH



- Operational condition 230°C / 0.5UR / 1000hrs or 200°C / 0.5UR / 10.000hrs
- Ceramic case hermetic packaging
- Stability under humidity and ambient atmosphere exposure
- Large case sizes including CTC-21D provide high capacitance values
- Manufacturing and screening utilizing AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operation life

Operating Temp	-55°C to +230°C
Case Size	9, I
Voltage	16V to 63V
Capacitance	3.3μF to 330μF

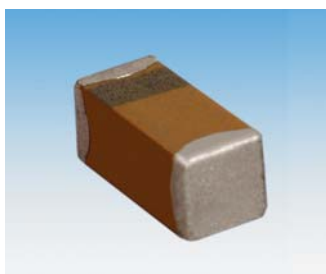
TAZ / CWR09 / CWR19 / CWR29



- Extended Range of MIL-Spec capacitors
- Fully qualified to MIL-PRF-55365/11
- Compatible with wide range of board assembly techniques: wave soldering, reflow soldering, conductive epoxy, or compression bonding.
- Some case sizes available in low-profile, with "A" case size being the worlds smallest molded military tantalum chip
- Also can be qualified to SRC9000 for space-level applications.
- "X" case size components are considered to be MSL 3 in accordance with J-STD-020.

Operating Temp	-55°C to +125°C
Case Size	A, B, C, D, E, F, G, H, X
Voltage	6.3V to 50V
Capacitance	0.22μF to 680μF

TBC / CWR15



- World's smallest military approved tantalum chip capacitor
- Employs TACmicrochip® technology to offer designers opportunity to downsize circuits for military and aerospace applications.
- Available in Capacitance and Voltage ratings usually only found in much larger packages.

Operating Temp	-55°C to +125°C
Case Size	A, L R
Voltage	6.3V to 50V
Capacitance	0.22μF to 680μF

TCB



- COTS-Plus version of the TCR polymer series
- Each batch receives additional reliability level verification through life testing to 0.1%/1000 hours with a 90% confidence level.
- Reduced ignition failure mode compared to non-polymer tantalum capacitors
- Low ESR compared to non-polymer tantalum capacitors

Operating Temp	-55°C to +125°C
Case Size	B, C, D, E
Voltage	10V to 63V
Capacitance	0.47μF to 100μF

TCR



- Conductive polymer electrode reduces ignition failure mode
- Robust design for long operation lifetime
- AVX maverick part control Q-process with statistical screening
- Improved basic reliability 0.5%/1000hrs
- 85°C/85r.h. 120 hours
- -55 to +105°C operation temperature
- DCL 0.1 CxV, 0.05CV on selected codes
- 3x reflow 260°C compatible
- Low ESR

Operating Temp	-55°C to +105°C
Case Size	B, C, D, E
Voltage	10V to 63V
Capacitance	0.47μF to 100μF

TANTALUM CAPACITOR MODULES

TWM



- Capacitor Module
- Based on Wet Tantalum Technology
- Very high capacitance (up to 6.6mF)
- Capable of higher voltage than tantalum capacitors alone

Operating Temp	-55°C to +125°C
Case Size	Module
Voltage	25V to 125V
Capacitance	200µF to 6600µF

TCP



- High packing density modules for applications utilizing multiple components in a parallel configuration
- Available with testing to DSCC 09009
- Composed of stacked assemblies of CWR29 capacitors
- Ultra-Low ESR
- Established reliability
- Can be supplied with SRC9000 space level components

Operating Temp	-55°C to +125°C
Case Size	2H, 4H, 6H
Voltage	6V to 50V
Capacitance	9.4µF to 1980µF

WET TANTALUM CAPACITORS

TWC



- COTS-Plus version of conventional wet electrolytic tantalum capacitors
- Incorporates all ratings available in MIL-PRF-39006 /22 /25 /30 and /31
- Custom voltage and capacitance designs possible
- Welded tantalum can and header assembly, providing a hermetic seal
- Ideal for harsh environments

Operating Temp	-55°C to +125°C
Case Size	T1, T2, T3, T4
Voltage	6V to 125V
Capacitance	1.7µF to 1200µF

TWC-Y High Temperature



- COTS-Plus wet tantalum capacitor
- Designed for use in high temperature environments up to 200°C
- Components are capable of 500 hours of operation at extreme temperature with the applicable derated voltage
- Welded tantalum can and header assembly, providing a hermetic seal
- Ideal for harsh environments

Operating Temp	-55°C to +200°C
Case Size	T1, T2, T3, T4
Voltage	6V to 125V
Capacitance	6.8µF to 560µF

TWA DSCC 93026



- Axial leaded wet electrolytic tantalum capacitor
- High level of Capacitance/Voltage in DSCC compatible case sizes
- Welded tantalum can and header assembly, providing a hermetic seal
- Ideal for harsh environment and vibration requirements of MIL-PRF-39006
- Customized capacitance and voltage packages available

Operating Temp	-55°C to +125°C
Case Size	T1, T2, T3, T4
Voltage	25V to 125V
Capacitance	10µF to 5600µF

TWA-Y High Temperature



- Axial leaded wet electrolytic tantalum capacitor
- Designed for use at 200°C, and are capable of up to 2000 hours of operation at extreme temperatures with applicable derated voltage
- Mechanical testing in accordance to MIL-STD-202, High frequency vibration – method 204, test condition “D” Mechanical shock test – method 213, test condition “I”

Operating Temp	-55°C to +200°C
Case Size	T1, T2, T3, T4
Voltage	50V to 125V
Capacitance	22µF to 1000µF

MIL-PRF-39006 Military Conventional Wet Tantalum



- Axial leaded wet electrolytic tantalum capacitor
- MIL-PRF-39006 ratings for which AVX is a qualified supplier
- For COTS-Plus version, see TWC
- 1000hr failure rates of 1%, 0.1%, and 0.01%.

Operating Temp	-55°C to +125°C
Case Size	T1, T2, T3, T4
Voltage	6V to 125V
Capacitance	11µF to 2200µF

RF/MICROWAVE CAPACITORS

Accu-P



- Internationally agreed sizes with excellent dimensional control.
- Ultra small size chip capacitors (01005) are available.
- Ultra tight capacitance tolerances.
- Low ESR at VHF, UHF, and microwave frequencies.
- Enhanced RF power handling capability.
- High stability with respect to time, temperature, frequency, and voltage variation.
- Nickel/solder-coated terminations to provide excellent solderability and leach resistance.

Operating Temp	-55°C to +125°C
Case Size	01005 to 1210
Voltage	10V to 200V
Capacitance	0.1pF to 68pF

DLA Drawings 09024/09025/09026/09027



- Surface mount, thin film RF capacitors
- DLA approved parts in 0402, 0603, 0805, and 1210 case sizes
- Accu-P technology that meets DLA specifications

Operating Temp	-55°C to +125°C
Case Size	0402 to 1210
Voltage	10V to 100V
Capacitance	0.05pF to 100pF

CDR11 – CDR14



- Designed to meet the requirements of MIL-PRF-55681
- Available in very tight tolerance options, as low as $\pm 0.1\text{pF}$
- Available in Tin/lead and RoHS compliant terminations
- 1000hr failure rates of 1.0%, 0.1%, 0.01%, and 0.001% available

Operating Temp	-55°C to +125°C
Case Size	CDR11, CDR12, CD413, CDR14
Voltage	50V to 500V
Capacitance	0.1pF to 5100pF

“U” Series NP0 Capacitors



- Designed specifically for Ultra Low ESR for applications in the communications market
- Available in very tight tolerance options, as low as $\pm 0.1\text{pF}$
- Use of NP0 dielectric creates thermal and dc bias stability

Operating Temp	-55°C to +125°C
Case Size	0402 to 1210
Voltage	25V to 200V
Capacitance	0.2pF to 1000pF

RF/MICROWAVE PRODUCTS

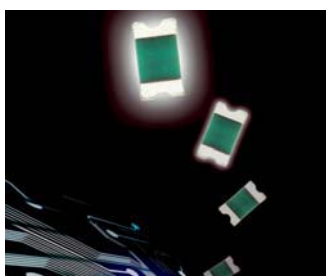
SQ Series RF Capacitors



- Low ESR, High Q, High SRF capacitors
- 175°C Capability in SQCB
- Wide RF Capacitance range
- Excellent for use in RF power amplifiers, low noise amplifiers, filter networks, MRI systems, and point-to-point radios.

Operating Temp	-55°C to +175°C
Case Size	0603 to 1210
Voltage	50V to 500V
Capacitance	0.1pF to 5100pF

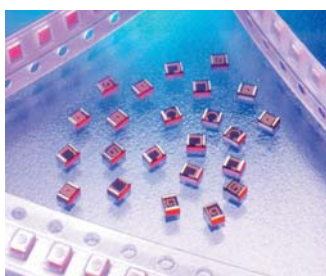
MLO Capacitors



- Low loss organic technology
- Identical coefficient of thermal expansion to PCB, reducing mechanical stress
- Low ESR
- Hi-Q
- High Self Resonance
- Tight Tolerance
- Low Dielectric Absorption (0.0015%)

Operating Temp	-55°C to +175°C
Case Size	0603
Voltage	50V to 500V
Capacitance	0.1pF to 3.9pF

Accu-L

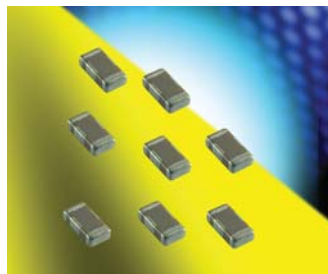


- Thin Film multilayer technology, providing a high level of control on the electrical and physical characteristics
- High Q
- RF Power Capability
- Low DC Resistance
- High SRF
- Low DC Resistance
- Ultra-tight Tolerance on Inductance
- Low Profile

Operating Temp	-55°C to +125°C
Case Size	0201 to 0805
Inductance	0.33nH to 22nH

LICC

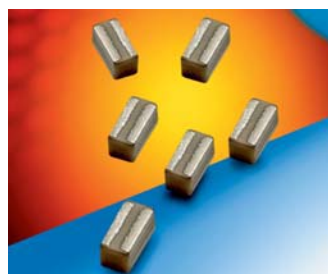
Surface Mount Feedthrough Capacitors



- Available in 0805 and 1206 case sizes.
- Electrodes cross, allowing reduced inductance compared to basic MLCCs
- Ideal for EMI suppression, Broadband I/O filtering, or Vcc power line conditioning
- Available in a large range of capacitances in NP0 and X7R dielectrics
- AEC-Q200 qualified

Operating Temp	-55°C to +125°C
Case Size	0805 to 1210
Voltage	50V to 100V
Capacitance	22pF to 47000pF

LICC



- Surface mount MLCCs in three different terminal layouts to improve high frequency performance
- Different terminal layouts allow for varying levels of low inductance, improving the caps' use in decoupling high speed circuits
- Contact factory for COTS+ versions of these parts

Operating Temp	-55°C to +125°C
Case Size	0204 to 0612
Voltage	4V to 50V
Capacitance	0.001µF to 3.3µF

IDC



- Surface mount MLCCs in three different terminal layouts to improve high frequency performance
- Different terminal layouts allow for varying levels of low inductance, improving the caps' use in decoupling high speed circuits
- Contact factory for COTS+ versions of these parts

Operating Temp	-55°C to +125°C
Case Size	0306 to 0612
Voltage	4V to 25V
Capacitance	0.010µF to 3.3µF

LGA



- Surface mount MLCCs in three different terminal layouts to improve high frequency performance
- Different terminal layouts allow for varying levels of low inductance, improving the caps' use in decoupling high speed circuits
- Contact factory for COTS+ versions of these parts

Operating Temp	-55°C to +125°C
Case Size	0204 to 0805
Voltage	4V to 10V
Capacitance	0.010µF to 2.2µF

EMI Filters



- Available in solder-in, blot-in, and cylindrical packages
- Comprised of discoidal capacitors with a conduction path set such that there is a high frequency shunt path to the chassis
- Extensive options exist, and any variety of custom filter can be created.

Operating Temp	See Individual Series for Electrical Specifications
Case Size	
Voltage	
Capacitance	

Build-to-Print High-Pass, Low-Pass, and Band-Pass Filters



- AVX Patented MLO material
- Can create High-Pass, Low-Pass, and Band-Pass filters to meet customer needs.
- Can build to print from customer's electrical specifications and physical limitations.

SURFACE MOUNT CERAMIC CAPACITORS

Ceramic capacitors are the foundation of many electronic designs. AVX has been providing a wide array of multilayer ceramic capacitors for decades, and this experience allows us to provide MLCCs for many aerospace and avionic applications

AT Series

Surface mount MLCCs with extended temperature range up to +200°C and +250°C, in C0G and VHT dielectrics

APS for COTS+ Applications

High reliability with ultra-low failure rate, <1ppb.

FLEXISAFE MLC Chips

FELXITERM in conjunction with a cascaded design for safety critical applications

MIL-PRF-55681

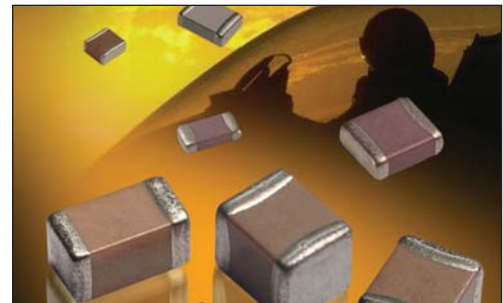
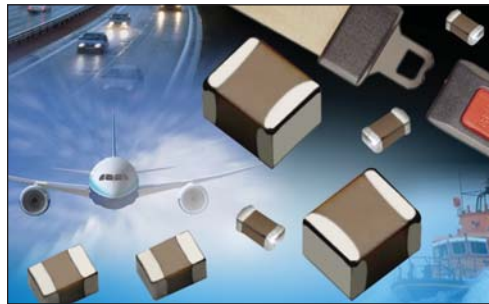
CDR01-06, 31-35, MIL-qualified SMD MLCCs

Space Level BME X7R

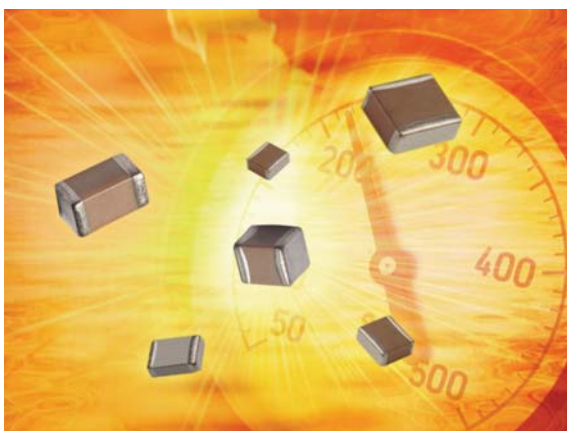
ESCC 3009041 approved BME SMD MLCCS

MH Ceramic

X7R high capacitance MLCC in a precision-made molded case.



A KYOCERA GROUP COMPANY



Present military specifications, as well as a majority of commercial applications, require a maximum operating temperature of 125°C. However, the emerging market for high temperature electronics demands capacitors operating reliably at temperatures beyond 125°C. AVX's new high temperature chip capacitor product line, with verified capability of long term operation up to 250°C is a response to both military and commercial business needs. The new capacitors demonstrate high current handling capabilities, high volumetric efficiency, high insulation resistance and low ESR/ESL. This product has been designed for the most demanding applications, such as "down-hole" oil exploration and aerospace programs.

HOW TO ORDER

AT10	3	T	104	K	A	T	2	A
AVX Style	Voltage Code	Temperature Coefficient	Capacitance Code (2 significant digits + no. of zeros)	Capacitance Tolerance	Test Level	Termination	Packaging	Special Code
AT03 = 0603 AT05 = 0805 AT06 = 1206 AT10 = 1210 AT12 = 1812 AT14 = 2225	Y = 16V 3 = 25V 5 = 50V	A = COG 250°C 2 = COG 200°C T = VHT 250°C 4 = VHT 200°C	101 = 100pF 102 = 1nF 103 = 10nF 104 = 100nF 105 = 1µF	J = ±5% K = ±10% M = ±20%	A = Standard	1 = Pd/Ag T = 100% Sn Plated (RoHS Compliant)	2 = 7" Reel 4 = 13" Reel 9 = Bulk	A = Standard

ELECTRICAL SPECIFICATIONS

Temperature Coefficient

COG: A 0±30 ppm/°C, -55°C to +250°C
VHT: T ±15%, -55°C to +150°C
See TCC Plot for +250°C

Capacitance Test (MIL-STD-202, Method 305)
25°C, 1.0 ± 0.2 Vrms (open circuit voltage) @ 1kHz

Dissipation factor 25°C

COG: 0.15% Max at 1.0 ± 0.2 Vrms (open circuit voltage) @ 1kHz
VHT: 2.5% Max at 1.0 ± 0.2 Vrms (open circuit voltage) @ 1kHz

Insulation Resistance 25°C (MIL-STD-202, Method 302)
100GΩ or 1000MΩ.µF (whichever is less)

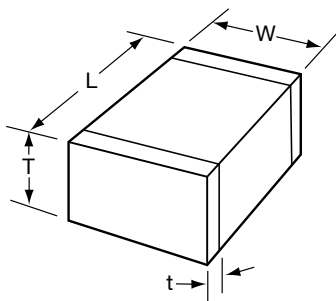
Insulation Resistance 125°C (MIL-STD-202, Method 302)
10GΩ or 100MΩ.µF (whichever is less)

Insulation Resistance 200°C (MIL-STD-202, Method 302)
1GΩ or 10MΩ.µF (whichever is less)

Insulation Resistance 250°C (MIL-STD-202, Method 302)
100MΩ or 1MΩ.µF (whichever is less)

Direct Withstanding Voltage 25°C (Flash Test)
250% rated voltage for 5 seconds with 50mA max charging current (500 Volt units @ 750VDC)

DIMENSIONS

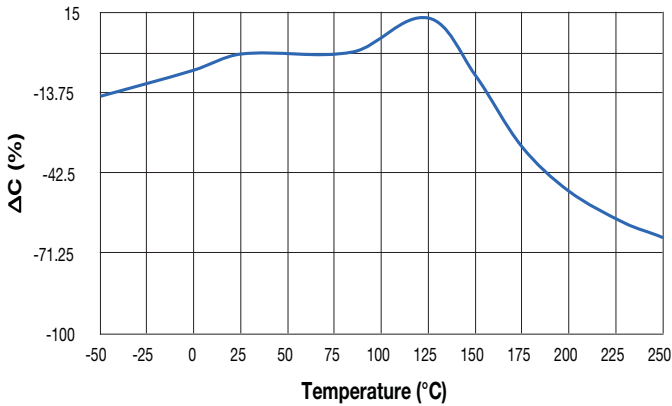


millimeters (inches)

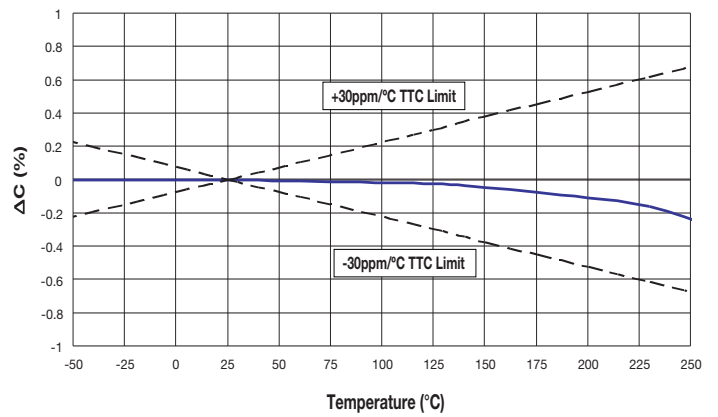
Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225
(L) Length	1.60 ± 0.15 (0.063 ± 0.006)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.50 ± 0.30 (0.177 ± 0.012)	5.72 ± 0.25 (0.225 ± 0.010)
(W) Width	0.81 ± 0.15 (0.032 ± 0.006)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)
(T) Thickness Max.	1.02 (0.040)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)
(t) terminal min. max.	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)

PERFORMANCE CHARACTERISTICS

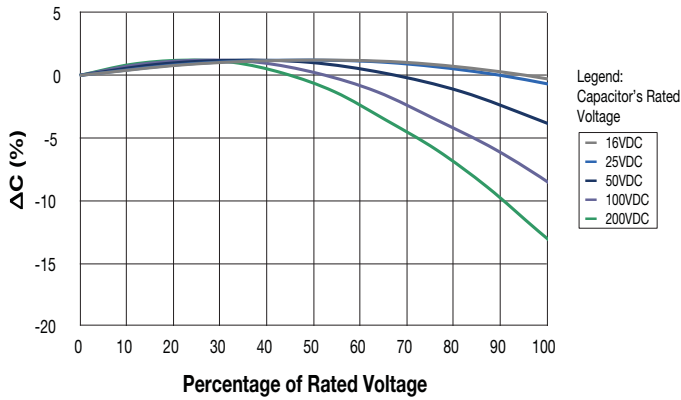
Typical Temperature Coefficient of Capacitance (VHT Dielectric)



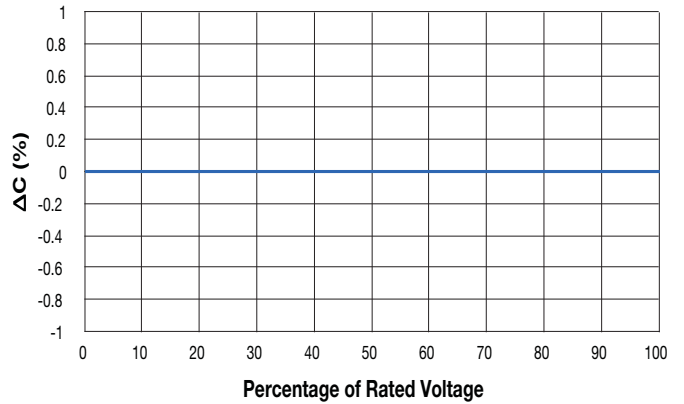
Typical Temperature Coefficient of Capacitance (COG Dielectric)



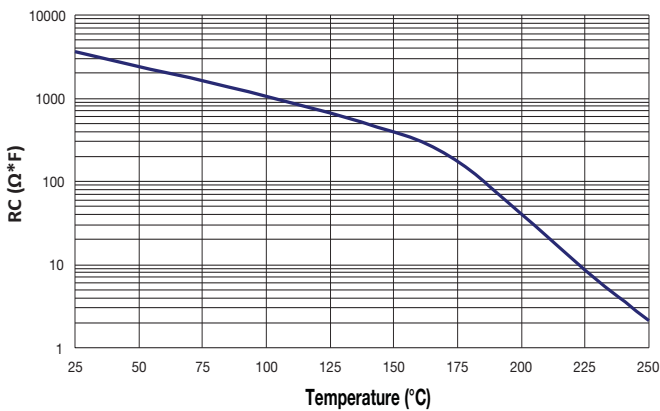
Typical Voltage Coefficient of Capacitance (VHT Dielectric)



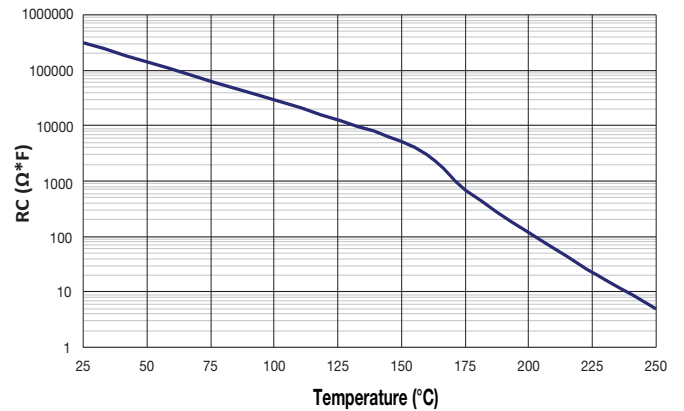
Typical Voltage Coefficient of Capacitance (COG Dielectric)



Typical RC vs Temperature (VHT Dielectric)

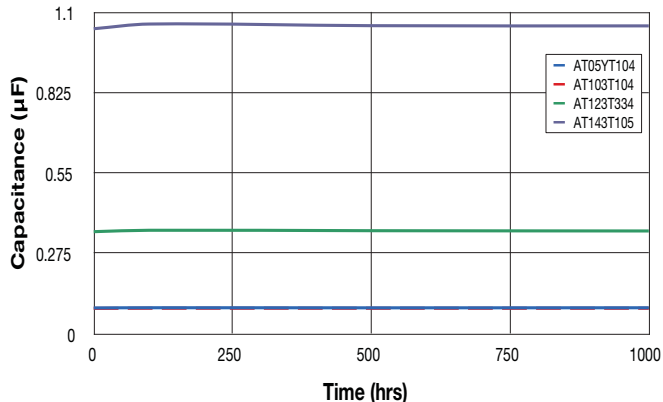


Typical RC vs Temperature (COG Dielectric)

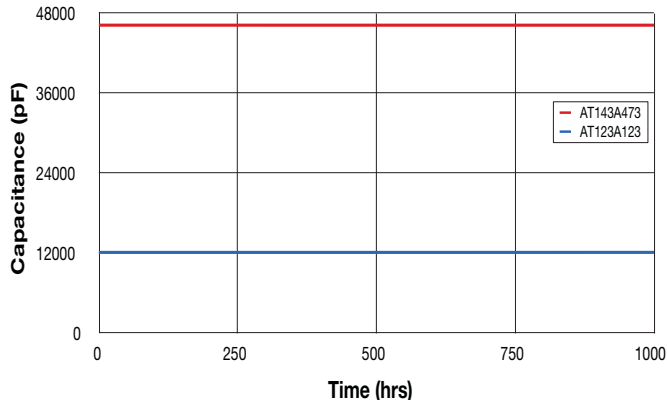


RELIABILITY

250°C Life Test @ 2x Rated Voltage (VHT Dielectric)



250°C Life Test @ 2x Rated Voltage (C0G Dielectric)



VHT - Failure Rate @ 90% Confidence Level (%/1000 hours)		
Temperature (°C)	50% Rated Voltage	100% Rated Voltage
200	0.002	0.017
250	0.026	0.210

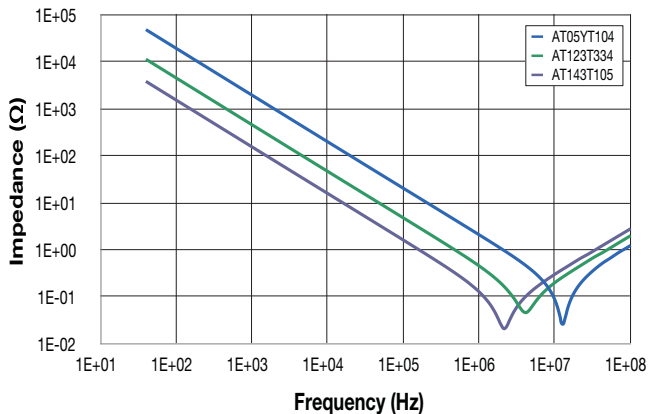
*Typical 1210, 1812, 2225 Failure Rate Analysis based on 250°C testing and voltage ratings specified on the following page.

C0G - Failure Rate @ 90% Confidence Level (%/1000 hours)		
Temperature (°C)	50% Rated Voltage	100% Rated Voltage
200	0.006	0.047
250	0.074	0.590

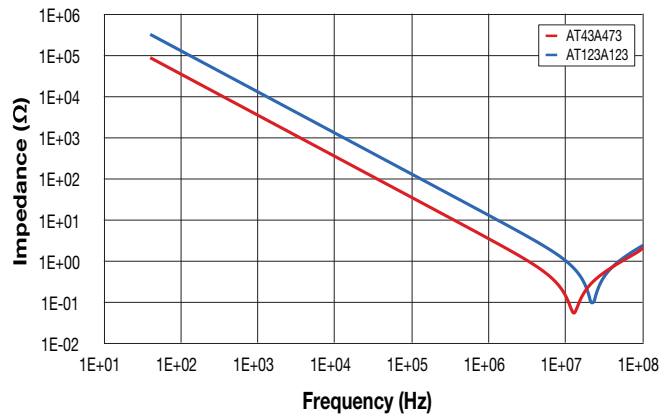
*Typical 1812 and 2225 Failure Rate Analysis based on 250°C testing and voltage ratings specified on the following page.

FREQUENCY RESPONSE

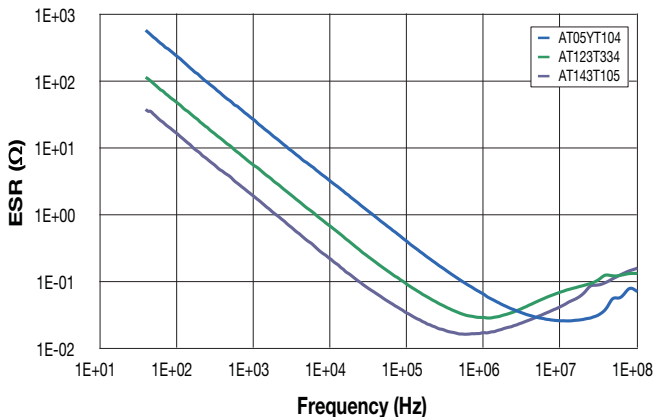
Impedance Frequency Response (VHT Dielectric)



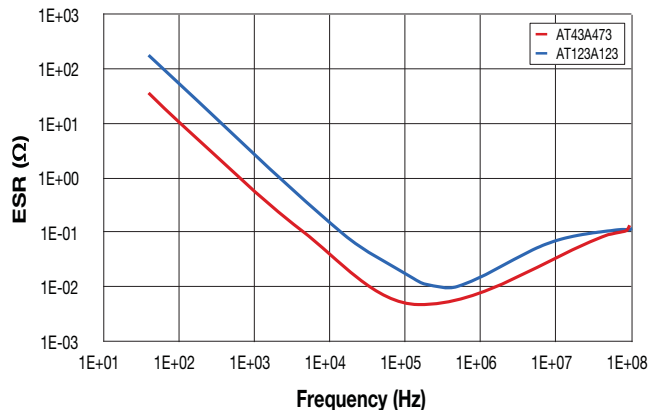
Impedance Frequency Response (C0G Dielectric)



ESR Frequency Response (VHT Dielectric)



ESR Frequency Response (C0G Dielectric)



CAPACITANCE RANGE

PREFERRED SIZES ARE SHADED

VHT Temp. Coefficient: 4 200°C Rated

Case Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	
Soldering	Reflow/Wave	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only	
(L) Length mm (in.)	1.60 ± 0.15 (0.063 ± 0.006)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.50 ± 0.30 (0.177 ± 0.012)	5.72 ± 0.25 (0.225 ± 0.010)	
(W) Width mm (in.)	0.81 ± 0.15 (0.032 ± 0.006)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)	
(T) Thickness mm (in.)	1.02 (0.040)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)	
(t) Terminal min max	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	
Rated Temp. (°C)	200	200	200	200	200	200	
Temp. Coefficient	4	4	4	4	4	4	
Voltage (V)	25	25 50	25 50	25 50	50	50	
Cap (pF)	1000 102 1200 122 1500 152 1800 182 2200 222 2700 272 3300 332 3900 392 4700 472 5600 562 6800 682 8200 822						
Cap (µF)	0.010 103 0.012 123 0.015 153 0.018 183 0.022 223 0.027 273 0.033 333 0.039 393 0.047 473 0.056 563 0.068 683 0.082 823 0.100 104 0.120 124 0.150 154 0.180 184 0.220 224 0.270 274 0.330 334 0.390 394 0.470 474 0.560 564 0.680 684 0.820 824 1.000 105						
Rated Temp. (°C)	200	200	200	200	200	200	
Case Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	

VHT Temp. Coefficient: T 250°C Rated

Case Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	
Soldering	Reflow/Wave	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only	
(L) Length mm (in.)	1.60 ± 0.15 (0.063 ± 0.006)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.50 ± 0.30 (0.177 ± 0.012)	5.72 ± 0.25 (0.225 ± 0.010)	
(W) Width mm (in.)	0.81 ± 0.15 (0.032 ± 0.006)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)	
(T) Thickness mm (in.)	1.02 (0.040)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)	
(t) Terminal min max	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	
Rated Temp. (°C)	250	250	250	250	250	250	
Temp. Coefficient	T	T	T	T	T	T	
Voltage (V)	16	16 25	16 25	16 25	25	25	
Cap (pF)	1000 102 1200 122 1500 152 1800 182 2200 222 2700 272 3300 332 3900 392 4700 472 5600 562 6800 682 8200 822						
Cap (µF)	0.010 103 0.012 123 0.015 153 0.018 183 0.022 223 0.027 273 0.033 333 0.039 393 0.047 473 0.056 563 0.068 683 0.082 823 0.100 104 0.120 124 0.150 154 0.180 184 0.220 224 0.270 274 0.330 334 0.390 394 0.470 474 0.560 564 0.680 684 0.820 824 1.000 105						
Rated Temp. (°C)	250	250	250	250	250	250	
Case Size	AT03 = 0603	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	

Voltage rating per table. Capacitance values specified at 25°C, derate capacitance value based on TCC and VCC Plots on page 27.

NOTE: Contact factory for non-specified capacitance values.

CAPACITANCE RANGE

PREFERRED SIZES ARE SHADED

COG Temp. Coefficient: 2 200°C Rated

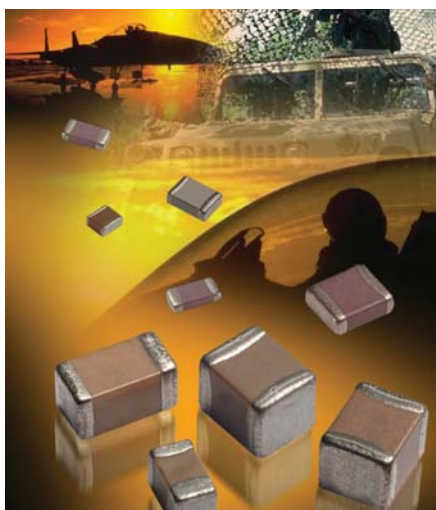
Case Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	
Soldering	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only	
(L) Length mm (in.)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.60 ± 0.30 (0.177 ± 0.012)	2.75 ± 0.25 (0.225 ± 0.010)	
(W) Width mm (in.)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)	
(T) Thickness mm (in.)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)	
(t) Terminal min max	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	
Rated Temp. (°C)	200	200	200	200	200	
Temp. Coefficient	2	2	2	2	2	
Voltage (V)	50	50	50	50	50	
Cap (pF)	100					
	120					
	150					
	180					
	220					
	270					
	330					
	390					
	470					
	560					
	680					
	820					
	1000					
	1200					
	1500					
1800						
2200						
2700						
3300						
3900						
4700						
5600						
6800						
8200						
Cap (µF)	0.010					
	0.012					
	0.015					
	0.018					
	0.022					
	0.027					
	0.033					
	0.039					
	0.047					
	0.056					
	0.068					
	0.082					
	0.100					
	Voltage (V)	50	50	50	50	50
	Rated Temp. (°C)	200	200	200	200	200
Case Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	

COG Temp. Coefficient: A 250°C Rated

Case Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	
Soldering	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only	
(L) Length mm (in.)	2.01 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.50 ± 0.30 (0.177 ± 0.012)	2.75 ± 0.25 (0.225 ± 0.010)	
(W) Width mm (in.)	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.20 (0.098 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	6.35 ± 0.25 (0.250 ± 0.010)	
(T) Thickness mm (in.)	1.30 (0.051)	1.52 (0.060)	1.70 (0.067)	2.54 (0.100)	2.54 (0.100)	
(t) Terminal min max	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	
Rated Temp. (°C)	250	250	250	250	250	
Temp. Coefficient	A	A	A	A	A	
Voltage (V)	25	25	25	25	25	
Cap (pF)	100					
	120					
	150					
	180					
	220					
	270					
	330					
	390					
	470					
	560					
	680					
	820					
	1000					
	1200					
	1500					
1800						
2200						
2700						
3300						
3900						
4700						
5600						
6800						
8200						
Cap (µF)	0.010					
	0.012					
	0.015					
	0.018					
	0.022					
	0.027					
	0.033					
	0.039					
	0.047					
	0.056					
	0.068					
	0.082					
	0.100					
	Voltage (V)	25	25	25	25	25
	Rated Temp. (°C)	250	250	250	250	250
Case Size	AT05 = 0805	AT06 = 1206	AT10 = 1210	AT12 = 1812	AT14 = 2225	

Voltage rating per table. Capacitance values specified at 25°C, derate capacitance value based on TCC and VCC Plots on page 27.

NOTE: Contact factory for non-specified capacitance values.



AVX's APS series of multilayer ceramic capacitors offers the customer a higher reliability solution with an ultralow failure rate, ≤ 1 ppb, in a variety of case sizes and voltages. The APS range encompasses a wide range of dielectric types to meet the customer's requirements from low temperature/voltage capacitance change dielectric, NPO, to high performing capacitance voltage X7R to high temperature reliability dielectrics, X8R/L.

APS capacitors have a wider capacitance range than MIL spec parts that satisfies the need for higher CV demands and board space saving requirements. Each production lot is extensively tested and removes the requirement for customer specific drawings. The testing regime uses many of the MIL-STD test methods as per MIL-PRF-55681 and has a field failure rate of less than 1 ppb. The APS testing series uses AVX's unique in-house maverick testing detection system that eliminates infant mortality failures.

Applications suitable for APS include Industrial, Telecommunications, Aviation, and Military. The APS is available with a range of different termination finishes, Flexiterm[®], Nickel / Tin and Tin with Pb¹. Flexiterm[®] technology delivers improved thermo-mechanical stress resistance.

AVX'S APS RELIABILITY TEST SUMMARY

- 100 % Visual Inspection
- DPA
- IR, DF, Cap, DWV
- Maverick Lot Review
- Thermal Shock
- 85/85 Testing
- Life Testing 125°C 2xRV
- C of C with every Order
- Quarterly Data Package

Dielectric	Temperature/Percentage Cap Change
NPO	-30ppm +30ppm from -55°C to + 125°C
X7R	-15% +15% from -55°C to + 125°C
X8R	-15% +15% from -55°C to + 150°C
X8L	-15% +40% from -55°C to + 150°C

FEATURES

- The APS range has extensive reliability testing as standard resulting in an ultralow failure rate, ≤ 1 ppb.
- The APS range is available with Flexiterm[®] that deliver's high thermo-mechanical stress resistance.
- High CV range enabling board space saving requirements.

HOW TO ORDER

AP03	5	A	104	K	Q	T	2	A
Size	Voltage	Dielectric	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	Terminations	Packaging	Special Code
AP03 = 0603	Y = 16V	A = NP0	2 Significant Digits +	J = $\pm 5\%$	Q = APS	T = Plated Ni and Sn	2 = 7" Reel	A = Std. Product
AP05 = 0805	3 = 25V	C = X7R	Number of Zeros	K = $\pm 10\%$		Z = FLEXITERM ^{®**}	4 = 13" Reel	
AP06 = 1206	5 = 50V	F = X8R	e.g. 10 μ F = 106	M = $\pm 20\%$		B = 10% min lead		
AP10 = 1210	1 = 100V	L = X8L				X = FLEXITERM [®] with 10% min lead		
AP12 = 1812	2 = 200V							
AP20 = 2220	7 = 500V							

Z,X for X7R only

NP0 CAPACITANCE RANGE

		0603			0805			1206					1210				1812	
		25V	50V	100V	25V	50V	100V	25V	50V	100V	200V	500V	25V	50V	100V	200V	50V	100V
100	10pF	G	G	G	J	J	J	J	J	J	J	J						
120	12	G	G	G	J	J	J	J	J	J	J	J						
150	15	G	G	G	J	J	J	J	J	J	J	J						
180	18	G	G	G	J	J	J	J	J	J	J	J						
220	22	G	G	G	J	J	J	J	J	J	J	J						
270	27	G	G	G	J	J	J	J	J	J	J	J						
330	33	G	G	G	J	J	J	J	J	J	J	J						
390	39	G	G	G	J	J	J	J	J	J	J	J						
470	47	G	G	G	J	J	J	J	J	J	J	J						
510	51	G	G	G	J	J	J	J	J	J	J	J						
560	56	G	G	G	J	J	J	J	J	J	J	J						
680	68	G	G	G	J	J	J	J	J	J	J	J						
820	82	G	G	G	J	J	J	J	J	J	J	J						
101	100	G	G	G	J	J	J	J	J	J	J	J						
121	120	G	G	G	J	J	J	J	J	J	J	J						
151	150	G	G	G	J	J	J	J	J	J	J	J						
181	180	G	G	G	J	J	J	J	J	J	J	J						
221	220	G	G	G	J	J	J	J	J	J	J	J						
271	270	G	G	G	J	J	J	J	J	J	J	J						
331	330	G	G	G	J	J	J	J	J	J	J	J						
391	390	G	G		J	J	J	J	J	J	J	J						
471	470	G	G		J	J	J	J	J	J	J	J						
561	560				J	J	J	J	J	J	J	J						
681	680				J	J	J	J	J	J	J	J						
821	820				J	J	J	J	J	J	J	J						
102	1000				J	J	J	J	J	J	J	J	J	J	J	J	J	J
122	1200							J	J	J			J	J	M	M		
152	1500							J	M	M			J	J	M	M		
182	1800							J	M	M			J	J	M	M		
222	2200							J	M	M			J	J	M	M		
272	2700							J	M				J	J				
332	3300							J	M				J	J				
392	3900												J	J				
472	4700												J	J				
103	10nF												J	J				
		0603			0805			1206					1210				1812	

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER					EMBOSSSED							

X7R CAPACITANCE RANGE

		0603					0805					1206					1210				1812		2220		
		16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	500V	16V	25V	50V	100V	50V	100V	25V	50V
102	Cap 1000	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
182	(pF) 1800	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
222	2200	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
332	3300	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
472	4700	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
103	0.01	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K		
123	0.012	G	G	G	G		J	J	J	M								K	K	K	K	K	K		
153	0.015	G	G	G			J	J	J	M								K	K	K	K	K	K		
183	0.018	G	G	G			J	J	J	M								K	K	K	K	K	K		
223	0.022	G	G	G			J	J	J	M								K	K	K	K	K	K		
273	0.027	G	G	G			J	J	J	M								K	K	K	K	K	K		
333	0.033	G	G	G			J	J	J	M								K	K	K	K	K	K		
473	0.047	G	G	G			J	J	J	M								K	K	K	K	K	K		
563	0.056	G	G	G			J	J	J	M								K	K	K	M	K	K		
683	0.068	G	G	G			J	J	J	M								K	K	K	M	K	K		
823	0.082	G	G	G			J	J	J	M								K	K	K	M	K	K		
104	0.1	G	G	G			J	J	J	M								K	K	K	M	K	K		
124	0.12						J	J	M									K	K	K	P	K	K		
154	0.15						M	N	M									K	K	K	P	K	K		
224	0.22						M	N	M									M	M	M	P	M	M		
334	0.33						N	N	M									P	P	P	Q	X	X		
474	0.47						N	N	M									P	P	P	Q	X	X		
684	0.68						N	N										P	P	Q	X	X	X		
105	Cap 1.0						N	N										P	Q	Q	X	X	X		
155	(µF) 1.5																	P	Q	Z	Z	X	X		
225	2.2																	X	Z	Z	Z	Z	Z		
335	3.3																	X	Z	Z	Z	Z	Z		
475	4.7																	X	Z	Z	Z	Z	Z		
106	10																								Z
226	22																								Z
		0603					0805					1206					1210				1812		2220		

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER					EMBOSSSED							

NP0 CAPACITANCE RANGE

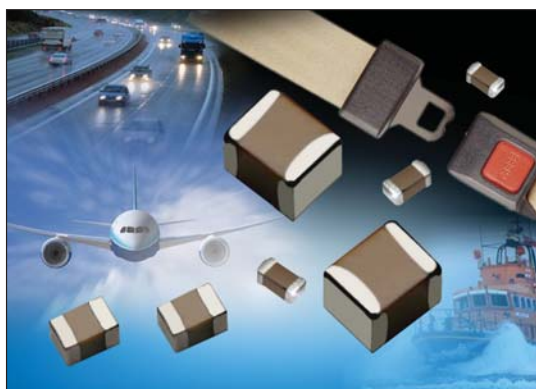
X8R

		0603		0805		1206	
WVDC		25V	50V	25V	50V	25V	50V
331	Cap 330	G	G	J	J		
471	(pF) 470	G	G	J	J		
681	680	G	G	J	J		
102	1000	G	G	J	J	J	J
152	1500	G	G	J	J	J	J
222	2200	G	G	J	J	J	J
332	3300	G	G	J	J	J	J
472	4700	G	G	J	J	J	J
682	6800	G	G	J	J	J	J
103	Cap 0.01	G	G	J	J	J	J
153	(µF) 0.015	G	G	J	J	J	J
223	0.022	G	G	J	J	J	J
333	0.033	G	G	J	J	J	J
473	0.047	G	G	J	J	J	J
683	0.068	G		N	N	M	M
104	0.1			N	N	M	M
154	0.15			N	N	M	M
224	0.22			N		M	M
334	0.33					M	M
474	0.47					M	
684	0.68						
105	1						
		25V	50V	25V	50V	25V	50V
		0603		0805		1206	

X8L

		0603			0805			1206			
		25V	50V	100V	25V	50V	100V	16V	25V	50V	100V
331	Cap 330		G	G		J	J				
471	(pF) 470		G	G		J	J				
681	680		G	G		J	J				
102	1000		G	G		J	J				
152	1500		G	G		J	J			J	J
222	2200		G	G		J	J			J	J
332	3300		G	G		J	J			J	J
472	4700		G	G		J	J			J	J
682	6800		G	G		J	J			J	J
103	Cap 0.01		G	G		J	J			J	J
153	(µF) 0.015	G	G		J	J	J			J	J
223	0.022	G	G		J	J	J			J	J
333	0.033	G	G		J	J	N			J	J
473	0.047	G	G		J	J	N			J	J
683	0.068	G	G		J	J				J	J
104	0.1	G	G		J	J				J	M
154	0.15				J	N		J	J	J	Q
224	0.22				N	N		J	J	J	Q
334	0.33				N			J	M	P	Q
474	0.47				N			M	M	P	
684	0.68							M			
105	1							M			
		25V	50V	100V	25V	50V	100V	16V	25V	50V	100V
		0603			0805			1206			

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
	PAPER					EMBOSSED							



AVX have developed a range of components specifically for safety critical applications.

Utilizing the award-winning FLEXITERM™ layer in conjunction with the cascade design previously used for high voltage MLCCs, a range of ceramic capacitors is now available for customers who require components designed with an industry leading set of safety features.

The FLEXITERM™ layer protects the component from any damage to the ceramic resulting from mechanical stress during PCB assembly or use with end customers. Board flexure type mechanical damage accounts for the majority of MLCC failures. The addition of the cascade structure protects the component from low insulation resistance failure resulting from other common causes for failure; thermal stress damage, repetitive strike ESD damage and placement damage. With the inclusion of the cascade design structure to complement the FLEXITERM™ layer, the FLEXISAFE range of capacitors has unbeatable safety features.

HOW TO ORDER

FS03	5	C	104	K	Q	Z	2	A
Size	Voltage	Dielectric	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	Terminations	Packaging	Special Code
FS03 = 0603 FS05 = 0805 FS06 = 1206 FS10 = 1210	16V = Y 25V = 3 50V = 5 100V = 1	X7R = C	2 Sig. Digits + Number of Zeros e.g. 10µF = 106	J = ±5% K = ±10% M = ±20%	A = Commercial 4 = Automotive Q = APS	Z = FLEXITERM™ X = FLEXITERM™ with 5% min lead	2 = 7" Reel 4 = 13" Reel	A = Std. Product

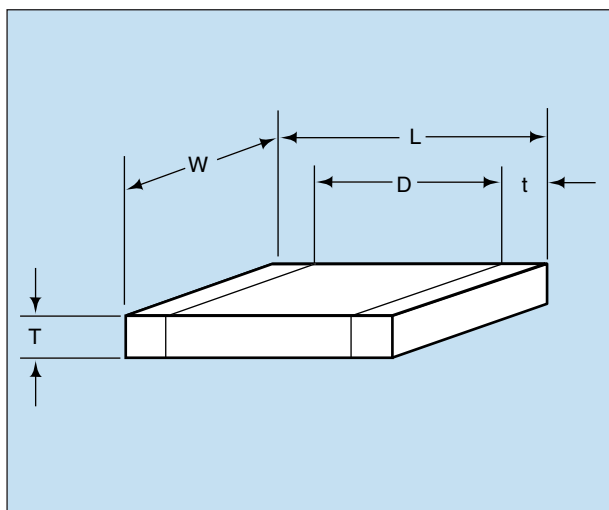
*Not RoHS Compliant

FLEXISAFE X7R RANGE

Capacitance Code	Soldering	FS03 = 0603				FS05 = 0805				FS06 = 1206			FS10 = 1210		
		Reflow/Wave				Reflow/Wave				Reflow/Wave			Reflow Only		
		16	25	50	100	16	25	50	100	16	25	50	16	25	50
102	µF .0012														
182	.0018														
222	.0022														
332	.0033														
472	.0047														
103	.01														
123	.012														
153	.015														
183	.018														
223	.022														
273	.027														
333	.033														
473	.047														
563	.056														
683	.068														
823	.082														
104	.1														
124	.12														
154	.15														
224	.22														
334	.33														
474	.47														

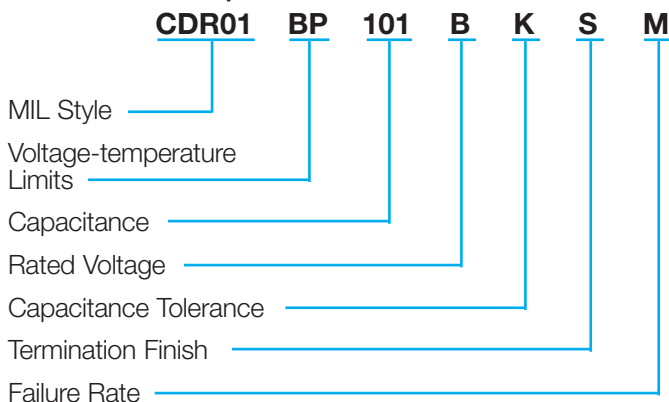
Qualified





MILITARY DESIGNATION PER MIL-PRF-55681

Part Number Example



NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

MIL Style: CDR01, CDR02, CDR03, CDR04, CDR05, CDR06

Voltage Temperature Limits:

BP = 0 ± 30 ppm/°C without voltage; 0 ± 30 ppm/°C with rated voltage from -55°C to +125°C

BX = $\pm 15\%$ without voltage; +15 -25% with rated voltage from -55°C to +125°C

Capacitance: Two digit figures followed by multiplier (number of zeros to be added) e.g., 101 = 100 pF

Rated Voltage: A = 50V, B = 100V

Capacitance Tolerance: J $\pm 5\%$, K $\pm 10\%$, M $\pm 20\%$

Termination Finish:

- M = Palladium silver
- N = Silver-nickel-gold
- S = Solder coated final with a minimum of 4 percent lead
- T = Silver
- U = Base metallization-barrier metal-solder coated (tin/lead alloy, with a minimum of 4 percent lead)
- W = Base metallization-barrier metal-tinned (tin or tin/lead alloy)
- Y = Base metallization-barrier metal-tin (100 percent)
- Z = Base metallization-barrier metal-tinned (tin/lead alloy, with a minimum of 4 percent lead)

*See MIL-PRF-55681 Specification for more details

Failure Rate Level: M = 1.0%, P = .1%, R = .01%, S = .001%

Packaging: Bulk is standard packaging. Tape and reel per RS481 is available upon request.

CROSS REFERENCE: AVX/MIL-PRF-55681/CDR01 THRU CDR06*

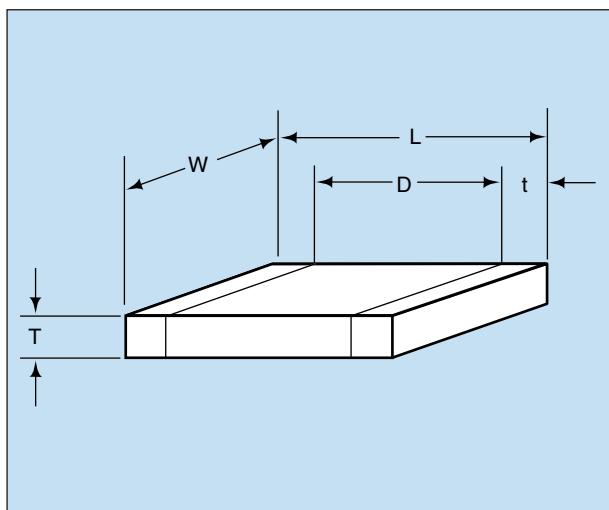
Per MIL-PRF-55681	AVX Style	Length (L)	Width (W)	Thickness (T)		D		Termination Band (t)	
				Min.	Max.	Min.	Max.	Min.	Max.
CDR01	0805	.080 \pm .015	.050 \pm .015	.022	.055	.030	—	.010	—
CDR02	1805	.180 \pm .015	.050 \pm .015	.022	.055	—	—	.010	.030
CDR03	1808	.180 \pm .015	.080 \pm .018	.022	.080	—	—	.010	.030
CDR04	1812	.180 \pm .015	.125 \pm .015	.022	.080	—	—	.010	.030
CDR05	1825	.180 $^{+.020}$ $_{-.015}$.250 $^{+.020}$ $_{-.015}$.020	.080	—	—	.010	.030
CDR06	2225	.225 \pm .020	.250 \pm .020	.020	.080	—	—	.010	.030

Military Type Designation	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 0805/CDR01				
CDR01BP100B---	10	J,K	BP	100
CDR01BP120B---	12	J	BP	100
CDR01BP150B---	15	J,K	BP	100
CDR01BP180B---	18	J	BP	100
CDR01BP220B---	22	J,K	BP	100
CDR01BP270B---	27	J	BP	100
CDR01BP330B---	33	J,K	BP	100
CDR01BP390B---	39	J	BP	100
CDR01BP470B---	47	J,K	BP	100
CDR01BP560B---	56	J	BP	100
CDR01BP680B---	68	J,K	BP	100
CDR01BP820B---	82	J	BP	100
CDR01BP101B---	100	J,K	BP	100
CDR01B--121B---	120	J,K	BP,BX	100
CDR01B--151B---	150	J,K	BP,BX	100
CDR01B--181B---	180	J,K	BP,BX	100
CDR01BX221B---	220	K,M	BX	100
CDR01BX271B---	270	K	BX	100
CDR01BX331B---	330	K,M	BX	100
CDR01BX391B---	390	K	BX	100
CDR01BX471B---	470	K,M	BX	100
CDR01BX561B---	560	K	BX	100
CDR01BX681B---	680	K,M	BX	100
CDR01BX821B---	820	K	BX	100
CDR01BX102B---	1000	K,M	BX	100
CDR01BX122B---	1200	K	BX	100
CDR01BX152B---	1500	K,M	BX	100
CDR01BX182B---	1800	K	BX	100
CDR01BX222B---	2200	K,M	BX	100
CDR01BX272B---	2700	K	BX	100
CDR01BX332B---	3300	K,M	BX	100
CDR01BX392A---	3900	K	BX	50
CDR01BX472A---	4700	K,M	BX	50
AVX Style 1805/CDR02				
CDR02BP221B---	220	J,K	BP	100
CDR02BP271B---	270	J	BP	100
CDR02BX392B---	3900	K	BX	100
CDR02BX472B---	4700	K,M	BX	100
CDR02BX562B---	5600	K	BX	100
CDR02BX682B---	6800	K,M	BX	100
CDR02BX822B---	8200	K	BX	100
CDR02BX103B---	10,000	K,M	BX	100
CDR02BX123A---	12,000	K	BX	50
CDR02BX153A---	15,000	K,M	BX	50
CDR02BX183A---	18,000	K	BX	50
CDR02BX223A---	22,000	K,M	BX	50

- Add appropriate failure rate
- Add appropriate termination finish
- Capacitance Tolerance

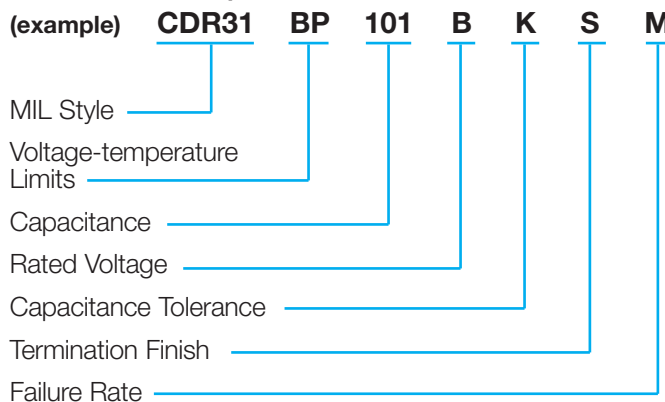
Military Type Designation	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1808/CDR03				
CDR03BP331B---	330	J,K	BP	100
CDR03BP391B---	390	J	BP	100
CDR03BP471B---	470	J,K	BP	100
CDR03BP561B---	560	J	BP	100
CDR03BP681B---	680	J,K	BP	100
CDR03BP821B---	820	J	BP	100
CDR03BP102B---	1000	J,K	BP	100
CDR03BX123B---	12,000	K	BX	100
CDR03BX153B---	15,000	K,M	BX	100
CDR03BX183B---	18,000	K	BX	100
CDR03BX223B---	22,000	K,M	BX	100
CDR03BX273B---	27,000	K	BX	100
CDR03BX333B---	33,000	K,M	BX	100
CDR03BX393A---	39,000	K	BX	50
CDR03BX473A---	47,000	K,M	BX	50
CDR03BX563A---	56,000	K	BX	50
CDR03BX683A---	68,000	K,M	BX	50
AVX Style 1812/CDR04				
CDR04BP122B---	1200	J	BP	100
CDR04BP152B---	1500	J,K	BP	100
CDR04BP182B---	1800	J	BP	100
CDR04BP222B---	2200	J,K	BP	100
CDR04BP272B---	2700	J	BP	100
CDR04BP332B---	3300	J,K	BP	100
CDR04BX393B---	39,000	K	BX	100
CDR04BX473B---	47,000	K,M	BX	100
CDR04BX563B---	56,000	K	BX	100
CDR04BX823A---	82,000	K	BX	50
CDR04BX104A---	100,000	K,M	BX	50
CDR04BX124A---	120,000	K	BX	50
CDR04BX154A---	150,000	K,M	BX	50
CDR04BX184A---	180,000	K	BX	50
AVX Style 1825/CDR05				
CDR05BP392B---	3900	J,K	BP	100
CDR05BP472B---	4700	J,K	BP	100
CDR05BP562B---	5600	J,K	BP	100
CDR05BX683B---	68,000	K,M	BX	100
CDR05BX823B---	82,000	K	BX	100
CDR05BX104B---	100,000	K,M	BX	100
CDR05BX124B---	120,000	K	BX	100
CDR05BX154B---	150,000	K,M	BX	100
CDR05BX224A---	220,000	K,M	BX	50
CDR05BX274A---	270,000	K	BX	50
CDR05BX334A---	330,000	K,M	BX	50
AVX Style 2225/CDR06				
CDR06BP682B---	6800	J,K	BP	100
CDR06BP822B---	8200	J,K	BP	100
CDR06BP103B---	10,000	J,K	BP	100
CDR06BX394A---	390,000	K	BX	50
CDR06BX474A---	470,000	K,M	BX	50

- Add appropriate failure rate
- Add appropriate termination finish
- Capacitance Tolerance



MILITARY DESIGNATION PER MIL-PRF-55681

Part Number Example



NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

MIL Style: CDR31, CDR32, CDR33, CDR34, CDR35

Voltage Temperature Limits:

BP = 0 ± 30 ppm/°C without voltage; 0 ± 30 ppm/°C with rated voltage from -55°C to +125°C

BX = ±15% without voltage; +15 -25% with rated voltage from -55°C to +125°C

Capacitance: Two digit figures followed by multiplier (number of zeros to be added) e.g., 101 = 100 pF

Rated Voltage: A = 50V, B = 100V

Capacitance Tolerance: B ± .10 pF, C ± .25 pF, D ± .5 pF, F ± 1%, J ± 5%, K ± 10%, M ± 20%

Termination Finish:

Termination Finish:

- M = Palladium silver
- N = Silver-nickel-gold
- S = Solder coated final with a minimum of 4 percent lead
- T = Silver
- U = Base metallization-barrier metal-solder coated (tin/lead alloy, with a minimum of 4 percent lead)
- W = Base metallization-barrier metal-tinned (tin or tin/lead alloy)
- Y = Base metallization-barrier metal-tin (100 percent)
- Z = Base metallization-barrier metal-tinned (tin/lead alloy, with a minimum of 4 percent lead)

*See MIL-PRF-55681 Specification for more details

Failure Rate Level: M = 1.0%, P = .1%, R = .01%, S = .001%

Packaging: Bulk is standard packaging. Tape and reel per RS481 is available upon request.

CROSS REFERENCE: AVX/MIL-PRF-55681/CDR31 THRU CDR35

Per MIL-PRF-55681 (Metric Sizes)	AVX Style	Length (L) (mm)	Width (W) (mm)	Thickness (T)	D	Termination Band (t)	
				Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
CDR31	0805	2.00	1.25	1.3	.50	.70	.30
CDR32	1206	3.20	1.60	1.3	—	.70	.30
CDR33	1210	3.20	2.50	1.5	—	.70	.30
CDR34	1812	4.50	3.20	1.5	—	.70	.30
CDR35	1825	4.50	6.40	1.5	—	.70	.30

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 0805/CDR31 (BP)				
CDR31BP1R0B---	1.0	B,C	BP	100
CDR31BP1R1B---	1.1	B,C	BP	100
CDR31BP1R2B---	1.2	B,C	BP	100
CDR31BP1R3B---	1.3	B,C	BP	100
CDR31BP1R5B---	1.5	B,C	BP	100
CDR31BP1R6B---	1.6	B,C	BP	100
CDR31BP1R8B---	1.8	B,C	BP	100
CDR31BP2R0B---	2.0	B,C	BP	100
CDR31BP2R2B---	2.2	B,C	BP	100
CDR31BP2R4B---	2.4	B,C	BP	100
CDR31BP2R7B---	2.7	B,C,D	BP	100
CDR31BP3R0B---	3.0	B,C,D	BP	100
CDR31BP3R3B---	3.3	B,C,D	BP	100
CDR31BP3R6B---	3.6	B,C,D	BP	100
CDR31BP3R9B---	3.9	B,C,D	BP	100
CDR31BP4R3B---	4.3	B,C,D	BP	100
CDR31BP4R7B---	4.7	B,C,D	BP	100
CDR31BP5R1B---	5.1	B,C,D	BP	100
CDR31BP5R6B---	5.6	B,C,D	BP	100
CDR31BP6R2B---	6.2	B,C,D	BP	100
CDR31BP6R8B---	6.8	B,C,D	BP	100
CDR31BP7R5B---	7.5	B,C,D	BP	100
CDR31BP8R2B---	8.2	B,C,D	BP	100
CDR31BP9R1B---	9.1	B,C,D	BP	100
CDR31BP100B---	10	F,J,K	BP	100
CDR31BP110B---	11	F,J,K	BP	100
CDR31BP120B---	12	F,J,K	BP	100
CDR31BP130B---	13	F,J,K	BP	100
CDR31BP150B---	15	F,J,K	BP	100
CDR31BP160B---	16	F,J,K	BP	100
CDR31BP180B---	18	F,J,K	BP	100
CDR31BP200B---	20	F,J,K	BP	100
CDR31BP220B---	22	F,J,K	BP	100
CDR31BP240B---	24	F,J,K	BP	100
CDR31BP270B---	27	F,J,K	BP	100
CDR31BP300B---	30	F,J,K	BP	100
CDR31BP330B---	33	F,J,K	BP	100
CDR31BP360B---	36	F,J,K	BP	100
CDR31BP390B---	39	F,J,K	BP	100
CDR31BP430B---	43	F,J,K	BP	100
CDR31BP470B---	47	F,J,K	BP	100
CDR31BP510B---	51	F,J,K	BP	100
CDR31BP560B---	56	F,J,K	BP	100
CDR31BP620B---	62	F,J,K	BP	100
CDR31BP680B---	68	F,J,K	BP	100
CDR31BP750B---	75	F,J,K	BP	100
CDR31BP820B---	82	F,J,K	BP	100
CDR31BP910B---	91	F,J,K	BP	100
CDR31BP101B---	100	F,J,K	BP	100
CDR31BP111B---	110	F,J,K	BP	100
CDR31BP121B---	120	F,J,K	BP	100
CDR31BP131B---	130	F,J,K	BP	100
CDR31BP151B---	150	F,J,K	BP	100
CDR31BP161B---	160	F,J,K	BP	100
CDR31BP181B---	180	F,J,K	BP	100
CDR31BP201B---	200	F,J,K	BP	100
CDR31BP221B---	220	F,J,K	BP	100
CDR31BP241B---	240	F,J,K	BP	100
CDR31BP271B---	270	F,J,K	BP	100
CDR31BP301B---	300	F,J,K	BP	100
CDR31BP331B---	330	F,J,K	BP	100
CDR31BP361B---	360	F,J,K	BP	100
CDR31BP391B---	390	F,J,K	BP	100
CDR31BP431B---	430	F,J,K	BP	100
CDR31BP471B---	470	F,J,K	BP	100
CDR31BP511A---	510	F,J,K	BP	50
CDR31BP561A---	560	F,J,K	BP	50
CDR31BP621A---	620	F,J,K	BP	50
CDR31BP681A---	680	F,J,K	BP	50

- Add appropriate failure rate
- Add appropriate termination finish
- Capacitance Tolerance

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 0805/CDR31 (BX)				
CDR31BX471B---	470	K,M	BX	100
CDR31BX561B---	560	K,M	BX	100
CDR31BX681B---	680	K,M	BX	100
CDR31BX821B---	820	K,M	BX	100
CDR31BX102B---	1,000	K,M	BX	100
CDR31BX122B---	1,200	K,M	BX	100
CDR31BX152B---	1,500	K,M	BX	100
CDR31BX182B---	1,800	K,M	BX	100
CDR31BX222B---	2,200	K,M	BX	100
CDR31BX272B---	2,700	K,M	BX	100
CDR31BX332B---	3,300	K,M	BX	100
CDR31BX392B---	3,900	K,M	BX	100
CDR31BX472B---	4,700	K,M	BX	100
CDR31BX562A---	5,600	K,M	BX	50
CDR31BX682A---	6,800	K,M	BX	50
CDR31BX822A---	8,200	K,M	BX	50
CDR31BX103A---	10,000	K,M	BX	50
CDR31BX123A---	12,000	K,M	BX	50
CDR31BX153A---	15,000	K,M	BX	50
CDR31BX183A---	18,000	K,M	BX	50
AVX Style 1206/CDR32 (BP)				
CDR32BP1R0B---	1.0	B,C	BP	100
CDR32BP1R1B---	1.1	B,C	BP	100
CDR32BP1R2B---	1.2	B,C	BP	100
CDR32BP1R3B---	1.3	B,C	BP	100
CDR32BP1R5B---	1.5	B,C	BP	100
CDR32BP1R6B---	1.6	B,C	BP	100
CDR32BP1R8B---	1.8	B,C	BP	100
CDR32BP2R0B---	2.0	B,C	BP	100
CDR32BP2R2B---	2.2	B,C	BP	100
CDR32BP2R4B---	2.4	B,C	BP	100
CDR32BP2R7B---	2.7	B,C,D	BP	100
CDR32BP3R0B---	3.0	B,C,D	BP	100
CDR32BP3R3B---	3.3	B,C,D	BP	100
CDR32BP3R6B---	3.6	B,C,D	BP	100
CDR32BP3R9B---	3.9	B,C,D	BP	100
CDR32BP4R3B---	4.3	B,C,D	BP	100
CDR32BP4R7B---	4.7	B,C,D	BP	100
CDR32BP5R1B---	5.1	B,C,D	BP	100
CDR32BP5R6B---	5.6	B,C,D	BP	100
CDR32BP6R2B---	6.2	B,C,D	BP	100
CDR32BP6R8B---	6.8	B,C,D	BP	100
CDR32BP7R5B---	7.5	B,C,D	BP	100
CDR32BP8R2B---	8.2	B,C,D	BP	100
CDR32BP9R1B---	9.1	B,C,D	BP	100
CDR32BP100B---	10	F,J,K	BP	100
CDR32BP110B---	11	F,J,K	BP	100
CDR32BP120B---	12	F,J,K	BP	100
CDR32BP130B---	13	F,J,K	BP	100
CDR32BP150B---	15	F,J,K	BP	100
CDR32BP160B---	16	F,J,K	BP	100
CDR32BP180B---	18	F,J,K	BP	100
CDR32BP200B---	20	F,J,K	BP	100
CDR32BP220B---	22	F,J,K	BP	100
CDR32BP240B---	24	F,J,K	BP	100
CDR32BP270B---	27	F,J,K	BP	100
CDR32BP300B---	30	F,J,K	BP	100
CDR32BP330B---	33	F,J,K	BP	100
CDR32BP360B---	36	F,J,K	BP	100
CDR32BP390B---	39	F,J,K	BP	100
CDR32BP430B---	43	F,J,K	BP	100
CDR32BP470B---	47	F,J,K	BP	100
CDR32BP510B---	51	F,J,K	BP	100
CDR32BP560B---	56	F,J,K	BP	100
CDR32BP620B---	62	F,J,K	BP	100
CDR32BP680B---	68	F,J,K	BP	100
CDR32BP750B---	75	F,J,K	BP	100
CDR32BP820B---	82	F,J,K	BP	100
CDR32BP910B---	91	F,J,K	BP	100

- Add appropriate failure rate
- Add appropriate termination finish
- Capacitance Tolerance

1/ The complete part number will include additional symbols to indicate capacitance tolerance, termination and failure rate level.

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1206/CDR32 (BP) cont'd				
CDR32BP101B---	100	F,J,K	BP	100
CDR32BP111B---	110	F,J,K	BP	100
CDR32BP121B---	120	F,J,K	BP	100
CDR32BP131B---	130	F,J,K	BP	100
CDR32BP151B---	150	F,J,K	BP	100
CDR32BP161B---	160	F,J,K	BP	100
CDR32BP181B---	180	F,J,K	BP	100
CDR32BP201B---	200	F,J,K	BP	100
CDR32BP221B---	220	F,J,K	BP	100
CDR32BP241B---	240	F,J,K	BP	100
CDR32BP271B---	270	F,J,K	BP	100
CDR32BP301B---	300	F,J,K	BP	100
CDR32BP331B---	330	F,J,K	BP	100
CDR32BP361B---	360	F,J,K	BP	100
CDR32BP391B---	390	F,J,K	BP	100
CDR32BP431B---	430	F,J,K	BP	100
CDR32BP471B---	470	F,J,K	BP	100
CDR32BP511B---	510	F,J,K	BP	100
CDR32BP561B---	560	F,J,K	BP	100
CDR32BP621B---	620	F,J,K	BP	100
CDR32BP681B---	680	F,J,K	BP	100
CDR32BP751B---	750	F,J,K	BP	100
CDR32BP821B---	820	F,J,K	BP	100
CDR32BP911B---	910	F,J,K	BP	100
CDR32BP102B---	1,000	F,J,K	BP	100
CDR32BP112A---	1,100	F,J,K	BP	50
CDR32BP122A---	1,200	F,J,K	BP	50
CDR32BP132A---	1,300	F,J,K	BP	50
CDR32BP152A---	1,500	F,J,K	BP	50
CDR32BP162A---	1,600	F,J,K	BP	50
CDR32BP182A---	1,800	F,J,K	BP	50
CDR32BP202A---	2,000	F,J,K	BP	50
CDR32BP222A---	2,200	F,J,K	BP	50
AVX Style 1206/CDR32 (BX)				
CDR32BX472B---	4,700	K,M	BX	100
CDR32BX562B---	5,600	K,M	BX	100
CDR32BX682B---	6,800	K,M	BX	100
CDR32BX822B---	8,200	K,M	BX	100
CDR32BX103B---	10,000	K,M	BX	100
CDR32BX123B---	12,000	K,M	BX	100
CDR32BX153B---	15,000	K,M	BX	100
CDR32BX183A---	18,000	K,M	BX	50
CDR32BX223A---	22,000	K,M	BX	50
CDR32BX273A---	27,000	K,M	BX	50
CDR32BX333A---	33,000	K,M	BX	50
CDR32BX393A---	39,000	K,M	BX	50
AVX Style 1210/CDR33 (BP)				
CDR33BP102B---	1,000	F,J,K	BP	100
CDR33BP112B---	1,100	F,J,K	BP	100
CDR33BP122B---	1,200	F,J,K	BP	100
CDR33BP132B---	1,300	F,J,K	BP	100
CDR33BP152B---	1,500	F,J,K	BP	100
CDR33BP162B---	1,600	F,J,K	BP	100
CDR33BP182B---	1,800	F,J,K	BP	100
CDR33BP202B---	2,000	F,J,K	BP	100
CDR33BP222B---	2,200	F,J,K	BP	100
CDR33BP242A---	2,400	F,J,K	BP	50
CDR33BP272A---	2,700	F,J,K	BP	50
CDR33BP302A---	3,000	F,J,K	BP	50
CDR33BP332A---	3,300	F,J,K	BP	50
AVX Style 1210/CDR33 (BX)				
CDR33BX153B---	15,000	K,M	BX	100
CDR33BX183B---	18,000	K,M	BX	100
CDR33BX223B---	22,000	K,M	BX	100
CDR33BX273B---	27,000	K,M	BX	100
CDR33BX393A---	39,000	K,M	BX	50

Add appropriate failure rate
 Add appropriate termination finish
 Capacitance Tolerance

Military Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1210/CDR33 (BX) cont'd				
CDR33BX473A---	47,000	K,M	BX	50
CDR33BX563A---	56,000	K,M	BX	50
CDR33BX683A---	68,000	K,M	BX	50
CDR33BX823A---	82,000	K,M	BX	50
CDR33BX104A---	100,000	K,M	BX	50
AVX Style 1812/CDR34 (BP)				
CDR34BP222B---	2,200	F,J,K	BP	100
CDR34BP242B---	2,400	F,J,K	BP	100
CDR34BP272B---	2,700	F,J,K	BP	100
CDR34BP302B---	3,000	F,J,K	BP	100
CDR34BP332B---	3,300	F,J,K	BP	100
CDR34BP362B---	3,600	F,J,K	BP	100
CDR34BP392B---	3,900	F,J,K	BP	100
CDR34BP432B---	4,300	F,J,K	BP	100
CDR34BP472B---	4,700	F,J,K	BP	100
CDR34BP512A---	5,100	F,J,K	BP	50
CDR34BP562A---	5,600	F,J,K	BP	50
CDR34BP622A---	6,200	F,J,K	BP	50
CDR34BP682A---	6,800	F,J,K	BP	50
CDR34BP752A---	7,500	F,J,K	BP	50
CDR34BP822A---	8,200	F,J,K	BP	50
CDR34BP912A---	9,100	F,J,K	BP	50
CDR34BP103A---	10,000	F,J,K	BP	50
AVX Style 1812/CDR34 (BX)				
CDR34BX273B---	27,000	K,M	BX	100
CDR34BX333B---	33,000	K,M	BX	100
CDR34BX393B---	39,000	K,M	BX	100
CDR34BX473B---	47,000	K,M	BX	100
CDR34BX563B---	56,000	K,M	BX	100
CDR34BX104A---	100,000	K,M	BX	50
CDR34BX124A---	120,000	K,M	BX	50
CDR34BX154A---	150,000	K,M	BX	50
CDR34BX184A---	180,000	K,M	BX	50
AVX Style 1825/CDR35 (BP)				
CDR35BP472B---	4,700	F,J,K	BP	100
CDR35BP512B---	5,100	F,J,K	BP	100
CDR35BP562B---	5,600	F,J,K	BP	100
CDR35BP622B---	6,200	F,J,K	BP	100
CDR35BP682B---	6,800	F,J,K	BP	100
CDR35BP752B---	7,500	F,J,K	BP	100
CDR35BP822B---	8,200	F,J,K	BP	100
CDR35BP912B---	9,100	F,J,K	BP	100
CDR35BP103B---	10,000	F,J,K	BP	100
CDR35BP113A---	11,000	F,J,K	BP	50
CDR35BP123A---	12,000	F,J,K	BP	50
CDR35BP133A---	13,000	F,J,K	BP	50
CDR35BP153A---	15,000	F,J,K	BP	50
CDR35BP163A---	16,000	F,J,K	BP	50
CDR35BP183A---	18,000	F,J,K	BP	50
CDR35BP203A---	20,000	F,J,K	BP	50
CDR35BP223A---	22,000	F,J,K	BP	50
AVX Style 1825/CDR35 (BX)				
CDR35BX563B---	56,000	K,M	BX	100
CDR35BX683B---	68,000	K,M	BX	100
CDR35BX823B---	82,000	K,M	BX	100
CDR35BX104B---	100,000	K,M	BX	100
CDR35BX124B---	120,000	K,M	BX	100
CDR35BX154B---	150,000	K,M	BX	100
CDR35BX184A---	180,000	K,M	BX	50
CDR35BX224A---	220,000	K,M	BX	50
CDR35BX274A---	270,000	K,M	BX	50
CDR35BX334A---	330,000	K,M	BX	50
CDR35BX394A---	390,000	K,M	BX	50
CDR35BX474A---	470,000	K,M	BX	50

Add appropriate failure rate
 Add appropriate termination finish
 Capacitance Tolerance



The AVX Space BME (Base Metal Electrode) X7R surface mount MLCC utilises leading edge technology in MLCC construction and material processing. The BME technology delivers a superior capacitance voltage capability compared to conventional PME (Precious Metal Electrode) technologies with the reliability levels demanded by the space industry. The availability of higher capacitance values in smaller case sizes not only reduces the amount of board space required by the engineer but also the weight of the complete PCB. These surface mount components also incorporate Flexiterm®, which greatly improves the resistance to the mechanical stress experienced by MLCCs

FEATURES

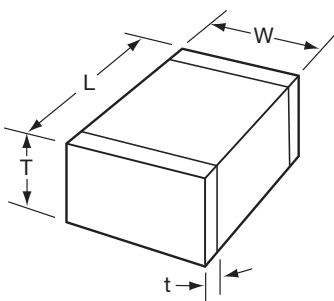
- Higher CV capability than PME capacitors resulting in reduced weight of components and reduction in PCB space required.
- Use of Flexiterm® technology for enhanced mechanical stress resistance.
- Capacitance values up to 8.2uF available.

HOW TO ORDER

3009041	06	225	J	E
Detailed Spec 3009041	Component Variant	Capacitance Code	Capacitance Tolerance	Voltage
	02 (0603) 03 (0805) 04 (1206) 05 (1210) 06 (1812)	2 significant digits + number of zeros e.g. 103 = 10nF 225 = 2.2µF	J = 5% K = 10% M = 20%	X = 16V A = 25V C = 50V E = 100V

Please note all parts are terminated with a minimum 10% Pb plating. All parts packed in waffles. Lot Validation Testing (LVT) can be ordered separately, LVT Groups 3, 2b, 2a, 1.

DIMENSIONS



mm (inches)

Size	0603		0805		1206		1210		1812	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
(L) Length	1.45 (0.057)	1.75 (0.069)	1.80 (0.071)	2.20 (0.087)	3.00 (0.118)	3.40 (0.134)	3.00 (0.118)	3.40 (0.124)	4.20 (0.165)	4.80 (0.189)
(W) Width	0.65 (0.026)	0.95 (0.037)	1.05 (0.041)	1.45 (0.057)	1.40 (0.055)	1.80 (0.071)	2.30 (0.091)	2.70 (0.106)	3.00 (0.118)	3.40 (0.124)
(T) Thickness	1.00 (0.039) Max.		1.52 (0.060) Max.		1.80 (0.071) Max.		2.80 (0.110) Max.		2.80 (0.110) Max.	
(t) terminal	0.20 (0.008)	0.50 (0.020)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.95 (0.037)

ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

The measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

Charateristics	Symbol	Test Method and Conditions	Tolerance (\pm %)	Limits		Unit
				Min.	Max.	
Capacitance (Note 1)	C_A	ESCC No. 3009	5	$0.95C_n$	$1.05C_n$	pF
			10	$0.9C_n$	$1.1C_n$	
			20	$0.8C_n$	$1.2C_n$	
Tangent of Loss Angle	$tg\delta$	ESCC No. 3009 For $U_R = 50\text{V}, 100\text{V}$: For $U_R = 16\text{V}, 25\text{V}$:	All	-	250×10^{-4} 300×10^{-4}	- -
Insulation Resistance	R_I	ESCC No. 3009 For $C_n \leq 10000\text{pF}$: For $C_n > 10000\text{pF}$:	All	100 1000	- -	$G\Omega$ $G\Omega \text{ nF}$
Voltage Proof	VP	ESCC No. 3009	All	$2.5U_R$	-	V

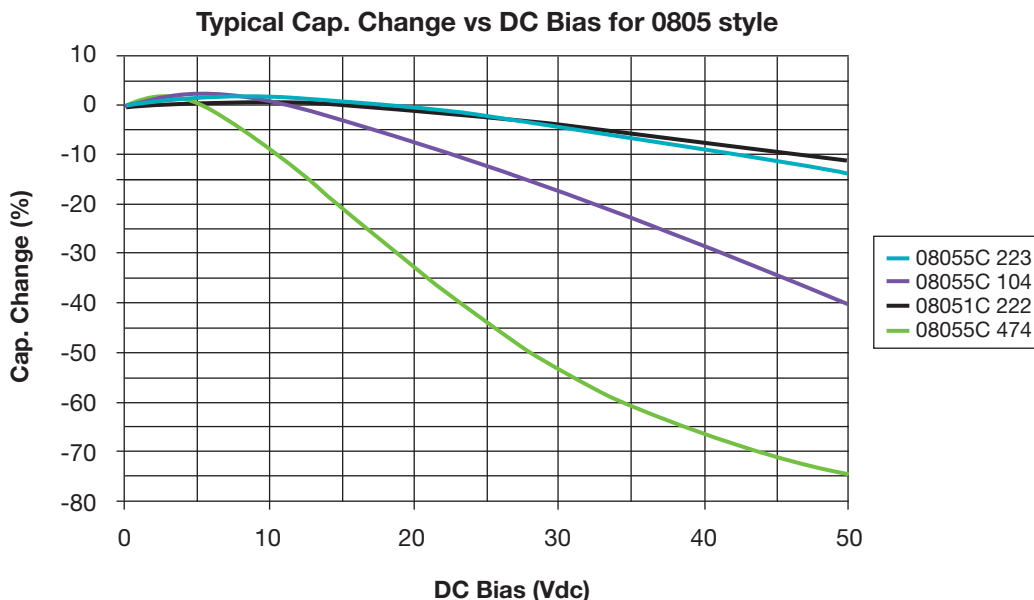
NOTE: 1. 300 max for 16 volt and 25 volt rated components

ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURE

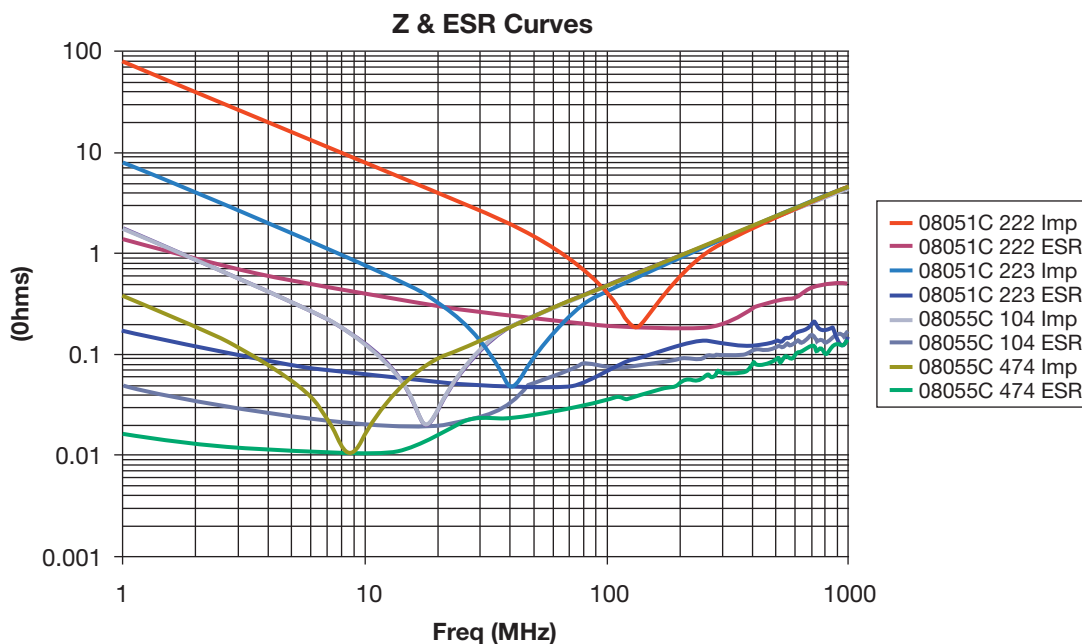
Charateristics	Symbol	Test Method and Conditions (Note 1)	Limits		Unit
			Min.	Max.	
Insulation Resistance	R_I	ESCC No. 3009 For $C_n \leq 10000\text{pF}$: For $C_n > 10000\text{pF}$:	10 100	-	$G\Omega$ $G\Omega \text{ nF}$
Temperature Characteristic	TC	ESCC No. 3009 $T_{amb} = -55 \pm 2^{\circ}\text{C}, +20 \pm 2^{\circ}\text{C}, +125 \pm 2^{\circ}\text{C}$ (Note 2 and 3) For VT = no voltage applied:	-15	+15	%

NOTE: 1. Single Sample, Inspection Level S3, AQL = 2.5%
 2. If 1 failure out of 5 parts, then test 100%. 1.0% rejects maximum allowed in case of 100% testing.
 3. X7R dielectric: Delta C/C at U_R is typically -10% to -70% dependant on capacitance value. (See curves on next page)

TYPICAL ELECTRICAL CHARACTERISTICS FOR ESCC BME SURFACE MOUNT
CAPACITANCE TEMPERATURE CHARACTERISTICS FOR 0805 STYLE (WITH DC BIAS)



IMPEDANCE WITH ESR CHARACTERISTICS FOR 0805 CAPACITANCE RANGE



If required AVX will produce a data sheet for each part number with the following information:

- Impedance/ESR Frequency Sweep
- Capacitance Change with Temperature from -55°C to +125°C
- Capacitance Change with DC Voltage up to the rated voltage of the component
- Temperature Change with AC Current applied for higher capacitance values.

MH Ceramic Capacitor

Lead Free Ceramic Capacitor in Molded SM Leadframe



The MH components use a X7R high capacitance value ceramic capacitor in a surface mount precision made moulded case.

The MH capacitor combine the ceramic attributes of very low ESR, non-polar construction, excellent high frequency behaviour and voltage stress capabilities and wide temperature range; with the enhanced mechanical protection of a moulded case. The moulded case is UL94 V-0 flame retardant and the MH is RoHs and also AEC-Q200 compliant.

The MH range provides a lead frame solution to customers who have previously been unable to use large case ceramic capacitors because of mechanical stressing concerns.

For those applications where a tin termination is not acceptable, a Tin/Lead termination is available.

FEATURES

- Capacitance: 2.2u F – 22 μF
- MHs are AEC-Q200 compliant
- Voltage Range DC: 25V – 100V
- Enhanced thermo mechanical stress resistance.

HOW TO ORDER

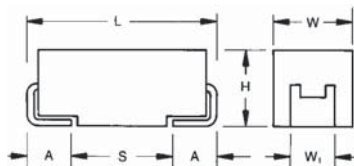
MH MH Series	V Case Size see table below	1 MLCC Count	1 Voltage 3 = 25V 5 = 50V 1 = 100V	C Dielectric C = X7R	475 Capacitance Code (In pF) 2 Sig. Digits + Number of Zeros	M Capacitance Tolerance K = ±10% M = ±20%	A Failure Rate A = Not Applicable	T Terminations T = Tin Plated B = Tin/Lead Plated	2 Packaging 2 = 7" Reel 4 = 13" Reel 6 = Waffle Pack	A Special Code A = Std. Product
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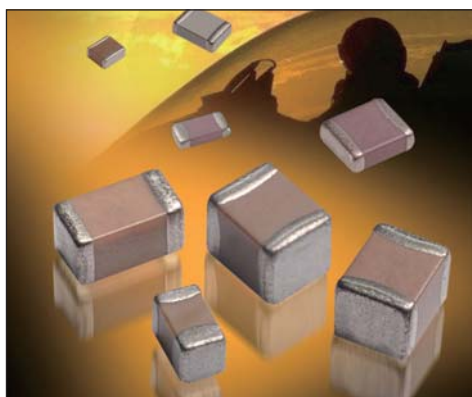
MH X7R RANGE

	Cap μF	25V	50V	100V
225	2.2			
335	3.3			
475	4.7			
685	6.8			
106	10			
156	15			
226	22			

“V” CASE DIMENSIONS: millimeters (inches)

L	7.3±0.2 0 (0.287 ±0.008)
W	6.1 + 0.20 - 0.10
	(0.24 + 0.008 - 0.004)
H	3.45±0.30 (0.136±0.012)
W₁	3.1±0.20 (0.120±0.008)
A	1.4 + 0.30 - 0.20
	(0.055 + 0.012 - 0.008)
S Min	4.40 (0.173)





AVX's M123 series MIL-qualified ceramic capacitors are designed for high performance application in BX voltage temperature characteristics for general purpose dielectric and in BP voltage temperature characteristics for temperature stable dielectric.

M123 series capacitors offer design and component engineers a proven technology for SMD processing and applications requiring space-level reliability. They are designed for use in timing circuits and critical frequency applications where absolute stability of capacitance is required (BP), as well as in applications where a wider capacitance variation with temperature and voltage can be tolerated (BX)

HOW TO ORDER

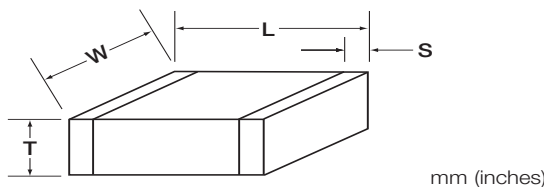
Military Type Designation: Capacitors, Fixed, Ceramic Dielectric, (Temperature Stable and General Purpose), High Reliability

Not RoHS Compliant

M123	A	10	BX	B	103	K	S
Mil-Spec Number	Modification Spec.	Slash Sheet Number	Temperature Characteristic	Voltage B = 50V C = 100V	Capacitance Code	Capacitance Tolerance C = ±0.25pF D = ±0.5pF F = ±1% J = ±5% K = ±10% M = ±20%	Termination G = Silver - Nickel - Gold M = Palladium/Silver S = Silver - Nickel - Solder Coated Z = Silver - Nickel - Solder Plated (tin/lead alloy with a minimum of 4 percent lead)

Capacitance change with reference to 25°C over temperature range -55°C to +125°C		
Symbol	Without Voltage	With Rated DC Voltage
BP	0 ± 30 ppm/°C	0 ± 30 ppm/°C
BX	+15, -15%	+15, -25%

DIMENSIONS



(L) Length	(W) Width	(T) Thickness	(S) Termination Band
CKS51, /10, 0805 Size Chip			
2.03 (0.080) ± 0.381 (0.015)	1.27 (0.050) ± 0.381 (0.015)	0.508 (0.020) Min. 1.40 (0.055) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS52, /11, 1210 Size Chip			
3.05 (0.120) ± 0.381 (0.015)	2.54 (0.100) ± 0.381 (0.015)	0.508 (0.020) Min. 1.65 (0.065) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS53, /12, 1808 Size Chip			
4.57 (0.180) ± 0.381 (0.015)	2.03 (0.080) ± 0.381 (0.015)	0.508 (0.020) Min. 1.65 (0.065) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS54, /13, 2225 Size Chip			
5.59 (0.220) ± 0.381 (0.015)	6.35 (0.250) ± 0.381 (0.015)	0.508 (0.020) Min. 1.78 (0.070) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS55, /21, 1206 Size Chip			
3.05 (0.120) ± 0.381 (0.015)	1.52 (0.060) ± 0.381 (0.015)	0.508 (0.020) Min. 1.65 (0.065) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS56, /22, 1812 Size Chip			
4.57 (0.180) ± 0.381 (0.015)	3.18 (0.125) ± 0.381 (0.015)	0.508 (0.020) Min. 2.03 (0.080) Max.	0.508 (0.020) ± 0.254 (0.010)
CKS57, /23, 1825 Size Chip			
4.57 (0.180) ± 0.381 (0.015)	6.35 (0.250) ± 0.381 (0.015)	0.508 (0.020) Min. 2.03 (0.080) Max.	0.508 (0.020) ± 0.254 (0.010)

Slash Sheet	Case Size	Dielectric	Cap Range (pF)
10	0805	BP	1.0-680
		BX	330-18,000
11	1210	BP	300-3,300
		BX	5,600-100,000
12	1808	BP	300-1,000
		BX	5,600-100,000
13	2225	BP	1,100-10,000
		BX	120,000-1,000,000
21	1206	BP	1.0-2,200
		BX	4,700-39,000
22	1812	BP	1,200-10,000
		BX	27,000-180,000
23	1825	BP	3,900-22,000
		BX	56,000-470,000

MIL-PRF-123/STYLE CKS51, -/10

Part Number 1/ (0805 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage			
M123A10BP_1R0_	1.0	C,D	BP	50,100			
M123A10BP_1R1_	1.1						
M123A10BP_1R2_	1.2						
M123A10BP_1R3_	1.3						
M123A10BP_1R5_	1.5						
M123A10BP_1R6_	1.6						
M123A10BP_1R8_	1.8						
M123A10BP_2R0_	2.0						
M123A10BP_2R2_	2.2						
M123A10BP_2R4_	2.4						
M123A10BP_2R7_	2.7	↓	↓	↓			
M123A10BP_3R0_	3.0						
M123A10BP_3R3_	3.3						
M123A10BP_3R6_	3.6						
M123A10BP_3R9_	3.9						
M123A10BP_4R3_	4.3						
M123A10BP_4R7_	4.7						
M123A10BP_5R1_	5.1						
M123A10BP_5R6_	5.6						
M123A10BP_6R2_	6.2						
M123A10BP_6R8_	6.8	↓	↓	↓			
M123A10BP_7R5_	7.5						
M123A10BP_8R2_	8.2						
M123A10BP_9R1_	9.1						
M123A10BP_100_	10						
M123A10BP_110_	11						
M123A10BP_120_	12						
M123A10BP_130_	13						
M123A10BP_150_	15						
M123A10BP_160_	16						
M123A10BP_180_	18	↓	↓	↓			
M123A10BP_200_	20						
M123A10BP_220_	22						
M123A10BP_240_	24						
M123A10BP_270_	27						
M123A10BP_300_	30						
M123A10BP_330_	33						
M123A10BP_360_	36						
M123A10BP_390_	39						
M123A10BP_430_	43						
M123A10BP_470_	47	↓	↓	↓			
M123A10BP_510_	51						
M123A10BP_560_	56						
M123A10BP_620_	62						
M123A10BP_680_	68						
M123A10BP_750_	75						
M123A10BP_750_	75				F, J, K	BP	50,100

Part Number 1/ (0805 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage			
M123A10BP_820_	82	F, J, K	BP	50,100			
M123A10BP_910_	91						
M123A10BP_101_	100						
M123A10BP_111_	110						
M123A10BP_121_	120						
M123A10BP_131_	130						
M123A10BP_151_	150						
M123A10BP_161_	160						
M123A10BP_181_	180						
M123A10BP_201_	200						
M123A10BP_221_	220	↓	↓	↓			
M123A10BP_241_	240						
M123A10BP_271_	270						
M123A10BP_301_	300						
M123A10BP_331_	330						
M123A10BP_361_	360						
M123A10BP_391_	390						
M123A10BP_431_	430						
M123A10BP_471_	470						
M123A10BPB511_	510				F,J,K	BP	50
M123A10BPB561_	560	↓	↓	↓			
M123A10BPB621_	620				F,J,K	BP	50
M123A10BPB681_	680				F,J,K	BP	50
M123A10BX_331K_	330	K	BX	50,100			
M123A10BX_391K_	390						
M123A10BX_471K_	470						
M123A10BX_561K_	560						
M123A10BX_681K_	680						
M123A10BX_821K_	820						
M123A10BX_102K_	1,000						
M123A10BX_122K_	1,200						
M123A10BX_152K_	1,500						
M123A10BX_182K_	1,800						
M123A10BX_222K_	2,200	↓	↓	↓			
M123A10BX_272K_	2,700						
M123A10BX_332K_	3,300						
M123A10BX_392K_	3,900						
M123A10BX_472K_	4,700						
M123A10BX_562K_	5,600						
M123A10BX_682K_	6,800						
M123A10BX_822K_	8,200						
M123A10BX_103K_	10,000						
M123A10BX_123K_	12,000						
M123A10BX_153K_	15,000	↓	↓	↓			
M123A10BX_183K_	18,000				K	BX	50

MIL-PRF-123/STYLE CKS52, -/11

Part Number 1/ (1210 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A11BP_301__	300	F, J, K	BP	50,100
M123A11BP_331__	330	↓	↓	↓
M123A11BP_361__	360			
M123A11BP_391__	390			
M123A11BP_431__	430			
M123A11BP_471__	470			
M123A11BP_511__	510			
M123A11BP_561__	560			
M123A11BP_621__	620			
M123A11BP_681__	680			
M123A11BP_751__	750			
M123A11BP_821__	820			
M123A11BP_911__	910			
M123A11BP_102__	1,000			
M123A11BP_112__	1,100			
M123A11BP_122__	1,200			
M123A11BP_132__	1,300			
M123A11BP_152__	1,500			
M123A11BP_162__	1,600			
M123A11BP_182__	1,800			
M123A11BP_202__	2,000			
M123A11BP_222__	2,200			
		F, J, K	BP	50,100

Part Number 1/ (1210 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage			
M123A11BPB242__	2,400	F, J, K	BP	50			
M123A11BPB272__	2,700	↓	↓	↓			
M123A11BPB302__	3,000						
M123A11BPB332__	3,300						
M123A11BX_562__	5,600	K, M	BX	50,100			
M123A11BX_682__	6,800	↓	↓	↓			
M123A11BX_822__	8,200						
M123A11BX_103__	10,000						
M123A11BX_123__	12,000						
M123A11BX_153__	15,000						
M123A11BX_183__	18,000						
M123A11BX_223__	22,000						
M123A11BX_273__	27,000						
					K, M	BX	50,100
M123A11BXB333__	33,000				K, M	BX	50
M123A11BXB393__	39,000	↓	↓	↓			
M123A11BXB473__	47,000						
M123A11BXB563__	56,000						
M123A11BXB683__	68,000						
M123A11BXB823__	82,000						
M123A11BXB104__	100,000						
		K, M	BX	50			

MIL-PRF-123/STYLE CKS53, -/12

Part Number 1/ (1808 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A12BP_301__	300	F, J, K	BP	50,100
M123A12BP_331__	330	↓	↓	↓
M123A12BP_361__	360			
M123A12BP_391__	390			
M123A12BP_431__	430			
M123A12BP_471__	470			
M123A12BP_511__	510			
M123A12BP_561__	560			
M123A12BP_621__	620			
M123A12BP_681__	680			
M123A12BP_751__	750			
M123A12BP_821__	820			
M123A12BP_911__	910			
M123A12BP_102__	1,000			
		F, J, K	BP	50,100

Part Number 1/ (1808 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A12BX_562K__	5,600	K	BX	50,100
M123A12BX_682K__	6,800	↓	↓	↓
M123A12BX_822K__	8,200			
M123A12BX_103K__	10,000			
M123A12BX_123K__	12,000			
M123A12BX_153K__	15,000			
M123A12BX_183K__	18,000			
M123A12BX_223K__	22,000			
M123A12BX_273K__	27,000			
M123A12BX_333K__	33,000			
M123A12BXB393K__	39,000	K	BX	50
M123A12BXB473K__	47,000	↓	↓	↓
M123A12BXB563K__	56,000			
M123A12BXB683K__	68,000			
M123A12BXB823K__	82,000			
M123A12BXB104K__	100,000			
		K	BX	50

MIL-PRF-123/STYLE CKS54, -/13

Part Number 1/ (2225 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A13BPB112__	1,100	F, J, K	BP	50
M123A13BPB122__	1,200	↓	↓	↓
M123A13BPB132__	1,300			
M123A13BPB152__	1,500			
M123A13BPB162__	1,600			
M123A13BPB182__	1,800			
M123A13BPB202__	2,000			
M123A13BPB222__	2,200			
M123A13BPB242__	2,400			
M123A13BPB272__	2,700			
M123A13BPB302__	3,000			
M123A13BPB332__	3,300			
M123A13BPB362__	3,600			
M123A13BPB392__	3,900			
M123A13BPB432__	4,300			
M123A13BPB472__	4,700			
M123A13BPB512__	5,100			
		F, J, K	BP	50

Part Number 1/ (2225 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A13BPB562__	5,600	F, J, K	BP	50
M123A13BPB622__	6,200	↓	↓	↓
M123A13BPB682__	6,800			
M123A13BPB752__	7,500	↓	↓	↓
M123A13BPB822__	8,200			
M123A13BPB912__	9,100			
M123A13BPB103__	10,000			
M123A13BXB124K__	120,000	K	BX	50
M123A13BXB154K__	150,000	↓	↓	↓
M123A13BXB184K__	180,000			
M123A13BXB224K__	220,000			
M123A13BXB274K__	270,000			
M123A13BXB334K__	330,000			
M123A13BXB394K__	394,000			
M123A13BXB474K__	474,000			
M123A13BXB105K__	1,000,000			
		K	BX	50

MIL-PRF-123/STYLE CKS55, -/21

Part Number 1/ (1206 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A21BPC1R0_	1.0	B, C	BP	100
M123A21BPC1R1_	1.1	↓	↓	↓
M123A21BPC1R2_	1.2			
M123A21BPC1R3_	1.3			
M123A21BPC1R5_	1.5			
M123A21BPC1R6_	1.6			
M123A21BPC1R8_	1.8			
M123A21BPC2R0_	2.0	↓	↓	↓
M123A21BPC2R2_	2.2			
M123A21BPC2R4_	2.4			
M123A21BPC2R7_	2.7	B, C B, C, D	↓	↓
M123A21BPC3R0_	3.0			
M123A21BPC3R3_	3.3			
M123A21BPC3R6_	3.6			
M123A21BPC3R9_	3.9			
M123A21BPC4R3_	4.3			
M123A21BPC4R7_	4.7			
M123A21BPC5R1_	5.1			
M123A21BPC5R6_	5.6			
M123A21BPC6R2_	6.2			
M123A21BPC6R8_	6.8			
M123A21BPC7R5_	7.5	↓		
M123A21BPC8R2_	8.2			
M123A21BPC9R1_	9.1			
M123A21BPC100_	10			
M123A21BPC110_	11	B, C, D F, J, K	↓	↓
M123A21BPC120_	12			
M123A21BPC130_	13			
M123A21BPC150_	15			
M123A21BPC160_	16			
M123A21BPC180_	18			
M123A21BPC200_	20			
M123A21BPC240_	24			
M123A21BPC270_	27			
M123A21BPC330_	33			
M123A21BPC360_	36			
M123A21BPC390_	39	↓	↓	↓
M123A21BPC430_	43			
M123A21BPC470_	47			
M123A21BPC510_	51			
M123A21BPC560_	56			
M123A21BPC620_	62			
M123A21BPC680_	68			
M123A21BPC750_	75			
M123A21BPC820_	82			
M123A21BPC910_	91			
M123A21BPC101_	100	F, J, K	BP	100

Part Number 1/ (1206 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A21BPC111_	110	F, J, K	BP	100
M123A21BPC121_	120	↓	↓	↓
M123A21BPC131_	130			
M123A21BPC151_	150			
M123A21BPC161_	160			
M123A21BPC181_	180			
M123A21BPC201_	200			
M123A21BPC221_	220			
M123A21BPC241_	240			
M123A21BPC271_	270			
M123A21BPC301_	300			
M123A21BPC331_	330			
M123A21BPC361_	360			
M123A21BPC391_	390			
M123A21BPC431_	430			
M123A21BPC471_	470			
M123A21BPC511_	510			
M123A21BPC561_	560			
M123A21BPC621_	620			
M123A21BPC681_	680			
M123A21BPC751_	750			
M123A21BPC821_	820			
M123A21BPC911_	910			
M123A21BPC102_	1,000			
M123A21BPB112_	1,100			
M123A21BPB122_	1,200			
M123A21BPB132_	1,300			
M123A21BPB152_	1,500			
M123A21BPB162_	1,600			
M123A21BPB182_	1,800			
M123A21BPB202_	2,000			
M123A21BPB222_	2,200	F, J, K	BP	50
M123A21BXC472_	4,700	↓	↓	↓
M123A21BXC562_	5,600			
M123A21BXC682_	6,800			
M123A21BXC822_	8,200			
M123A21BXC103_	10,000			
M123A21BXC123_	12,000			
M123A21BXC153_	15,000	K, M	BX	100
M123A21BXC183_	18,000	↓	↓	↓
M123A21BXC223_	22,000			
M123A21BXC273_	27,000			
M123A21BXC333_	33,000			
M123A21BXC393_	39,000	K, M	BX	50

MIL-PRF-123/STYLE CKS56, -/22

Part Number 1/ (1812 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A22BPC122__	1,200	F, J, K	BP	100
M123A22BPC152__	1,500	↓	↓	↓
M123A22BPC182__	1,800			
M123A22BPC222__	2,200			
M123A22BPC242__	2,400			
M123A22BPC272__	2,700	↓	↓	↓
M123A22BPC302__	3,000			
M123A22BPC332__	3,300			
M123A22BPC362__	3,600			
M123A22BPC392__	3,900			
M123A22BPC432__	4,300			
M123A22BPC472__	4,700			
M123A22BPB512__	5,100	F, J, K	BP	50
M123A22BPB562__	5,600	↓	↓	↓
M123A22BPB622__	6,200			
M123A22BPB682__	6,800			
M123A22BPB752__	7,500			
M123A22BPB822__	8,200	↓	↓	↓
M123A22BPB912__	9,100			
M123A22BPB103__	10,000			

Part Number 1/ (1812 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A22BXC273__	27,000	K, M	BX	100
M123A22BXC333__	33,000	↓	↓	↓
M123A22BXC393__	39,000			
M123A22BXC473__	47,000			
M123A22BXC563__	56,000	K, M	BX	100
M123A22BXC823__	82,000	K, M	BX	50
M123A22BXC104__	100,000	↓	↓	↓
M123A22BXC124__	120,000			
M123A22BXC154__	150,000			
M123A22BXC184__	180,000			

MIL-PRF-123/STYLE CKS57, -/23

Part Number 1/ (1825 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage			
M123A23BPC392__	3,900	F, J, K	BP	100			
M123A23BPC472__	4,700	↓	↓	↓			
M123A23BPC512__	5,100						
M123A23BPC562__	5,600						
M123A23BPC622__	6,200						
M123A23BPC682__	6,800	↓	↓	↓			
M123A23BPC752__	7,500						
M123A23BPC822__	8,200						
M123A23BPC912__	9,100						
M123A23BPC103__	10,000				F, J, K	BP	100
M123A23BPB113__	11,000				F, J, K	BP	50
M123A23BPB123__	12,000				↓	↓	↓
M123A23BPB133__	13,000						
M123A23BPB153__	15,000						
M123A23BPB163__	16,000						
M123A23BPB183__	18,000	↓	↓	↓			
M123A23BPB203__	20,000						
M123A23BPB223__	22,000				F, J, K	BP	50

Part Number 1/ (1825 Size Chip)	Capacitance pF	Capacitance Tolerance	Voltage- Temperature Limits	Rated Voltage
M123A23BXC563__	56,000	K, M	BX	100
M123A23BXC683__	68,000	↓	↓	↓
M123A23BXC823__	82,000			
M123A23BXC104__	100,000			
M123A23BXC124__	120,000			
M123A23BXC154__	150,000	K, M	BX	100
M123A23BXC184__	180,000	K, M	BX	50
M123A23BXC224__	220,000	↓	↓	↓
M123A23BXC274__	270,000			
M123A23BXC334__	330,000			
M123A23BXC394__	390,000			
M123A23BXC474__	470,000	K, M	BX	50



SWITCHED MODE POWER SUPPLY CAPACITORS

Anywhere DC power is required, a switched mode power supply can be found. These capacitors have been specifically designed for SMPS applications to provide the smallest possible output ripple, while still maintaining high voltage capability.

RMM/SMM Style

Stacked capacitors made in X7R dielectric, offering extended capacitance range, with voltage ratings up to 500V.

SMX Series

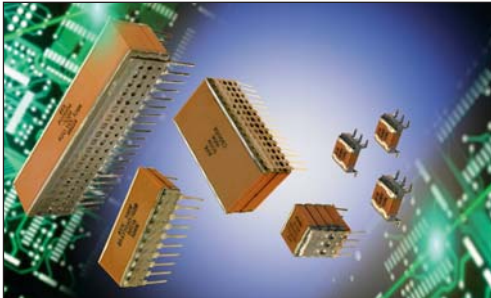
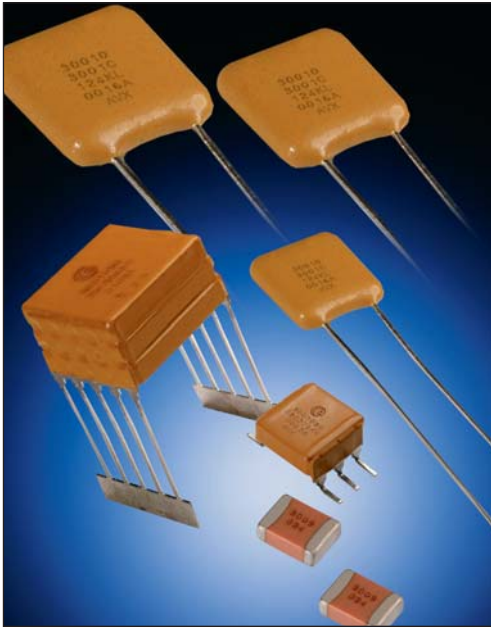
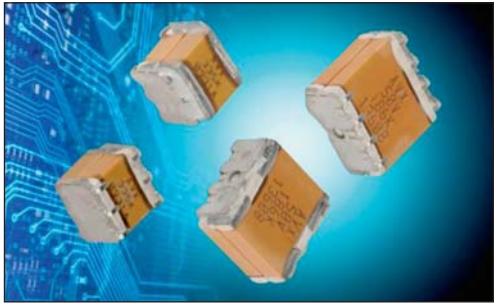
Stacked MLCC capacitors providing high capacitance and voltage ratings, capable of withstanding temperatures up to 200°C.

ESCC Qualified (3009)

Designed and qualified for use in ESCC space programs, according to ESCC General Specification 3009

CECC Approved

Leaded SMPS Capacitor with CECC approved range.





The RMM series SMPS capacitors incorporate the Super X7R dielectric material. AVX RMM stacked capacitors offer high dielectric constant (K) characteristics allowing for an extended capacitance range. The higher capacitance values in the smaller case sizes reduce the amount of board space needed to mount these components. The RMM series capacitors are designed for use in applications ranging from high end DC/DC converters to general power supplies, telecom networks, snubbers, aerospace instrumentation panels, hybrid power applications and more.

ELECTRICAL SPECIFICATIONS

Temperature Coefficient

±15%, -55°C to +125°C

Capacitance Test (MIL-STD-202 Method 305)

25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1 kHz

Dissipation Factor 25°C

2.5% Max @ 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1 kHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

1000 MΩ-μF, whichever is less

Insulation Resistance 125°C (MIL-STD-202 Method 302)

100 MΩ-μF, whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)

250% rated voltage for 5 seconds with 50 mA maximum charging current (500 Volt units @ 750 VDC)

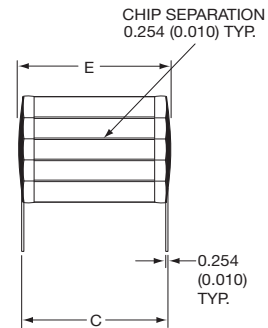
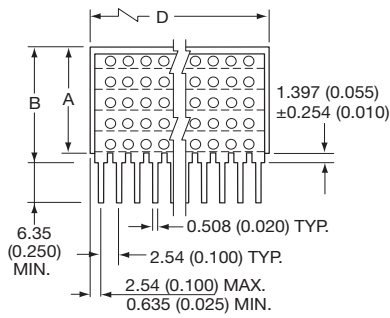
Life Test (1000 hrs)

200% rated voltage for at 125°C (500 Volts units @ 600 VDC)

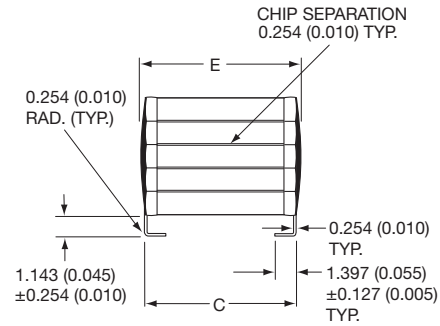
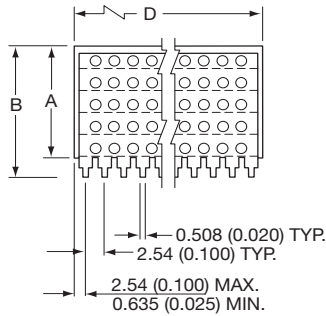
HOW TO ORDER

RMM4	5	186	M	A	K	120
AVX Style	Voltage	Capacitance Code	Tolerance	Test Level	Leads	Height
RMM3	5 = 50V	(pF - 2 significant digits + number of zeros)	K = ±10%	A = Standard	N = Straight Lead	Max
RMM4	1 = 100V	105 = 1μF	M = ±20%	B = Hi-Rel*	K = Leads formed in	Dimension "A"
RMM5	2 = 200V	106 = 10μF			M = Leads formed out	120 = 0.120"
	7 = 500V	107 = 100μF				240 = 0.240"
						360 = 0.360"
						480 = 0.480"
						600 = 0.600"

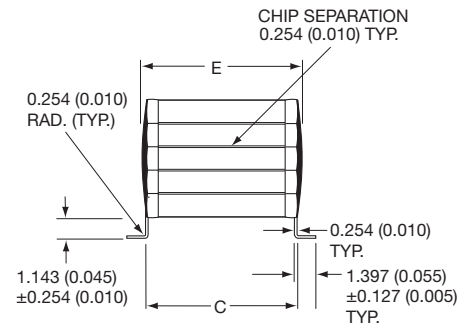
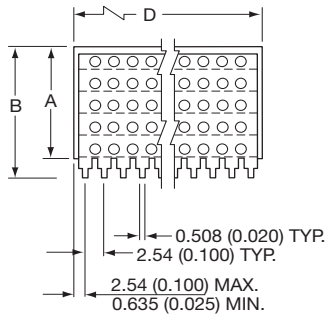
*Hi-Rel screening for consists of 100% Group A (B Level), Subgroup 1 per MIL-PRF-49470.



“N” STYLE LEADS



“K” STYLE LEADS



“M” STYLE LEADS

DIMENSIONS

millimeters (inches)

Style	A (max.)	B (max.)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
RMM3	See next table below for maximum "A" Dimension	For "N" Style Leads: "A" Dimension Plus 1.651 (0.065) For "K" & "M" Style Leads: "A" Dimension Plus 1.39 (0.055)	11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
RMM4			10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
RMM5			6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3

CAPACITANCE RANGE

Max Capacitance (µF) Available Versus Style and Height (Diminsion "A")

AVX STYLE	RMM3				RMM4				RMM5			
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
Height "A"												
0.120"	27	15	8.2	3.9	10	4.7	3.3	1.2	3.9	1.8	1.2	0.56
0.240"	56	27	15	6.8	18	8.2	6.8	2.2	6.8	3.3	2.2	1.0
0.360"	82	47	22	12	27	12	10	3.3	12	5.6	3.3	1.6
0.480"	100	56	33	15	39	18	12	4.7	15	6.8	4.7	2.2
0.600"	120	68	39	18	49	22	15	5.6	18	8.2	5.6	2.7



The SMM series SMPS capacitors incorporate the Super X7R dielectric material. AVX SMM stacked capacitors offer high dielectric constant (K) characteristics allowing for an extended capacitance range. The higher capacitance values in the smaller case sizes reduce the amount of board space needed to mount these components. The SMM series capacitors are designed for use in applications ranging from high end DC/DC converters to general power supplies, telecom networks, snubbers, aerospace instrumentation panels, hybrid power applications and more.

ELECTRICAL SPECIFICATIONS

Temperature Coefficient

±15%, -55°C to +125°C

Capacitance Test (MIL-STD-202 Method 305)

25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1 kHz

Dissipation Factor 25°C

2.5% Max @ 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1 kHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

1000 MΩ-μF, whichever is less

Insulation Resistance 125°C (MIL-STD-202 Method 302)

100 MΩ-μF, whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)

250% rated voltage for 5 seconds with 50 mA maximum charging current (500 Volt units @ 750 VDC)

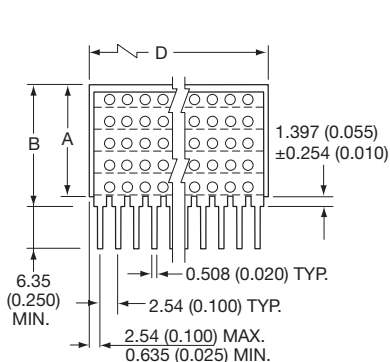
Life Test (1000 hrs)

200% rated voltage for at 125°C (500 Volts units @ 600 VDC)

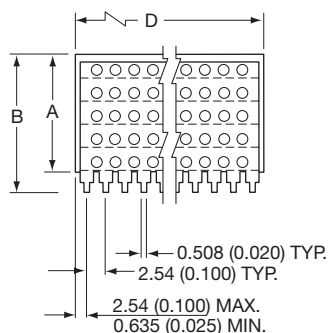
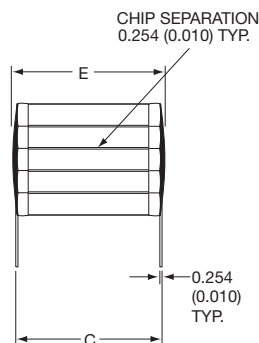
HOW TO ORDER

SMM4	5	186	M	A	K	120
AVX Style	Voltage	Capacitance Code	Tolerance	Test Level	Leads	Height
SMM3	5 = 50V	(pF - 2 significant digits + number of zeros)	K = ±10%	A = Standard	N = Straight Lead	Max
SMM4	1 = 100V	105 = 1μF	M = ±20%	B = Hi-Rel*	K = Leads formed in	Dimension "A"
SMM5	2 = 200V	106 = 10μF			M = Leads formed out	120 = 0.120"
	7 = 500V	107 = 100μF				240 = 0.240"
						360 = 0.360"
						480 = 0.480"
						600 = 0.600"

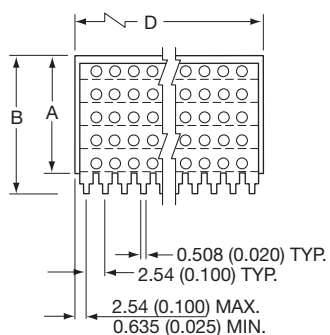
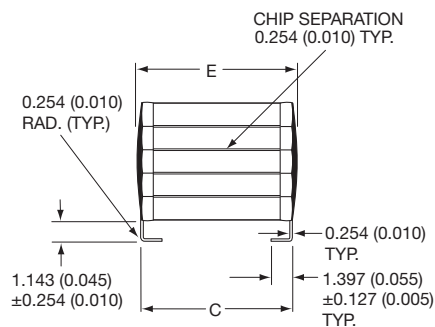
*Hi-Rel screening for consists of 100% Group A (B Level), Subgroup 1 per MIL-PRF-49470.



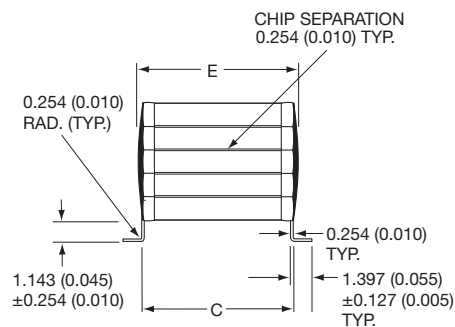
“N” STYLE LEADS



“K” STYLE LEADS



“M” STYLE LEADS



DIMENSIONS

millimeters (inches)

Style	A (max.)	B (max.)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
SMM3	See next table below for maximum "A" Dimension	For "N" Style Leads: "A" Dimension Plus 1.651 (0.065)	11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
SMM4		For "K" & "M" Style Leads: "A" Dimension Plus 1.39 (0.055)	10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
SMM5			6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3

CAPACITANCE RANGE

Max Capacitance (µF) Available Versus Style and Height (Diminsion "A")

AVX STYLE	SMM3				SMM4				SMM5			
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
Height "A"												
0.120"	27	15	8.2	3.9	10	4.7	3.3	1.2	3.9	1.8	1.2	0.56
0.240"	56	27	15	6.8	18	8.2	6.8	2.2	6.8	3.3	2.2	1.0
0.360"	82	47	22	12	27	12	10	3.3	12	5.6	3.3	1.6
0.480"	100	56	33	15	39	18	12	4.7	15	6.8	4.7	2.2
0.600"	120	68	39	18	49	22	15	5.6	18	8.2	5.6	2.7



SMX-style, stacked Switch Mode Power Supply Capacitors (SMPS) utilizing Multilayer Ceramic (MLCC) construction are ideally suited for high temperature applications up to 200°C. This product is intended for downhole oil exploration, including logging while drilling, geophysical probes, as well as space and aerospace electronics. The high temperature solder utilized in the construction of SMX-style parts assures reliable operation in harsh environments. The wide product offering provides designers a solution for high capacitance value and high voltage capacitors rated at 200°C. The SMX-style capacitors are ideally suited for applications as DC filters in high power, high frequency motor drives, high pulsed-current circuitry, as well as low power electronics.

SMX-style, SMPS capacitors are characterized with excellent performance in comparison to wet tantalum products. The main benefits of SMX-product over wet tantalum capacitors include:

- Much lower ESR and lower losses
- Excellent capacitance retention with frequency
- Excellent high frequency performance
- Low DC leakage current
- Much higher current handling capabilities

ELECTRICAL SPECIFICATIONS

Temperature Coefficient

COG: A Temperature Coefficient 0 ±30 ppm/°C, -55° to +200°C
 VHT: C Temperature Coefficient ±15%, -55°C to +125°C
 +15% - 56%, -55°C to +200°C

Capacitance Test (MIL-STD-202 Method 305)
 25°C, 1.0±0.2 Vrms (open circuit voltage) at 1KHz

Dissipation Factor 25°C

COG: 0.15% Max @ 25°C, 1.0±0.2 Vrms (open circuit voltage) at 1KHz
 VHT: 2.5% Max @ 25°C, 1.0±0.2 Vrms (open circuit voltage) at 1KHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)
 100K MΩ or 1000 MΩ-μF, whichever is less.

Insulation Resistance 125°C (MIL-STD-202 Method 302)
 10K MΩ or 100 MΩ-μF, whichever is less.

Insulation Resistance 200°C (MIL-STD-202 Method 302)
 1K MΩ or 10 MΩ -μF, whichever is less.

Dielectric Withstanding Voltage 25°C (Flash Test)
 250% rated voltage for 5 seconds with 50 mA max charging current. (500 Volt units @ 750 VDC)

Moisture Resistance (MIL-STD-202 Method 106)
 Ten cycles with no voltage applied.

Thermal Shock (MIL-STD-202 Method 107, Condition A)

Immersion Cycling (MIL-STD-202 Method 104, Condition B)

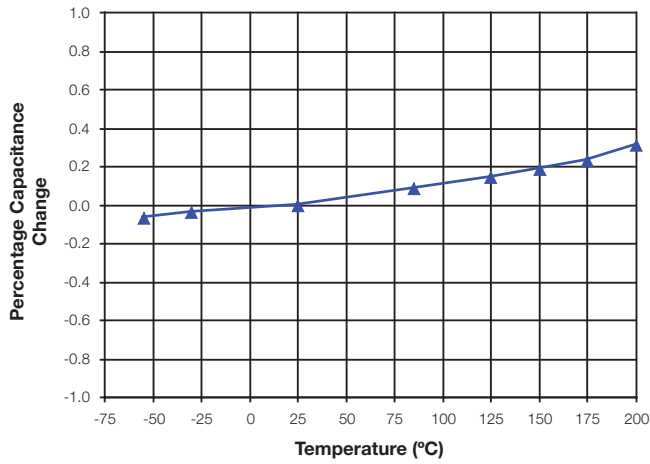
Resistance To Solder Heat (MIL-STD-202, Method 210, Condition B, for 20 seconds)

HOW TO ORDER

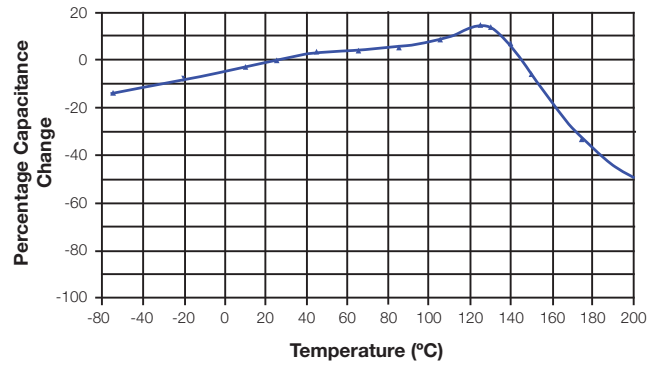
SMX	1	7	C	106	M	A	N	650
AVX Style SMX = Uncoated	Size See Dimensions chart	Voltage 25 = 3 50V = 5 100V = 1 200V = 2 500V = 7	Temperature Coefficient COG = A VHT = C	Capacitance Code (2 significant digits + number of zeros) 10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1 μF = 105 10 μF = 106 100 μF = 107	Capacitance Tolerance COG: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	Test Level A = Standard	Termination N = Straight Lead J = Leads formed in L = Leads formed out P = P Style Leads Z = Z Style Leads	Height Max Dimension "A" 120 = 0.120" 240 = 0.240" 360 = 0.360" 480 = 0.480" 650 = 0.650"

Note: Capacitors with X7R/X9U dielectric is not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations.

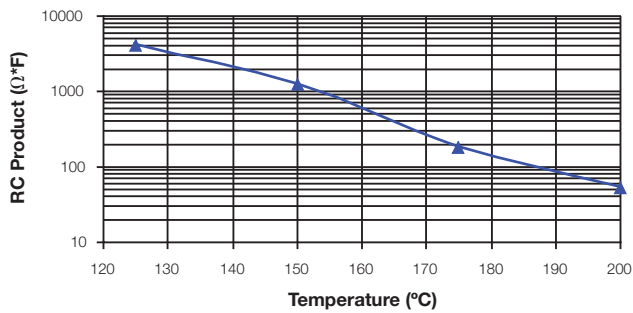
Typical Extended Temperature TCC
Characterization of C0G, SMPS Capacitors
 Test conditions: 1 Vrms, 1 kHz, 0 VDC bias



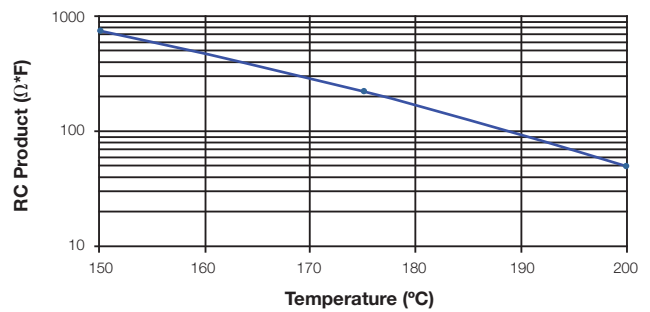
Typical Extended Temperature TCC
Characterization of VHT, SMPS Capacitors
 Test conditions: 1 Vrms, 1 kHz, 0 VDC bias



Typical Extended Temperature IR Characterization of
C0G, SMPS Capacitors

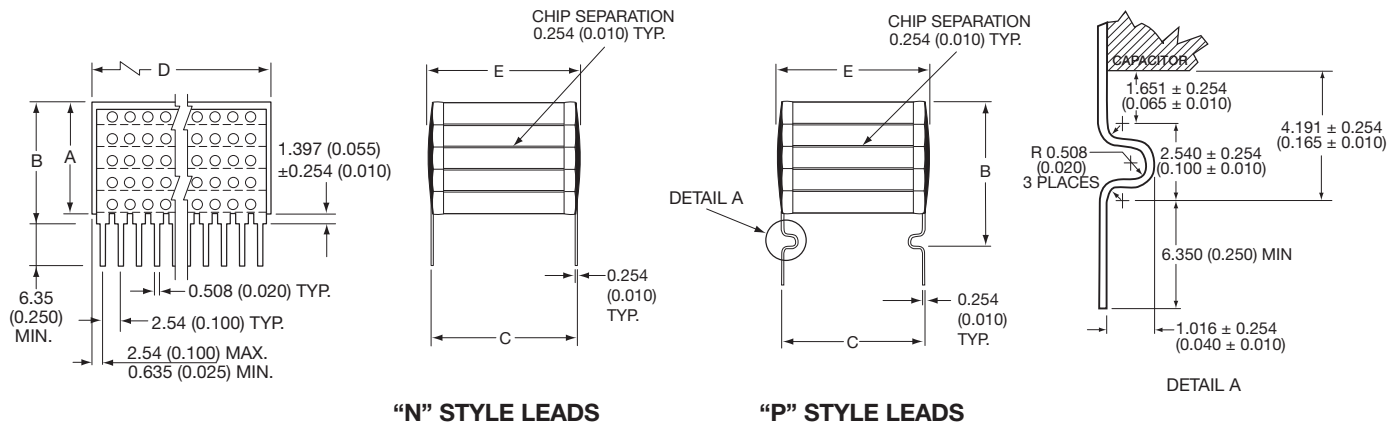


Typical Extended Temperature IR Characterization of
VHT, SMPS Capacitors



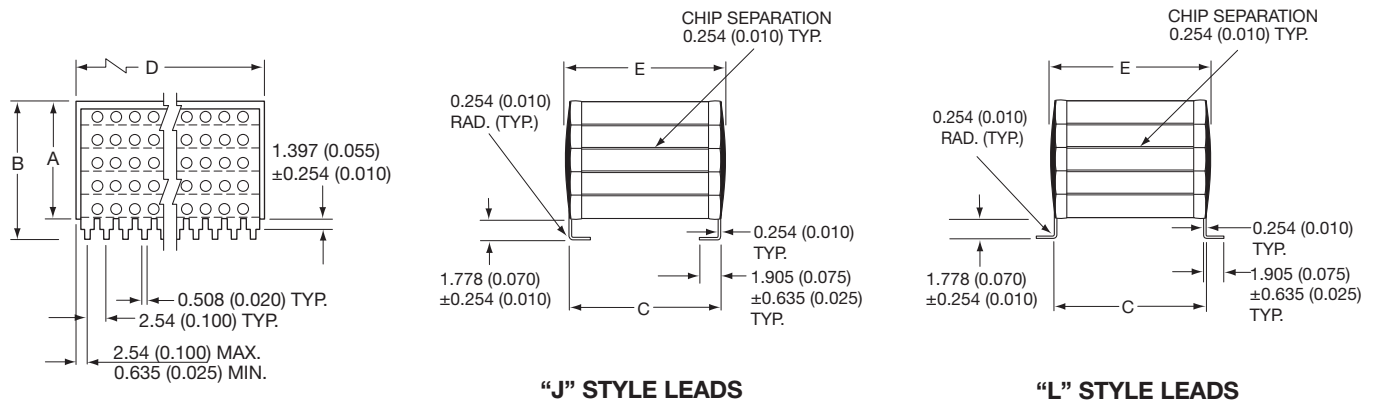
SMPS Stacked MLC Capacitors

SMX Style for High Temperature Applications up to 200°C



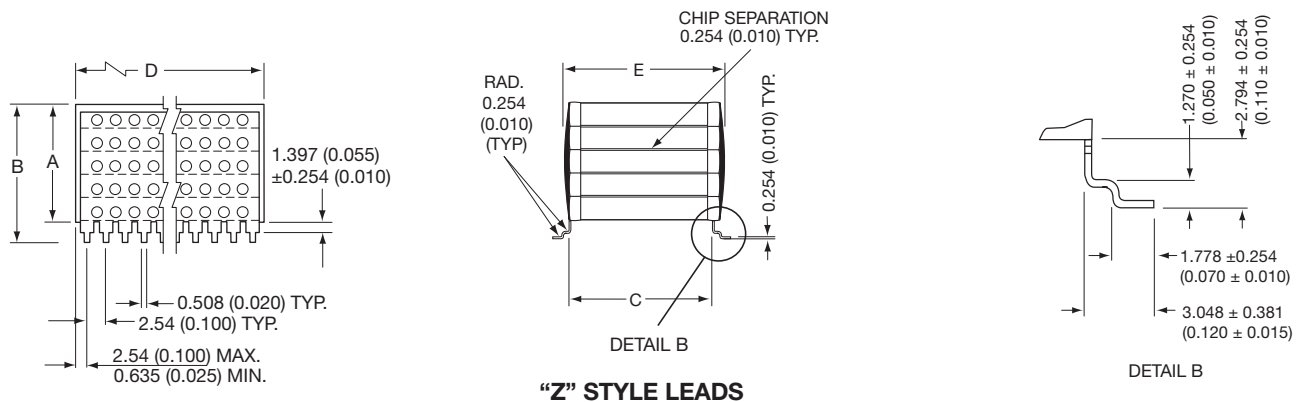
“N” STYLE LEADS

“P” STYLE LEADS



“J” STYLE LEADS

“L” STYLE LEADS



“Z” STYLE LEADS

DIMENSIONS

millimeters (inches)

Style	A (max.)	B (max.)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
SMX1	See page 40 for maximum “A” Dimension	For “N” Style Leads: “A” Dimension Plus 1.651 (0.065) For “J” & “L” Style Leads: “A” Dimension Plus 2.032 (0.080) For “P” Style Leads: “A” Dimension Plus 4.445 (0.175) For “Z” Style Leads: “A” Dimension Plus 3.048 (0.120)	11.4 (0.450)	52.1 (2.050)	12.7 (0.500)	20
SMX2			20.3 (0.800)	38.4 (1.510)	22.1 (0.870)	15
SMX3			11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
SMX4			10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
SMX5			6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3
SMX6			31.8 (1.250)	52.1 (2.050)	34.3 (1.350)	20

Max Capacitance (µF) Available Versus Style with Height (A) of 0.120" - 3.05mm

AVX STYLE	SMX1					AN120					SMX2					AN120					SMX3					AN120					SMX4					AN120					SMX5					AN120					SMX6					AN120				
	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V										
COG	1.0	.70	.40	.18	.068	1.2	1.0	.60	.26	.10	.50	.40	.20	.09	.033	.16	.13	.07	.02	.01	.05	.04	.02	.01	0039	3.2	2.4	1.3	.50	.20																														
VHT	-	18	10	3.9	1.8	-	27	15	5.6	2.7	12	8.2	4.7	1.8	.82	3.9	2.7	1.5	.56	.27	1.5	1.0	.56	.22	.10	-	56	33	12	5.6																														

Max Capacitance (µF) Available Versus Style with Height (A) of 0.240" - 6.10mm

AVX STYLE	SMX1					AN240					SMX2					AN240					SMX3					AN240					SMX4					AN240					SMX5					AN240					SMX6					AN240				
	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V															
COG	2.0	1.4	.80	.36	.13	2.4	2.0	1.2	.52	.20	1.0	.80	.40	.18	.068	.33	.26	.14	.05	.02	.10	.08	.05	.02	0078	6.4	4.8	2.6	1.0	.40																														
VHT	-	33	18	6.8	3.3	-	47	27	10	4.7	22	15	8.2	3.3	1.5	6.8	4.7	2.7	1.0	.47	2.7	1.8	1.0	.39	.18	-	100	56	22	10																														

Max Capacitance (µF) Available Versus Style with Height (A) of 0.360" - 9.14mm

AVX STYLE	SMX1					AN360					SMX2					AN360					SMX3					AN360					SMX4					AN360					SMX5					AN360					SMX6					AN360				
	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V															
COG	3.0	2.1	1.2	.54	.22	3.6	3.0	1.8	.78	.30	1.5	1.2	.60	.27	.10	.48	.39	.21	.07	.03	.15	.12	.07	.03	.011	10	7.2	3.9	1.5	.60																														
VHT	-	47	27	10	4.7	-	68	39	15	6.8	33	22	12	5.6	2.2	12	6.8	3.9	1.5	.68	3.9	2.7	1.5	.56	.27	-	150	82	33	15																														

Max Capacitance (µF) Available Versus Style with Height (A) of 0.480" - 12.2mm

AVX STYLE	SMX1					AN480					SMX2					AN480					SMX3					AN480					SMX4					AN480					SMX5					AN480					SMX6					AN480				
	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V															
COG	4.0	2.8	1.6	.72	.27	4.8	4.0	2.2	1.0	.40	2.0	1.6	.80	.36	.130	.64	.52	.28	.10	.04	.20	.16	.10	.04	.015	13	9.6	5.2	2.0	.80																														
VHT	-	68	39	15	6.8	-	100	56	22	10	47	33	18	6.8	3.3	15	10	5.6	2.2	1.0	5.6	3.9	2.2	.82	.39	-	220	120	47	22																														

Max Capacitance (µF) Available Versus Style with Height (A) of 0.650" - 16.5mm

AVX STYLE	SMX1					AN650					SMX2					AN650					SMX3					AN650					SMX4					AN650					SMX5					AN650					SMX6					AN650				
	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V	25V	50V	100V	200V	500V															
COG	5.0	3.5	2.0	.90	.34	6.0	5.0	3.0	1.3	.50	2.5	2.0	1.0	.45	.160	.82	.65	.35	.12	.05	.25	.20	.12	.05	.019	16	12	6.5	2.5	1.0																														
VHT	-	82	47	18	8.2	-	120	68	27	12	56	39	22	8.2	3.9	18	12	6.8	2.7	1.2	6.8	4.7	2.7	1.0	.47	-	270	150	56	27																														

For the requirements that cannot be satisfied by standard SMPS style products (SM0-style or SM9-style), AVX offers leading edge solutions in custom configuration and packaging. Ranging from unique geometries, lead configurations, packaging and stress relief mounting options, AVX has optimized solutions for a wide range of customer specific designs. The solutions provided by AVX maintain high reliability of stacked capacitor product originally developed by AVX and historically recognized as the highest reliability product in the market. Custom packaging options provide solutions that eliminate reliability concerns in the next level assembly. These custom options provide the following benefits:

- eliminate soldering requirements altogether by providing means of electrical/mechanical connection to the circuit
- provide options for remote soldering away from large ceramic capacitor body and eliminating the risk of thermal shock (refer to photograph with soft, insulated leads soldered to the stacked capacitor using high melting point SN10 solder)

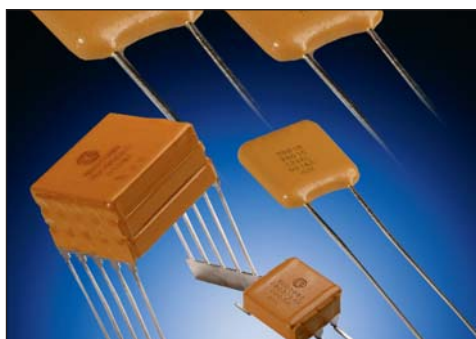
Many other innovations are available from AVX Olean Advanced Products. Let them apply these ideas to your application specific requirements. Please contact AVX for a solution that will meet demands of your program requirements.

CUSTOM LEAD CONFIGURATIONS...



CUSTOM PACKAGING...





HIGH VOLTAGE CHIP CAPACITORS

Capacitors, Fixed, Chip, Ceramic Dielectric, Type II, High Voltage, Based on Styles 1812 and 1825 for use in ESCC space programs, according to ESCC Generic Specification 3009 and associated Detail Specification 3009/034 as recommended by the Space Components Coordination Group. (ranges in table below)

HOW TO ORDER

3009034

Detail Spec Number

XX

Type Variant
(per table)

B

Test Level

C = Standard test level
B = Level C plus serialized and capacitance recorded before and after 100% burn-in.

XXX

Capacitance Code

The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e.
102 = 1000pF
103 = 10000pF

Eg 300903401C223

Size	Variant	Rated Voltage (kV)	Tolerance (%)	Capacitance Code (E12)
1812	01	1.0	±10	392 - 223
	02		±20	
	03		±10	
	04	2.0	±20	152 - 182
	05		±10	
	06		±20	
1825	07	1.0	±10	273 - 563
	08		±20	
	09		±10	
	10	2.0	±20	222 - 682
	11		±10	
	12		±20	

HIGH VOLTAGE LEADED CAPACITORS

Capacitors, Fixed, Ceramic Dielectric, Type II, High Voltage, 1.0 to 5.0 kV, Based on Case Styles VR, CV and CH for use in ESCC space programs, according to ESCC Generic Specification 3001 and associated Detail Specification 3001/034 as recommended by the Space Components Coordination Group. (ranges in table)

Note 1: Lead Types

- a - Leaded Radial (epoxy coated)
- b - Leaded Radial (Polyurethane Varnish)
- c - Straight Dual in Line
- d - L Dual in Line

Note 2: Tolerances of ±10% and ±20% are available

Case Size	Variant	Lead Type	Capacitance Code (E12)				
			1.0kV	2.0kV	3.0kV	4.0kV	5.0kV
VR30S	01	a	392 - 203	152 - 182	821 - 102		
VR30	02	a	273 - 563	222 - 682	821 - 392		
VR40	03	a	473 - 124	822 - 153	472 - 103	182 - 222	
VR50	04	a	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
VR66	05	a	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
VR84	06	a	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
VR90	07	a	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CV41	08	b	473 - 124	822 - 153	472 - 103	182 - 222	
CH41	09	c	473 - 124	822 - 153	472 - 103	182 - 222	
CH41	10	d	473 - 124	822 - 153	472 - 103	182 - 222	
CV51	11	b	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CH51	12	c	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CH51	13	d	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CV61	14	b	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CH61	15	c	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CH61	16	d	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CV76	17	b	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CH76	18	c	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CH76	19	d	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CV91	20	b	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CH91	21	c	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CH91	22	d	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563

HOW TO ORDER

3001034

Detail Spec Number

XX

Type Variant
(per table above)

B

Test Level

C = Standard test level
B = Level C plus serialized and capacitance recorded before and after 100% burn-in.

XXX

Capacitance Code

The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e.
102 = 1000pF
103 = 10000pF

K

Capacitance Tolerance
K = 10%
M = 20%

X

Voltage
M = 1kV
P = 2kV
R = 3kV
S = 4kV
Z = 5kV

HIGH CAPACITANCE LEADED CAPACITORS

Capacitors, Fixed, Ceramic Dielectric, Type II, High Capacitance, Based on Case Styles BR, CV and CH for use in ESCC space programs, according to ESCC Generic Specification 3001 and associated Detail Specification 3001/030 as recommended by the Space Components Coordination Group. (see ranges in table below)

Note 1: Lead Types

- a - Leaded Radial (epoxy coated)
- b - Leaded Radial (Polyurethane Varnish)
- c - Straight Dual in Line
- d - L Dual in Line

Note 2: Tolerances of ±10% and ±20% are available

Case Size	Variant	Figure	Capacitance Code (E12)			
			50V	100V	200V	500V
BR40	01	a	185 - 335	125 - 275	334 - 564	124 - 224
BR50	02	a	395 - 565	225 - 395	684 - 105	274 - 394
BR66	03	a	685 - 106	475 - 825	105 - 225	474 - 105
BR72	04	a	126 - 186	825 - 156	225 - 335	824 - 155
BR84	05	a	126 - 186	825 - 156	225 - 335	824 - 155
CV41	06	b	185 - 335	125 - 275	334 - 564	124 - 224
CH41	07	c	185 - 335	125 - 275	334 - 564	124 - 224
CH41	08	d	185 - 335	125 - 275	334 - 564	124 - 224
CH42	09	c	395 - 685	335 - 565	684 - 125	274 - 474
CH42	10	d	395 - 685	335 - 565	684 - 125	274 - 474
CH43	11	c	825 - 106	685 - 825	155 - 185	564 - 684
CH43	12	d	825 - 106	685 - 825	155 - 185	564 - 684
CH44	13	c	126	106	225	824 - 105
CH44	14	d	126	106	225	824 - 105
CV51	15	b	395 - 565	225 - 395	684 - 105	274 - 394
CH51	16	c	395 - 565	225 - 395	684 - 105	274 - 394
CH51	17	d	395 - 565	225 - 395	684 - 105	274 - 394
CH52	18	c	685 - 106	475 - 825	125 - 225	474 - 824
CH52	19	d	685 - 106	475 - 825	125 - 225	474 - 824
CH53	20	c	126 - 156	106 - 126	275 - 335	105 - 125
CH53	21	d	126 - 156	106 - 126	275 - 335	105 - 125
CH54	22	c	186 - 226	156	395	155
CH54	23	d	186 - 226	156	395	155
CV61	24	b	685 - 106	475 - 825	105 - 225	474 - 105
CH61	25	c	685 - 106	475 - 825	105 - 225	474 - 105
CH61	26	d	685 - 106	475 - 825	105 - 225	474 - 105
CH62	27	c	126 - 226	106 - 156	275 - 475	105 - 185
CH62	28	d	126 - 226	106 - 156	275 - 475	105 - 185
CH63	29	c	276 - 336	186 - 226	565 - 685	225 - 275
CH63	30	d	276 - 336	186 - 226	565 - 685	225 - 275
CH64	31	c	396	276 - 336	825 - 106	335
CH64	32	d	396	276 - 336	825 - 106	335
CV71	33	b	126 - 186	825 - 156	225 - 335	824 - 155
CH71	34	c	126 - 186	825 - 156	225 - 335	824 - 155
CH71	35	d	126 - 186	825 - 156	225 - 335	824 - 155
CH72	36	c	226 - 396	186 - 276	395 - 685	185 - 335
CH72	37	d	226 - 396	186 - 276	395 - 685	185 - 335

Case Size	Variant	Figure	Capacitance Code (E12)			
			50V	100V	200V	500V
CH73	38	c	476 - 566	336 - 396	825 - 106	395 - 475
CH73	39	d	476 - 566	336 - 396	825 - 106	395 - 475
CH74	40	c	686	476	126	565
CH74	41	d	686	476	126	565
CV76	42	b	126 - 186	825 - 156	225 - 335	824 - 155
CH76	43	c	126 - 186	825 - 156	225 - 335	824 - 155
CH76	44	d	126 - 186	825 - 156	225 - 335	824 - 155
CH77	45	c	226 - 396	186 - 276	395 - 685	185 - 335
CH77	46	d	226 - 396	186 - 276	395 - 685	185 - 335
CH78	47	c	476 - 566	336 - 396	825 - 106	395 - 475
CH78	48	d	476 - 566	336 - 396	825 - 106	395 - 475
CH79	49	c	686	476	126	565
CH79	50	d	686	476	126	565
CH81	51	c	156 - 226	126 - 186	225 - 395	824 - 155
CH81	52	d	156 - 226	126 - 186	225 - 395	824 - 155
CH82	53	c	276 - 476	226 - 396	475 - 825	
CH82	54	d	276 - 476	226 - 396	475 - 825	
CH83	55	c	566 - 686	476 - 566	106 - 126	
CH83	56	d	566 - 686	476 - 566	106 - 126	
CH84	57	c	826	686	156	
CH84	58	d	826	686	156	
CH86	59	c	226 - 336	156 - 276	395 - 685	155 - 225
CH86	60	d	226 - 336	156 - 276	395 - 685	155 - 225
CH87	61	c	396 - 686	336 - 566	825 - 156	
CH87	62	d	396 - 686	336 - 566	825 - 156	
CH88	63	c	826 - 107	686 - 826	186 - 226	
CH88	64	d	826 - 107	686 - 826	186 - 226	
CH89	65	c	127	107	276	
CH89	66	d	127	107	276	
CH91	67	c	396 - 476	336 - 396	825 - 106	
CH91	68	d	396 - 476	336 - 396	825 - 106	
CH92	69	c	566 - 107	476 - 826	126 - 226	
CH92	70	d	566 - 107	476 - 826	126 - 226	
CH93	71	c	127 - 157	107 - 127	276 - 336	
CH93	72	d	127 - 157	107 - 127	276 - 336	
CH94	73	c	187	157	396	
CH94	74	d	187	157	396	

HOW TO ORDER

3001030

Detail Spec Number

XX

Type Variant (per table above)

B

Test Level

C = Standard test level
B = Level C plus serialized and capacitance recorded before and after 100% burn-in.

XXX

Capacitance Code

The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e.

102 = 1000pF
103 = 10000pF

K

Capacitance Tolerance

K = 10%
M = 20%

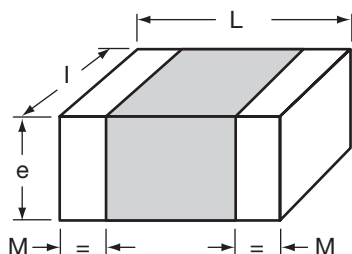
X

Voltage

C = 50V
E = 100V
G = 200V
L = 500V

ESCC DETAIL SPECIFICATION NO. 3009/034 PHYSICAL DIMENSIONS

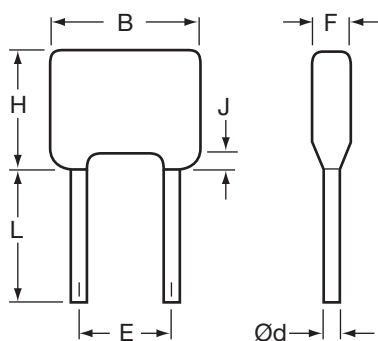
Millimeters (Inches)



Symbol	Variants 01 to 06		Variants 07 to 12	
	Min.	Max.	Min.	Max.
L	4.20 (0.165)	5.00 (0.197)	4.20 (0.165)	5.00 (0.197)
l	2.80 (0.110)	3.60 (0.142)	5.67 (0.223)	6.67 (0.263)
e	-	3.00 (0.118)	-	3.30 (0.130)
M	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)

ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – VR STYLE

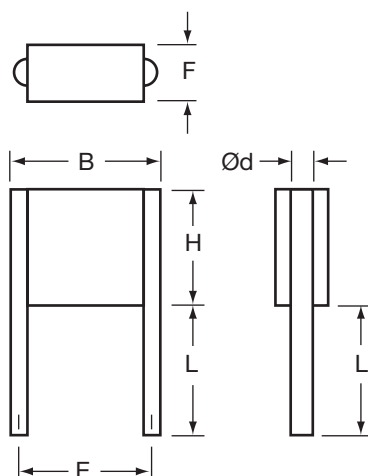
Millimeters (Inches)



Variant	Case Size	B		Ød		E		F	H	J	L
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	
01	VR30S	7.62 (0.300)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	4.60 (0.181)	1.50 (0.059)	31.7 (1.248)	
02	VR30	7.62 (0.300)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	9.62 (0.379)	1.50 (0.059)	31.7 (1.248)	
03	VR40	10.16 (0.400)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	11.7 (0.461)	1.50 (0.059)	31.7 (1.248)	
04	VR50	12.7 (0.500)	0.59 (0.023)	0.69 (0.027)	9.66 (0.380)	10.66 (0.420)	5.10 (0.201)	14.2 (0.559)	1.50 (0.059)	31.7 (1.248)	
05	VR66	17.5 (0.689)	0.86 (0.034)	0.96 (0.038)	14.2 (0.559)	15.2 (0.598)	6.40 (0.252)	16.5 (0.650)	1.50 (0.059)	31.7 (1.248)	
06	VR84	23.62 (0.930)	0.86 (0.034)	0.96 (0.038)	20.4 (0.803)	22.0 (0.866)	6.40 (0.252)	19.78 (0.779)	1.50 (0.059)	31.7 (1.248)	
07	VR90	23.5 (0.925)	0.86 (0.034)	0.96 (0.038)	20.4 (0.803)	22.0 (0.866)	6.40 (0.252)	42.0 (1.654)	1.50 (0.059)	31.7 (1.248)	

ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CV STYLE

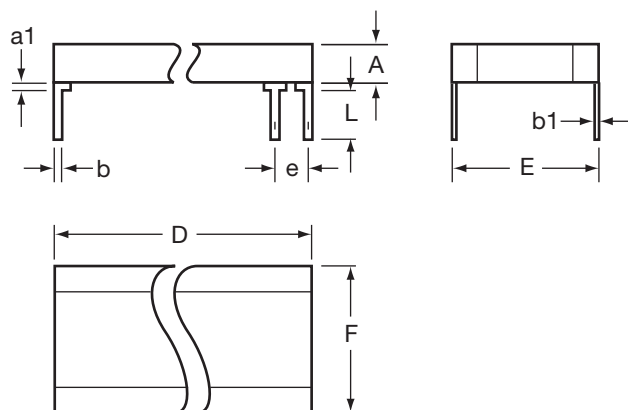
Millimeters (Inches)



Variant	Case Size	B		Ød		E		F	H	L	
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	
08	CV41	10.6 (0.417)	0.65 (0.026)	0.75 (0.030)	7.70 (0.303)	8.70 (0.343)	3.80 (0.150)	8.70 (0.343)	22.0 (0.866)	28.0 (1.102)	
11	CV51	11.9 (0.469)	0.85 (0.033)	0.95 (0.037)	9.66 (0.380)	10.66 (0.420)	3.80 (0.150)	10.7 (0.421)	22.0 (0.866)	28.0 (1.102)	
14	CV61	16.5 (0.650)	0.85 (0.033)	0.95 (0.037)	14.74 (0.580)	15.74 (0.620)	3.80 (0.150)	13.6 (0.535)	22.0 (0.866)	28.0 (1.102)	
17	CV76	22.7 (0.894)	0.85 (0.033)	0.95 (0.037)	20.4 (0.803)	22.0 (0.866)	3.80 (0.150)	16.6 (0.654)	22.0 (0.866)	28.0 (1.102)	
20	CV91	22.7 (0.894)	1.15 (0.045)	1.25 (0.049)	20.4 (0.803)	22.0 (0.866)	3.80 (0.150)	40.6 (1.598)	22.0 (0.866)	28.0 (1.102)	

ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CH STYLE, D.I.L.

Millimeters (Inches)



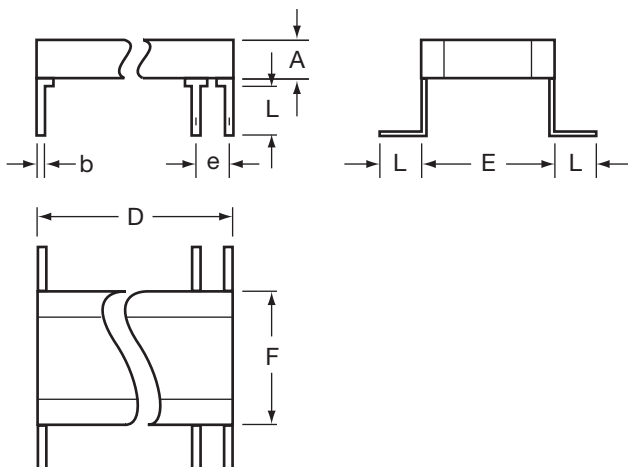
Symbol	Min.	Max.	Notes
a1	-	2.00 (0.079)	1
b	0.45 (0.018)	0.55 (0.022)	1
b1	0.204 (0.008)	0.304 (0.012)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	12.0 (0.472)	14.0 (0.551)	1

Notes: 1 – All leads
2 – Each space

Variant	Case Size	A		D		E		F
		Max.	Max.	Min.	Max.	Min.	Max.	
07	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)		
09	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)		
11	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)		
13	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)		
16	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)		
18	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)		
20	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)		
22	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)		
25	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)		
27	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)		
29	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)		
31	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)		
34	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)		
36	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)		
38	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)		
40	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)		
43	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)		
45	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)		
47	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)		
49	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)		
51	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)		
53	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)		
55	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)		
57	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)		
59	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)		
61	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)		
63	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)		
65	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)		
67	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)		
69	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)		
71	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)		
73	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)		

ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CH STYLE, L

Millimeters (Inches)



Variant	Case Size	A		D		E		F
		Max.	Max.	Min.	Max.	Min.	Max.	
10	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)		
13	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)		
16	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)		
19	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)		
22	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)		

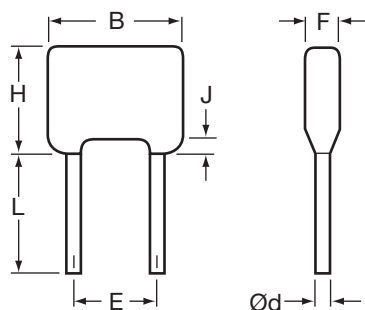
Symbol	Min.	Max.	Notes
b	0.45 (0.018)	0.55 (0.022)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.01 (0.120)	1

Notes: 1 – All leads
2 – Each space

ESCC DETAIL SPECIFICATION NO. 3001/030

PHYSICAL DIMENSIONS – BR STYLE

Millimeters (Inches)

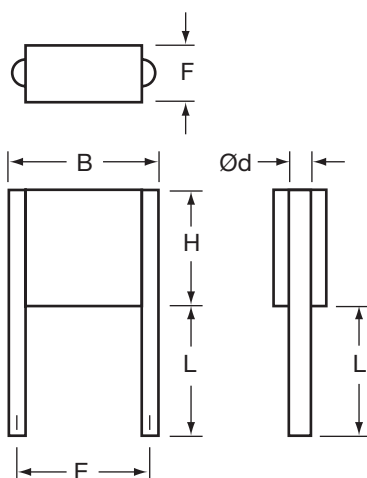


Variant	Case Size	B	Ød		E		F	H	J	L
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.
01	BR40	10.16	0.46	0.56	4.58	5.58	5.00	11.7	1.50	31.7
		(0.400)	(0.018)	(0.022)	(0.180)	(0.220)	(0.197)	(0.461)	(0.059)	(1.248)
02	BR50	12.7	0.59	0.69	9.66	10.66	5.10	14.2	1.50	31.7
		(0.500)	(0.023)	(0.027)	(0.380)	(0.420)	(0.201)	(0.559)	(0.059)	(1.248)
03	BR66	17.5	0.86	0.96	14.2	15.2	6.40	16.5	1.50	31.7
		(0.689)	(0.034)	(0.038)	(0.559)	(0.598)	(0.252)	(0.650)	(0.059)	(1.248)
04	BR72	19.3	0.86	0.96	14.74	15.74	6.40	24.0	1.50	31.7
		(0.760)	(0.034)	(0.038)	(0.580)	(0.620)	(0.252)	(0.945)	(0.059)	(1.248)
05	BR84	23.62	0.71	0.81	18.93	20.83	6.40	19.78	1.50	31.7
		(0.930)	(0.028)	(0.032)	(0.745)	(0.820)	(0.252)	(0.779)	(0.059)	(1.248)

ESCC DETAIL SPECIFICATION NO. 3001/030

PHYSICAL DIMENSIONS – CV STYLE

Millimeters (Inches)

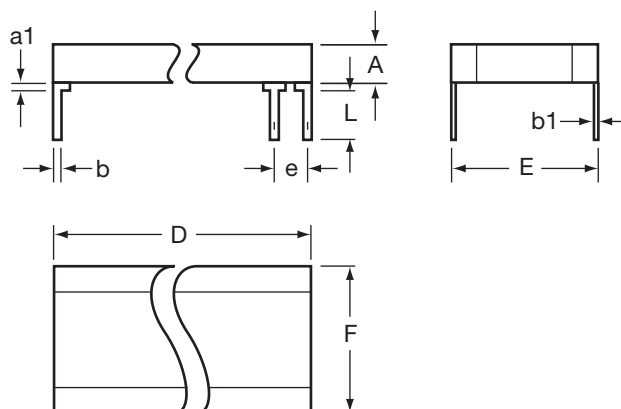


Variant	Case Size	B	Ød		E		F	H	L	
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.
06	CV41	10.6	0.65	0.75	7.70	8.70	3.80	8.70	22.0	28.0
		(0.417)	(0.026)	(0.030)	(0.303)	(0.343)	(0.150)	(0.343)	(0.866)	(1.102)
15	CV51	11.9	0.85	0.95	9.66	10.66	3.80	10.7	22.0	28.0
		(0.469)	(0.033)	(0.037)	(0.380)	(0.420)	(0.150)	(0.421)	(0.866)	(1.102)
24	CV61	16.5	0.85	0.95	14.74	15.74	3.80	13.6	22.0	28.0
		(0.650)	(0.033)	(0.037)	(0.580)	(0.620)	(0.150)	(0.535)	(0.866)	(1.102)
33	CV71	17.8	0.85	0.95	14.74	15.74	3.80	21.6	22.0	28.0
		(0.701)	(0.033)	(0.037)	(0.580)	(0.620)	(0.150)	(0.850)	(0.866)	(1.102)
42	CV76	22.7	0.85	0.95	20.4	22.0	3.80	16.6	22.0	28.0
		(0.894)	(0.033)	(0.037)	(0.803)	(0.866)	(0.150)	(0.654)	(0.866)	(1.102)

ESCC DETAIL SPECIFICATION NO. 3001/030

PHYSICAL DIMENSIONS – CH STYLE, D.I.L.

Millimeters (Inches)



Symbol	Min.	Max.	Notes
a1	-	2.00 (0.079)	1
b	0.45 (0.018)	0.55 (0.022)	1
b1	0.204 (0.008)	0.304 (0.012)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.04 (0.120)	1

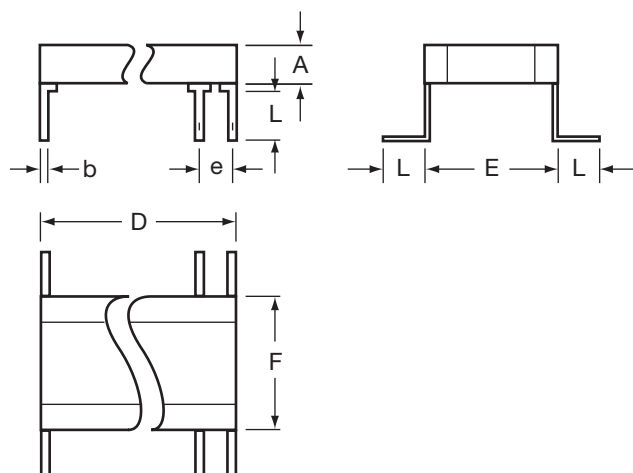
Notes: 1 – All leads
2 – Each space

Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
07	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
09	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
11	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
13	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
16	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
18	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
20	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
22	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
25	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
27	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
29	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
31	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
34	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
36	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
38	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
40	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
43	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
45	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
47	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
49	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
51	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
53	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
55	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
57	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
59	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
61	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
63	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
65	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
67	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
69	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
71	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
73	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)

ESCC DETAIL SPECIFICATION NO. 3001/030

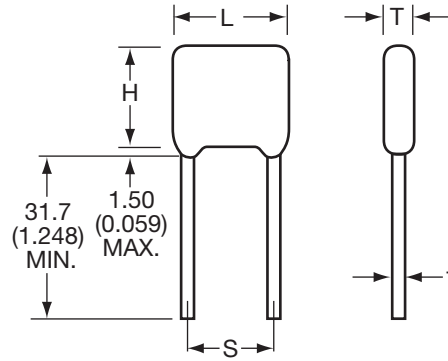
PHYSICAL DIMENSIONS – CH STYLE, L

Millimeters (Inches)



Symbol	Min.	Max.	Notes
b	0.45 (0.018)	0.55 (0.022)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.04 (0.120)	1

Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
08	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
10	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
12	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
14	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
17	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
19	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
21	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
23	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
26	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
28	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
30	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
32	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
35	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
37	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
39	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
41	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
44	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
46	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
48	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
50	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
52	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
54	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
56	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
58	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
60	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
62	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
64	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
66	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
68	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
70	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
72	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
73	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)



DIMENSIONS millimeters (inches)

Size Code	Length (L) (max.)	Height (H) (max.)	Thickness (T) (max.)	Nom (t)	S ±0.4
BR40	10.16 (0.400)	11.7 (0.460)	3.81 (0.150)	0.51 (0.020)	5.08 (0.200)
BR50	12.7 (0.500)	12.7 (0.500)	5.1 (0.200)	0.64 (0.025)	10.16 (0.400)
BR84	23.6 (0.930)	17.78 (0.700)	6.35 (0.250)	0.76 (0.030)	20.32 (0.800)

CECC APPROVED RANGE

	2C1/X7R CECC 30 701 801 Issue 1			
	50V	100V	200V	500V
BR40	185-275	125-185	334-474	473-154
BR50	395-475	225-275	684-105	104-394
BR84	475-186	475-156	105-335	474-155

HOW TO ORDER

BR	84	1	C	156	K	T	A
Style Code	Size Code See table above	Voltage Code 5 = 50V 1 = 100V 2 = 200V 7 = 500V	Dielectric Code A = COG C = X7R	Capacitance Code (2 significant digits + no. of zeros)	Capacitance Tolerance G = ±2% (COG only) J = ±5% (COG only) K = ±10% M = ±20% P = +100%/-0%	Specification Code T = CECC	Lead Length Code A = 31.7mm min

Note: If tape and reel is required, add TR to the end of the part number

ELECTRICAL SPECIFICATIONS

Temperature Coefficient

C0G: A Temperature Coefficient - 0 ± 30 ppm/°C, -55° to +125°C
 X7R: C Temperature Coefficient - $\pm 15\%$, -55° to +125°C
 Z5U: E Temperature Coefficient - +22, -56%, +10° to +85°C

Capacitance Test (MIL-STD-202 Method 305)

C0G: 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1KHz
 X7R: 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1KHz
 Z5U: 25°C, 0.5 Vrms max (open circuit voltage) at 1KHz

Dissipation Factor 25°C

C0G: 0.15% Max @ 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1KHz
 X7R: 2.5% Max @ 25°C, 1.0 ± 0.2 Vrms (open circuit voltage) at 1KHz
 Z5U: 3.0% Max @ 25°C, 0.5 Vrms max (open circuit voltage) at 1KHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

C0G and X7R: 100K MΩ or 1000 MΩ-μF, whichever is less.
 Z5U: 10K MΩ or 1000 MΩ-μF, whichever is less.

Insulation Resistance 125°C (MIL-STD-202 Method 302)

C0G and X7R: 10K MΩ or 100 MΩ-μF, whichever is less.
 Z5U: 1K MΩ or 100 MΩ-μF, whichever is less.

Dielectric Withstanding Voltage 25°C (Flash Test)

C0G and X7R: 250% rated voltage for 5 seconds with 50 mA max charging current. (500 Volt units @ 750 VDC)
 Z5U: 200% rated voltage for 5 seconds with 50 mA max charging current.

Life Test (1000 hrs)

C0G and X7R: 200% rated voltage at +125°C. (500 Volt units @ 600 VDC)
 Z5U: 150% rated voltage at +85°C

Moisture Resistance (MIL-STD-202 Method 106)

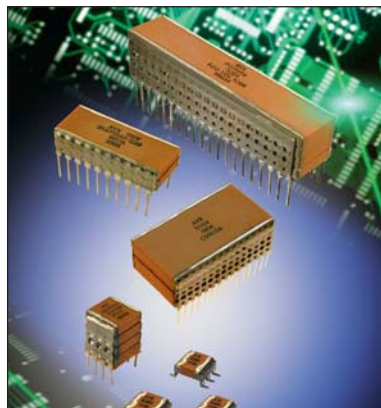
C0G, X7R, Z5U: Ten cycles with no voltage applied.

Thermal Shock (MIL-STD-202 Method 107, Condition A)

Immersion Cycling (MIL-STD-202 Method 104, Condition B)

Resistance To Solder Heat (MIL-STD-202, Method 210, Condition B, for 20 seconds)

Not RoHS Compliant



Typical ESR Performance (mΩ)

	Aluminum Electrolytic 100μF/50V	Low ESR Solid Tantalum 100μF/10V	Solid Aluminum Electrolytic 100μF/16V	MLCC SMPS 100μF/50V	MLCC SMPS 4.7μF/50V
ESR @ 10KHz	300	72	29	3	66
ESR @ 50KHz	285	67	22	2	23
ESR @ 100KHz	280	62	20	2.5	15
ESR @ 500KHz	265	56	18	4	8
ESR @ 1MHz	265	56	17	7	7.5
ESR @ 5MHz	335	72	17	12.5	8
ESR @ 10MHz	560	91	22	20	14

HOW TO ORDER

AVX Styles: SM-1, SM-2, SM-3, SM-4, SM-5, SM-6

SM0	1	7	C	106	M	A	N	650
AVX Style	Size	Voltage	Temperature Coefficient	Capacitance Code	Capacitance Tolerance	Test Level	Termination	Height
SM0 = Uncoated SM5 = Epoxy Coated	See Dimensions chart	5 = 50V 1 = 100V 2 = 200V 7 = 500V	A = C0G C = X7R E = Z5U	(2 significant digits + number of zeros) 100 = 10 pF 101 = 100 pF 102 = 1,000 pF 223 = 22,000 pF 224 = 220,000 pF 105 = 1μF 106 = 10 μF 107 = 100 μF	C0G: J = $\pm 5\%$ K = $\pm 10\%$ M = $\pm 20\%$ X7R: K = $\pm 10\%$ M = $\pm 20\%$ Z = +80%, -20% Z5U: M = $\pm 20\%$ Z = +80%, -20% P = GMV (+100, -0%)	A = Standard B = Hi-Rel* 5 = Standard/MIL** 6 = Hi-Rel/MIL***	N = Straight Lead J = Leads formed in L = Leads formed out P = P Style Leads Z = Z Style Leads	Max Dimension "A" 120 = 0.120" 240 = 0.240" 360 = 0.360" 480 = 0.480" 650 = 0.650"

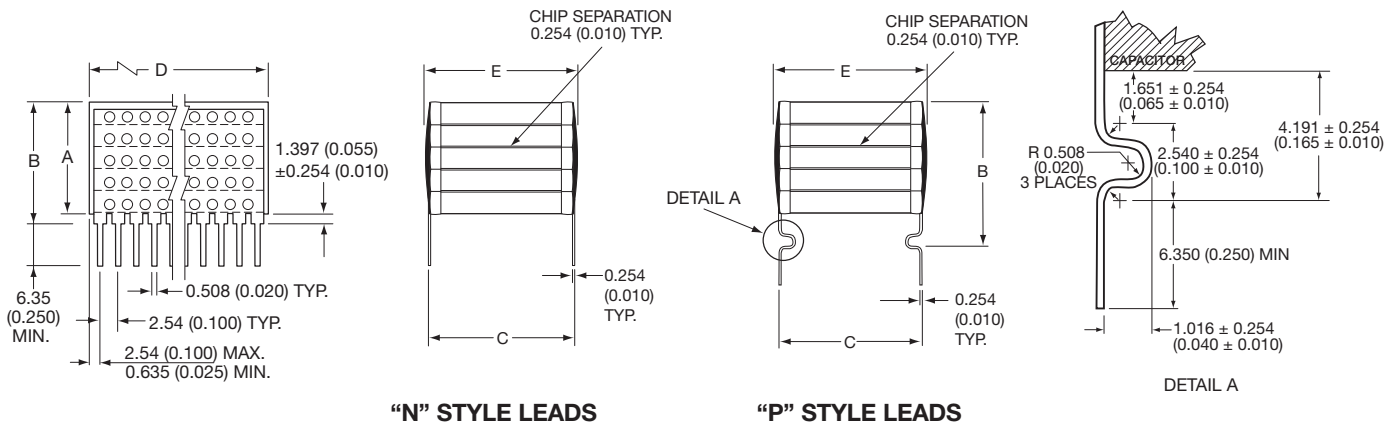
Note: Capacitors with X7R and Z5U dielectrics are not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations.

* Hi-Rel screening for C0G and X7R only. Screening consists of 100% Group A (B Level), Subgroup 1 per MIL-PRF-49470.

** Form, fit & function equivalent to MIL-PRF-49470 part. Applies to 50V rated parts only. No screening.

*** Form, fit & function equivalent to MIL-PRF-49470 part. Applies to 50V rated parts only. Hi-Rel screening the same as option B.

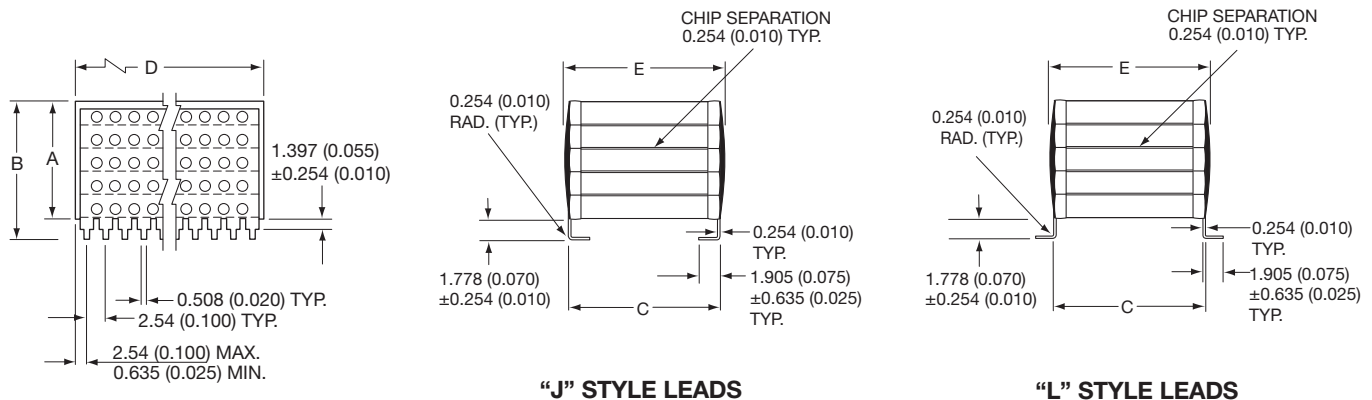
SMPS Stacked MLC Capacitors (SM Style) Technical Information on SMPS Capacitors



“N” STYLE LEADS

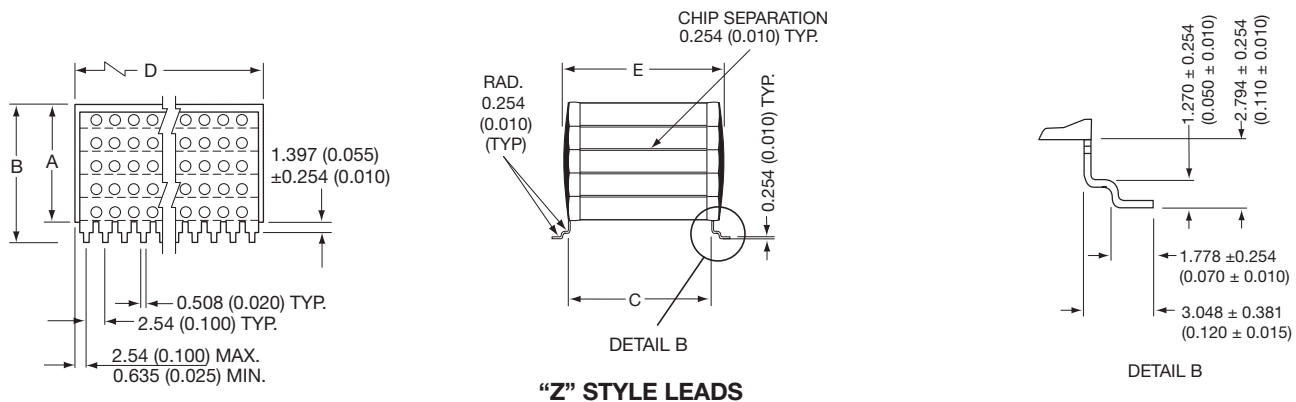
“P” STYLE LEADS

DETAIL A



“J” STYLE LEADS

“L” STYLE LEADS



“Z” STYLE LEADS

DETAIL B

DIMENSIONS

millimeters (inches)

Style	A (max.)	B (max.)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
SM-1	See page 10 for maximum “A” Dimension	For “N” Style Leads: “A” Dimension Plus 1.651 (0.065) For “J” & “L” Style Leads: “A” Dimension Plus 2.032 (0.080) For “P” Style Leads: “A” Dimension Plus 4.445 (0.175) For “Z” Style Leads: “A” Dimension Plus 3.048 (0.120)	11.4 (0.450)	52.1 (2.050)	12.7 (0.500)	20
SM-2			20.3 (0.800)	38.4 (1.510)	22.1 (0.870)	15
SM-3			11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
SM-4			10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
SM-5			6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3
SM-6			31.8 (1.250)	52.1 (2.050)	34.3 (1.350)	20

Max Capacitance (μF) Available Versus Style with Height (A) of 0.120" - 3.05mm

AVX STYLE	SM01 _____ AN120				SM02 _____ AN120				SM03 _____ AN120				SM04 _____ AN120				SM05 _____ AN120				SM06 _____ AN120							
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
C0G	1.0	.70	.40	.18	1.2	1.0	.60	.26	.47	.40	.20	.09	.16	.13	.07	.02	.05	.04	.02	.01	3.2	2.4	1.3	.50				
X7R	27	12	7.0	2.6	41	18	11	4.0	18	6.0	3.6	1.3	7.5	1.8	1.1	.40	2.8	.68	.40	.16	80	40	24	9.4				
Z5U	84	32	12	--	110	46	34	--	40	15	6.0	--	12	4.6	3.0	--	4.6	1.8	.72	--	260	140	92	--				

Max Capacitance (μF) Available Versus Style with Height (A) of 0.240" - 6.10mm

AVX STYLE	SM01 _____ AN240				SM02 _____ AN240				SM03 _____ AN240				SM04 _____ AN240				SM05 _____ AN240				SM06 _____ AN240							
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
C0G	2.0	1.4	.80	.36	2.4	2.0	1.2	.52	1.0	.80	.40	.18	.32	.26	.14	.05	.10	.08	.05	.02	6.4	4.8	2.6	1.0				
X7R	54	24	14	5.2	82	36	22	8.0	36	12	7.2	2.6	15	3.6	2.2	.80	5.6	1.3	.80	.32	160	80	48	18				
Z5U	160	64	24	--	230	92	68	--	80	30	12	--	24	9.2	6.0	--	9.2	3.6	1.4	--	520	280	180	--				

Max Capacitance (μF) Available Versus Style with Height (A) of 0.360" - 9.14mm

AVX STYLE	SM01 _____ AN360				SM02 _____ AN360				SM03 _____ AN360				SM04 _____ AN360				SM05 _____ AN360				SM06 _____ AN360							
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
C0G	3.0	2.1	1.2	.54	3.6	3.0	1.8	.78	1.5	1.2	.60	.27	.48	.39	.21	.07	.15	.12	.07	.03	9.6	7.2	3.9	1.5				
X7R	82	36	21	7.8	120	54	33	12	54	18	10	3.9	22	5.4	3.3	1.2	8.2	2.0	1.2	.48	240	120	72	28				
Z5U	250	96	36	--	350	130	100	--	120	45	18	--	36	13	9.0	--	13	5.4	2.1	--	780	430	270	--				

Max Capacitance (μF) Available Versus Style with Height (A) of 0.480" - 12.2mm

AVX STYLE	SM01 _____ AN480				SM02 _____ AN480				SM03 _____ AN480				SM04 _____ AN480				SM05 _____ AN480				SM06 _____ AN480							
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
C0G	4.0	2.8	1.6	.72	4.8	4.0	2.2	1.0	2.0	1.6	.80	.36	.64	.52	.28	.10	.20	.16	.10	.04	12	9.6	5.2	2.0				
X7R	110	48	28	10	160	72	44	16	72	24	14	5.2	30	7.2	4.4	1.6	10	2.7	1.6	.64	320	160	96	37				
Z5U	330	120	48	--	470	180	130	--	160	60	24	--	48	18	12	--	18	7.2	2.8	--	1000	570	360	--				

Max Capacitance (μF) Available Versus Style with Height (A) of 0.650" - 16.5mm

AVX STYLE	SM01 _____ AN650				SM02 _____ AN650				SM03 _____ AN650				SM04 _____ AN650				SM05 _____ AN650				SM06 _____ AN650							
	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V	50V	100V	200V	500V
C0G	5.0	3.5	2.0	.90	6.0	5.0	3.0	1.3	2.5	2.0	1.0	.47	.80	.65	.35	.12	.25	.20	.12	.05	16	12	6.5	2.5				
X7R	130	60	35	13	200	90	55	20	90	30	18	6.5	36	9.0	5.5	2.0	12	3.4	2.0	.80	400	200	120	47				
Z5U	420	160	60	--	590	230	170	--	200	75	30	--	60	23	15	--	23	9.0	3.6	--	1300	720	460	--				

AVX IS QUALIFIED TO MIL-PRF-49470/1 AND MIL-PRF-49470/2

The SMPS capacitors are designed for high current, high-power and high-temperature applications. These capacitors have very low ESR (Equivalent Series Resistance) and ESL (Equivalent Series Inductance). SMPS Series capacitors offer design and component engineers a proven technology specifically designed for programs requiring high reliability performance in harsh environments.

MIL-PRF-49470 SMPS Series capacitors are primarily used in input/output filters of high-power and high-voltage power supplies as well as in bus filters and DC snubbers for high power inverters and other high-current applications. These capacitors are available with through-hole and surface mount leads. The operating temperature is -55°C to +125°C.

The MIL-PRF-49470 capacitors are preferred over the DSCC drawing 87106 capacitors. MIL-PRF-49470 specification was created to produce a robust replacement for DSCC 87106. MIL-PRF-49470 offers two product levels.

Level “B” is the standard reliability. Level “T” is the high reliability suitable for space application.

AVX is qualified to supply MIL-PRF-49470/1 parts. These are unencapsulated ceramic dielectric, switch mode power supply capacitors. AVX is also qualified to supply MIL-PRF-49470/2 parts. These are encapsulated ceramic dielectric, switch mode power supply capacitors.

PLEASE CONTACT THE DLA WEBSITE

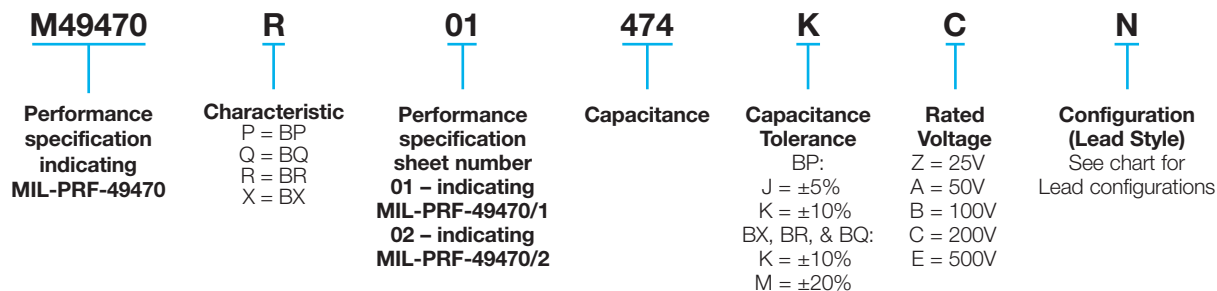
<http://www.landandmaritime.dla.mil/programs/milspec/DocSearch.aspx> for details on testing, electrical, mechanical and part number options.

PLEASE CONTACT THE DLA WEBSITE

<http://www.landandmaritime.dla.mil/Programs/QmlQpl/> for the latest QPL (Qualified Products List).

Not RoHS Compliant

HOW TO ORDER



For “T” level parts, replace the “M” in the pin with “T” (for example M49470R01474KCN becomes T49470R01474KCN) MIL-PRF-49470 contains additional capacitors that are not available in 87106, such as additional lead configurations and lower profile parts.

On the pages to follow is the general dimensional outline along with a cross reference from 87106 parts to MIL-PRF-49470 parts.

LEAD CONFIGURATION

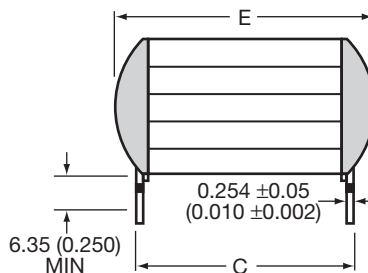
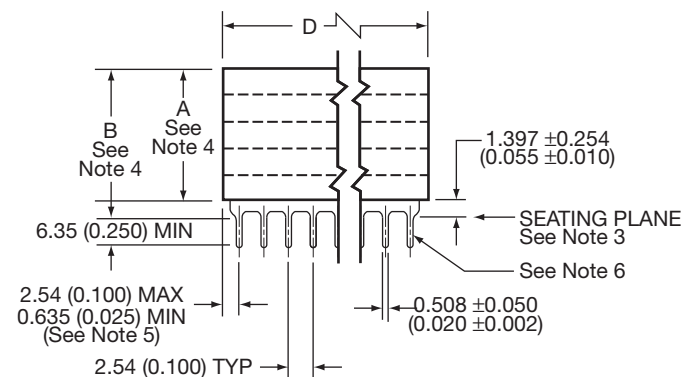
millimeters (inches)

Symbol (Last digit of military PN, 12th digit of AVX PN)	Lead Style	Height Profile (Dimension A)	Formed lead length, L
N	N (straight)	Standard	N/A
L	L (formed)	Standard	1.78 ± 0.25 (0.070 ± 0.010)
M	L (formed)	Standard	1.14 ± 0.25 (0.045 ± 0.010)
J	J (formed)	Standard	1.78 ± 0.25 (0.070 ± 0.010)
K	J (formed)	Standard	1.14 ± 0.25 (0.045 ± 0.010)
A	N (straight)	Low	N/A
B	L (formed)	Low	1.78 ± 0.25 (0.070 ± 0.010)
D	L (formed)	Low	1.14 ± 0.25 (0.045 ± 0.010)
C	J (formed)	Low	1.78 ± 0.25 (0.070 ± 0.010)
F	J (formed)	Low	1.14 ± 0.25 (0.045 ± 0.010)

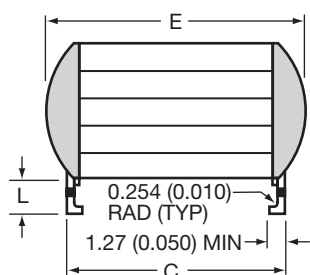
Note: Lead options available marked with a “-” as a place holder. See lead configuration column for available lead options to replace the “-”.

MIL-PRF-49470/1

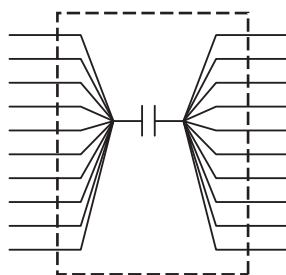
MIL-PRF-49470/1 - capacitor, fixed, ceramic dielectric, switch mode power supply (general purpose and temperature stable), standard reliability and high reliability unencapsulated, Style PS01.



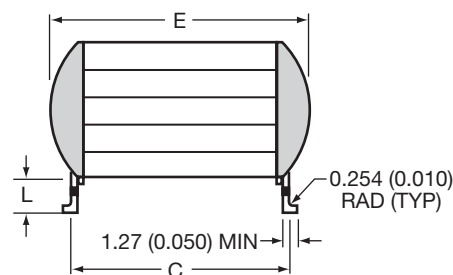
LEAD STYLE N AND A



LEAD STYLE J AND C



CIRCUIT DIAGRAM



LEAD STYLE L AND B

DIMENSIONS:

millimeters (inches)

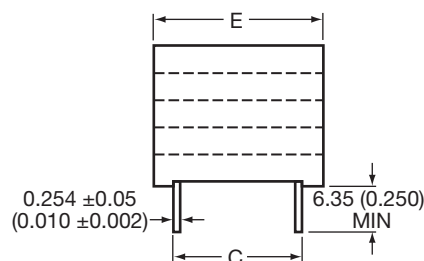
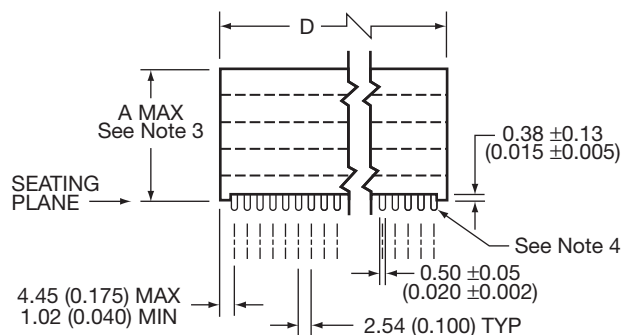
Case Code	C ±0.635 (±0.025)	D		E (max.)	Number of Leads per side
		Min.	Max.		
1	11.4 (0.450)	49.5 (1.950)	52.7 (2.075)	12.7 (0.500)	20
2	20.3 (0.800)	36.8 (1.450)	40.0 (1.535)	22.1 (0.870)	15
3	11.4 (0.450)	24.1 (0.950)	27.3 (1.075)	12.7 (0.500)	10
4	10.2 (0.400)	8.89 (0.350)	10.8 (0.425)	11.2 (0.440)	4
5	6.35 (0.250)	6.20 (0.224)	6.97 (0.275)	7.62 (0.300)	3
6	31.8 (1.250)	49.5 (1.950)	52.7 (2.075)	34.3 (1.350)	20

NOTES:

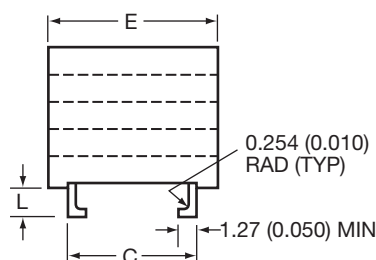
- Dimensions are in millimeters (inches)
- Unless otherwise specified, tolerances are 0.254 (±0.010).
- Lead frame configuration is shown as typical above the seating plane.
- See table I of MIL-PRF-49470/1 for specific maximum A dimension. For maximum B dimension, add 1.65 (0.065) to the appropriate A dimension. For all lead styles, the number of chips is determined by the capacitance and voltage rating.
- For case code 5, dimensions shall be 2.54 (0.100) maximum and 0.305 (0.012) minimum.
- Lead alignment within pin rows shall be within ±0.10 (0.005).

MIL-PRF-49470/2

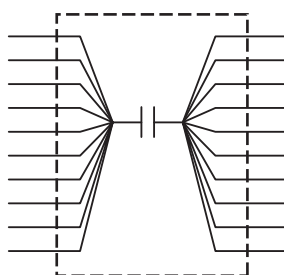
MIL-PRF-49470/2 - capacitor, fixed, ceramic dielectric, switch mode power supply (general purpose and temperature stable), standard reliability and high reliability encapsulated, Style PS02.



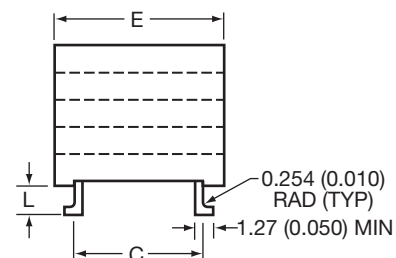
LEAD STYLE N AND A



LEAD STYLE J AND C



CIRCUIT DIAGRAM



LEAD STYLE L AND B

DIMENSIONS:

millimeters (inches)

Case Code	C ± 0.635 (± 0.025)	D ± 0.635 (± 0.025)	E (max)	Number of Leads per side
1	11.4 (0.450)	54.7 (2.155)	14.7 (0.580)	20
2	20.3 (0.800)	41.0 (1.615)	24.1 (0.950)	15
3	11.4 (0.450)	29.3 (1.155)	14.7 (0.580)	10
4	10.2 (0.400)	12.3 (0.485)	12.3 (0.485)	4
5	6.35 (0.250)	9.02 (0.355)	9.02 (0.355)	3
6	31.8 (1.250)	54.7 (2.155)	36.3 (1.430)	20

NOTES:

- Dimensions are in millimeters (inches)
- Unless otherwise specified, tolerances are 0.254 (± 0.001).
- See table I of MIL-PRF-49470/2 for specific maximum A dimension. For all lead styles, the number of chips is determined by the capacitance and voltage rating.
- Lead alignment within pin rows shall be within ± 0.10 (0.004).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors



MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
25V						
-49470X0-155-Z-	SM-53C155-H-120	1.5	K, M	BX	5	N, L, M, J, K
-49470X0-185-Z-	SM-53C185-H-120	1.8	K, M	BX	5	N, L, M, J, K
-49470X0-225-Z-	SM-53C225-H-120	2.2	K, M	BX	5	N, L, M, J, K
-49470X0-275-Z-	SM-53C275-H-240	2.7	K, M	BX	5	N, L, M, J, K
-49470X0-335-Z-	SM-53C335-H-240	3.3	K, M	BX	5	N, L, M, J, K
-49470X0-395-Z-	SM-53C395-H-240	3.9	K, M	BX	5	N, L, M, J, K
-49470X0-475-Z-	SM-53C475-H-240	4.7	K, M	BX	5	N, L, M, J, K
-49470X0-565-Z-	SM-53C565-H-360	5.6	K, M	BX	5	N, L, M, J, K
-49470X0-685-Z-	SM-53C685-H-360	6.8	K, M	BX	5	N, L, M, J, K
-49470X0-685-Z-	SM-43C685-H-120	6.8	K, M	BX	4	A, B, D, C, F
-49470X0-825-Z-	SM-53C825-H-480	8.2	K, M	BX	5	N, L, M, J, K
-49470X0-825-Z-	SM-43C825-H-240	8.2	K, M	BX	4	A, B, D, C, F
-49470X0-106-Z-	SM-53C106-H-650	10	K, M	BX	5	N, L, M, J, K
-49470X0-106-Z-	SM-43C106-H-240	10	K, M	BX	4	A, B, D, C, F
-49470X0-126-Z-	SM-43C126-H-240	12	K, M	BX	4	N, L, M, J, K
-49470X0-156-Z-	SM-43C156-H-360	15	K, M	BX	4	N, L, M, J, K
-49470X0-156-Z-	SM-33C156-H-120	15	K, M	BX	3	A, B, D, C, F
-49470X0-186-Z-	SM-43C186-H-360	18	K, M	BX	4	N, L, M, J, K
-49470X0-186-Z-	SM-33C186-H-120	18	K, M	BX	3	A, B, D, C, F
-49470X0-226-Z-	SM-43C226-H-480	22	K, M	BX	4	N, L, M, J, K
-49470X0-226-Z-	SM-33C226-H-240	22	K, M	BX	3	A, B, D, C, F
-49470X0-276-Z-	SM-43C276-H-480	27	K, M	BX	4	N, L, M, J, K
-49470X0-276-Z-	SM-33C276-H-240	27	K, M	BX	3	A, B, D, C, F
-49470X0-336-Z-	SM-43C336-H-650	33	K, M	BX	4	N, L, M, J, K
-49470X0-336-Z-	SM-33C336-H-240	33	K, M	BX	3	A, B, D, C, F
-49470X0-396-Z-	SM-33C396-H-360	39	K, M	BX	3	N, L, M, J, K
-49470X0-396-Z-	SM-13C396-H-240	39	K, M	BX	1	A, B, D, C, F
-49470X0-476-Z-	SM-33C476-H-480	47	K, M	BX	3	N, L, M, J, K
-49470X0-476-Z-	SM-13C476-H-360	47	K, M	BX	1	A, B, D, C, F
-49470X0-566-Z-	SM-33C566-H-480	56	K, M	BX	3	N, L, M, J, K
-49470X0-566-Z-	SM-13C566-H-360	56	K, M	BX	1	A, B, D, C, F
-49470X0-686-Z-	SM-33C686-H-480	68	K, M	BX	3	N, L, M, J, K
-49470X0-686-Z-	SM-13C686-H-360	68	K, M	BX	1	A, B, D, C, F
-49470X0-826-Z-	SM-33C826-H-650	82	K, M	BX	3	N, L, M, J, K
-49470X0-826-Z-	SM-13C826-H-360	82	K, M	BX	1	A, B, D, C, F
-49470X0-107-Z-	SM-13C107-H-480	100	K, M	BX	1	N, L, M, J, K
-49470X0-107-Z-	SM-23C107-H-360	100	K, M	BX	2	A, B, D, C, F
-49470X0-127-Z-	SM-13C127-H-650	120	K, M	BX	1	N, L, M, J, K
-49470X0-127-Z-	SM-23C127-H-360	120	K, M	BX	2	A, B, D, C, F
-49470X0-157-Z-	SM-23C157-H-480	150	K, M	BX	2	N, L, M, J, K
-49470X0-157-Z-	SM-63C157-H-240	150	K, M	BX	6	A, B, D, C, F
-49470X0-187-Z-	SM-23C187-H-650	180	K, M	BX	2	N, L, M, J, K
-49470X0-187-Z-	SM-63C187-H-360	180	K, M	BX	6	A, B, D, C, F
-49470X0-227-Z-	SM-63C227-H-360	220	K, M	BX	6	N, L, M, J, K
-49470X0-277-Z-	SM-63C277-H-480	270	K, M	BX	6	N, L, M, J, K
-49470X0-337-Z-	SM-63C337-H-650	330	K, M	BX	6	N, L, M, J, K
-49470X0-397-Z-	SM-63C397-H-650	390	K, M	BX	6	N, L, M, J, K
50V						
-49470P0-563-A-	SM-55A563-H-120	0.056	J, K	BP	5	N, L, M, J, K
-49470P0-683-A-	SM-55A683-H-240	0.068	J, K	BP	5	N, L, M, J, K
-49470P0-823-A-	SM-55A823-H-240	0.082	J, K	BP	5	N, L, M, J, K
-49470P0-104-A-	SM-55A104-H-240	0.1	J, K	BP	5	N, L, M, J, K
-49470P0-124-A-	SM-55A124-H-360	0.12	J, K	BP	5	N, L, M, J, K
-49470P0-154-A-	SM-55A154-H-360	0.15	J, K	BP	5	N, L, M, J, K
-49470P0-184-A-	SM-55A184-H-480	0.18	J, K	BP	5	N, L, M, J, K
-49470P0-184-A-	SM-45A184-H-240	0.18	J, K	BP	4	A, B, D, C, F

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors



MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
-49470P0-224-A-	SM-55A224-H-480	0.22	J, K	BP	5	N, L, M, J, K
-49470P0-224-A-	SM-45A224-H-240	0.22	J, K	BP	4	A, B, D, C, F
-49470P0-274-A-	SM-55A274-H-650	0.27	J, K	BP	5	N, L, M, J, K
-49470P0-274-A-	SM-45A274-H-240	0.27	J, K	BP	4	A, B, D, C, F
-49470P0-334-A-	SM-45A334-H-360	0.33	J, K	BP	4	N, L, M, J, K
-49470P0-394-A-	SM-45A394-H-480	0.39	J, K	BP	4	N, L, M, J, K
-49470P0-474-A-	SM-45A474-H-480	0.47	J, K	BP	4	N, L, M, J, K
-49470P0-564-A-	SM-45A564-H-650	0.56	J, K	BP	4	N, L, M, J, K
-49470P0-564-A-	SM-35A564-H-240	0.56	J, K	BP	3	A, B, D, C, F
-49470P0-684-A-	SM-35A684-H-240	0.68	J, K	BP	3	N, L, M, J, K
-49470P0-824-A-	SM-35A824-H-240	0.82	J, K	BP	3	N, L, M, J, K
-49470P0-105-A-	SM-35A105-H-360	1	J, K	BP	3	N, L, M, J, K
-49470X0-105-A-	SM-55C105-H-120	1	K, M	BX	5	N, L, M, J, K
-49470P0-125-A-	SM-35A125-H-360	1.2	J, K	BP	3	N, L, M, J, K
-49470X0-125-A-	SM-55C125-H-120	1.2	K, M	BX	5	N, L, M, J, K
-49470P0-155-A-	SM-35A155-H-480	1.5	J, K	BP	3	N, L, M, J, K
-49470X0-155-A-	SM-55C155-H-240	1.5	K, M	BX	5	N, L, M, J, K
-49470P0-185-A-	SM-35A185-H-480	1.8	J, K	BP	3	N, L, M, J, K
-49470X0-185-A-	SM-55C185-H-240	1.8	K, M	BX	5	N, L, M, J, K
-49470P0-225-A-	SM-35A225-H-650	2.2	J, K	BP	3	N, L, M, J, K
-49470X0-225-A-	SM-55C225-H-240	2.2	K, M	BX	5	N, L, M, J, K
-49470X0-275-A-	SM-55C275-H-360	2.7	K, M	BX	5	N, L, M, J, K
-49470X0-335-A-	SM-55C335-H-360	3.3	K, M	BX	5	N, L, M, J, K
-49470X0-395-A-	SM-55C395-H-480	3.9	K, M	BX	5	N, L, M, J, K
-49470X0-475-A-	SM-55C475-H-480	4.7	K, M	BX	5	N, L, M, J, K
-49470X0-475-A-	SM-45C475-H-240	4.7	K, M	BX	4	A, B, D, C, F
-49470X0-565-A-	SM-55C565-H-650	5.6	K, M	BX	5	N, L, M, J, K
-49470X0-565-A-	SM-45C565-H-240	5.6	K, M	BX	4	A, B, D, C, F
-49470X0-685-A-	SM-45C685-H-360	6.8	K, M	BX	4	N, L, M, J, K
-49470X0-825-A-	SM-45C825-H-360	8.2	K, M	BX	4	N, L, M, J, K
-49470X0-106-A-	SM-45C106-H-480	10	K, M	BX	4	N, L, M, J, K
-49470X0-126-A-	SM-45C126-H-480	12	K, M	BX	4	N, L, M, J, K
-49470X0-156-A-	SM-45C156-H-650	15	K, M	BX	4	N, L, M, J, K
-49470X0-156-A-	SM-35C156-H-240	15	K, M	BX	3	A, B, D, C, F
-49470X0-186-A-	SM-35C186-H-240	18	K, M	BX	3	N, L, M, J, K
-49470X0-226-A-	SM-35C226-H-360	22	K, M	BX	3	N, L, M, J, K
-49470X0-276-A-	SM-35C276-H-360	27	K, M	BX	3	N, L, M, J, K
-49470X0-336-A-	SM-35C336-H-360	33	K, M	BX	3	N, L, M, J, K
-49470X0-396-A-	SM-35C396-H-480	39	K, M	BX	3	N, L, M, J, K
-49470X0-476-A-	SM-35C476-H-650	47	K, M	BX	3	N, L, M, J, K
-49470X0-476-A-	SM-25C476-H-240	47	K, M	BX	2	A, B, D, C, F
-49470X0-566-A-	SM-15C566-H-360	56	K, M	BX	1	N, L, M, J, K
-49470X0-566-A-	SM-25C566-H-240	56	K, M	BX	2	A, B, D, C, F
-49470X0-686-A-	SM-15C686-H-480	68	K, M	BX	1	N, L, M, J, K
-49470X0-686-A-	SM-25C686-H-360	68	K, M	BX	2	A, B, D, C, F
-49470X0-826-A-	SM-15C826-H-480	82	K, M	BX	1	N, L, M, J, K
-49470X0-826-A-	SM-25C826-H-360	82	K, M	BX	2	A, B, D, C, F
-49470X0-107-A-	SM-15C107-H-650	100	K, M	BX	1	N, L, M, J, K
-49470X0-107-A-	SM-25C107-H-480	100	K, M	BX	2	A, B, D, C, F
-49470X0-127-A-	SM-25C127-H-480	120	K, M	BX	2	N, L, M, J, K
-49470X0-157-A-	SM-25C157-H-650	150	K, M	BX	2	N, L, M, J, K
-49470X0-187-A-	SM-65C187-H-480	180	K, M	BX	6	N, L, M, J, K
-49470X0-227-A-	SM-65C227-H-480	220	K, M	BX	6	N, L, M, J, K
-49470X0-277-A-	SM-65C277-H-650	270	K, M	BX	6	N, L, M, J, K
100V						
-49470P0-473-B-	SM-51A473-H-240	0.047	J, K	BP	5	N, L, M, J, K
-49470P0-563-B-	SM-51A563-H-240	0.056	J, K	BP	5	N, L, M, J, K

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors



MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
-49470P0-683-B-	SM-51A683-H-240	0.068	J, K	BP	5	N, L, M, J, K
-49470P0-823-B-	SM-51A823-H-240	0.082	J, K	BP	5	N, L, M, J, K
-49470P0-104-B-	SM-51A104-H-360	0.1	J, K	BP	5	N, L, M, J, K
-49470P0-124-B-	SM-51A124-H-360	0.12	J, K	BP	5	N, L, M, J, K
-49470P0-154-B-	SM-51A154-H-480	0.15	J, K	BP	5	N, L, M, J, K
-49470P0-154-B-	SM-41A154-H-240	0.15	J, K	BP	4	A, B, D, C, F
-49470P0-184-B-	SM-51A184-H-650	0.18	J, K	BP	5	N, L, M, J, K
-49470P0-184-B-	SM-41A184-H-240	0.18	J, K	BP	4	A, B, D, C, F
-49470P0-224-B-	SM-51A224-H-650	0.22	J, K	BP	5	N, L, M, J, K
-49470P0-224-B-	SM-41A224-H-240	0.22	J, K	BP	4	A, B, D, C, F
-49470P0-274-B-	SM-41A274-H-360	0.27	J, K	BP	4	N, L, M, J, K
-49470P0-334-B-	SM-41A334-H-480	0.33	J, K	BP	4	N, L, M, J, K
-49470P0-394-B-	SM-41A394-H-480	0.39	J, K	BP	4	N, L, M, J, K
-49470P0-474-B-	SM-41A474-H-650	0.47	J, K	BP	4	N, L, M, J, K
-49470P0-474-B-	SM-31A474-H-240	0.47	J, K	BP	3	A, B, D, C, F
-49470P0-564-B-	SM-41A564-H-650	0.56	J, K	BP	4	N, L, M, J, K
-49470P0-564-B-	SM-31A564-H-240	0.56	J, K	BP	3	A, B, D, C, F
-49470P0-684-B-	SM-31A684-H-240	0.68	J, K	BP	3	N, L, M, J, K
-49470X0-684-B-	SM-51C684-H-120	0.68	K, M	BX	5	N, L, M, J, K
-49470P0-824-B-	SM-31A824-H-360	0.82	J, K	BP	3	N, L, M, J, K
-49470X0-824-B-	SM-51C824-H-240	0.82	K, M	BX	5	N, L, M, J, K
-49470P0-105-B-	SM-31A105-H-360	1	J, K	BP	3	N, L, M, J, K
-49470X0-105-B-	SM-51C105-H-240	1	K, M	BX	5	N, L, M, J, K
-49470P0-125-B-	SM-31A125-H-480	1.2	J, K	BP	3	N, L, M, J, K
-49470X0-125-B-	SM-51C125-H-240	1.2	K, M	BX	5	N, L, M, J, K
-49470P0-155-B-	SM-31A155-H-480	1.5	J, K	BP	3	N, L, M, J, K
-49470X0-155-B-	SM-51C155-H-360	1.5	K, M	BX	5	N, L, M, J, K
-49470P0-185-B-	SM-31A185-H-650	1.8	J, K	BP	3	N, L, M, J, K
-49470X0-185-B-	SM-51C185-H-360	1.8	K, M	BX	5	N, L, M, J, K
-49470X0-225-B-	SM-51C225-H-480	2.2	K, M	BX	5	N, L, M, J, K
-49470X0-225-B-	SM-41C225-H-240	2.2	K, M	BX	4	A, B, D, C, F
-49470X0-275-B-	SM-51C275-H-480	2.7	K, M	BX	5	N, L, M, J, K
-49470X0-335-B-	SM-51C335-H-650	3.3	K, M	BX	5	N, L, M, J, K
-49470X0-335-B-	SM-41C335-H-240	3.3	K, M	BX	4	A, B, D, C, F
-49470X0-395-B-	SM-41C395-H-360	3.9	K, M	BX	4	N, L, M, J, K
-49470X0-475-B-	SM-41C475-H-360	4.7	K, M	BX	4	N, L, M, J, K
-49470X0-565-B-	SM-41C565-H-480	5.6	K, M	BX	4	N, L, M, J, K
-49470X0-685-B-	SM-41C685-H-480	6.8	K, M	BX	4	N, L, M, J, K
-49470X0-825-B-	SM-41C825-H-650	8.2	K, M	BX	4	N, L, M, J, K
-49470X0-825-B-	SM-31C825-H-240	8.2	K, M	BX	3	A, B, D, C, F
-49470X0-106-B-	SM-31C106-H-240	10	K, M	BX	3	N, L, M, J, K
-49470X0-126-B-	SM-31C126-H-240	12	K, M	BX	3	N, L, M, J, K
-49470X0-156-B-	SM-31C156-H-360	15	K, M	BX	3	N, L, M, J, K
-49470X0-186-B-	SM-31C186-H-360	18	K, M	BX	3	N, L, M, J, K
-49470X0-226-B-	SM-31C226-H-480	22	K, M	BX	3	N, L, M, J, K
-49470X0-276-B-	SM-31C276-H-650	27	K, M	BX	3	N, L, M, J, K
-49470X0-276-B-	SM-21C276-H-240	27	K, M	BX	2	A, B, D, C, F
-49470X0-336-B-	SM-11C336-H-360	33	K, M	BX	1	N, L, M, J, K
-49470X0-336-B-	SM-21C336-H-240	33	K, M	BX	2	A, B, D, C, F
-49470X0-396-B-	SM-11C396-H-480	39	K, M	BX	1	N, L, M, J, K
-49470X0-396-B-	SM-21C396-H-360	39	K, M	BX	2	A, B, D, C, F
-49470X0-476-B-	SM-11C476-H-480	47	K, M	BX	1	N, L, M, J, K
-49470X0-476-B-	SM-21C476-H-360	47	K, M	BX	2	A, B, D, C, F
-49470X0-566-B-	SM-11C566-H-650	56	K, M	BX	1	N, L, M, J, K
-49470X0-686-B-	SM-21C686-H-480	68	K, M	BX	2	N, L, M, J, K
-49470X0-826-B-	SM-21C826-H-650	82	K, M	BX	2	N, L, M, J, K
-49470X0-107-B-	SM-61C107-H-360	100	K, M	BX	6	N, L, M, J, K

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors



MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
-49470X0-127-B-	SM-61C127-H-360	120	K, M	BX	6	N, L, M, J, K
-49470X0-157-B-	SM-61C157-H-480	150	K, M	BX	6	N, L, M, J, K
-49470X0-187-B-	SM-61C187-H-540	180	K, M	BX	6	N, L, M, J, K
200V						
-49470P0-223-C-	SM-52A223-H-120	0.022	J, K	BP	5	N, L, M, J, K
-49470P0-273-C-	SM-52A273-H-240	0.027	J, K	BP	5	N, L, M, J, K
-49470P0-333-C-	SM-52A333-H-240	0.033	J, K	BP	5	N, L, M, J, K
-49470P0-393-C-	SM-52A393-H-240	0.039	J, K	BP	5	N, L, M, J, K
-49470P0-473-C-	SM-52A473-H-360	0.047	J, K	BP	5	N, L, M, J, K
-49470P0-563-C-	SM-52A563-H-360	0.056	J, K	BP	5	N, L, M, J, K
-49470P0-683-C-	SM-52A683-H-480	0.068	J, K	BP	5	N, L, M, J, K
-49470P0-683-C-	SM-42A683-H-120	0.068	J, K	BP	4	A, B, D, C, F
-49470P0-823-C-	SM-52A823-H-480	0.082	J, K	BP	5	N, L, M, J, K
-49470P0-823-C-	SM-42A823-H-240	0.082	J, K	BP	4	A, B, D, C, F
-49470P0-104-C-	SM-52A104-H-650	0.1	J, K	BP	5	N, L, M, J, K
-49470P0-104-C-	SM-42A104-H-240	0.1	J, K	BP	4	A, B, D, C, F
-49470P0-124-C-	SM-42A124-H-360	0.12	J, K	BP	4	N, L, M, J, K
-49470P0-154-C-	SM-42A154-H-360	0.15	J, K	BP	4	N, L, M, J, K
-49470P0-184-C-	SM-42A184-H-480	0.18	J, K	BP	4	N, L, M, J, K
-49470P0-224-C-	SM-42A224-H-480	0.22	J, K	BP	4	N, L, M, J, K
-49470P0-274-C-	SM-42A274-H-650	0.27	J, K	BP	4	N, L, M, J, K
-49470P0-274-C-	SM-32A274-H-240	0.27	J, K	BP	3	A, B, D, C, F
-49470P0-334-C-	SM-32A334-H-240	0.33	J, K	BP	3	N, L, M, J, K
-49470P0-394-C-	SM-32A394-H-240	0.39	J, K	BP	3	N, L, M, J, K
-49470P0-474-C-	SM-32A474-H-360	0.47	J, K	BP	3	N, L, M, J, K
-49470R0-474-C-	SM-52C474-H-240	0.47	K, M	BR	5	N, L, M, J, K
-49470P0-564-C-	SM-32A564-H-480	0.56	J, K	BP	3	N, L, M, J, K
-49470P0-564-C-	SM-32A564-H-360	0.56	J, K	BP	3	N, L, M, J, K
-49470R0-564-C-	SM-52C564-H-240	0.56	K, M	BR	5	N, L, M, J, K
-49470P0-684-C-	SM-32A684-H-480	0.68	J, K	BP	3	N, L, M, J, K
-49470R0-684-C-	SM-52C684-H-360	0.68	K, M	BR	5	N, L, M, J, K
-49470P0-824-C-	SM-32A824-H-650	0.82	J, K	BP	3	N, L, M, J, K
-49470R0-824-C-	SM-52C824-H-360	0.82	K, M	BR	5	N, L, M, J, K
-49470P0-105-C-	SM-32A105-H-650	1	J, K	BP	3	N, L, M, J, K
-49470R0-105-C-	SM-52C105-H-480	1	K, M	BR	5	N, L, M, J, K
-49470R0-105-C-	SM-42C105-H-120	1	K, M	BR	4	A, B, D, C, F
-49470R0-125-C-	SM-52C125-H-480	1.2	K, M	BR	5	N, L, M, J, K
-49470R0-125-C-	SM-42C125-H-240	1.2	K, M	BR	4	A, B, D, C, F
-49470R0-155-C-	SM-52C155-H-650	1.5	K, M	BR	5	N, L, M, J, K
-49470R0-155-C-	SM-42C155-H-240	1.5	K, M	BR	4	A, B, D, C, F
-49470R0-185-C-	SM-42C185-H-360	1.8	K, M	BR	4	N, L, M, J, K
-49470R0-225-C-	SM-42C225-H-360	2.2	K, M	BR	4	N, L, M, J, K
-49470R0-275-C-	SM-42C275-H-480	2.7	K, M	BR	4	N, L, M, J, K
-49470R0-335-C-	SM-42C335-H-480	3.3	K, M	BR	4	N, L, M, J, K
-49470R0-395-C-	SM-42C395-H-650	3.9	K, M	BR	4	N, L, M, J, K
-49470R0-395-C-	SM-32C395-H-240	3.9	K, M	BR	3	A, B, D, C, F
-49470R0-475-C-	SM-32C475-H-240	4.7	K, M	BR	3	N, L, M, J, K
-49470R0-565-C-	SM-32C565-H-240	5.6	K, M	BR	3	N, L, M, J, K
-49470R0-685-C-	SM-32C685-H-360	6.8	K, M	BR	3	N, L, M, J, K
-49470R0-825-C-	SM-32C825-H-360	8.2	K, M	BR	3	N, L, M, J, K
-49470R0-106-C-	SM-32C106-H-480	10	K, M	BR	3	N, L, M, J, K
-49470R0-126-C-	SM-32C126-H-650	12	K, M	BR	3	N, L, M, J, K
-49470R0-126-C-	SM-22C126-H-240	12	K, M	BR	2	A, B, D, C, F
-49470R0-156-C-	SM-12C156-H-360	15	K, M	BR	1	N, L, M, J, K
-49470R0-156-C-	SM-22C156-H-240	15	K, M	BR	2	A, B, D, C, F
-49470R0-186-C-	SM-12C186-H-480	18	K, M	BR	1	N, L, M, J, K
-49470R0-186-C-	SM-22C186-H-360	18	K, M	BR	2	A, B, D, C, F

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors



MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
-49470R0-226-C-	SM-12C226-H-650	22	K, M	BR	1	N, L, M, J, K
-49470R0-226-C-	SM-22C226-H-360	22	K, M	BR	2	A, B, D, C, F
-49470R0-276-C-	SM-12C276-H-650	27	K, M	BR	1	N, L, M, J, K
-49470R0-276-C-	SM-22C276-H-480	27	K, M	BR	2	A, B, D, C, F
-49470R0-336-C-	SM-22C336-H-480	33	K, M	BR	2	N, L, M, J, K
-49470R0-396-C-	SM-22C396-H-650	39	K, M	BR	2	N, L, M, J, K
-49470R0-476-C-	SM-62C476-H-240	47	K, M	BR	6	N, L, M, J, K
-49470R0-566-C-	SM-62C566-H-360	56	K, M	BR	6	N, L, M, J, K
-49470R0-686-C-	SM-62C686-H-360	68	K, M	BR	6	N, L, M, J, K
-49470R0-826-C-	SM-62C826-H-480	82	K, M	BR	6	N, L, M, J, K
-49470R0-107-C-	SM-62C107-H-650	100	K, M	BR	6	N, L, M, J, K
-49470R0-127-C-	SM-62C127-H-650	120	K, M	BR	6	N, L, M, J, K
500V						
-49470P0-103-E-	SM-57A103-H-120	0.01	J, K	BP	5	N, L, M, J, K
-49470P0-123-E-	SM-57A123-H-240	0.012	J, K	BP	5	N, L, M, J, K
-49470P0-153-E-	SM-57A153-H-240	0.015	J, K	BP	5	N, L, M, J, K
-49470P0-183-E-	SM-57A183-H-240	0.018	J, K	BP	5	N, L, M, J, K
-49470P0-223-E-	SM-57A223-H-360	0.022	J, K	BP	5	N, L, M, J, K
-49470P0-273-E-	SM-57A273-H-360	0.027	J, K	BP	5	N, L, M, J, K
-49470P0-333-E-	SM-57A333-H-480	0.033	J, K	BP	5	N, L, M, J, K
-49470P0-333-E-	SM-47A333-H-240	0.033	J, K	BP	4	A, B, C, D, F
-49470P0-393-E-	SM-57A393-H-480	0.039	J, K	BP	5	N, L, M, J, K
-49470P0-393-E-	SM-47A393-H-240	0.039	J, K	BP	4	A, B, C, D, F
-49470P0-473-E-	SM-57A473-H-650	0.047	J, K	BP	5	N, L, M, J, K
-49470P0-473-E-	SM-47A473-H-360	0.047	J, K	BP	4	A, B, C, D, F
-49470P0-563-E-	SM-47A563-H-360	0.056	J, K	BP	4	N, L, M, J, K
-49470P0-683-E-	SM-47A683-H-360	0.068	J, K	BP	4	N, L, M, J, K
-49470P0-823-E-	SM-47A823-H-480	0.082	J, K	BP	4	N, L, M, J, K
-49470P0-104-E-	SM-47A104-H-480	0.1	J, K	BP	4	N, L, M, J, K
-49470P0-124-E-	SM-47A124-H-650	0.12	J, K	BP	4	N, L, M, J, K
-49470P0-124-E-	SM-37A124-H-240	0.12	J, K	BP	3	A, B, C, D, F
-49470P0-154-E-	SM-37A154-H-240	0.15	J, K	BP	3	N, L, M, J, K
-49470Q0-154-E-	SM-57C154-H-120	0.15	K, M	BQ	5	N, L, M, J, K
-49470P0-184-E-	SM-37A184-H-240	0.18	J, K	BP	3	N, L, M, J, K
-49470Q0-184-E-	SM-57C184-H-240	0.18	K, M	BQ	5	N, L, M, J, K
-49470P0-224-E-	SM-37A224-H-360	0.22	J, K	BP	3	N, L, M, J, K
-49470Q0-224-E-	SM-57C224-H-240	0.22	K, M	BQ	5	N, L, M, J, K
-49470P0-274-E-	SM-37A274-H-360	0.27	J, K	BP	3	N, L, M, J, K
-49470Q0-274-E-	SM-57C274-H-240	0.27	K, M	BQ	5	N, L, M, J, K
-49470P0-334-E-	SM-37A334-H-480	0.33	J, K	BP	3	N, L, M, J, K
-49470Q0-334-E-	SM-57C334-H-360	0.33	K, M	BQ	5	N, L, M, J, K
-49470P0-394-E-	SM-37A394-H-650	0.39	J, K	BP	3	N, L, M, J, K
-49470Q0-394-E-	SM-57C394-H-360	0.39	K, M	BQ	5	N, L, M, J, K
-49470Q0-474-E-	SM-57C474-H-360	0.47	K, M	BQ	5	N, L, M, J, K
-49470Q0-564-E-	SM-57C564-H-480	0.56	K, M	BQ	5	N, L, M, J, K
-49470Q0-564-E-	SM-47C564-H-240	0.56	K, M	BQ	4	A, B, D, C, F
-49470Q0-684-E-	SM-57C684-H-650	0.68	K, M	BQ	5	N, L, M, J, K
-49470Q0-684-E-	SM-47C684-H-240	0.68	K, M	BQ	4	A, B, D, C, F
-49470Q0-824-E-	SM-47C824-H-360	0.82	K, M	BQ	4	N, L, M, J, K
-49470Q0-105-E-	SM-47C105-H-360	1	K, M	BQ	4	N, L, M, J, K
-49470Q0-125-E-	SM-47C125-H-360	1.2	K, M	BQ	4	N, L, M, J, K
-49470Q0-155-E-	SM-47C155-H-480	1.5	K, M	BQ	4	N, L, M, J, K
-49470Q0-185-E-	SM-47C185-H-650	1.8	K, M	BQ	4	N, L, M, J, K
-49470Q0-185-E-	SM-37C185-H-240	1.8	K, M	BQ	3	A, B, D, C, F
-49470Q0-225-E-	SM-37C225-H-240	2.2	K, M	BQ	3	N, L, M, J, K
-49470Q0-275-E-	SM-37C275-H-360	2.7	K, M	BQ	3	N, L, M, J, K
-49470Q0-335-E-	SM-37C335-H-360	3.3	K, M	BQ	3	N, L, M, J, K

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).

SMPS Stacked MLC Capacitors

(SM Style) Technical Information on SMPS Capacitors

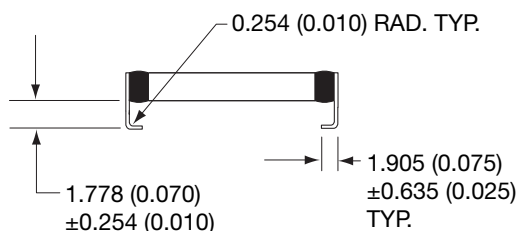
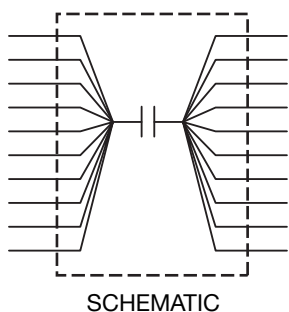
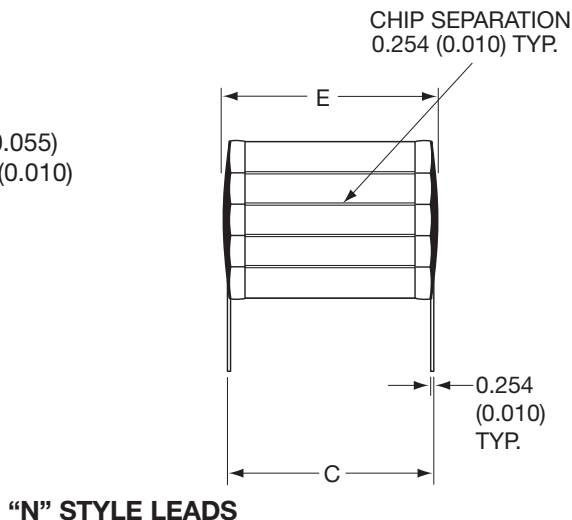
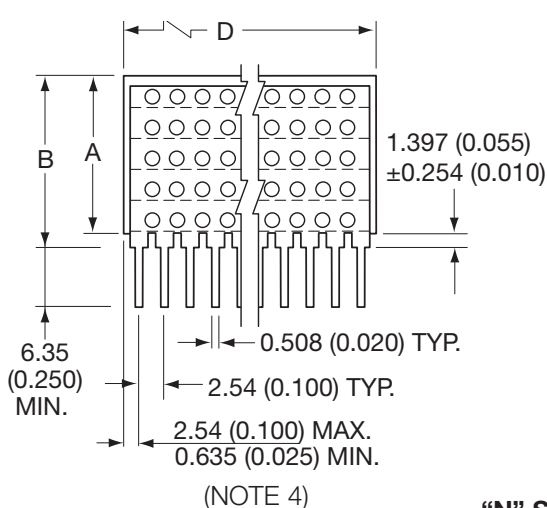


MIL-PRF-49470 PIN 1/	AVX PART NUMBER (for reference only) 2/	Capacitance µF	Tolerance	Characteristic	Case Code	Lead Configuration
-49470Q0-395-E-	SM-37C395-H-360	3.9	K, M	BQ	3	N, L, M, J, K
-49470Q0-475-E-	SM-37C475-H-480	4.7	K, M	BQ	3	N, L, M, J, K
-49470Q0-565-E-	SM-37C565-H-650	5.6	K, M	BQ	3	N, L, M, J, K
-49470Q0-565-E-	SM-27C565-H-240	5.6	K, M	BQ	2	A, B, D, C, F
-49470Q0-685-E-	SM-17C685-H-480	6.8	K, M	BQ	1	N, L, M, J, K
-49470Q0-685-E-	SM-27C685-H-240	6.8	K, M	BQ	2	A, B, D, C, F
-49470Q0-825-E-	SM-17C825-H-480	8.2	K, M	BQ	1	N, L, M, J, K
-49470Q0-825-E-	SM-27C825-H-360	8.2	K, M	BQ	2	A, B, D, C, F
-49470Q0-106-E-	SM-17C106-H-480	10	K, M	BQ	1	N, L, M, J, K
-49470Q0-106-E-	SM-27C106-H-360	10	K, M	BQ	2	A, B, D, C, F
-49470Q0-126-E-	SM-17C126-H-650	12	K, M	BQ	1	N, L, M, J, K
-49470Q0-126-E-	SM-27C126-H-480	12	K, M	BQ	2	A, B, D, C, F
-49470Q0-156-E-	SM-27C156-H-650	15	K, M	BQ	2	N, L, M, J, K
-49470Q0-186-E-	SM-27C186-H-650	18	K, M	BQ	2	N, L, M, J, K
-49470Q0-226-E-	SM-67C226-H-360	22	K, M	BQ	6	N, L, M, J, K
-49470Q0-276-E-	SM-67C276-H-360	27	K, M	BQ	6	N, L, M, J, K
-49470Q0-336-E-	SM-67C336-H-480	33	K, M	BQ	6	N, L, M, J, K
-49470Q0-396-E-	SM-67C396-H-650	39	K, M	BQ	6	N, L, M, J, K

1/ Complete PIN shall include additional symbols replacing dashes (from left to right): product level (M for B level, or T for T level), part style (1 for unencapsulated, 2 for encapsulated), capacitance tolerance, lead configuration

2/ Complete AVX Part Number (provided for reference only) shall include additional symbols replacing dashes (from left to right): part style (0 for unencapsulated and 9 for encapsulated), capacitance tolerance, lead configuration

The last 3 digits of the AVX Part Number represent the chip height of the unencapsulated version. For the encapsulated version, replace the last 3 digits as follows: (120 replace with 270, 240 replace with 390, 360 replace with 530, 480 replace with 660 and 650 replace with 800).



DIMENSIONS

millimeters (inches)

Case Code	A (max.) (See Note 2)	B (max.) (See Note 2)	C ±.635 (±0.025)	D ±.635 (±0.025)	E (max.)	No. of Leads per side
1	16.5 (0.650)	18.2 (0.715)	11.4 (0.450)	52.1 (2.050)	12.7 (0.500)	20
2	16.5 (0.650)	18.2 (0.715)	20.3 (0.800)	38.4 (1.510)	22.1 (0.870)	15
3	16.5 (0.650)	18.2 (0.715)	11.4 (0.450)	26.7 (1.050)	12.7 (0.500)	10
4	16.5 (0.650)	18.2 (0.715)	10.2 (0.400)	10.2 (0.400)	11.2 (0.440)	4
5	16.5 (0.650)	18.2 (0.715)	6.35 (0.250)	6.35 (0.250)	7.62 (0.300)	3
6	16.5 (0.650)	18.2 (0.715)	31.8 (1.250)	52.1 (2.050)	34.3 (1.350)	20

NOTES:

1. Unless otherwise specified, tolerances 0.254 (±0.010).
2. “A” dimensions are maximum (see tables on pages 23 thru 26 for specific part number dimensions).
3. “N” straight leads; “J” leads formed in.
4. For case code 5, dimensions shall be 2.54 (0.100) maximum, 0.305 (0.012) minimum.



LEADED MLCC PRODUCTS

AVX extends its MLCC offering even more with the inclusion of leaded MLCC packages. Available in Axial and Radial leads, we can provide parts for any aerospace or avionic application which requires through-hole mounting.

All the parts listed here were developed to meet military qualifications, and can be used for high-reliability or mission critical applications.

M123

Radial, Axial, and 2-Pin DIP MLCCs designed to meet MIL-PRF-123 qualifications.

CKR04-CKR24

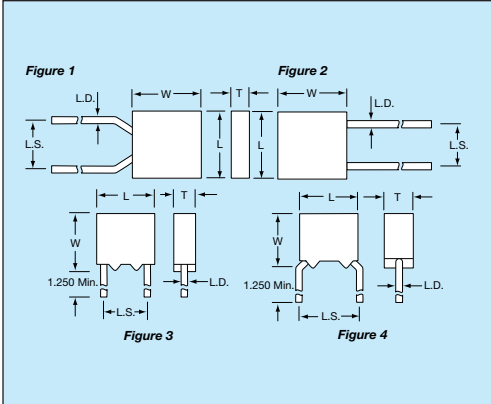
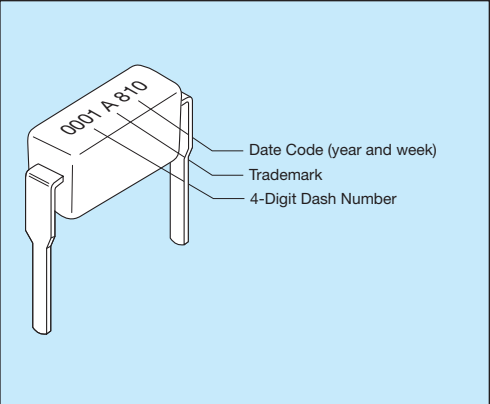
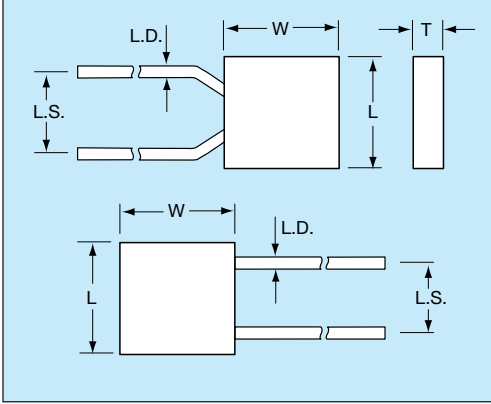
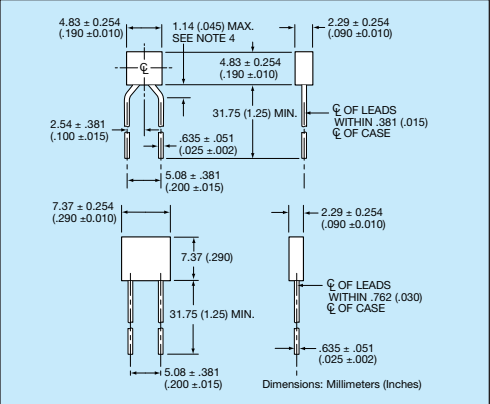
Radial, Axial and 2-Pin DIP MLCCs designed to meet MIL-PER-39014 qualifications.

CK05-CK16

Radial and Axial MLCCs designed to meet MIL-C-11015 qualifications.

CCR05-CCR79

Radial and Axial MLCCs designed to meet MIL-PRF-20



A KYOCERA GROUP COMPANY

HOW TO ORDER

Military Type Designation: Capacitors, Fixed, Ceramic Dielectric, (Temperature Stable and General Purpose), High Reliability

M123	A	01	BX	B	103	K	C												
Mil-Spec Number	Modification Spec.	Slash Sheet Number	Temperature Characteristic	Voltage B = 50 C = 100	Capacitance Code	Capacitance Tolerance	Termination												
			<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Capacitance change with reference to 25°C over temperature range -55°C to +125°C</th> </tr> <tr> <th>Symbol</th> <th>Without Voltage</th> <th>With Rated DC Voltage</th> </tr> </thead> <tbody> <tr> <td>BP</td> <td>0 ± 30 ppm/°C</td> <td>0 ± 30 ppm/°C</td> </tr> <tr> <td>BX</td> <td>±15, -15%</td> <td>±15, -25%</td> </tr> </tbody> </table>	Capacitance change with reference to 25°C over temperature range -55°C to +125°C			Symbol	Without Voltage	With Rated DC Voltage	BP	0 ± 30 ppm/°C	0 ± 30 ppm/°C	BX	±15, -15%	±15, -25%			C = ±0.25pF D = ±0.5pF F = ±1% J = ±5% K = ±10%	C = Copper, solder coated (type C-4 or C-5 of MIL-STD-1276) W = Copper clad steel, solder coated, 60 micro inches minimum.
Capacitance change with reference to 25°C over temperature range -55°C to +125°C																			
Symbol	Without Voltage	With Rated DC Voltage																	
BP	0 ± 30 ppm/°C	0 ± 30 ppm/°C																	
BX	±15, -15%	±15, -25%																	

CROSS REFERENCE MIL-SPEC TEST REQUIREMENTS

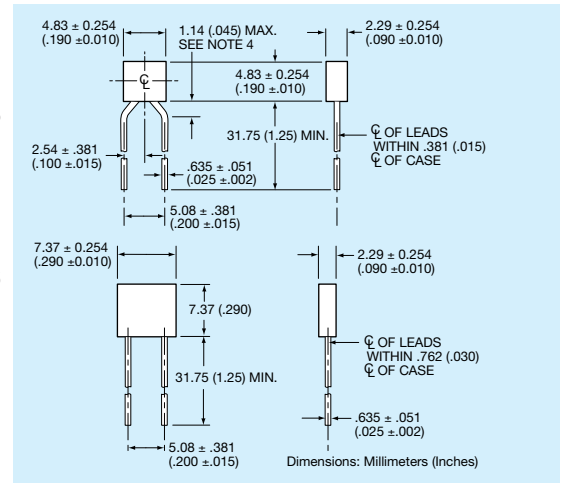
TEST DESCRIPTION	MIL-PRF-123	MIL-PRF-39014	MIL-PRF-20	MIL-PRF-55681
NDT (Non-Destructive Test)	100% Ultrasonic Scan or Neutron-Radiography	No	No	No
Pre-Cap Visual (Pre-Encapsulation Visual Examination)	100%	No	No	No
D.P.A. (Destructive Physical Analysis)	Lot by Lot—Pre-Termination Lot by Lot—Finished Product	No	No	No
Pre-Cap Terminal Strength (Pre-Encapsulation Pull Test)	Lot by Lot	No	No	No
Life Test (Lot by Lot)	Lot by Lot—1000 Hours	No	No	No
Low Voltage Humidity (Lot by Lot)	Lot by Lot	No	No	No
Thermal Shock 100 Cycles (Lot by Lot)	Lot by Lot	No	No	No

MIL-PRF-123/STYLE CKS05, -/01

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A01BPC4R7_C M123A01BPC5R1_C M123A01BPC5R6_C M123A01BPC6R2_C M123A01BPC6R8_C	4.7 5.1 5.6 6.2 6.8	C, D	BP	100
M123A01BPC7R5_C M123A01BPC8R2_C M123A01BPC9R1_C M123A01BPC100_C M123A01BPC110_C	7.5 8.2 9.1 10 11	C, D C, J, K		
M123A01BPC120_C M123A01BPC130_C M123A01BPC150_C M123A01BPC160_C M123A01BPC180_C	12 13 15 16 18	C, J, K	BP	100
M123A01BP_200_C M123A01BP_220_C M123A01BP_240_C M123A01BP_270_C M123A01BP_300_C	20 22 24 27 30	C, J, K C, J, K C, J, K F, J, K	BP	100, 200
M123A01BP_330_C M123A01BP_360_C M123A01BP_390_C M123A01BP_430_C M123A01BP_470_C	33 36 39 43 47			
M123A01BP_510_C M123A01BP_560_C M123A01BP_620_C M123A01BP_680_C M123A01BP_750_C	51 56 62 68 75			
M123A01BP_820_C M123A01BP_910_C M123A01BP_101_C M123A01BP_111_C M123A01BP_121_C	82 91 100 110 120			
M123A01BP_131_C M123A01BP_151_C M123A01BP_161_C M123A01BP_181_C M123A01BP_201_C	130 150 160 180 200			
M123A01BP_221_C M123A01BP_241_C	220 240	F, J, K	BP	100, 200
M123A01BP_271_C M123A01BP_301_C M123A01BP_331_C	270 300 330	F, J, K F, J, K F, J, K	BP BP BP	50, 100, 200 50, 100, 200 50, 100, 200
M123A01BP_361_C M123A01BP_391_C M123A01BP_431_C M123A01BP_471_C M123A01BP_511_C	360 390 430 470 510	F, J, K	BP	50, 100
M123A01BP_561_C M123A01BP_621_C M123A01BP_681_C M123A01BP_751_C M123A01BP_821_C	560 620 680 750 820			
M123A01BP_911_C M123A01BP_102_C M123A01BP_112_C M123A01BP_122_C M123A01BP_132_C	910 1,000 1,100 1,200 1,300			
M123A01BP_152_C M123A01BP_162_C M123A01BP_182_C	1,500 1,600 1,800	F, J, K	BP	50, 100
M123A01BFB202_C M123A01BFB222_C M123A01BFB242_C M123A01BFB272_C M123A01BFB302_C	2,000 2,200 2,400 2,700 3,000	F, J, K	BP	50
M123A01BFB332_C	3,300	F, J, K	BP	50
M123A01BXC271KC M123A01BXC331KC M123A01BXC391KC M123A01BXC471KC M123A01BXC561KC	270 330 390 470 560	K	BX	100
M123A01BXC681KC M123A01BXC821KC M123A01BXC102KC M123A01BXC122KC M123A01BXC152KC	680 820 1,000 1,200 1,500			
M123A01BXC182KC M123A01BXC222KC M123A01BXC272KC M123A01BXC332KC M123A01BXC392KC	1,800 2,200 2,700 3,300 3,900			
M123A01BXC472KC	4,700	K	BX	100
M123A01BXB562KC M123A01BXB682KC M123A01BXB822KC M123A01BXB103KC	5,600 6,800 8,200 10,000	K	BX	50
	10,000	K	BX	50

CKS05

CKS06



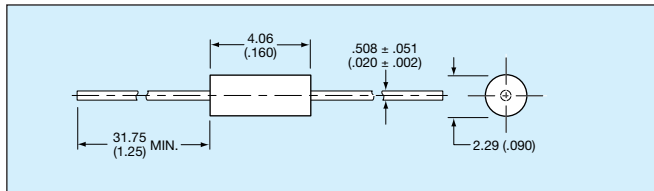
MIL-PRF-123/STYLE CKS06, -/02

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A02BPC271_C M123A02BPC301_C M123A02BPC331_C	270 300 330	F, J, K F, J, K F, J, K	BP BP BP	100 100 100
M123A02BP_361_C M123A02BP_391_C M123A02BP_431_C M123A02BP_471_C M123A02BP_511_C	360 390 430 470 510	F, J, K	BP	100, 200
M123A02BP_561_C M123A02BP_621_C M123A02BP_681_C M123A02BP_751_C M123A02BP_821_C	560 620 680 750 820			
M123A02BP_911_C M123A02BP_102_C M123A02BP_112_C M123A02BP_122_C M123A02BP_132_C	910 1,000 1,100 1,200 1,300			
M123A02BP_152_C M123A02BP_162_C M123A02BP_182_C	1,500 1,600 1,800	F, J, K	BP	100, 200
M123A02BPC202_C M123A02BPC222_C M123A02BPC242_C	2,000 2,200 2,400	F, J, K F, J, K F, J, K	BP BP BP	100 100 100
M123A02BP_272_C M123A02BP_302_C M123A02BP_332_C M123A02BP_362_C M123A02BP_392_C	2,700 3,000 3,300 3,600 3,900	F, J, K	BP	50, 100
M123A02BP_432_C M123A02BP_472_C	4,300 4,700	F, J, K	BP	50, 100
M123A02BFB512_C M123A02BFB562_C M123A02BFB622_C M123A02BFB682_C M123A02BFB752_C	5,100 5,600 6,200 6,800 7,500	F, J, K	BP	50
M123A02BFB822_C M123A02BFB912_C M123A02BFB103_C M123A02BFB123_C M123A02BFB153_C	8,200 9,100 10,000 12,000 15,000			
M123A02BFB183_C	18,000	F, J, K	BP	50
M123A02BXC562KC M123A02BXC682KC M123A02BXC822KC M123A02BXC103KC M123A02BXC123KC	5,600 6,800 8,200 10,000 12,000	K	BX	100
M123A02BXC153KC M123A02BXC183KC M123A02BXC223KC M123A02BXC273KC M123A02BXC333KC	15,000 18,000 22,000 27,000 33,000			
M123A02BXC393KC M123A02BXC473KC	39,000 47,000	K	BX	100
M123A02BX_563KC M123A02BX_683KC M123A02BX_823KC M123A02BX_104KC	56,000 68,000 82,000 100,000	K	BX	50, 100
		K	BX	50, 100

**MIL-PRF-123/STYLE CKS06, -/02
(CONTINUED)**

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A02BXB124KC M123A02BXB154KC M123A02BXB184KC M123A02BXB224KC M123A02BXB274KC	120,000 150,000 180,000 220,000 270,000	K	BX	50
M123A02BXB334KC M123A02BXB394KC M123A02BXB474KC M123A02BXB564KC M123A02BXB684KC M123A02BXB824KC M123A02BXB105KC	330,000 390,000 470,000 560,000 680,000 820,000 1,000,000	K	BX	50

Dimensions: Millimeters (Inches)

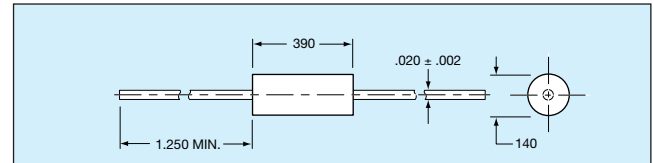
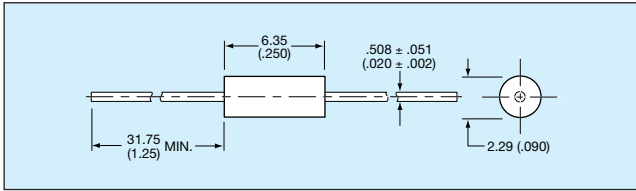


MIL-PRF-123/STYLE CKS11, -/04

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A04BPD1R0_W M123A04BPD1R1_W M123A04BPD1R2_W M123A04BPD1R3_W M123A04BPD1R5_W M123A04BPD1R6_W	1 1.1 1.2 1.3 1.5 1.6	B, C	BP	200
M123A04BPD1R8_W M123A04BPD2R0_W M123A04BPD2R2_W M123A04BPD2R4_W M123A04BPD2R7_W	1.8 2 2.2 2.4 2.7	B, C, D	BP	200
M123A04BPD3R0_W M123A04BPD3R3_W M123A04BPD3R6_W M123A04BPD3R9_W M123A04BPD4R3_W	3 3.3 3.6 3.9 4.3	B, C, D	BP	200
M123A04BP_4R7_W M123A04BP_5R1_W M123A04BP_6R2_W M123A04BP_6R8_W M123A04BP_7R5_W	4.7 5.1 6.2 6.8 7.5	B, C, D	BP	100, 200
M123A04BP_8R2_W M123A04BP_9R1_W M123A04BP_100_W M123A04BP_110_W M123A04BP_120_W	8.2 9.1 10 11 12	B, C, D C, F, J, K	BP	100, 200
M123A04BP_130_W M123A04BP_150_W M123A04BP_160_W M123A04BP_180_W M123A04BP_200_W	13 15 16 18 20	C, F, J, K F, J, K	BP BP	100, 200 100, 200
M123A04BP_220_W M123A04BP_240_W M123A04BP_270_W M123A04BP_300_W	22 24 27 30	C, F, J, K F, J, K	BP BP	100, 200 100, 200
M123A04BP_330_W M123A04BP_360_W M123A04BP_390_W M123A04BP_430_W M123A04BP_470_W	33 36 39 43 47	F, J, K	BP	100, 200
M123A04BP_510_W M123A04BP_560_W M123A04BP_620_W M123A04BP_680_W M123A04BP_750_W	51 56 62 68 75	F, J, K	BP	100, 200

**MIL-PRF-123/STYLE CKS11, -/04
(CONTINUED)**

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A04BPC820_W M123A04BPC910_W M123A04BPC101_W M123A04BPC4R7_W M123A04BPC5R1_W	82 91 100 4.7 5.1	F, J, K F, J, K F, J, K C, D	BP	100
M123A04BPC6R2_W M123A04BPC6R8_W M123A04BPC7R5_W M123A04BPC8R2_W M123A04BPC9R1_W	6.2 6.8 7.5 8.2 9.1	C, D	BP	100
M123A04BPC100_W M123A04BPC110_W M123A04BPC120_W M123A04BPC130_W M123A04BPC150_W	10 11 12 13 15	C, J, K	BP	100
M123A04BPC160_W M123A04BPC180_W M123A04BPC200_W M123A04BPC220_W M123A04BPC240_W	16 18 20 22 24	C, J, K	BP	100
M123A04BPC270_W M123A04BPC300_W M123A04BPC330_W M123A04BPC360_W M123A04BPC390_W	27 30 33 36 39	C, J, K	BP	100
M123A04BPC430_W M123A04BPC470_W M123A04BPC510_W M123A04BPC560_W M123A04BPC620_W	43 47 51 56 62	C, J, K	BP	100
M123A04BPC680_W M123A04BPC750_W M123A04BPC820_W M123A04BPC910_W M123A04BPC101_W	68 75 82 91 100	C, J, K	BP	100
M123A04BP_111_W M123A04BP_121_W M123A04BP_131_W M123A04BP_151_W M123A04BP_161_W	110 120 130 150 160	F, J, K	BP	50, 100
M123A04BP_181_W M123A04BP_201_W M123A04BP_221_W M123A04BP_241_W	180 200 220 240	F, J, K	BP	50, 100
M123A04BPB271_W M123A04BPB301_W M123A04BPB331_W M123A04BPB361_W M123A04BPB391_W	270 300 330 360 390	F, J, K	BP	50
M123A04BPB431_W M123A04BPB471_W M123A04BPB511_W M123A04BPB561_W M123A04BPB621_W M123A04BPB681_W	430 470 510 560 620 680	F, J, K	BP	50
M123A04BXC101KW M123A04BXC121KW M123A04BXC151KW M123A04BXC181KW M123A04BXC221KW	100 120 150 180 220	K	BX	100
M123A04BXC271KW M123A04BXC331KW M123A04BXC391KW M123A04BXC471KW M123A04BXC561KW	270 330 390 470 560	K	BX	100
M123A04BXC681KW M123A04BXC821KW M123A04BXC102KW	680 820 1,000	K	BX	100
M123A04BXB122KW M123A04BXB152KW M123A04BXB182KW M123A04BXB222KW M123A04BXB272KW	1,200 1,500 1,800 2,200 2,700	K	BX	50
M123A04BXB332KW M123A04BXB392KW M123A04BXB472KW	3,300 3,900 4,700	K	BX	50

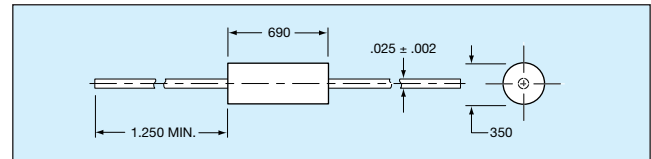
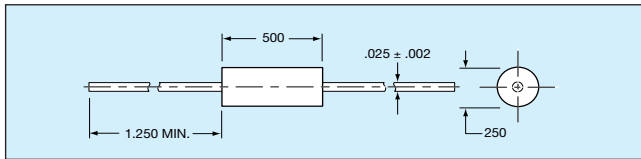


MIL-PRF-123/STYLE CKS12, -/05

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A05BPD820_W M123A05BPD910_W M123A05BPD101_W	82 91 100	F, J, K F, J, K F, J, K	BP BP BP	200 200 200
M123A05BP_111_W M123A05BP_121_W M123A05BP_131_W	110 120 130	F, J, K F, J, K F, J, K	BP BP BP	100, 200 100, 200 100, 200
M123A05BPC151_W M123A05BPC161_W M123A05BPC181_W M123A05BPC201_W M123A05BPC221_W	150 160 180 200 220	F, J, K ↓ F, J, K	BP ↓ BP	100 ↓ 100
M123A05BPP241_W	240	F, J, K	BP	50
M123A05BP_271_W M123A05BP_301_W M123A05BP_331_W M123A05BP_361_W M123A05BP_391_W M123A05BP_431_W M123A05BP_471_W	270 300 330 360 390 430 470	F, J, K ↓ F, J, K	BP ↓ BP	50, 100 ↓ 50, 100
M123A05BPC511_W M123A05BPC561_W M123A05BPC621_W M123A05BPC681_W	510 560 620 680	F, J, K ↓ F, J, K	BP ↓ BP	100 ↓ 100
M123A05BPP751_W M123A05BPP821_W M123A05BPP911_W M123A05BPP102_W	750 820 910 1000	F, J, K ↓ F, J, K	BP ↓ BP	50 ↓ 50
M123A05BXC122KW M123A05BXC152KW M123A05BXC182KW M123A05BXC222KW M123A05BXC272KW M123A05BXC332KW M123A05BXC392KW M123A05BXC472KW	1,200 1,500 1,800 2,200 2,700 3,300 3,900 4,700	K ↓ K	BX ↓ BX	100 ↓ 100
M123A05BXC562KW M123A05BXC682KW M123A05BXC822KW M123A05BXC103KW	5,600 6,800 8,200 10,000	K ↓ K	BX ↓ BX	50 ↓ 50

MIL-PRF-123/STYLE CKS14, -/06

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A06BPD151_W M123A06BPD161_W M123A06BPD181_W M123A06BPD201_W M123A06BPD221_W	150 160 180 200 220	F, J, K ↓ F, J, K	BP ↓ BP	200 ↓ 200
M123A06BP_241_W M123A06BP_271_W M123A06BP_301_W M123A06BP_331_W M123A06BP_361_W M123A06BP_391_W M123A06BP_431_W M123A06BP_471_W M123A06BP_511_W M123A06BP_561_W M123A06BP_621_W M123A06BP_681_W	240 270 300 330 360 390 430 470 510 560 620 680	F, J, K ↓ F, J, K	BP ↓ BP	100, 200 ↓ 100, 200
M123A06BPC751_W M123A06BPC821_W M123A06BPC911_W M123A06BPC102_W	750 820 910 1,000	F, J, K ↓ F, J, K	BP ↓ BP	100 ↓ 100
M123A06BP_112_W M123A06BP_122_W M123A06BP_132_W M123A06BP_152_W M123A06BP_162_W M123A06BP_182_W M123A06BP_202_W M123A06BP_222_W	1,100 1,200 1,300 1,500 1,600 1,800 2,000 2,200	F, J, K ↓ F, J, K	BP ↓ BP	50, 100 ↓ 50, 100
M123A06BPP242_W M123A06BPP272_W M123A06BPP302_W M123A06BPP332_W M123A06BPP362_W M123A06BPP392_W M123A06BPP432_W M123A06BPP472_W M123A06BPP512_W M123A06BPP562_W M123A06BPP622_W M123A06BPP682_W	2,400 2,700 3,000 3,300 3,600 3,900 4,300 4,700 5,100 5,600 6,200 6,800	F, J, K ↓ F, J, K	BP ↓ BP	50 ↓ 50
M123A06BXC562KW M123A06BXC682KW M123A06BXC822KW M123A06BXC103KW	5,600 6,800 8,200 10,000	K ↓ K	BX ↓ BX	100 ↓ 100
M123A06BXC123KW M123A06BXC153KW M123A06BXC183KW M123A06BXC223KW M123A06BXC273KW M123A06BXC333KW M123A06BXC393KW M123A06BXC473KW	12,000 15,000 18,000 22,000 27,000 33,000 39,000 47,000	K ↓ K	BX ↓ BX	50 ↓ 50



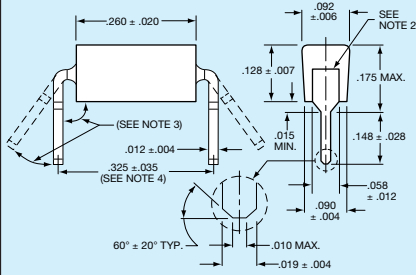
MIL-PRF-123/STYLE CKS15, -/07

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A07BPD821_W M123A07BPD102_W	820 1000	F, J, K F, J, K	BP BP	200 200
M123A07BP_112_W M123A07BP_122_W M123A07BP_132_W M123A07BP_152_W M123A07BP_162_W	1,100 1,200 1,300 1,500 1,600	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	100, 200 ↓ ↓ ↓ ↓
M123A07BP_182_W M123A07BP_202_W M123A07BP_222_W	1,800 2,000 2,200	F, J, K ↓ ↓	BP ↓ ↓	100, 200 ↓ ↓
M123A07BP_242_W M123A07BP_272_W M123A07BP_302_W M123A07BP_332_W	2,400 2,700 3,000 3,300	F, J, K ↓ ↓ ↓	BP ↓ ↓ ↓	50, 200 ↓ ↓ ↓
M123A07BPB362_W	3,600	F, J, K	BP	50
M123A07BP_392_W M123A07BP_432_W M123A07BP_472_W M123A07BP_512_W M123A07BP_562_W	3,900 4,300 4,700 5,100 5,600	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	50, 100 ↓ ↓ ↓ ↓
M123A07BP_622_W M123A07BP_682_W M123A07BP_752_W M123A07BP_822_W M123A07BP_912_W	6,200 6,800 7,500 8,200 9,100	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓
M123A07BP_103_W M123A07BP_113_W M123A07BP_123_W	10,000 11,000 12,000	F, J, K ↓ ↓	BP ↓ ↓	50, 100 ↓ ↓
M123A07BPB133_W M123A07BPB153_W M123A07BPB163_W M123A07BPB183_W M123A07BPB203_W	13,000 15,000 16,000 18,000 20,000	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	50 ↓ ↓ ↓ ↓
M123A07BPB223_W M123A07BPB273_W	22,000 27,000	F, J, K ↓	BP ↓	50 ↓
M123A07BXC123KW M123A07BXC153KW M123A07BXC183KW M123A07BXC223KW M123A07BXC273KW	12,000 15,000 18,000 22,000 27,000	K ↓ ↓ ↓ ↓	BX ↓ ↓ ↓ ↓	100 ↓ ↓ ↓ ↓
M123A07BXC333KW M123A07BXC393KW M123A07BXC473KW M123A07BXC563KW M123A07BXC683KW	33,000 39,000 47,000 56,000 68,000	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓
M123A07BXC823KW M123A07BXC104KW	82,000 100,000	↓ K	↓ BX	↓ 100
M123A07BXB124KW M123A07BXB154KW M123A07BXB184KW	120,000 150,000 180,000	K K K	BX BX BX	50 50 50

MIL-PRF-123/STYLE CKS16, -/08

Part Number 1/	Capacitance pF	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A08BPC242_W M123A08BPC272_W M123A08BPC302_W M123A08BPC332_W M123A08BPC362_W	2,400 2,700 3,000 3,300 3,600	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	100 ↓ ↓ ↓ ↓
M123A08BP_392_W M123A08BP_432_W M123A08BP_472_W M123A08BP_512_W M123A08BP_562_W	3,900 4,300 4,700 5,100 5,600	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	100, 200 ↓ ↓ ↓ ↓
M123A08BP_622_W M123A08BP_682_W M123A08BP_822_W M123A08BP_912_W M123A08BP_103_W	6,200 6,800 8,200 9,100 10,000	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓	↓ ↓ ↓ ↓ ↓
M123A08BPB113_W M123A08BPB123_W M123A08BPB133_W	11,000 12,000 13,000	F, J, K F, J, K F, J, K	BP BP BP	50 50 50
M123A08BP_153_W M123A08BP_163_W M123A08BP_183_W M123A08BP_203_W M123A08BP_223_W	15,000 16,000 18,000 20,000 22,000	F, J, K ↓ ↓ ↓ ↓	BP ↓ ↓ ↓ ↓	50, 100 ↓ ↓ ↓ ↓
M123A08BPC273_W M123A08BPC333_W M123A08BPC393_W	27,000 33,000 39,000	F, J, K F, J, K F, J, K	BP BP BP	100 100 100
M123A08BPB473_W M123A08BPB563_W M123A08BPB683_W M123A08BPB823_W	47,000 56,000 68,000 82,000	F, J, K ↓ ↓ ↓	BP ↓ ↓ ↓	50 ↓ ↓ ↓
M123A08BXC124KW M123A08BXC154KW M123A08BXC184KW M123A08BXC224KW M123A08BXC274KW	120,000 150,000 180,000 220,000 270,000	K ↓ ↓ ↓ ↓	BX ↓ ↓ ↓ ↓	100 ↓ ↓ ↓ ↓
M123A08BXC334KW M123A08BXC394KW M123A08BXC474KW	330,000 390,000 470,000	↓ ↓ K	↓ ↓ BX	↓ ↓ 100
M123A08BXB564KW M123A08BXB684KW M123A08BXB824KW M123A08BXB105KW	560,000 680,000 820,000 1,000,000	K ↓ ↓ K	BX ↓ ↓ BX	50 ↓ ↓ 50

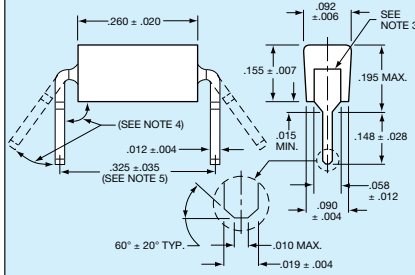
STYLE CKS22, -/16



NOTES:

1. Dimensions are in inches.
2. Leads shall be centered within $\pm .005$ (0.13mm).
3. The angle shall be $95^\circ +10^\circ, -5^\circ$.
4. The distance between the centers of the mounting holes will be $.300 \pm .010$ inch (7.62 \pm 0.25mm).
5. Nonconductive material shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

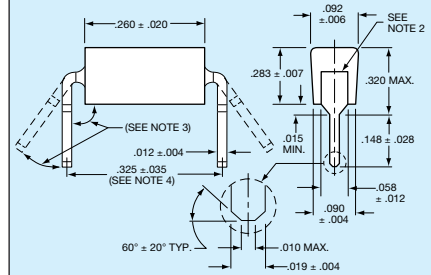
STYLE CKS23, -/17



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Leads shall be centered within $\pm .005$ (0.13mm).
4. The angle shall be $95^\circ +10^\circ, -5^\circ$.
5. The distance between the centers of the mounting holes will be $.300 \pm .010$ inch (7.62 \pm 0.25mm).
6. Nonconductive materials shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

STYLE CKS24, -/18



NOTES:

1. Dimensions are in inches.
2. Leads shall be centered within $\pm .005$ (0.13mm).
3. The angle shall be $95^\circ +10^\circ, -5^\circ$.
4. The distance between the centers of the mounting holes will be $.300 \pm .010$ inch (7.62 \pm 0.25mm).
5. Nonconductive material shall not extend beyond .030 inch (0.76mm) from the edge of the capacitor body.

MIL-PRF-123/STYLE CKS22, -/16

Part Number 1/	Capacitance pf	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A16BPD1R0DC	1.0	D	BP	200
M123A16BPD1R2DC	1.2			
M123A16BPD1R5DC	1.5			
M123A16BPD1R8DC	1.8			
M123A16BPD2R2DC	2.2			
M123A16BPD2R7DC	2.7			
M123A16BPD3R3DC	3.3			
M123A16BPD3R9DC	3.9			
M123A16BPD4R7DC	4.7			
M123A16BPD5R6DC	5.6			
M123A16BPD6R8DC	6.8			
M123A16BPD8R2DC	8.2			
M123A16BPD100_C	10			
M123A16BPD120_C	12			
M123A16BPD150_C	15			
M123A16BPD180_C	18			
M123A16BPD220_C	22			
M123A16BPD270_C	27			
M123A16BPD330_C	33			
M123A16BPD390_C	39			
M123A16BPD470_C	47			
M123A16BPD560_C	56			
M123A16BPD680_C	68			
M123A16BPD820_C	82			
M123A16BPD101_C	100			
M123A16BPD121_C	120			
M123A16BPD151_C	150			
M123A16BPD181_C	180			
M123A16BPD221_C	220			
M123A16BPD271_C	270			
M123A16BPD331_C	330			
M123A16BPD391_C	390			
M123A16BPD471_C	470			
M123A16BPC561_C	560	F, J, K	BP	100
M123A16BPC681_C	680			
M123A16BPC821_C	820			
M123A16BPC102_C	1000			
M123A16BPC122_C	1200			
M123A16BPC152_C	1500			
M123A16BPC182_C	1800			
M123A16BPC222_C	2200			
M123A16BPB272_C	2700	F, J, K	BP	50
M123A16BPB332_C	3300			
M123A16BPB392_C	3900			
M123A16BPB472_C	4700			
M123A16BXD271KC	270	K	BX	200
M123A16BXD331_C	330	K, M		
M123A16BXD391KC	390	K		
M123A16BXD471_C	470	K, M		
M123A16BXD561KC	560	K		
M123A16BXD681_C	680	K, M		
M123A16BXD821KC	820	K	BX	200
M123A16BXC102_C	1000	K, M	BX	100
M123A16BXC122KC	1200	K		
M123A16BXC152_C	1500	K, M		
M123A16BXC182KC	1800	K		
M123A16BXC222_C	2200	K, M	BX	100

Part Number 1/	Capacitance pf	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A16BXC272KC	2700	K	BX	100
M123A16BXC332_C	3300	K, M		
M123A16BXC392KC	3900	K		
M123A16BXC472_C	4700	K, M		
M123A16BXC562KC	5600	K		
M123A16BXC682_C	6800	K, M		
M123A16BXC822KC	8200	K		
M123A16BXC103_C	10000	K, M	BX	100
M123A16BXC123KC	12000	K	BX	50
M123A16BXC153_C	15000	K, M		
M123A16BXC183KC	18000	K		
M123A16BXC223_C	22000	K, M		
M123A16BXC273KC	27000	K		
M123A16BXC333_C	33000	K, M		
M123A16BXC393KC	39000	K		
M123A16BXC473_C	47000	K, M		
M123A16BXC563KC	56000	K		
M123A16BXC683_C	68000	K, M		
M123A16BXC823KC	82000	K		
M123A16BXC104_C	100000	K, M	BX	100
M123A17BXC124KC	120000	K	BX	50
M123A17BXC154_C	150000	K, M		
M123A17BXC184KC	180000	K		
M123A17BXC224_C	220000	K, M	BX	50

1/The complete part number shall include a symbol to indicate capacitance tolerance, as applicable.

MIL-PRF-123/STYLE CKS23, -/17

Part Number 1/	Capacitance pf	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A17BPD561_C	560	F, J, K	BP	200
M123A17BPD681_C	680			
M123A17BPD821_C	820			
M123A17BPD102_C	1000			
M123A17BPD122_C	1200	F, J, K	BP	200
M123A17BPC272_C	2700	F, J, K	BP	100
M123A17BPC332_C	3300	F, J, K	BP	100
M123A17BPB472_C	4700	F, J, K	BP	50
M123A17BPB562_C	5600			
M123A17BPB682_C	6800			
M123A17BPB822_C	8200			
M123A17BPB103_C	10000	F, J, K	BP	50
M123A17BXD102_C	1000	K, M	BX	200
M123A17BXD122KC	1200	K		
M123A17BXD152_C	1500	K, M		
M123A17BXD182KC	1800	K		
M123A17BXD222_C	2200	K, M		
M123A17BXD272KC	2700	K		
M123A17BXD332_C	3300	K, M		
M123A17BXD392KC	3900	K		
M123A17BXD472_C	4700	K, M		
M123A17BXD562KC	5600	K		
M123A17BXD682_C	6800	K, M		
M123A17BXD822KC	8200	K		
M123A17BXD103_C	10000	K, M	BX	200
M123A17BXC123KC	12000	K	BX	100
M123A17BXC153_C	15000	K, M		
M123A17BXC183KC	18000	K		
M123A17BXC223_C	22000	K, M		
M123A17BXC273KC	27000	K	BX	100

Part Number 1/	Capacitance pf	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A17BXC333_C	33000	K, M	BX	100
M123A17BXC393KC	39000	K		
M123A17BXC473_C	47000	K, M		
M123A17BXC563KC	56000	K		
M123A17BXC683_C	68000	K, M		
M123A17BXC823KC	82000	K		
M123A17BXC104_C	100000	K, M	BX	100
M123A17BXC124KC	120000	K	BX	50
M123A17BXC154_C	150000	K, M		
M123A17BXC184KC	180000	K		
M123A17BXC224_C	220000	K, M	BX	50

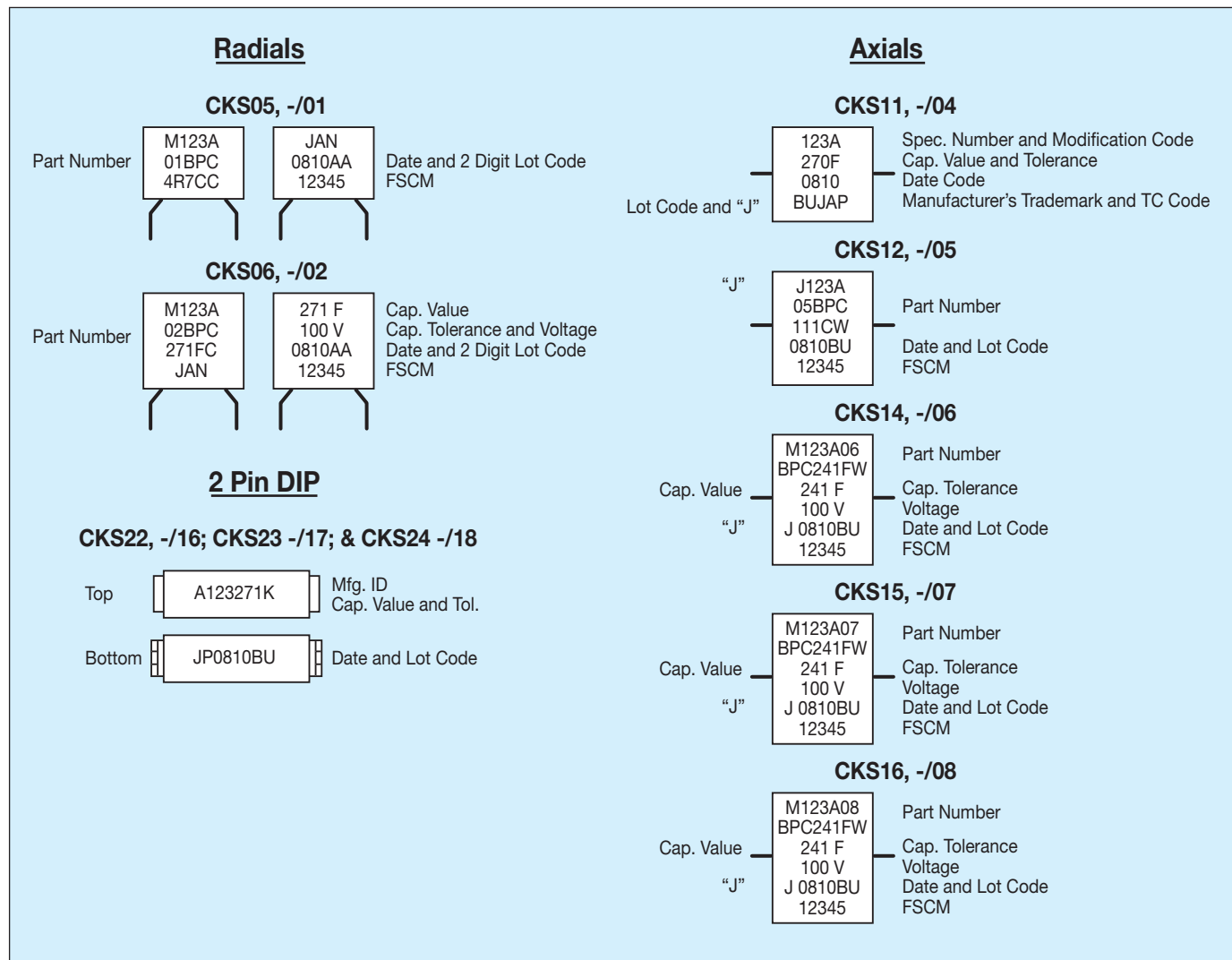
1/The complete part number shall include a symbol to indicate capacitance tolerance, as applicable.

MIL-PRF-123/STYLE CKS24, -/18

Part Number 1/	Capacitance pf	Capacitance Tolerance	Voltage-Temperature Limits	Rated Voltage
M123A18BRC124KC	120,000	K, M	BR	100
M123A18BRC154_C	150,000	K, M	BR	100
M123A18BRB184KC	180,000	K, M	BR	50
M123A18BRB224_C	220,000	K, M	BR	50
M123A18B-B274_C	270,000	K, M	BX, BR	50
M123A18B-B334_C	330,000			
M123A18B-B394_C	390,000			
M123A18B-B474_C	470,000	K, M	BX, BR	50
M123A18BXC564_C	560,000	K, M	BX	50
M123A18BXC684_C	680,000			
M123A18BXC824_C	820,000			
M123A18BXC105_C	1,000,000	K, M	BX	50

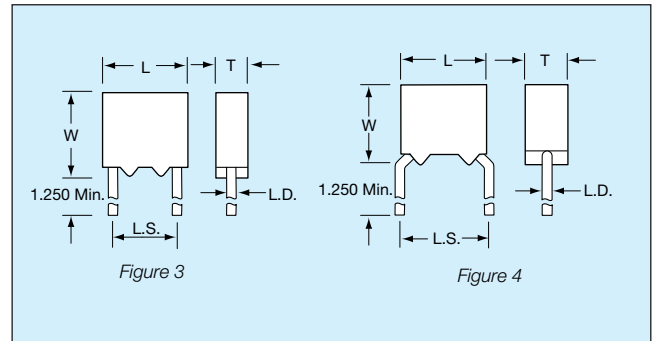
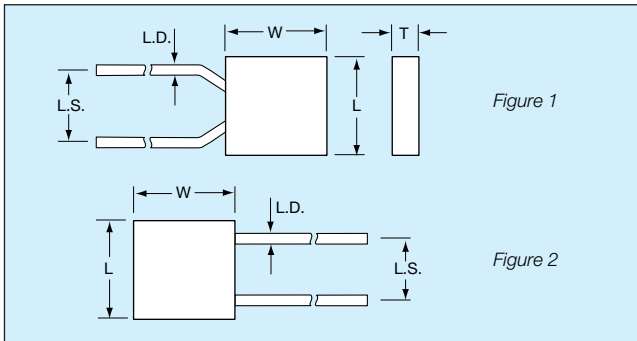
1/The complete PIN will include additional letters to indicate voltage-temperature limits and capacitance tolerance, as applicable.

MARKING



MILITARY PART NUMBER CROSS REFERENCE MIL-PRF-123/

MIL-PRF-123		MIL-PRF-39014		MIL-PRF-20		MIL-PRF-55681		AVX CATALOG
CKS #	M123/ -	CKR #	M39014/ -	CCR #	M20/ -	CDR #	M55681/ -	
CKS05	/1	CKR05	/01	CCR05	/35	N/A	N/A	MR05
CKS06	/2	CKR06	/02	CCR06	/36	N/A	N/A	MR06
CKS11	/4	CKR11	/05	CCR75	/27	N/A	N/A	MA10
CKS12	/5	CKR12	/05	CCR76	/28	N/A	N/A	MA20
CKS14	/6	CKR14	/05	CCR77	/29	N/A	N/A	MA40
CKS15	/7	CKR15	/05	CCR78	/30	N/A	N/A	MA50
CKS16	/8	CKR16	/05	CCR79	/31	N/A	N/A	MA60
CKS51	/10	N/A	N/A	N/A	N/A	CDR01	/1	0805
CKS52	/11	N/A	N/A	N/A	N/A	N/A	N/A	1210
CKS53	/12	N/A	N/A	N/A	N/A	CDR03	/1	1808
CKS54	/13	N/A	N/A	N/A	N/A	CDR06	/3	2225
CKS22	/16	CKR22	/22	N/A	N/A	N/A	N/A	MD01
CKS23	/17	CKR23	/22	N/A	N/A	N/A	N/A	MD02
CKS24	/18	CKR24	/22	N/A	N/A	N/A	N/A	MD03



HOW TO ORDER

Military Type Designation: Styles CKR04, CKR05, CKR06, CKR08

Dash Number Option: MIL-PRF-39014/01 (Appropriate Dash Number)

CKR05

Style

CK = General purpose, ceramic dielectric, fixed capacitors
 R = Established Reliability Parts
 05 = Remaining two numbers identify shape and dimension

BX

Voltage-Temperature Limits

First letter identifies temperature range.
 B = -55°C to +125°C
 Second letter identifies voltage-temperature coefficient.

Capacitance Change with Reference to 25°C		
Second Letter	No Voltage	Rated Voltage
X	+15, -15%	+15, -25%

104

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10pF use "R" in place of decimal point, e.g., 1R4 = 1.4pF)

K

Capacitance Tolerance

K = ±10%
 M = ±20%

S

Military Failure Rate

M = 1% per 1000 hours
 P = 0.1% per 1000 hours
 R = 0.01% per 1000 hours
 S = 0.001% per 1000 hours
 Note:

AVX reserves the right to substitute a lower failure rate part per MIL-PRF-39014. Substitutability for failure rate levels shall be as follows:

Failure Rate Level	Will Replace Failure Rate Level
S (STD) (X-ray)	R, P, M, L
R (STD) (No X-ray)	P, M, L
P	M, L
M	L

(V)

Standoff Option

To order standoff option, place "V" at the end of the part number.
 Example: CKR05BX104KSV

Not RoHS Compliant

PACKAGING REQUIREMENTS

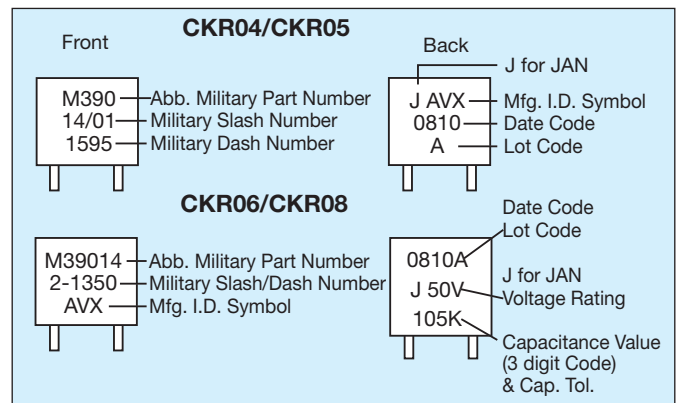
Packaging: 100 Pcs/bag; Radial Tape and Reel Packaging available upon request (2500 pcs./reel).

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Per Mil Spec	Case Size				
	Length (L)	Width (W)	Thickness (T)	Lead Spacing (L.S.)	Lead Diameter (L.D.)
MIL-PRF-39014					
CKR04 (Fig. 2)	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	2.54±.38 (.100±.015)	.64±.05 (.025±.002)
CKR05 (Fig. 1, 4)	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
CKR06 (Fig. 2, 3)	7.37±.25 (.290±.010)	7.37±.25 (.290±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
CKR08 (Fig. 2)	7.37±.25 (.290±.010)	7.37±.25 (.290±.010)	3.68±.38 (.145±.015)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)

MARKING RADIAL LEAD



MILITARY DASH NUMBER IDENTIFICATION CKR04 TO MIL-PRF-39014/23

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR04 (BX)							
CKR04BX100K_	0001	0101	0201	0301	10	10	200
CKR04BX100M_	0002	0102	0202	0302	10	20	200
CKR04BX120K_	0003	0103	0203	0303	12	10	200
CKR04BX150K_	0004	0104	0204	0304	15	10	200
CKR04BX150M_	0005	0105	0205	0305	15	20	200
CKR04BX180K_	0006	0106	0206	0306	18	10	200
CKR04BX220K_	0007	0107	0207	0307	22	10	200
CKR04BX220M_	0008	0108	0208	0308	22	20	200
CKR04BX270K_	0009	0109	0209	0309	27	10	200
CKR04BX330K_	0010	0110	0210	0310	33	10	200
CKR04BX330M_	0011	0111	0211	0311	33	20	200
CKR04BX390K_	0012	0112	0212	0312	39	10	200
CKR04BX470K_	0013	0113	0213	0313	47	10	200
CKR04BX470M_	0014	0114	0214	0314	47	20	200
CKR04BX560K_	0015	0115	0215	0315	56	10	200
CKR04BX680K_	0016	0116	0216	0316	68	10	200
CKR04BX680M_	0017	0117	0217	0317	68	20	200
CKR04BX820K_	0018	0118	0218	0318	82	10	200
CKR04BX101K_	0019	0119	0219	0319	100	10	200
CKR04BX101M_	0020	0120	0220	0320	100	20	200
CKR04BX121K_	0021	0121	0221	0321	120	10	200
CKR04BX151K_	0022	0122	0222	0322	150	10	200
CKR04BX151M_	0023	0123	0223	0323	150	20	200
CKR04BX181K_	0024	0124	0224	0324	180	10	200
CKR04BX221K_	0025	0125	0225	0325	220	10	200
CKR04BX221M_	0026	0126	0226	0326	220	20	200
CKR04BX271K_	0027	0127	0227	0327	270	10	200
CKR04BX331K_	0028	0128	0228	0328	330	10	200
CKR04BX331M_	0029	0129	0229	0329	330	20	200
CKR04BX391K_	0030	0130	0230	0330	390	10	200
CKR04BX471K_	0031	0131	0231	0331	470	10	200
CKR04BX471M_	0032	0132	0232	0332	470	20	200
CKR04BX561K_	0033	0133	0233	0333	560	10	200
CKR04BX681K_	0034	0134	0234	0334	680	10	200
CKR04BX681M_	0035	0135	0235	0335	680	20	200
CKR04BX821K_	0036	0136	0236	0336	820	10	200
CKR04BX102K_	0037	0137	0237	0337	1,000	10	200
CKR04BX102M_	0038	0138	0238	0338	1,000	20	200
CKR04BX122K_	0039	0139	0239	0339	1,200	10	100
CKR04BX152K_	0040	0140	0240	0340	1,500	10	100
CKR04BX152M_	0041	0141	0241	0341	1,500	20	100
CKR04BX182K_	0042	0142	0242	0342	1,800	10	100
CKR04BX222K_	0043	0143	0243	0343	2,200	10	100
CKR04BX222M_	0044	0144	0244	0344	2,200	20	100
CKR04BX272K_	0045	0145	0245	0345	2,700	10	100
CKR04BX332K_	0046	0146	0246	0346	3,300	10	100
CKR04BX332M_	0047	0147	0247	0347	3,300	20	100
CKR04BX392K_	0048	0148	0248	0348	3,900	10	100
CKR04BX472K_	0049	0149	0249	0349	4,700	10	100
CKR04BX472M_	0050	0150	0250	0350	4,700	20	100
CKR04BX562K_	0051	0151	0251	0351	5,600	10	100
CKR04BX682K_	0052	0152	0252	0352	6,800	10	100
CKR04BX682M_	0053	0153	0253	0353	6,800	20	100
CKR04BX822K_	0054	0154	0254	0354	8,200	10	100
CKR04BX103K_	0055	0155	0255	0355	10,000	10	100
CKR04BX103M_	0056	0156	0256	0356	10,000	20	100
CKR04BX123K_	0057	0157	0257	0357	12,000	10	50
CKR04BX153K_	0058	0158	0258	0358	15,000	10	50
CKR04BX153M_	0059	0159	0259	0359	15,000	20	50
CKR04BX183K_	0060	0160	0260	0360	18,000	10	50
CKR04BX223K_	0061	0161	0261	0361	22,000	10	50
CKR04BX223M_	0062	0162	0262	0362	22,000	20	50
CKR04BX273K_	0063	0163	0263	0363	27,000	10	50
CKR04BX333K_	0064	0164	0264	0364	33,000	10	50
CKR04BX333M_	0065	0165	0265	0365	33,000	20	50
CKR04BX393K_	0066	0166	0266	0366	39,000	10	50
CKR04BX473K_	0067	0167	0267	0367	47,000	10	50
CKR04BX473M_	0068	0168	0268	0368	47,000	20	50
CKR04BX563K_	0069	0169	0269	0369	56,000	10	50
CKR04BX683K_	0070	0170	0270	0370	68,000	10	50
CKR04BX683M_	0071	0171	0271	0371	68,000	20	50
CKR04BX823K_	0072	0172	0272	0372	82,000	10	50
CKR04BX104K_	0073	0173	0273	0373	100,000	10	50
CKR04BX104M_	0074	0174	0274	0374	100,000	20	50

_____ Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR05 TO MIL-PRF-39014/01

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR05 (BX)							
CKR05BX100K_	1201	1241	1281	1321	10	10	200
CKR05BX100M_	1202	1242	1282	1322	10	20	200
CKR05BX120K_	1203	1243	1283	1323	12	10	200
CKR05BX150K_	1204	1244	1284	1324	15	10	200
CKR05BX150M_	1205	1245	1285	1325	15	20	200
CKR05BX180K_	1206	1246	1286	1326	18	10	200
CKR05BX220K_	1207	1247	1287	1327	22	10	200
CKR05BX220M_	1208	1248	1288	1328	22	20	200
CKR05BX270K_	1209	1249	1289	1329	27	10	200
CKR05BX330K_	1210	1250	1290	1330	33	10	200
CKR05BX330M_	1211	1251	1291	1331	33	20	200
CKR05BX390K_	1212	1252	1292	1332	39	10	200
CKR05BX470K_	1213	1253	1293	1333	47	10	200
CKR05BX470M_	1214	1254	1294	1334	47	20	200
CKR05BX560K_	1215	1255	1295	1335	56	10	200
CKR05BX680K_	1216	1256	1296	1336	68	10	200
CKR05BX680M_	1217	1257	1297	1337	68	20	200
CKR05BX820K_	1218	1258	1298	1338	82	10	200
CKR05BX101K_	1219	1259	1299	1339	100	10	200
CKR05BX101M_	1220	1260	1300	1340	100	20	200
CKR05BX121K_	1221	1261	1301	1341	120	10	200
CKR05BX151K_	1222	1262	1302	1342	150	10	200
CKR05BX151M_	1223	1263	1303	1343	150	20	200
CKR05BX181K_	1224	1264	1304	1344	180	10	200
CKR05BX221K_	1225	1265	1305	1345	220	10	200
CKR05BX221M_	1226	1266	1306	1346	220	20	200
CKR05BX271K_	1227	1267	1307	1347	270	10	200
CKR05BX331K_	1228	1268	1308	1348	330	10	200
CKR05BX331M_	1229	1269	1309	1349	330	20	200
CKR05BX391K_	1230	1270	1310	1350	390	10	200
CKR05BX471K_	1231	1271	1311	1351	470	10	200
CKR05BX471M_	1232	1272	1312	1352	470	20	200
CKR05BX561K_	1233	1273	1313	1353	560	10	200
CKR05BX681K_	1234	1274	1314	1354	680	10	200
CKR05BX681M_	1235	1275	1315	1355	680	20	200
CKR05BX821K_	1236	1276	1316	1356	820	10	200
CKR05BX102K_	1237	1277	1317	1357	1,000	10	200
CKR05BX102M_	1238	1278	1318	1358	1,000	20	200
CKR05BX122K_	1239	1279	1319	1359	1,200	10	100
CKR05BX152K_	1240	1280	1320	1360	1,500	10	100
CKR05BX152M_	1441	1481	1521	1561	1,500	20	100
CKR05BX182K_	1442	1482	1522	1562	1,800	10	100
CKR05BX222K_	1443	1483	1523	1563	2,200	10	100
CKR05BX222M_	1444	1484	1524	1564	2,200	20	100
CKR05BX272K_	1445	1485	1525	1565	2,700	10	100
CKR05BX332K_	1446	1486	1526	1566	3,300	10	100
CKR05BX332M_	1447	1487	1527	1567	3,300	20	100
CKR05BX392K_	1448	1488	1528	1568	3,900	10	100
CKR05BX472K_	1449	1489	1529	1569	4,700	10	100
CKR05BX472M_	1450	1490	1530	1570	4,700	20	100
CKR05BX562K_	1451	1491	1531	1571	5,600	10	100
CKR05BX682K_	1452	1492	1532	1572	6,800	10	100
CKR05BX682M_	1453	1493	1533	1573	6,800	20	100
CKR05BX822K_	1454	1494	1534	1574	8,200	10	100
CKR05BX103K_	1455	1495	1535	1575	10,000	10	100
CKR05BX103M_	1456	1496	1536	1576	10,000	20	100
CKR05BX123K_	1457	1497	1537	1577	12,000	10	50
CKR05BX153K_	1458	1498	1538	1578	15,000	10	50
CKR05BX153M_	1459	1499	1539	1579	15,000	20	50
CKR05BX183K_	1460	1500	1540	1580	18,000	10	50
CKR05BX223K_	1461	1501	1541	1581	22,000	10	50
CKR05BX223M_	1462	1502	1542	1582	22,000	20	50
CKR05BX273K_	1463	1503	1543	1583	27,000	10	50
CKR05BX333K_	1464	1504	1544	1584	33,000	10	50
CKR05BX333M_	1465	1505	1545	1585	33,000	20	50
CKR05BX393K_	1466	1506	1546	1586	39,000	10	50
CKR05BX473K_	1467	1507	1547	1587	47,000	10	50
CKR05BX473M_	1468	1508	1548	1588	47,000	20	50
CKR05BX563K_	1469	1509	1549	1589	56,000	10	50
CKR05BX683K_	1470	1510	1550	1590	68,000	10	50
CKR05BX683M_	1471	1511	1551	1591	68,000	20	50
CKR05BX823K_	1472	1512	1552	1592	82,000	10	50
CKR05BX104K_	1473	1513	1553	1593	100,000	10	50
CKR05BX104M_	1474	1514	1554	1594	100,000	20	50

_____ Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR06 TO MIL-PRF-39014/02

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR06 (BX)							
CKR06BX122K_	1201	1241	1281	1321	1200	10	200
CKR06BX152K_	1202	1242	1282	1322	1500	10	200
CKR06BX152M_	1203	1243	1283	1323	1500	20	200
CKR06BX182K_	1204	1244	1284	1324	1800	10	200
CKR06BX222K_	1206	1246	1286	1326	2200	10	200
CKR06BX222M_	1207	1247	1287	1327	2200	20	200
CKR06BX272K_	1208	1248	1288	1328	2700	10	200
CKR06BX332K_	1209	1249	1289	1329	3300	10	200
CKR06BX332M_	1210	1250	1290	1330	3300	20	200
CKR06BX392K_	1211	1251	1291	1331	3900	10	200
CKR06BX472K_	1212	1252	1292	1332	4700	10	200
CKR06BX472M_	1213	1253	1293	1333	4700	20	200
CKR06BX562K_	1214	1254	1294	1334	5600	10	200
CKR06BX682K_	1215	1255	1295	1335	6800	10	200
CKR06BX682M_	1216	1256	1296	1336	6800	20	200
CKR06BX822K_	1217	1257	1297	1337	8200	10	200
CKR06BX103K_	1218	1258	1298	1338	10,000	10	200
CKR06BX103M_	1219	1259	1299	1339	10,000	20	200
CKR06BX123K_	1231	1271	1311	1351	12,000	10	100
CKR06BX153K_	1220	1260	1300	1340	15,000	10	100
CKR06BX183K_	1221	1261	1301	1341	18,000	10	100
CKR06BX223K_	1222	1262	1302	1342	22,000	10	100
CKR06BX273K_	1232	1272	1312	1352	27,000	10	100
CKR06BX333K_	1223	1263	1303	1343	33,000	10	100
CKR06BX393K_	1224	1264	1304	1344	39,000	10	100
CKR06BX473K_	1225	1265	1305	1345	47,000	10	100
CKR06BX563K_	1226	1266	1306	1346	56,000	10	100
CKR06BX683K_	1227	1267	1307	1347	68,000	10	100
CKR06BX823K_	1229	1269	1309	1349	82,000	10	100
CKR06BX104K_	1230	1270	1310	1350	100,000	10	100
CKR06BX124K_	1233	1273	1313	1353	120,000	10	50
CKR06BX154K_	1234	1274	1314	1354	150,000	10	50
CKR06BX184K_	1235	1275	1315	1355	180,000	10	50
CKR06BX224K_	1236	1276	1316	1356	220,000	10	50
CKR06BX274K_	1237	1277	1317	1357	270,000	10	50
CKR06BX334K_	1238	1278	1318	1358	330,000	10	50
CKR06BX394K_	1239	1279	1319	1359	390,000	10	50
CKR06BX474K_	1240	1280	1320	1360	470,000	10	50
CKR06BX564K_	1404	1408	1412	1416	560,000	10	50
CKR06BX684K_	1405	1409	1413	1417	680,000	10	50
CKR06BX824K_	1406	1410	1414	1418	820,000	10	50
CKR06BX105K_	1407	1411	1415	1419	1,000,000	10	50

— Add appropriate failure rate level letter (M, P, R or S)

CKR08 to MIL-PRF-39014/20 (Dash Number From Table)

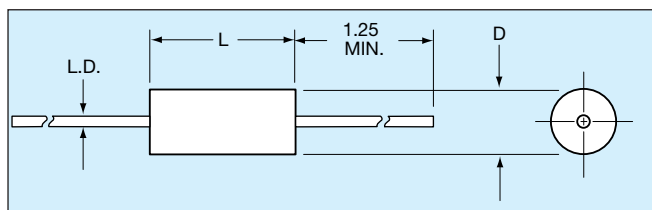
Military Type Designation	Failure Rate Level (%/1,000 Hours)		Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)				
CKR08 (BX)					
CKR08BX125K_	0104		1,200,000	10	50
CKR08BX155K_	0105		1,500,000	10	50
CKR08BX205K_	0106		2,000,000	10	50

— Add appropriate failure rate level letter (M)

CROSS REFERENCE CHART - AVX MILITARY FOR MOLDED RADIAL LEAD

Figure	AVX Style	Per Mil-Spec			Case Size				
		MIL-C-11015	MIL-PRF-39014	MIL-PRF-20	Length(L)	Width (W)	Thickness (T)	Lead Spacing (LS)	Lead Diameter (LD)
1	MR05	CK05	CKR05	CCR05/CC05	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
2	MR04	—	CKR04	CCR09/CC09	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	2.54±.38 (.100±.015)	.64±.05 (.025±.002)
2	MR06	CK06	CKR06	CCR06/CC06	7.37±.25 (.290±.010)	7.37±.25 (.290±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
2	MR68	—	CKR08	—	7.37±.25 (.290±.010)	7.37±.25 (.290±.010)	3.68±.38 (.145±.015)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
2	MR07	—	—	CCR07/CC07	12.19±.51 (.480±.020)	12.19±.51 (.480±.020)	3.56±.25 (.140±.010)	10.16±.51 (.400±.020)	.64±.05 (.025±.002)
2	MR08	—	—	CCR08/CC08	12.19±.51 (.480±.020)	12.19±.51 (.480±.020)	6.1±.25 (.240±.010)	10.16±.51 (.400±.020)	.64±.05 (.025±.002)

Dimensions: Millimeters (Inches)



HOW TO ORDER

Military Type Designation: Styles CKR11, CKR12, CKR14, CKR15, CKR16

Dash Number Option: MIL-PRF-39014/05 (Add Appropriate Dash Number)

CKR11

Style

CK = General purpose, ceramic dielectric, fixed capacitors
 R = Established Reliability parts
 11 = Remaining two numbers identify shape and dimension

BX

Voltage-Temperature Limits

First letter identifies temperature range.
 B = -55°C to +125°C
 Second letter identifies voltage-temperature coefficient.

Capacitance Change with Reference to 25°C		
Second Letter	No Voltage	Rated Voltage
R	+15, -15%	+15, -40%
X	+15, -15%	+15, -25%

103

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 10,000 pF as 103.

K

Capacitance Tolerance

K = ±10%
 M = ±20%

S

Military Failure Rate

M = 1% per 1000 hours
 P = 0.1% per 1000 hours
 R = 0.01% per 1000 hours
 S = 0.001% per 1000 hours

Note:
 AVX reserves the right to substitute a lower failure rate part per MIL-PRF-39014/5E.
 Substitutability for failure rate levels shall be as follows:

Failure Rate Level	Will Replace Failure Rate Level
S (STD) (X-ray)	R, P, M, L
R (STD) (No X-ray)	P, M, L
P	M, L
M	L

Not RoHS Compliant

PACKAGING REQUIREMENTS

Packaging: Bulk

CKR11, 12, & 14 100 pcs per bag
 CKR15 & 16 50 pcs per bag

Tape & Reel

CKR11, 12 5000 pcs per reel
 CKR14 3000 pcs per reel
 CKR15 950 pcs per reel
 CKR16 650 pcs per reel

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Per Mil Spec	Case Size		
	Length (L)	Diameter (D)	Lead Diameter (L.D.)
MIL-PRF-39014			
CKR11	4.07±.25 (.160±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
CKR12	6.35±.25 (.250±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
CKR14	9.91±.25 (.390±.010)	3.56±.25 (.140±.010)	.63±.025 (.025±.002)
CKR15	12.7±.51 (.500±.020)	6.35±.38 (.250±.015)	.63±.05 (.025±.002)
CKR16	17.53±.51 (.690±.020)	8.89±.51 (.350±.020)	.63±.05 (.025±.002)



MILITARY DASH NUMBER IDENTIFICATION CKR11 TO MIL-PRF-39014/05

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR11 (BX)							
CKR11BX100K_	2601	2801	2001	2201	10	10	100
CKR11BX100M_	2602	2802	2002	2202	10	20	100
CKR11BX120K_	2603	2803	2003	2203	12	10	100
CKR11BX150K_	2604	2804	2004	2204	15	10	100
CKR11BX150M_	2605	2805	2005	2205	15	20	100
CKR11BX180K_	2606	2806	2006	2206	18	10	100
CKR11BX220K_	2607	2807	2007	2207	22	10	100
CKR11BX220M_	2608	2808	2008	2208	22	20	100
CKR11BX270K_	2609	2809	2009	2209	27	10	100
CKR11BX330K_	2610	2810	2010	2210	33	10	100
CKR11BX330M_	2611	2811	2011	2211	33	20	100
CKR11BX390K_	2612	2812	2012	2212	39	10	100
CKR11BX470K_	2613	2813	2013	2213	47	10	100
CKR11BX470M_	2614	2814	2014	2214	47	20	100
CKR11BX560K_	2615	2815	2015	2215	56	10	100
CKR11BX680K_	2616	2816	2016	2216	68	10	100
CKR11BX680M_	2617	2817	2017	2217	68	20	100
CKR11BX820K_	2618	2818	2018	2218	82	10	100
CKR11BX101K_	2619	2819	2019	2219	100	10	100
CKR11BX101M_	2620	2820	2020	2220	100	20	100
CKR11BX121K_	2621	2821	2021	2221	120	10	100
CKR11BX151K_	2622	2822	2022	2222	150	10	100
CKR11BX151M_	2623	2823	2023	2223	150	20	100
CKR11BX181K_	2624	2824	2024	2224	180	10	100
CKR11BX221K_	2625	2825	2025	2225	220	10	100
CKR11BX221M_	2626	2826	2026	2226	220	20	100
CKR11BX271K_	2627	2827	2027	2227	270	10	100
CKR11BX331K_	2628	2828	2028	2228	330	10	100
CKR11BX331M_	2629	2829	2029	2229	330	20	100
CKR11BX391K_	2630	2830	2030	2230	390	10	100
CKR11BX471K_	2631	2831	2031	2231	470	10	100
CKR11BX471M_	2632	2832	2032	2232	470	20	100
CKR11BX561K_	2633	2833	2033	2233	560	10	100
CKR11BX681K_	2634	2834	2034	2234	680	10	100
CKR11BX681M_	2635	2835	2035	2235	680	20	100
CKR11BX821K_	2636	2836	2036	2236	820	10	100
CKR11BX102K_	2637	2837	2037	2237	1000	10	100
CKR11BX102M_	2638	2838	2038	2238	1000	20	100
CKR11BX122K_	2639	2839	2039	2239	1200	10	100
CKR11BX152K_	2640	2840	2040	2240	1500	10	100
CKR11BX152M_	2641	2841	2041	2241	1500	20	100
CKR11BX182K_	2642	2842	2042	2242	1800	10	100
CKR11BX222K_	2643	2843	2043	2243	2200	10	100
CKR11BX222M_	2644	2844	2044	2244	2200	20	100
CKR11BX272K_	2645	2845	2045	2245	2700	10	100
CKR11BX332K_	2646	2846	2046	2246	3300	10	100
CKR11BX332M_	2647	2847	2047	2247	3300	20	100
CKR11BX392K_	2648	2848	2048	2248	3900	10	100
CKR11BX472K_	2649	2849	2049	2249	4700	10	100
CKR11BX472M_	2650	2850	2050	2250	4700	20	100
CKR11BX562K_	2651	2851	2051	2251	5600	10	50
CKR11BX682K_	2652	2852	2052	2252	6800	10	50
CKR11BX682M_	2653	2853	2053	2253	6800	20	50
CKR11BX822K_	2654	2854	2054	2254	8200	10	50
CKR11BX103K_	2655	2855	2055	2255	10,000	10	50
CKR11BX103M_	2656	2856	2056	2256	10,000	20	50

— Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR12/14/15 TO MIL-PRF-39014/05

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR12 (BX)							
CKR12BX562K_	2657	2857	2057	2257	5600	10	100
CKR12BX682K_	2658	2858	2058	2258	6800	10	100
CKR12BX682M_	2659	2859	2059	2259	6800	20	100
CKR12BX822K_	2660	2860	2060	2260	8200	10	100
CKR12BX103K_	2661	2861	2061	2261	10,000	10	100
CKR12BX103M_	2662	2862	2062	2262	10,000	20	100
CKR12BX123K_	2663	2863	2063	2263	12,000	10	50
CKR12BX153K_	2664	2864	2064	2264	15,000	10	50
CKR12BX153M_	2665	2865	2065	2265	15,000	20	50
CKR12BX183K_	2666	2866	2066	2266	18,000	10	50
CKR12BX223K_	2667	2867	2067	2267	22,000	10	50
CKR12BX223M_	2668	2868	2068	2268	22,000	20	50
CKR12BX273K_	2669	2869	2069	2269	27,000	10	50
CKR12BX333K_	2670	2870	2070	2270	33,000	10	50
CKR12BX333M_	2671	2871	2071	2271	33,000	20	50
CKR12BX393K_	2672	2872	2072	2272	39,000	10	50
CKR12BX473K_	2673	2873	2073	2273	47,000	10	50
CKR12BX473M_	2674	2874	2074	2274	47,000	20	50
CKR14 (BX)							
CKR14BX123K_	2675	2875	2075	2275	12,000	10	100
CKR14BX153K_	2676	2876	2076	2276	15,000	10	100
CKR14BX153M_	2677	2877	2077	2277	15,000	20	100
CKR14BX183K_	2678	2878	2078	2278	18,000	10	100
CKR14BX223K_	2679	2879	2079	2279	22,000	10	100
CKR14BX223M_	2680	2880	2080	2280	22,000	20	100
CKR14BX273K_	2681	2881	2081	2281	27,000	10	100
CKR14BX333K_	2682	2882	2082	2282	33,000	10	100
CKR14BX333M_	2683	2883	2083	2283	33,000	20	100
CKR14BX393K_	2684	2884	2084	2284	39,000	10	100
CKR14BX473K_	2685	2885	2085	2285	47,000	10	100
CKR14BX473M_	2686	2886	2086	2286	47,000	20	100
CKR14BX563K_	2687	2887	2087	2287	56,000	10	50
CKR14BX683K_	2688	2888	2088	2288	68,000	10	50
CKR14BX683M_	2689	2889	2089	2289	68,000	20	50
CKR14BX823K_	2690	2890	2090	2290	82,000	10	50
CKR14BX104K_	2691	2891	2091	2291	100,000	10	50
CKR14BX104M_	2692	2892	2092	2292	100,000	20	50
CKR14 (BR)							
CKR14BR563K_	2693	2893	2093	2293	56,000	10	100
CKR14BR683K_	2694	2894	2094	2294	68,000	10	100
CKR14BR683M_	2695	2895	2095	2295	68,000	20	100
CKR14BR823K_	2696	2896	2096	2296	82,000	10	100
CKR14BR104K_	2697	2897	2097	2297	100,000	10	100
CKR14BR104M_	2698	2898	2098	2298	100,000	20	100
CKR14BR124K_	2699	2899	2099	2299	120,000	10	50
CKR14BR154K_	2700	2900	2100	2300	150,000	10	50
CKR14BR154M_	2701	2901	2101	2301	150,000	20	50
CKR14BR184K_	2702	2902	2102	2302	180,000	10	50
CKR14BR224K_	2703	2903	2103	2303	220,000	10	50
CKR14BR224M_	2704	2904	2104	2304	220,000	20	50
CKR14BR274K_	2705	2905	2105	2305	270,000	10	50
CKR15 (BX)							
CKR15BX563K_	2706	2906	2106	2306	56,000	10	100
CKR15BX683K_	2707	2907	2107	2307	68,000	10	100
CKR15BX683M_	2708	2908	2108	2308	68,000	20	100
CKR15BX823K_	2709	2909	2109	2309	82,000	10	100
CKR15BX104K_	2710	2910	2110	2310	100,000	10	100
CKR15BX104M_	2711	2911	2111	2311	100,000	20	100

— Add appropriate failure rate level letter (M, P, R or S)

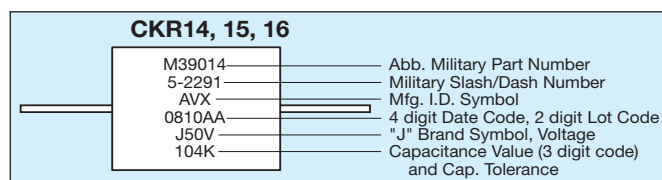
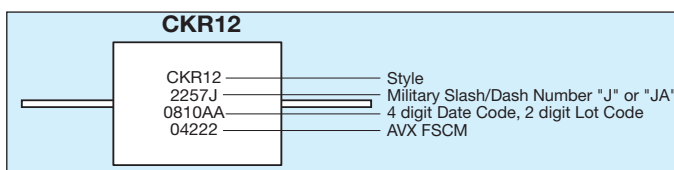
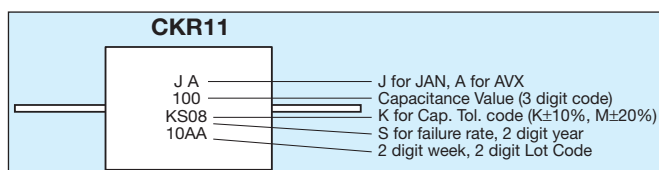
MILITARY DASH NUMBER IDENTIFICATION CKR15/16 TO MIL-PRF-39014/05

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)				Capacitance (pF)	Capacitance Tolerance ±Percent	WVDC
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
CKR15 (BR)							
CKR15BR124K_	2712	2912	2112	2312	120,000	10	100
CKR15BR154K_	2713	2913	2113	2313	150,000	10	100
CKR15BR154M_	2714	2914	2114	2314	150,000	20	100
CKR15BR184K_	2715	2915	2115	2315	180,000	10	100
CKR15BR224K_	2716	2916	2116	2316	220,000	10	100
CKR15BR224M_	2717	2917	2117	2317	220,000	20	100
CKR15BR274K_	2718	2918	2118	2318	270,000	10	100
CKR15BR334K_	2719	2919	2119	2319	330,000	10	100
CKR15BR334M_	2720	2920	2120	2320	330,000	20	100
CKR15BR474K_	2721	2921	2121	2321	470,000	10	50
CKR15BR474M_	2722	2922	2122	2322	470,000	20	50
CKR15BR684K_	2723	2923	2123	2323	680,000	10	50
CKR15BR684M_	2724	2924	2124	2324	680,000	20	50
CKR15BR105K_	2725	2925	2125	2325	1,000,000	10	50
CKR15BR105M_	2726	2926	2126	2326	1,000,000	20	50
CKR16 (BR)							
CKR16BR474K_	2727	2927	2127	2327	470,000	10	100
CKR16BR474M_	2728	2928	2128	2328	470,000	20	100
CKR16BR684K_	2729	2929	2129	2329	680,000	10	100
CKR16BR684M_	2730	2930	2130	2330	680,000	20	100
CKR16BR105K_	2731	2931	2131	2331	1,000,000	10	100
CKR16BR105M_	2732	2932	2132	2332	1,000,000	20	100
CKR16BR225K_	2733	2933	2133	2333	2,200,000	10	50
CKR16BR225M_	2734	2934	2134	2334	2,200,000	20	50
CKR16BR335K_	2735	2935	2135	2335	3,300,000	10	50
CKR16BR335M_	2736	2936	2136	2336	3,300,000	20	50

— Add appropriate failure rate level letter (M, P, R or S)

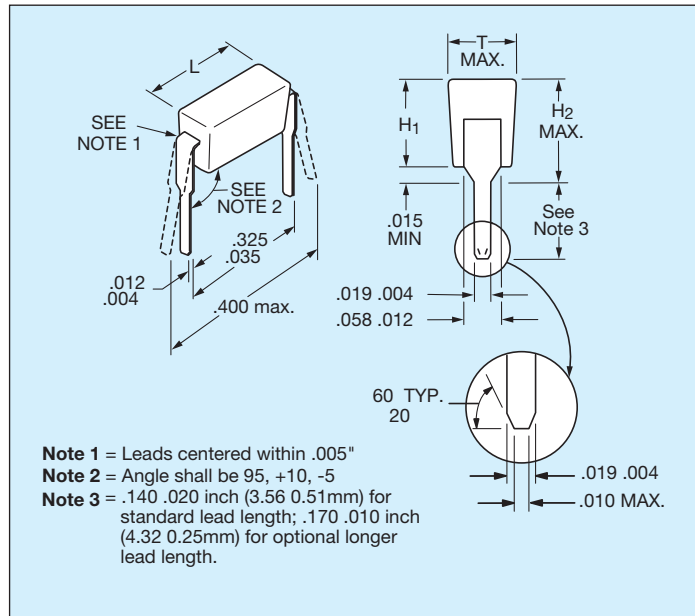
MARKING



CROSS REFERENCE CHART - AVX MILITARY FOR MOLDED AXIAL LEAD

AVX Style	Per Mil-Spec			Case Size		
	MIL-C-11015	MIL-PRF-39014	MIL-PRF-20	Length (L)	Diameter (D)	Lead Diameter (L.D.)
MA10	CK12	CKR11	CCR75/CC75	4.07 ±.25 (.160±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
MA20	CK13	CKR12	CCR76/CC76	6.35 ±.25 (.250 ±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
MA30	—	—	—	6.10 ±.25 (.240±.010)	3.30±.25 (.130±.010)	.48±.05 (.019±.002)
MA40	CK14	CKR14	CCR77/CC77	9.91±.25 (.390±.010)	3.56±.25 (.140±.010)	.63±.05 (.025±.002)
MA50	CK15	CKR15	CCR78/CC78	12.7±.51 (.500±.020)	6.35±.38 (.250±.015)	.63±.05 (.025±.002)
MA60	CK16	CKR16	CCR79/CC79	17.53±.51 (.690±.020)	8.89±.51 (.350±.015)	.63±.05 (.025±.002)

Dimensions: Millimeters (Inches)



HOW TO ORDER

Military Type Designation: Styles CKR22, CKR23, CKR24

Dash Number Option: MIL-PRF-39014/22 (Add Appropriate Dash Number)

CKR22

Style

CK = General purpose, ceramic dielectric, fixed capacitors
 R = Established Reliability parts
 22 = Remaining two numbers identify shape and dimension

BX

Voltage-Temperature Limits

First letter identifies temperature range.
 B = -55°C to +125°C
 C = -55°C to +125°C
 Second letter identifies voltage-temperature coefficient.

Capacitance Change with Reference to 25°C		
Second Letter	No Voltage	Rated Voltage
G	+30, -30ppm	+30, -30ppm
H	+60, -60ppm	+60, -60ppm
R	+15, -15%	+15, -40%
X	+15, -15%	+15, -25%

104

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10pF use "R" in place of decimal point, e.g., 1R5 = 1.5pF)

K

Capacitance Tolerance

D = ±.5pF
 F = ±1%
 J = ±5%
 K = ±10%
 M = ±20%

R

Military Failure Rate

M = 1% per 1000 hours
 P = 0.1% per 1000 hours
 R = 0.01% per 1000 hours
 S = 0.001% per 1000 hours
 Note:

AVX reserves the right to substitute a lower failure rate part per MIL-PRF-39014. Substitutability for failure rate levels shall be as follows:

Failure Rate Level	Will Replace Failure Rate Level
S (STD) (X-ray)	R, P, M, L
R (STD) (No X-ray)	P, M, L
P	M, L
M	L

Not RoHS Compliant

PACKAGING REQUIREMENTS

Packaging: MD01/MD02: 200 pcs/slide pack. See page 35.
 MD03: 200 pcs per vial.
 200 pcs per slide pack upon request.

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

MIL-PRF-39014	Length (L)	Height (H ₁)	Height (H ₂)	Thickness
CKR22	6.60 (.260 ±.020)	3.25 (.128 ±.007)	4.45 max. (.175)	2.34 (.092 ±.006)
CKR23	6.60 (.260 ±.020)	3.94 (.155 ±.007)	4.95 max. (.195)	2.34 (.092 ±.006)
CKR24	6.60 (.260 ±.020)	7.19 (.283 ±.007)	8.13 max. (.320)	2.34 (.092 ±.006)

MILITARY DASH NUMBER IDENTIFICATION CKR22 TO MIL-PRF-39014/22

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)								Capacitance (pF)	Capacitance Tolerance	WVDC	
	Standard Lead Length				Optional Longer Lead Length							
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)				
Style CKR22, Voltage-temperature limits of 0 ± 60 ppm/°C.												
CKR22CH1R0D_	0001	0301	0601	0901	3001	3301	3601	3901	1.0	D	200 ↓	
CKR22CH1R2D_	0004	0304	0604	0904	3004	3304	3604	3904	1.2	D		
CKR22CH1R5D_	0007	0307	0607	0907	3007	3307	3607	3907	1.5	D		
CKR22CH1R8D_	0010	0310	0610	0910	3010	3310	3610	3910	1.8	D		
CKR22CH2R2D_	0013	0313	0613	0913	3013	3313	3613	3913	2.2	D		
CKR22CH2R7D_	0016	0316	0616	0916	3016	3316	3616	3916	2.7	D		
CKR22CH3R3D_	0019	0319	0619	0919	3019	3319	3619	3919	3.3	D		
CKR22CH3R9D_	0022	0322	0622	0922	3022	3322	3622	3922	3.9	D		
CKR22CH4R7D_	0025	0325	0625	0925	3025	3325	3625	3925	4.7	D		
CKR22CH5R6D_	0028	0328	0628	0928	3028	3328	3628	3928	5.6	D		
CKR22CH6R8D_	0031	0331	0631	0931	3031	3331	3631	3931	6.8	D		
CKR22CH8R2D_	0034	0334	0634	0934	3034	3334	3634	3934	8.2	D		
CKR22CH100D_	0037	0337	0637	0937	3037	3337	3637	3937	10	D		
CKR22CH100J_	0038	0338	0638	0938	3038	3338	3638	3938	10	J		
CKR22CH100K_	0039	0339	0639	0939	3039	3339	3639	3939	10	K		
CKR22CH120D_	0040	0340	0640	0940	3040	3340	3640	3940	12	D		
CKR22CH120J_	0041	0341	0641	0941	3041	3341	3641	3941	12	J		
CKR22CH120K_	0042	0342	0642	0942	3042	3342	3642	3942	12	K		
CKR22CH150D_	0043	0343	0643	0943	3043	3343	3643	3943	15	D		
CKR22CH150J_	0044	0344	0644	0944	3044	3344	3644	3944	15	J		
CKR22CH150K_	0045	0345	0645	0945	3045	3345	3645	3945	15	K		
CKR22CH180D_	0046	0346	0646	0946	3046	3346	3646	3946	18	D		
CKR22CH180J_	0047	0347	0647	0947	3047	3347	3647	3947	18	J		
CKR22CH180K_	0048	0348	0648	0948	3048	3348	3648	3948	18	K		
Style CKR22, Voltage-temperature limits of ±30 ppm/°C,												
CKR22CG220D_	0049	0349	0649	0949	3049	3349	3649	3949	22	D		200 ↓
CKR22CG220J_	0050	0350	0650	0950	3050	3350	3650	3950	22	J		
CKR22CG220K_	0051	0351	0651	0951	3051	3351	3651	3951	22	K		
CKR22CG270D_	0052	0352	0652	0952	3052	3352	3652	3952	27	D		
CKR22CG270J_	0053	0353	0653	0953	3053	3353	3653	3953	27	J		
CKR22CG270K_	0054	0354	0654	0954	3054	3354	3654	3954	27	K		
CKR22CG330D_	0055	0355	0655	0955	3055	3355	3655	3955	33	D		
CKR22CG330J_	0056	0356	0656	0956	3056	3356	3656	3956	33	J		
CKR22CG330K_	0057	0357	0657	0957	3057	3357	3657	3957	33	K		
CKR22CG390D_	0058	0358	0658	0958	3058	3358	3658	3958	39	D		
CKR22CG390J_	0059	0359	0659	0959	3059	3359	3659	3959	39	J		
CKR22CG390K_	0060	0360	0660	0960	3060	3360	3660	3960	39	K		
CKR22CG470D_	0061	0361	0661	0961	3061	3361	3661	3961	47	D		
CKR22CG470J_	0062	0362	0662	0962	3062	3362	3662	3962	47	J		
CKR22CG470K_	0063	0363	0663	0963	3063	3363	3663	3963	47	K		
CKR22CG560D_	0064	0364	0664	0964	3064	3364	3664	3964	56	D		
CKR22CG560J_	0065	0365	0665	0965	3065	3365	3665	3965	56	J		
CKR22CG560K_	0066	0366	0666	0966	3066	3366	3666	3966	56	K		
CKR22CG680F_	0067	0367	0667	0967	3067	3367	3667	3967	68	F		
CKR22CG680J_	0068	0368	0668	0968	3068	3368	3668	3968	68	J		
CKR22CG680K_	0069	0369	0669	0969	3069	3369	3669	3969	68	K		
CKR22CG820F_	0070	0370	0670	0970	3070	3370	3670	3970	82	F		
CKR22CG820J_	0071	0371	0671	0971	3071	3371	3671	3971	82	J		
CKR22CG820K_	0072	0372	0672	0972	3072	3372	3672	3972	82	K		
CKR22CG101F_	0073	0373	0673	0973	3073	3373	3673	3973	100	F		
CKR22CG101J_	0074	0374	0674	0974	3074	3374	3674	3974	100	J		
CKR22CG101K_	0075	0375	0675	0975	3075	3375	3675	3975	100	K		
CKR22CG121F_	0076	0376	0676	0976	3076	3376	3676	3976	120	F		
CKR22CG121J_	0077	0377	0677	0977	3077	3377	3677	3977	120	J		
CKR22CG121K_	0078	0378	0678	0978	3078	3378	3678	3978	120	K		
CKR22CG151F_	0079	0379	0679	0979	3079	3379	3679	3979	150	F		
CKR22CG151J_	0080	0380	0680	0980	3080	3380	3680	3980	150	J		
CKR22CG151K_	0081	0381	0681	0981	3081	3381	3681	3981	150	K		
CKR22CG181F_	0082	0382	0682	0982	3082	3382	3682	3982	180	F		
CKR22CG181J_	0083	0383	0683	0983	3083	3383	3683	3983	180	J		
CKR22CG181K_	0084	0384	0684	0984	3084	3384	3684	3984	180	K		
CKR22CG221F_	0085	0385	0685	0985	3085	3385	3685	3985	220	F		
CKR22CG221J_	0086	0386	0686	0986	3086	3386	3686	3986	220	J		
CKR22CG221K_	0087	0387	0687	0987	3087	3387	3687	3987	220	K		
CKR22CG271F_	0088	0388	0688	0988	3088	3388	3688	3988	270	F		
CKR22CG271J_	0089	0389	0689	0989	3089	3389	3689	3989	270	J		

_____ Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR22 TO MIL-PRF-39014/22

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)								Capacitance (pF)	Capacitance Tolerance	WVDC
	Standard Lead Length				Optional Longer Lead Length						
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
Style CKR22, Voltage-temperature limits of ±30 ppm/°C, (continued)											
CKR22CG271K_	0090	0390	0690	0990	3090	3390	3690	3990	270	K	200 ↓ 200 ↓ 100 ↓ 100 ↓ 100 ↓ 50
CKR22CG331F_	0091	0391	0691	0991	3091	3391	3691	3991	330	F	
CKR22CG331J_	0092	0392	0692	0992	3092	3392	3692	3992	330	J	
CKR22CG331K_	0093	0393	0693	0993	3093	3393	3693	3993	330	K	
CKR22CG391F_	0094	0394	0694	0994	3094	3394	3694	3994	390	F	
CKR22CG391J_	0095	0395	0695	0995	3095	3395	3695	3995	390	J	
CKR22CG391K_	0096	0396	0696	0996	3096	3396	3696	3996	390	K	
CKR22CG471F_	0097	0397	0697	0997	3097	3397	3697	3997	470	F	
CKR22CG471J_	0098	0398	0698	0998	3098	3398	3698	3998	470	J	
CKR22CG471K_	0099	0399	0699	0999	3099	3399	3699	3999	470	K	
CKR22CG561F_	0100	0400	0700	1000	3100	3400	3700	4000	560	F	
CKR22CG561J_	0101	0401	0701	1001	3101	3401	3701	4001	560	J	
CKR22CG561K_	0102	0402	0702	1002	3102	3402	3702	4002	560	K	
CKR22CG681F_	0103	0403	0703	1003	3103	3403	3703	4003	680	F	
CKR22CG681J_	0104	0404	0704	1004	3104	3404	3704	4004	680	J	
CKR22CG681K_	0105	0405	0705	1005	3105	3405	3705	4005	680	K	
CKR22CG821F_	0106	0406	0706	1006	3106	3406	3706	4006	820	F	
CKR22CG821J_	0107	0407	0707	1007	3107	3407	3707	4007	820	J	
CKR22CG821K_	0108	0408	0708	1008	3108	3408	3708	4008	820	K	
CKR22CG102F_	0109	0409	0709	1009	3109	3409	3709	4009	1000	F	
CKR22CG102J_	0110	0410	0710	1010	3110	3410	3710	4010	1000	J	
CKR22CG102K_	0111	0411	0711	1011	3111	3411	3711	4011	1000	K	
CKR22CG122F_	0112	0412	0712	1012	3112	3412	3712	4012	1200	F	
CKR22CG122J_	0113	0413	0713	1013	3113	3413	3713	4013	1200	J	
CKR22CG122K_	0114	0414	0714	1014	3114	3414	3714	4014	1200	K	
CKR22CG152F_	0115	0415	0715	1015	3115	3415	3715	4015	1500	F	
CKR22CG152J_	0116	0416	0716	1016	3116	3416	3716	4016	1500	J	
CKR22CG152K_	0117	0417	0717	1017	3117	3417	3717	4017	1500	K	
CKR22CG182F_	0118	0418	0718	1018	3118	3418	3718	4018	1800	F	
CKR22CG182J_	0119	0419	0719	1019	3119	3419	3719	4019	1800	J	
CKR22CG182K_	0120	0420	0720	1020	3120	3420	3720	4020	1800	K	
CKR22CG222F_	0121	0421	0721	1021	3121	3421	3721	4021	2200	F	
CKR22CG222J_	0122	0422	0722	1022	3122	3422	3722	4022	2200	J	
CKR22CG222K_	0123	0423	0723	1023	3123	3423	3723	4023	2200	K	
CKR22CG272F_	0124	0424	0724	1024	3124	3424	3724	4024	2700	F	
CKR22CG272J_	0125	0425	0725	1025	3125	3425	3725	4025	2700	J	
CKR22CG272K_	0126	0426	0726	1026	3126	3426	3726	4026	2700	K	
CKR22CG332F_	0127	0427	0727	1027	3127	3427	3727	4027	3300	F	
CKR22CG332J_	0128	0428	0728	1028	3128	3428	3728	4028	3300	J	
CKR22CG332K_	0129	0429	0729	1029	3129	3429	3729	4029	3300	K	
CKR22CG392F_	0130	0430	0730	1030	3130	3430	3730	4030	3900	F	
CKR22CG392J_	0131	0431	0731	1031	3131	3431	3731	4031	3900	J	
CKR22CG392K_	0132	0432	0732	1032	3132	3432	3732	4032	3900	K	
CKR22CG472F_	0133	0433	0733	1033	3133	3433	3733	4033	4700	F	
CKR22CG472J_	0134	0434	0734	1034	3134	3434	3734	4034	4700	J	
CKR22CG472K_	0135	0435	0735	1035	3135	3435	3735	4035	4700	K	
CKR22CG562F_	0136	0436	0736	1036	3136	3436	3736	4036	5600	F	
CKR22CG562J_	0137	0437	0737	1037	3137	3437	3737	4037	5600	J	
CKR22CG562K_	0138	0438	0738	1038	3138	3438	3738	4038	5600	K	
CKR22CG682F_	0139	0439	0739	1039	3139	3439	3739	4039	6800	F	
CKR22CG682J_	0140	0440	0740	1040	3140	3440	3740	4040	6800	J	
CKR22CG682K_	0141	0441	0741	1041	3141	3441	3741	4041	6800	K	
CKR22CG822F_	0142	0442	0742	1042	3142	3442	3742	4042	8200	F	
CKR22CG822J_	0143	0443	0743	1043	3143	3443	3743	4043	8200	J	
CKR22CG822K_	0144	0444	0744	1044	3144	3444	3744	4044	8200	K	
CKR22CG103F_	0145	0445	0745	1045	3145	3445	3745	4045	10,000	F	
CKR22CG103J_	0146	0446	0746	1046	3146	3446	3746	4046	10,000	J	
CKR22CG103K_	0147	0447	0747	1047	3147	3447	3747	4047	10,000	K	

— Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR22 TO MIL-PRF-39014/22

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)								Capacitance (pF)	Capacitance Tolerance	WVDC
	Standard Lead Length				Optional Longer Lead Length						
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)			
Style CKR22, Voltage-temperature limits of ±15% (+15%, -25% for Rated Voltage)											
CKR22BX271K_	0148	0448	0748	1048	3148	3448	3748	4048	270	K	200
CKR22BX331K_	0149	0449	0749	1049	3149	3449	3749	4049	330	K	
CKR22BX331M_	0150	0450	0750	1050	3150	3450	3750	4050	330	M	
CKR22BX391K_	0151	0451	0751	1051	3151	3451	3751	4051	390	K	
CKR22BX471K_	0152	0452	0752	1052	3152	3452	3752	4052	470	K	
CKR22BX471M_	0153	0453	0753	1053	3153	3453	3753	4053	470	M	
CKR22BX561K_	0154	0454	0754	1054	3154	3454	3754	4054	560	K	
CKR22BX681K_	0155	0455	0755	1055	3155	3455	3755	4055	680	K	
CKR22BX681M_	0156	0456	0756	1056	3156	3456	3756	4056	680	M	
CKR22BX821K_	0157	0457	0757	1057	3157	3457	3757	4057	820	K	
CKR22BX102K_	0158	0458	0758	1058	3158	3458	3758	4058	1,000	K	
CKR22BX102M_	0159	0459	0759	1059	3159	3459	3759	4059	1,000	M	
CKR22BX122K_	0160	0460	0760	1060	3160	3460	3760	4060	1,200	K	
CKR22BX152K_	0161	0461	0761	1061	3161	3461	3761	4061	1,500	K	
CKR22BX152M_	0162	0462	0762	1062	3162	3462	3762	4062	1,500	M	
CKR22BX182K_	0163	0463	0763	1063	3163	3463	3763	4063	1,800	K	
CKR22BX222K_	0164	0464	0764	1064	3164	3464	3764	4064	2,200	K	
CKR22BX222M_	0165	0465	0765	1065	3165	3465	3765	4065	2,200	M	
CKR22BX272K_	0166	0466	0766	1066	3166	3466	3766	4066	2,700	K	
CKR22BX322K_	0167	0467	0767	1067	3167	3467	3767	4067	3,300	K	
CKR22BX332M_	0168	0468	0768	1068	3168	3468	3768	4068	3,300	M	
CKR22BX392K_	0169	0469	0769	1069	3169	3469	3769	4069	3,900	K	
CKR22BX472K_	0170	0470	0770	1070	3170	3470	3770	4070	4,700	K	
CKR22BX472M_	0171	0471	0771	1071	3171	3471	3771	4071	4,700	M	
CKR22BX562K_	0172	0472	0772	1072	3172	3472	3772	4072	5,600	K	
CKR22BX682K_	0173	0473	0773	1073	3173	3473	3773	4073	6,800	K	
CKR22BX682M_	0174	0474	0774	1074	3174	3474	3774	4074	6,800	M	
CKR22BX822K_	0175	0475	0775	1075	3175	3475	3775	4075	8,200	K	
CKR22BX103K_	0176	0476	0776	1076	3176	3476	3776	4076	10,000	K	
CKR22BX103M_	0177	0477	0777	1077	3177	3477	3777	4077	10,000	M	
CKR22BX123K_	0178	0478	0778	1078	3178	3478	3778	4078	12,000	K	
CKR22BX153K_	0179	0479	0779	1079	3179	3479	3779	4079	15,000	K	
CKR22BX153M_	0180	0480	0780	1080	3180	3480	3780	4080	15,000	M	
CKR22BX183K_	0181	0481	0781	1081	3181	3481	3781	4081	18,000	K	
CKR22BX223K_	0182	0482	0782	1082	3182	3482	3782	4082	22,000	K	
CKR22BX223M_	0183	0483	0783	1083	3183	3483	3783	4083	22,000	M	
CKR22BX273K_	0184	0484	0784	1084	3184	3484	3784	4084	27,000	K	
CKR22BX333K_	0185	0485	0785	1085	3185	3485	3785	4085	33,000	K	
CKR22BX333M_	0186	0486	0786	1086	3186	3486	3786	4086	33,000	M	
CKR22BX393K_	0187	0487	0787	1087	3187	3487	3787	4087	39,000	K	
CKR22BX473K_	0188	0488	0788	1088	3188	3488	3788	4088	47,000	K	
CKR22BX473M_	0189	0489	0789	1089	3189	3489	3789	4089	47,000	M	
CKR22BX563K_	0190	0490	0790	1090	3190	3490	3790	4090	56,000	K	
CKR22BX683K_	0191	0491	0791	1091	3191	3491	3791	4091	68,000	K	
CKR22BX683M_	0192	0492	0792	1092	3192	3492	3792	4092	68,000	M	
CKR22BX823K_	0193	0493	0793	1093	3193	3493	3793	4093	82,000	K	
CKR22BX104K_	0194	0494	0794	1094	3194	3494	3794	4094	100,000	K	
CKR22BX104M_	0195	0495	0795	1095	3195	3495	3795	4095	100,000	M	

— Add appropriate failure rate level letter (M, P, R or S)

MILITARY DASH NUMBER IDENTIFICATION CKR23 TO MIL-PRF-39014/22

(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)								Capacitance (pF)	Capacitance Tolerance	WVDC	
	Standard Lead Length				Optional Longer Lead Length							
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)				
Style CKR23, Voltage-temperature limits of 0 ± 60 ppm/°C												
CKR23CG561F	0258	0558	0858	1158	3258	3558	3858	4158	560	F	200 ↓ 200 ↓ 100 ↓ 100 ↓ 50 ↓ 50	
CKR23CG561J	0259	0559	0859	1159	3259	3559	3859	4159	560	J		
CKR23CG561K	0260	0560	0860	1160	3260	3560	3860	4160	560	K		
CKR23CG681F	0261	0561	0861	1161	3261	3561	3861	4161	680	F		
CKR23CG681J	0262	0562	0862	1162	3262	3562	3862	4162	680	J		
CKR23CG681K	0263	0563	0863	1163	3263	3563	3863	4163	680	K		
CKR23CG821F	0264	0564	0864	1164	3264	3564	3864	4164	820	F		
CKR23CG821J	0265	0565	0865	1165	3265	3565	3865	4165	820	J		
CKR23CG821K	0266	0566	0866	1166	3266	3566	3866	4166	820	K		
CKR23CG102F	0267	0567	0867	1167	3267	3567	3867	4167	1,000	F		
CKR23CG102J	0268	0568	0868	1168	3268	3568	3868	4168	1,000	J		
CKR23CG102K	0269	0569	0869	1169	3269	3569	3869	4169	1,000	K		
CKR23CG122F	0270	0570	0870	1170	3270	3570	3870	4170	1,200	F		
CKR23CG122J	0271	0571	0871	1171	3271	3571	3871	4171	1,200	J		
CKR23CG122K	0272	0572	0872	1172	3272	3572	3872	4172	1,200	K		
CKR23CG272F	0273	0573	0873	1173	3273	3573	3873	4173	2,700	F		
CKR23CG272J	0274	0574	0874	1174	3274	3574	3874	4174	2,700	J		
CKR23CG272K	0275	0575	0875	1175	3275	3575	3875	4175	2,700	K		
CKR23CG332F	0276	0576	0876	1176	3276	3576	3876	4176	3,300	F		
CKR23CG332J	0277	0577	0877	1177	3277	3577	3877	4177	3,300	J		
CKR23CG332K	0278	0578	0878	1178	3278	3578	3878	4178	3,300	K		
CKR23CG472F	0279	0579	0879	1179	3279	3579	3879	4179	4,700	F		
CKR23CG472J	0280	0580	0880	1180	3280	3580	3880	4180	4,700	J		
CKR23CG472K	0281	0581	0881	1181	3281	3581	3881	4181	4,700	K		
CKR23CG562F	0282	0582	0882	1182	3282	3582	3882	4182	5,600	F		
CKR23CG562J	0283	0583	0883	1183	3283	3583	3883	4183	5,600	J		
CKR23CG562K	0284	0584	0884	1184	3284	3584	3884	4184	5,600	K		
CKR23CG682F	0285	0585	0885	1185	3285	3585	3885	4185	6,800	F		
CKR23CG682J	0286	0586	0886	1186	3286	3586	3886	4186	6,800	J		
CKR23CG682K	0287	0587	0887	1187	3287	3587	3887	4187	6,800	K		
CKR23CG822F	0288	0588	0888	1188	3288	3588	3888	4188	8,200	F		
CKR23CG822J	0289	0589	0889	1189	3289	3589	3889	4189	8,200	J		
CKR23CG822K	0290	0590	0890	1190	3290	3590	3890	4190	8,200	K		
CKR23CG103F	0291	0591	0891	1191	3291	3591	3891	4191	10,000	F		
CKR23CG103J	0292	0592	0892	1192	3292	3592	3892	4192	10,000	J		
CKR23CG103K	0293	0593	0893	1193	3293	3593	3893	4193	10,000	K		
Style CKR23, voltage-temperature limits of ±15% (+15%, -25% for Rated Voltage)												
CKR23BX102K	0196	0496	0796	1096	3196	3496	3796	4096	1,000	K		200 ↓ 200 ↓ 100 ↓ 200 ↓ 100 ↓ 50 ↓ 50
CKR23BX102M	0197	0497	0797	1097	3197	3497	3797	4097	1,000	M		
CKR23BX122K	0198	0498	0798	1098	3198	3498	3798	4098	1,200	K		
CKR23BX152K	0199	0499	0799	1099	3199	3499	3799	4099	1,500	K		
CKR23BX152M	0200	0500	0800	1100	3200	3500	3800	4100	1,500	M		
CKR23BX182K	0201	0501	0801	1101	3201	3501	3801	4101	1,800	K		
CKR23BX222K	0202	0502	0802	1102	3202	3502	3802	4102	2,200	K		
CKR23BX222M	0203	0503	0803	1103	3203	3503	3803	4103	2,200	M		
CKR23BX272K	0204	0504	0804	1104	3204	3504	3804	4104	2,700	K		
CKR23BX332K	0205	0505	0805	1105	3205	3505	3805	4105	3,300	K		
CKR23BX332M	0206	0506	0806	1106	3206	3506	3806	4106	3,300	M		
CKR23BX392K	0207	0507	0807	1107	3207	3507	3807	4107	3,900	K		
CKR23BX472K	0208	0508	0808	1108	3208	3508	3808	4108	4,700	K		
CKR23BX472M	0209	0509	0809	1109	3209	3509	3809	4109	4,700	M		
CKR23BX562K	0210	0510	0810	1110	3210	3510	3810	4110	5,600	K		
CKR23BX682K	0211	0511	0811	1111	3211	3511	3811	4111	6,800	K		
CKR23BX682M	0212	0512	0812	1112	3212	3512	3812	4112	6,800	M		
CKR23BX822K	0213	0513	0813	1113	3213	3513	3813	4113	8,200	K		
CKR23BX103K	0214	0514	0814	1114	3214	3514	3814	4114	10,000	K		
CKR23BX103M	0215	0515	0815	1115	3215	3515	3815	4115	10,000	M		
CKR23BX123K	0216	0516	0816	1116	3216	3516	3816	4116	12,000	K		
CKR23BX153K	0217	0517	0817	1117	3217	3517	3817	4117	15,000	K		
CKR23BX153M	0218	0518	0818	1118	3218	3518	3818	4118	15,000	M		
CKR23BX183K	0219	0519	0819	1119	3219	3519	3819	4119	18,000	K		
CKR23BX223K	0220	0520	0820	1120	3220	3520	3820	4120	22,000	K		
CKR23BX223M	0221	0521	0821	1121	3221	3521	3821	4121	22,000	M		
CKR23BX273K	0222	0522	0822	1122	3222	3522	3822	4122	27,000	K		
CKR23BX333K	0223	0523	0823	1123	3223	3523	3823	4123	33,000	K		
CKR23BX333M	0224	0524	0824	1124	3224	3524	3824	4124	33,000	M		
CKR23BX393K	0225	0525	0825	1125	3225	3525	3825	4125	39,000	K		
CKR23BX473K	0226	0526	0826	1126	3226	3526	3826	4126	47,000	K		
CKR23BX473M	0227	0527	0827	1127	3227	3527	3827	4127	47,000	M		
CKR23BX563K	0228	0528	0828	1128	3228	3528	3828	4128	56,000	K		
CKR23BX683K	0229	0529	0829	1129	3229	3529	3829	4129	68,000	K		
CKR23BX683M	0230	0530	0830	1130	3230	3530	3830	4130	68,000	M		
CKR23BX823K	0231	0531	0831	1131	3231	3531	3831	4131	82,000	K		
CKR23BX104K	0232	0532	0832	1132	3232	3532	3832	4132	100,000	K		
CKR23BX104M	0233	0533	0833	1133	3233	3533	3833	4133	100,000	M		
CKR23BX124K	0234	0534	0834	1134	3234	3534	3834	4134	120,000	K		
CKR23BX154K	0235	0535	0835	1135	3235	3535	3835	4135	150,000	K		
CKR23BX154M	0236	0536	0836	1136	3236	3536	3836	4136	150,000	M		
CKR23BX184K	0237	0537	0837	1137	3237	3537	3837	4137	180,000	K		
CKR23BX224K	0238	0538	0838	1138	3238	3538	3838	4138	220,000	K		
CKR23BX224M	0239	0539	0839	1139	3239	3539	3839	4139	220,000	M		

— Add appropriate failure rate level letter (M, P, R or S)

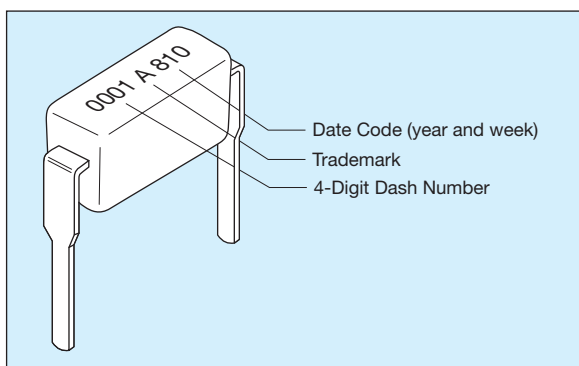
MILITARY DASH NUMBER IDENTIFICATION CKR24 TO MIL-PRF-39014/22

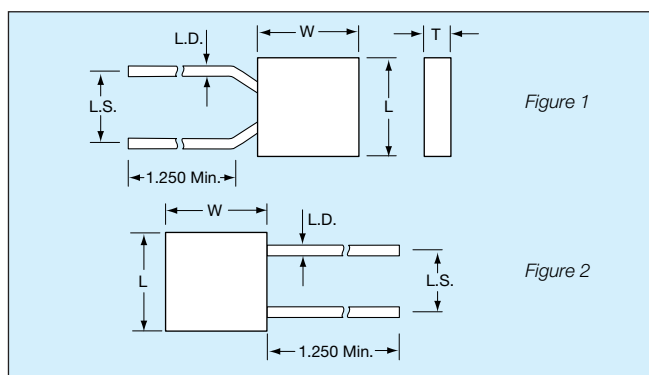
(Dash Number From Table)

Military Type Designation	Failure Rate Level (%/1,000 Hours)								Capacitance (pF)	Capacitance Tolerance	WVDC	
	Standard Lead Length				Optional Longer Lead Length							
	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)	1.0 (M)	0.1 (P)	0.01 (R)	0.001 (S)				
Style CKR24, Characteristic BX (Voltage-temperature limits of ±15% and +15%, -25%)												
CKR24BX274K	0294	0594	0894	1194	3294	3594	3894	4194	270000	K	50	
CKR24BX274M	0295	0595	0895	1195	3295	3595	3895	4195	270000	M		
CKR24BX334K	0296	0596	0896	1196	3296	3596	3896	4196	330000	K		
CKR24BX334M	0297	0597	0897	1197	3297	3597	3897	4197	330000	M		
CKR24BX394K	0298	0598	0898	1198	3298	3598	3898	4198	390000	K		
CKR24BX394M	0299	0599	0899	1199	3299	3599	3899	4199	390000	M		
CKR24BX474K	0300	0600	0900	1200	3300	3600	3900	4200	470000	K		
CKR24BX474M	0301	0601	0901	1201	3301	3601	3901	4201	470000	M		
CKR24BX564K	0302	0602	0902	1202	3302	3602	3902	4202	560000	K		
CKR24BX564M	0303	0603	0903	1203	3303	3603	3903	4203	560000	M		
CKR24BX684K	0304	0604	0904	1204	3304	3604	3904	4204	680000	K		
CKR24BX684M	0305	0605	0905	1205	3305	3605	3905	4205	680000	M		
CKR24BX824K	0306	0606	0906	1206	3306	3606	3906	4206	820000	K		
CKR24BX824M	0307	0607	0907	1207	3307	3607	3907	4207	820000	M		
CKR24BX105K	0308	0608	0908	1208	3308	3608	3908	4208	1000000	K		
CKR24BX105M	0309	0609	0909	1209	3309	3609	3909	4209	1000000	M		
Style CKR24, Characteristic BR (Voltage-temperature limits of ±15% and +15%, -40%)												
CKR24BR124K	0240	0540	0840	1140	3240	3540	3840	4140	120000	K		100
CKR24BR124M	0310	0610	0910	1210	3310	3610	3910	4210	120000	M		100
CKR24BR154K	0241	0541	0841	1141	3241	3541	3841	4141	150000	K		100
CKR24BR154M	0242	0542	0842	1142	3242	3542	3842	4142	150000	M	100	
CKR24BR184K	0243	0543	0843	1143	3243	3543	3843	4143	180000	K	50	
CKR24BR184M	0311	0611	0911	1211	3311	3611	3911	4211	180000	M	50	
CKR24BR224K	0244	0544	0844	1144	3244	3544	3844	4144	220000	K	50	
CKR24BR224M	0245	0545	0845	1145	3245	3545	3845	4145	220000	M	50	
CKR24BR274K	0246	0546	0846	1146	3246	3546	3846	4146	270000	K	50	
CKR24BR274M	0312	0612	0912	1212	3312	3612	3912	4212	270000	M	50	
CKR24BR334K	0247	0547	0847	1147	3247	3547	3847	4147	330000	K	50	
CKR24BR334M	0248	0548	0848	1148	3248	3548	3848	4148	330000	M	50	
CKR24BR394K	0249	0549	0849	1149	3249	3549	3849	4149	390000	K	50	
CKR24BR394M	0313	0613	0913	1213	3313	3613	3913	4213	390000	M	50	
CKR24BR474K	0250	0550	0850	1150	3250	3550	3850	4150	470000	K	50	
CKR24BR474M	0251	0551	0851	1151	3251	3551	3851	4151	470000	M	50	
CKR24BR564K	0252	0552	0852	1152	3252	3552	3852	4152	560000	K	50	
CKR24BR564M	0253	0553	0853	1153	3253	3553	3853	4153	560000	M	50	
CKR24BR684K	0254	0554	0854	1154	3254	3554	3854	4154	680000	K	50	
CKR24BR684M	0254	0554	0854	1154	3254	3554	3854	4154	680000	M	50	
CKR24BR824K	0255	0555	0855	1155	3255	3555	3855	4155	820000	K	50	
CKR24BR824M	0255	0555	0855	1155	3255	3555	3855	4155	820000	M	50	
CKR24BR105K	0256	0556	0856	1156	3256	3556	3856	4156	1000000	K	50	
CKR24BR105M	0257	0557	0857	1157	3257	3557	3857	4157	1000000	M	50	

Add appropriate failure rate level letter (M, P, R or S)

MARKING





HOW TO ORDER

Military Type Designation: Styles CK05, CK06

For values, tolerances, voltages, sizes, configurations and dielectrics not shown, contact AVX facilities directly for information.

CK05

Style

CK = General purpose, ceramic dielectric, fixed capacitors
05 = Remaining two numbers identify shape and dimension

BX

Voltage-Temperature Limits

First letter identifies temperature range.
B = -55°C to +125°C
Second letter identifies voltage-temperature coefficient.

104

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104.

K

Capacitance Tolerance

K = ±10%
M = ±20%

Not RoHS Compliant

Capacitance Change with Reference to 25°C		
Second Letter	No Voltage	Rated Voltage
X	+15, -15%	+15, -25%

PACKAGING

CK05 1000 per bag
CK06 1000 per bag

Radial tape and reel packaging available upon request (2500 pcs./reel).

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Case Size	Per MIL Spec	
MIL-C-11015	CK05 (Fig. 1)	CK06 (Fig. 2)
Length (L)	4.83±.25 (.190±.010)	7.37±.25 (.290±.010)
Width (W)	4.83±.25 (.190±.010)	7.37±.25 (.290±.010)
Thickness (T)	2.29±.25 (.090±.010)	2.29±.25 (.090±.010)
Lead Spacing (L.S.)	5.08±.38 (.200±.015)	5.08±.38 (.200±.015)
Lead Diameter (L.D.)	.64±.05 (.025±.002)	.64±.05 (.025±.002)

MILITARY PART NUMBER IDENTIFICATION CK05 AND CK06

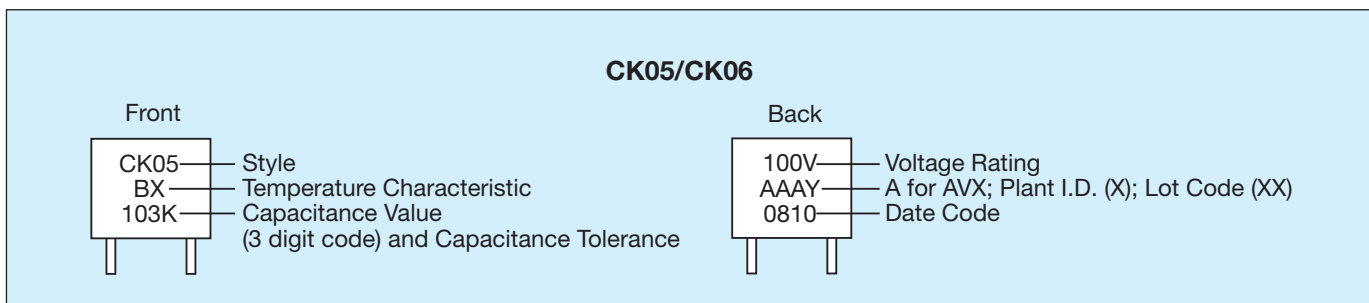
Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CK05 (BX)			
CK05BX100_	10	K, M	200
CK05BX120K_	12	K	200
CK05BX150_	15	K, M	200
CK05BX180K_	18	K	200
CK05BX220_	22	K, M	200
CK05BX270K_	27	K	200
CK05BX330_	33	K, M	200
CK05BX390K_	39	K	200
CK05BX470_	47	K, M	200
CK05BX560K_	56	K	200
CK05BX680_	68	K, M	200
CK05BX820K_	82	K	200
CK05BX101_	100	K, M	200
CK05BX121K_	120	K	200
CK05BX151_	150	K, M	200
CK05BX181K_	180	K	200
CK05BX221_	220	K, M	200
CK05BX271K_	270	K	200
CK05BX331_	330	K, M	200
CK05BX391K_	390	K	200
CK05BX471_	470	K, M	200
CK05BX561K_	560	K	200
CK05BX681_	680	K, M	200
CK05BX821K_	820	K	200
CK05BX102_	1,000	K, M	200
CK05BX122_	1,200	K	100
CK05BX152_	1,500	K, M	100
CK05BX182K_	1,800	K	100
CK05BX222_	2,200	K, M	100
CK05BX272K_	2,700	K	100
CK05BX332_	3,300	K, M	100
CK05BX392K_	3,900	K	100
CK05BX472_	4,700	K, M	100
CK05BX562K_	5,600	K	100
CK05BX682_	6,800	K, M	100
CK05BX822K_	8,200	K	100
CK05BX103_	10,000	K, M	100
CK05BX123K_	12,000	K	50
CK05BX153_	15,000	K, M	50
CK05BX183K_	18,000	K	50
CK05BX223_	22,000	K, M	50
CK05BX273K_	27,000	K	50
CK05BX333_	33,000	K, M	50
CK05BX393K_	39,000	K	50
CK05BX473_	47,000	K, M	50
CK05BX563K_	56,000	K	50
CK05BX683_	68,000	K, M	50
CK05BX823K_	82,000	K	50
CK05BX104_	100,000	K, M	50

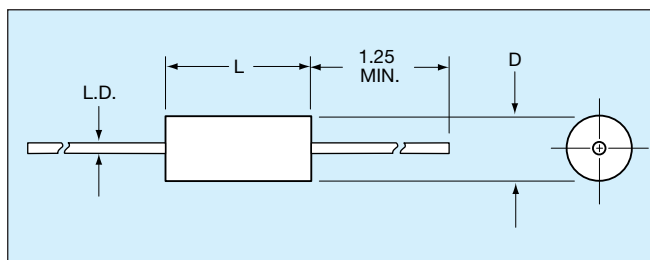
Add Capacitance Tolerance Letter K = ±10% or M = ±20%

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CK06 (BX)			
CK06BX122K_	1,200	K	200
CK06BX152_	1,500	K, M	200
CK06BX182K_	1,800	K	200
CK06BX222_	2,200	K, M	200
CK06BX272K_	2,700	K	200
CK06BX332_	3,300	K, M	200
CK06BX392K_	3,900	K	200
CK06BX472_	4,700	K, M	200
CK06BX562K_	5,600	K	200
CK06BX682_	6,800	K, M	200
CK06BX822K_	8,200	K	200
CK06BX103_	10,000	K, M	200
CK06BX123K_	12,000	K	100
CK06BX153_	15,000	K, M	100
CK06BX183K_	18,000	K	100
CK06BX223_	22,000	K, M	100
CK06BX273K_	27,000	K	100
CK06BX333_	33,000	K, M	100
CK06BX393K_	39,000	K	100
CK06BX473_	47,000	K, M	100
CK06BX563K_	56,000	K	100
CK06BX683_	68,000	K, M	100
CK06BX823K_	82,000	K	100
CK06BX104_	100,000	K, M	100
CK06BX124K_	120,000	K	50
CK06BX154_	150,000	K, M	50
CK06BX184K_	180,000	K	50
CK06BX224_	220,000	K, M	50
CK06BX274K_	270,000	K	50
CK06BX334_	330,000	K, M	50
CK06BX394K_	390,000	K	50
CK06BX474_	470,000	K, M	50
CK06BX564K_	560,000	K	50
CK06BX684_	680,000	K, M	50
CK06BX824K_	820,000	K	50
CK06BX105_	1.0 mfd	K, M	50

Add Capacitance Tolerance Letter K = ±10% or M = ±20%

MARKING





HOW TO ORDER

Military Type Designation: Styles CK12, CK13, CK14, CK15, CK16

CK12

Style

CK = General purpose, ceramic dielectric, fixed capacitors
12 = Remaining two numbers identify shape and dimension

BX

Voltage-

Temperature Limits

First letter identifies temperature range.
B = -55°C to +125°C
Second letter identifies voltage-temperature coefficient.

103

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 10,000 pF as 103.

K

Capacitance

Tolerance

K = ±10%
M = ±20%

Not RoHS Compliant

Capacitance Change with Reference to 25°C		
Second Letter	No Voltage	Rated Voltage
R	+15, -15%	+15, -40%
X	+15, -15%	+15, -25%

PACKAGING REQUIREMENTS

Packaging: Bulk

CK12, 13 & 14 100 pcs per bag
CK15 & 16 50 pcs per bag

Tape & Reel

CK12, 13 5000 pcs per reel
CK14 3000 pcs per reel
CK15 950 pcs per reel
CK16 650 pcs per reel

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Case Size	Per MIL Spec				
	CK12	CK13	CK14	CK15	CK16
MIL-C-11015					
Length (L)	4.07±.25 (.160±.010)	6.35±.25 (.250±.010)	9.91±.25 (.390±.010)	12.7±.51 (.500±.020)	17.53±.51 (.690±.020)
Diameter (D)	2.29±.25 (.090±.010)	2.29±.25 (.090±.010)	3.56±.25 (.140±.010)	6.35±.38 (.250±.015)	8.89±.51 (.350±.020)
Lead Diameter (L.D.)	.48±.05 (.019±.002)	.48±.05 (.019±.002)	.63±.05 (.025±.002)	.63±.05 (.025±.002)	.63±.05 (.025±.002)

MILITARY PART NUMBER IDENTIFICATION CK12 THRU CK16

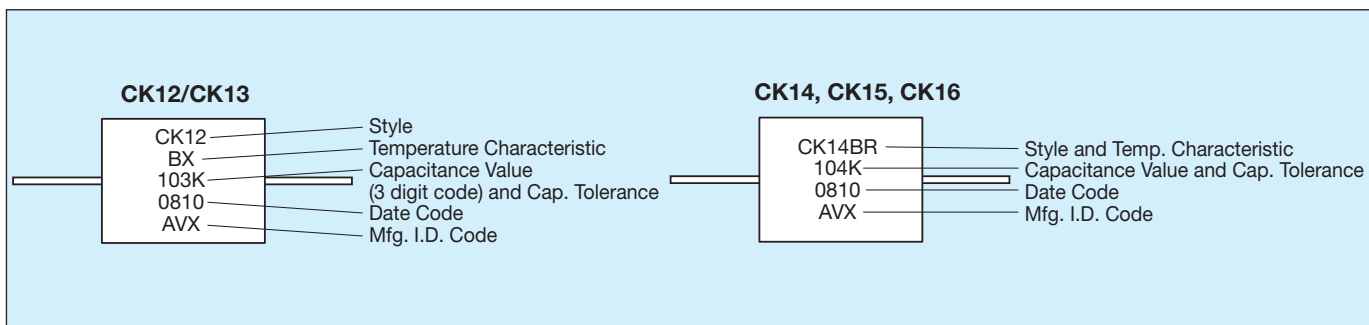
Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CK12 (BX)			
CK12BX100_	10	K, M	100
CK12BX120K	12	K	100
CK12BX150_	15	K, M	100
CK12BX180K	18	K	100
CK12BX220_	22	K, M	100
CK12BX270K	27	K	100
CK12BX330_	33	K, M	100
CK12BX390K	39	K	100
CK12BX470_	47	K, M	100
CK12BX560K	56	K	100
CK12BX680_	68	K, M	100
CK12BX820K	82	K	100
CK12BX101_	100	K, M	100
CK12BX121K	120	K	100
CK12BX151_	150	K, M	100
CK12BX181K	180	K	100
CK12BX221_	220	K, M	100
CK12BX271K	270	K	100
CK12BX331_	330	K, M	100
CK12BX391K	390	K	100
CK12BX471_	470	K, M	100
CK12BX561K	560	K	100
CK12BX681_	680	K, M	100
CK12BX821K	820	K	100
CK12BX102_	1,000	K, M	100
CK12BX122K	1,200	K	100
CK12BX152_	1,500	K, M	100
CK12BX182K	1,800	K	100
CK12BX222_	2,200	K, M	100
CK12BX272K	2,700	K	100
CK12BX332_	3,300	K, M	100
CK12BX392K	3,900	K	100
CK12BX472_	4,700	K, M	100
CK12BX562K	5,600	K	50
CK12BX682_	6,800	K, M	50
CK12BX822K	8,200	K	50
CK12BX103_	10,000	K, M	50
CK13 (BX)			
CK13BX562K	5,600	K	100
CK13BX682_	6,800	K, M	100
CK13BX822K	8,200	K	100
CK13BX103_	10,000	K, M	100
CK13BX123K	12,000	K	50
CK13BX153_	15,000	K, M	50
CK13BX183K	18,000	K	50
CK13BX223_	22,000	K, M	50
CK13 (BR)			
CK13BR273K	27,000	K	50
CK13BR333_	33,000	K, M	50
CK13BR393K	39,000	K	50
CK13BR473_	47,000	K, M	50

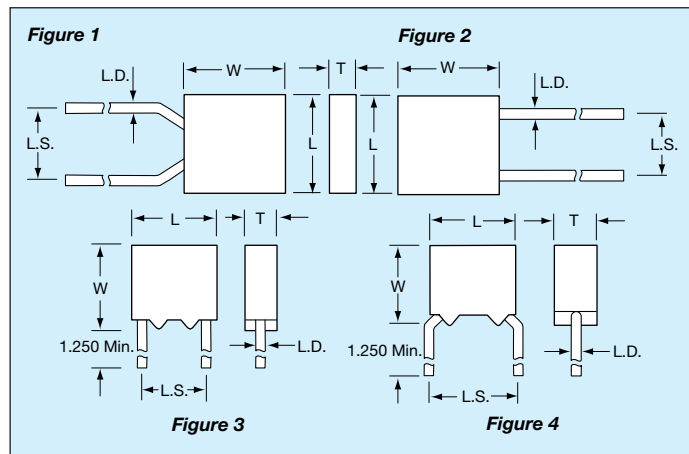
Add Capacitance Tolerance Letter K = ±10% or M = ±20%

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CK14 (BX)			
CK14BX123K	12,000	K	100
CK14BX153_	15,000	K, M	100
CK14BX183K	18,000	K	100
CK14BX223_	22,000	K, M	100
CK14BX273K	27,000	K	100
CK14BX333_	33,000	K, M	100
CK14BX393K	39,000	K	100
CK14BX473_	47,000	K, M	100
CK14 (BR)			
CK14BR563K	56,000	K	100
CK14BR683_	68,000	K, M	100
CK14BR823K	82,000	K	100
CK14BR104_	100,000	K, M	100
CK14BR124K	120,000	K	50
CK14BR154_	150,000	K, M	50
CK14BR184K	180,000	K	50
CK14BR224_	220,000	K, M	50
CK14BR274K	270,000	K	50
CK15 (BX)			
CK15BX104K	100,000	K, M	100
CK15 (BR)			
CK15BR124K	120,000	K	100
CK15BR154_	150,000	K, M	100
CK15BR184K	180,000	K	100
CK15BR224_	220,000	K, M	100
CK15BR274K	270,000	K	100
CK15BR334_	330,000	K, M	100
CK15BR474K	470,000	K, M	50
CK15BR105_	1,000,000	K, M	50
CK16 (BR)			
CK16BR474K	470,000	K, M	100
CK16BR105_	1,000,000	K, M	100
CK16BR225_	2,200,000	K, M	50
CK16BR335_	3,300,000	K, M	50

Add Capacitance Tolerance Letter K = ±10% or M = ±20%

MARKING





HOW TO ORDER

Military Type Designation:

Established Reliability = CCR05, CCR06, CCR07, CCR08, CCR09

Non-Established Reliability = CC05, CC06, CC07, CC08, CC09

CCR06

Style

CC = Identifies temperature compensating, ceramic dielectric, fixed capacitors.
R = Identifies Established Reliability parts
06 = Numbers identify shape and dimension

CG

Temperature Characteristic

Permissible capacitance change from capacitance at +25°C in ppm/°C		
Characteristic	Temp.	
CX	1/	+125°C
	1/	-55°C 2/
CK	±250 ppm/°C	+125°C
	+246.25, -326.25	-55°C 2/
CJ	±120 ppm/°C	+125°C
	+116.25, -166.25	-55°C 2/
CH	±60 ppm/°C	+125°C
	+55.00, -91.25	-55°C 2/
CG	±30 ppm/°C	+125°C
	+27.50, -53.75	-55°C 2/

1/ Not practically measurable.
2/ The ppm/°C values for -55°C were calculated by dividing ppm by negative 80°C.

183

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 18,000 pF as 183. (For values below 10pF use "R" in place of decimal point, e.g., 1R4 = 1.4pF)

J

Capacitance Tolerance

C = ±0.25pF
D = ±0.5pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%

R

Military Failure Rate

M = 1% per 1000 hours
P = 0.1% per 1000 hours
R = 0.01% per 1000 hours
S = 0.001% per 1000 hours

(V)

Standoff Option

To order standoff option, place "V" at the end of the part number.
Example:
CCR05CG332F5V

Not RoHS Compliant

PACKAGING REQUIREMENTS

Packaging: CCR0X: 100 pcs/bag; CC0X: 1000 pcs/bag

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Per MIL Spec	Case Size				
	Length (L)	Width (W)	Thickness (T)	Lead Spacing (L.S.)	Lead Diameter (L.D.)
CCR05/CC05 Figures 1, 4	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
CCR06/CC06 Figures 2, 3	7.37±.25 (.290±.010)	7.37±.25 (.290±.010)	2.29±.25 (.090±.010)	5.08±.38 (.200±.015)	.64±.05 (.025±.002)
CCR07/CC07 Figure 2	12.19±.51 (.480±.020)	12.19±.51 (.480±.020)	3.56±.25 (.140±.010)	10.16±.51 (.400±.020)	.64±.05 (.025±.002)
CCR08/CC08 Figure 2	12.19±.51 (.480±.020)	12.19±.51 (.480±.020)	6.1±.25 (.240±.010)	10.16±.51 (.400±.020)	.64±.05 (.025±.002)
CCR09/CC09 Figure 2	4.83±.25 (.190±.010)	4.83±.25 (.190±.010)	2.29±.25 (.090±.010)	2.54±.38 (.100±.015)	.64±.05 (.025±.002)

MILITARY PART NUMBER IDENTIFICATION

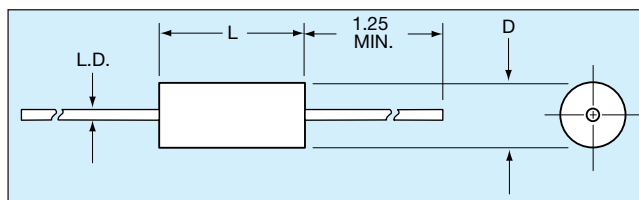
Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC05-CCR05, CC09-CCR09			
CCR05CX1R0	1.0	B, C	200
CCR05CX1R1	1.1	B, C	200
CCR05CX1R2	1.2	B, C	200
CCR05CX1R3	1.3	B, C	200
CCR05CX1R5	1.5	B, C	200
CCR05CX1R6	1.6	B, C	200
CCR05CX1R8	1.8	B, C	200
CCR05CX2R0	2.0	B, C	200
CCR05CK2R2	2.2	B, C	200
CCR05CK2R4	2.4	B, C	200
CCR05CK2R7	2.7	B, C, D	200
CCR05CK3R0	3.0	B, C, D	200
CCR05CK3R3	3.3	B, C, D	200
CCR05CK3R6	3.6	B, C, D	200
CCR05CK3R9	3.9	B, C, D	200
CCR05CJ4R3	4.3	B, C, D	200
CCR05CJ4R7	4.7	B, C, D	200
CCR05CJ5R1	5.1	B, C, D	200
CCR05CJ5R6	5.6	B, C, D	200
CCR05CJ6R2	6.2	B, C, D	200
CCR05CJ6R8	6.8	B, C, D	200
CCR05CJ7R5	7.5	B, C, D	200
CCR05CH8R2	8.2	B, C, D	200
CCR05CH9R1	9.1	B, C, D	200
CCR05CH100	10	F, G, J	200
CCR05CH110	11	F, G, J	200
CCR05CH120	12	F, G, J	200
CCR05CH130	13	F, G, J	200
CCR05CH150	15	F, G, J	200
CCR05CH160	16	F, G, J	200
CCR05CH180	18	F, G, J	200
CCR05CG200	20	F, G, J	200
CCR05CG220	22	F, G, J	200
CCR05CG240	24	F, G, J	200
CCR05CG270	27	F, G, J	200
CCR05CG300	30	F, G, J	200
CCR05CG330	33	F, G, J	200
CCR05CG360	36	F, G, J	200
CCR05CG390	39	F, G, J	200
CCR05CG430	43	F, G, J	200
CCR05CG470	47	F, G, J	200
CCR05CG510	51	F, G, J	200
CCR05CG560	56	F, G, J	200
CCR05CG620	62	F, G, J	200
CCR05CG680	68	F, G, J	200
CCR05CG750	75	F, G, J	200
CCR05CG820	82	F, G, J	200
CCR05CG910	91	F, G, J	200
CCR05CG101	100	F, G, J	200
CCR05CG111	110	F, G, J	200
CCR05CG121	120	F, G, J	200
CCR05CG131	130	F, G, J	200
CCR05CG151	150	F, G, J	200
CCR05CG161	160	F, G, J	200
CCR05CG181	180	F, G, J	200
CCR05CG201	200	F, G, J	200
CCR05CG221	220	F, G, J	200
CCR05CG241	240	F, G, J	200
CCR05CG271	270	F, G, J	200
CCR05CG301	300	F, G, J	200
CCR05CG331	330	F, G, J	200
CCR05CG361	360	F, G, J	100
CCR05CG391	390	F, G, J	100
CCR05CG431	430	F, G, J	100
CCR05CG471	470	F, G, J	100
CCR05CG511	510	F, G, J	100
CCR05CG561	560	F, G, J	100
CCR05CG621	620	F, G, J	100
CCR05CG681	680	F, G, J	100
CCR05CG751	750	F, G, J	100
CCR05CG821	820	F, G, J	100
CCR05CG911	910	F, G, J	100
CCR05CG102	1,000	F, G, J	100
CCR05CG112	1,100	F, G, J	100
CCR05CG122	1,200	F, G, J	100
CCR05CG132	1,300	F, G, J	100
CCR05CG152	1,500	F, G, J	100
CCR05CG162	1,600	F, G, J	100
CCR05CG182	1,800	F, G, J	100
CCR05CG202	2,000	F, G, J	50

— Add appropriate failure rate level (M, P, R or S)
 — Add appropriate cap. tolerance letter

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC05-CCR05, CC09-CCR09 (cont)			
CCR05CG222	2,200	F, G, J	50
CCR05CG242	2,400	F, G, J	50
CCR05CG272	2,700	F, G, J	50
CCR05CG302	3,000	F, G, J	50
CCR05CG332	3,300	F, G, J	50
CC06, CCR06			
CCR06CG361	360	F, G, J	200
CCR06CG391	390	F, G, J	200
CCR06CG431	430	F, G, J	200
CCR06CG471	470	F, G, J	200
CCR06CG511	510	F, G, J	200
CCR06CG561	560	F, G, J	200
CCR06CG621	620	F, G, J	200
CCR06CG681	680	F, G, J	200
CCR06CG751	750	F, G, J	200
CCR06CG821	820	F, G, J	200
CCR06CG911	910	F, G, J	200
CCR06CG102	1,000	F, G, J	200
CCR06CG112	1,100	F, G, J	200
CCR06CG122	1,200	F, G, J	200
CCR06CG132	1,300	F, G, J	200
CCR06CG152	1,500	F, G, J	200
CCR06CG162	1,600	F, G, J	200
CCR06CG182	1,800	F, G, J	200
CCR06CG202	2,000	F, G, J	100
CCR06CG222	2,200	F, G, J	100
CCR06CG242	2,400	F, G, J	100
CCR06CG272	2,700	F, G, J	100
CCR06CG302	3,000	F, G, J	100
CCR06CG332	3,300	F, G, J	100
CCR06CG362	3,600	F, G, J	100
CCR06CG392	3,900	F, G, J	100
CCR06CG432	4,300	F, G, J	100
CCR06CG472	4,700	F, G, J	100
CCR06CG512	5,100	F, G, J, K	50
CCR06CG562	5,600	F, G, J, K	50
CCR06CG622	6,200	F, G, J, K	50
CCR06CG682	6,800	F, G, J, K	50
CCR06CG752	7,500	F, G, J, K	50
CCR06CG822	8,200	F, G, J, K	50
CCR06CG912	9,100	F, G, J, K	50
CCR06CG103	10,000	F, G, J, K	50
CCR06CG123	12,000	F, G, J, K	50
CCR06CG153	15,000	F, G, J, K	50
CCR06CG183	18,000	F, G, J, K	50
CC07, CCR07			
CCR07CG222	2,200	F, G, J, K	200
CCR07CG272	2,700	F, G, J, K	200
CCR07CG332	3,300	F, G, J, K	200
CCR07CG392	3,900	F, G, J, K	200
CCR07CG472	4,700	F, G, J, K	200
CCR07CG562	5,600	F, G, J, K	100
CCR07CG682	6,800	F, G, J, K	100
CCR07CG822	8,200	F, G, J, K	100
CCR07CG103	10,000	F, G, J, K	100
CCR07CG123	12,000	F, G, J, K	100
CCR07CG153	15,000	F, G, J, K	50
CCR07CG183	18,000	F, G, J, K	50
CCR07CG223	22,000	F, G, J, K	50
CCR07CG273	27,000	F, G, J, K	50
CCR07CG333	33,000	F, G, J, K	50
CCR07CG393	39,000	F, G, J, K	50
CCR07CG473	47,000	F, G, J, K	50
CCR07CG563	56,000	F, G, J, K	50
CCR07CG683	68,000	F, G, J, K	50
CCR07CG823	82,000	F, G, J, K	50
CCR07CG104	100,000	F, G, J, K	50
CC08, CCR08			
CCR08CG392	3,900	G, J, K	200
CCR08CG472	4,700	G, J, K	200
CCR08CG153	15,000	G, J, K	100
CCR08CG183	18,000	G, J, K	100
CCR08CG563	56,000	G, J, K	50
CCR08CG683	68,000	G, J, K	50

— Add appropriate failure rate level (M, P, R or S)
 — Add appropriate cap. tolerance letter

Note: For marking information, see page 73.



HOW TO ORDER

Military Type Designation:

Established Reliability = CCR75, CCR76, CCR77, CCR78, CCR79

Non-Established Reliability = CC75, CC76, CC77, CC78, CC79

CCR76

Style

CC = Identifies temperature compensating, ceramic dielectric, fixed capacitors.

R = Identifies Established Reliability parts.

76 = Numbers identify shape and dimension.

CG

Temperature Characteristic

Permissible capacitance change from capacitance at +25°C in ppm/°C		
Characteristic	Temp.	
CX	1/	+125°C
	1/	-55°C 2/
CK	±250 ppm/°C	+125°C
	+246.25, -326.25	-55°C 2/
CJ	±120 ppm/°C	+125°C
	+116.25, -166.25	-55°C 2/
CH	±60 ppm/°C	+125°C
	+55.00, -91.25	-55°C 2/
CG	±30 ppm/°C	+125°C
	+27.50, -53.75	-55°C 2/

1/ Not practically measurable.

2/ The ppm/°C values for -55°C were calculated by dividing ppm by negative 80°C.

102

Capacitance

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 1,000 pF as 102. (For values below 10pF use "R" in place of decimal point, e.g., 1R8 = 1.8pF.)

K

Capacitance Tolerance

C = ±0.25pF
 D = ±0.5pF
 F = ±1%
 G = ±2%
 J = ±5%
 K = ±10%

R

Military Failure Rate

M = 1% per 1000 hours
 P = 0.1% per 1000 hours
 R = 0.01% per 1000 hours
 S = 0.001% per 1000 hours

Not RoHS Compliant

PACKAGING REQUIREMENTS

Packaging:

Bulk

CCR75/CC75, CCR76/CC76, CCR77/CC77, 100 pcs/bag
 CCR78/CC78, CCR79/CC79 50 pcs/bag

Tape & Reel

CCR75/CC75, CCR76/CC76 5000 pcs/reel
 CCR77/CC77 3000 pcs/reel
 CCR78/CC78 950 pcs/reel
 CCR79/CC79 650 pcs/reel

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Per MIL Spec	Case Size		
	Length (L)	Diameter (D)	Lead Diameter (L.D.)
MIL-PRF-20			
CCR75 CC75	4.07±.25 (.160±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
CCR76 CC76	6.35±.25 (.250±.010)	2.29±.25 (.090±.010)	.48±.05 (.019±.002)
CCR77 CC77	9.91±.25 (.390±.010)	3.56±.25 (.140±.010)	.63±.05 (.025±.002)
CCR78 CC78	12.7±.51 (.500±.020)	6.35±.38 (.250±.015)	.63±.05 (.025±.002)
CCR79 CC79	17.53±.51 (.690±.020)	8.89±.51 (.350±.020)	.63±.05 (.025±.002)

MILITARY PART NUMBER IDENTIFICATION CC75 THRU CC79 AND CCR75 THRU CCR79

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC75-CCR75			
CCR75CX1R0_	1.0	C	200
CCR75CX1R1_	1.1	C	200
CCR75CX1R2_	1.2	C	200
CCR75CX1R3_	1.3	C	200
CCR75CX1R5_	1.5	C	200
CCR75CX1R6_	1.6	C	200
CCR75CX1R8_	1.8	C	200
CCR75CX2R0_	2.0	C	200
CCR75CK2R2_	2.2	C	200
CCR75CK2R4_	2.4	C	200
CCR75CK2R7_	2.7	C, D	200
CCR75CK3R0_	3.0	C, D	200
CCR75CK3R3_	3.3	C, D	200
CCR75CK3R6_	3.6	C, D	200
CCR75CK3R9_	3.9	C, D	200
CCR75CJ4R3_	4.3	C, D	200
CCR75CJ4R7_	4.7	C, D	200
CCR75CJ5R1_	5.1	C, D	200
CCR75CJ5R6_	5.6	C, D	200
CCR75CJ6R2_	6.2	C, D	200
CCR75CJ6R8_	6.8	C, D	200
CCR75CJ7R5_	7.5	C, D	200
CCR75CH8R2_	8.2	C, D	200
CCR75CH9R1_	9.1	C, D	200
CCR75CH100_	10	G, J	200
CCR75CH110_	11	G, J	200
CCR75CH120_	12	G, J	200
CCR75CH130_	13	G, J	200
CCR75CH150_	15	G, J	200
CCR75CH160_	16	G, J	200
CCR75CH180_	18	G, J	200
CCR75CG200_	20	F, G, J	200
CCR75CG220_	22	F, G, J	200
CCR75CG240_	24	F, G, J	200
CCR75CG270_	27	F, G, J	200
CCR75CG300_	30	F, G, J	200

Add appropriate failure rate level (M, P, R or S)
 Add appropriate cap. tolerance letter

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC75-CCR75			
CCR75CG330_	33	F, G, J	200
CCR75CG360_	36	F, G, J	200
CCR75CG390_	39	F, G, J	200
CCR75CG430_	43	F, G, J	200
CCR75CG470_	47	F, G, J	200
CCR75CG510_	51	F, G, J	200
CCR75CG560_	56	F, G, J	200
CCR75CG620_	62	F, G, J	200
CCR75CG680_	68	F, G, J	200
CCR75CG750_	75	F, G, J	200
CCR75CG820_	82	F, G, J	100
CCR75CG910_	91	F, G, J	100
CCR75CG101_	100	F, G, J	100
CCR75CG111_	110	F, G, J	100
CCR75CG121_	120	F, G, J	100
CCR75CG131_	130	F, G, J	100
CCR75CG151_	150	F, G, J	100
CCR75CG161_	160	F, G, J	100
CCR75CG181_	180	F, G, J	100
CCR75CG201_	200	F, G, J	100
CCR75CG221_	220	F, G, J	100
CCR75CG241_	240	F, G, J	100
CCR75CG271_	270	F, G, J	50
CCR75CG301_	300	F, G, J	50
CCR75CG331_	330	F, G, J	50
CCR75CG361_	360	F, G, J	50
CCR75CG391_	390	F, G, J	50
CCR75CG431_	430	F, G, J	50
CCR75CG471_	470	F, G, J	50
CCR75CG511_	510	F, G, J	50
CCR75CG561_	560	F, G, J	50
CCR75CG621_	620	F, G, J	50
CCR75CG681_	680	F, G, J	50

Add appropriate failure rate level (M, P, R or S)
 Add appropriate cap. tolerance letter

MILITARY PART NUMBER IDENTIFICATION CC75 THRU CC79 AND CCR75 THRU CCR79

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC76, CCR76			
CCR76CG820_	82	F, G, J	200
CCR76CG910_	91	F, G, J	200
CCR76CG101_	100	F, G, J	200
CCR76CG111_	110	F, G, J	200
CCR76CG121_	120	F, G, J	200
CCR76CG131_	130	F, G, J	200
CCR76CG271_	270	F, G, J	100
CCR76CG301_	300	F, G, J	100
CCR76CG331_	330	F, G, J	100
CCR76CG361_	360	F, G, J	100
CCR76CG391_	390	F, G, J	100
CCR76CG431_	430	F, G, J	100
CCR76CG471_	470	F, G, J	100
CCR76CG511_	510	F, G, J	100
CCR76CG561_	560	F, G, J	100
CCR76CG621_	620	F, G, J	100
CCR76CG681_	680	F, G, J	100
CCR76CG751_	750	F, G, J	50
CCR76CG821_	820	F, G, J	50
CCR76CG911_	910	F, G, J	50
CCR76CG102_	1,000	F, G, J	50
CC77, CCR77			
CCR77CG151_	150	F, G, J	200
CCR77CG161_	160	F, G, J	200
CCR77CG181_	180	F, G, J	200
CCR77CG201_	200	F, G, J	200
CCR77CG221_	220	F, G, J	200
CCR77CG241_	240	F, G, J	200
CCR77CG271_	270	F, G, J	200
CCR77CG301_	300	F, G, J	200
CCR77CG331_	330	F, G, J	200
CCR77CG361_	360	F, G, J	200
CCR77CG391_	390	F, G, J	200
CCR77CG431_	430	F, G, J	200
CCR77CG471_	470	F, G, J	200
CCR77CG511_	510	F, G, J	200
CCR77CG561_	560	F, G, J	200
CCR77CG621_	620	F, G, J	200
CCR77CG681_	680	F, G, J	200
CCR77CG751_	750	F, G, J	100
CCR77CG821_	820	F, G, J	100
CCR77CG911_	910	F, G, J	100
CCR77CG102_	1,000	F, G, J	100
CCR77CG112_	1,100	F, G, J	100
CCR77CG122_	1,200	F, G, J	100
CCR77CG132_	1,300	F, G, J	100
CCR77CG152_	1,500	F, G, J	100
CCR77CG162_	1,600	F, G, J	100
CCR77CG182_	1,800	F, G, J	100
CCR77CG202_	2,000	F, G, J	100
CCR77CG222_	2,200	F, G, J	100
CCR77CG242_	2,400	F, G, J	50
CCR77CG272_	2,700	F, G, J	50

Add appropriate failure rate level (M, P, R or S)
 Add appropriate cap. tolerance letter

Military Type Designation	Capacitance (pF)	Capacitance Tolerance	WVDC
CC77, CCR77 (cont)			
CCR77CG302_	3,000	F, G, J	50
CCR77CG332_	3,300	F, G, J	50
CCR77CG362_	3,600	F, G, J	50
CCR77CG392_	3,900	F, G, J	50
CCR77CG432_	4,300	F, G, J	50
CCR77CG472_	4,700	F, G, J	50
CCR77CG512_	5,100	F, G, J, K	50
CCR77CG562_	5,600	F, G, J, K	50
CC78, CCR78			
CCR78CG821_	820	F, G, J, K	200
CCR78CG102_	1,000	F, G, J, K	200
CCR78CG122_	1,200	F, G, J, K	200
CCR78CG152_	1,500	F, G, J, K	200
CCR78CG182_	1,800	F, G, J, K	200
CCR78CG222_	2,200	F, G, J, K	200
CCR78CG272_	2,700	F, G, J, K	200
CCR78CG332_	3,300	F, G, J, K	200
CCR78CG392_	3,900	F, G, J, K	100
CCR78CG472_	4,700	F, G, J, K	100
CCR78CG562_	5,600	F, G, J, K	100
CCR78CG682_	6,800	F, G, J, K	100
CCR78CG822_	8,200	F, G, J, K	100
CCR78CG103_	10,000	F, G, J, K	100
CCR78CG123_	12,000	F, G, J, K	100
CCR78CG153_	15,000	F, G, J, K	50
CCR78CG183_	18,000	F, G, J, K	50
CCR78CG223_	22,000	F, G, J, K	50
CCR78CG273_	27,000	F, G, J, K	50
CC79, CCR79			
CCR79CG392_	3,900	F, G, J, K	200
CCR79CG472_	4,700	F, G, J, K	200
CCR79CG562_	5,600	F, G, J, K	200
CCR79CG682_	6,800	F, G, J, K	200
CCR79CG822_	8,200	F, G, J, K	200
CCR79CG103_	10,000	F, G, J, K	200
CCR79CG153_	15,000	F, G, J, K	100
CCR79CG183_	18,000	F, G, J, K	100
CCR79CG223_	22,000	F, G, J, K	100
CCR79CG273_	27,000	F, G, J, K	100
CCR79CG333_	33,000	F, G, J, K	100
CCR79CG393_	39,000	F, G, J, K	100
CCR79CG473_	47,000	F, G, J, K	50
CCR79CG563_	56,000	F, G, J, K	50
CCR79CG683_	68,000	F, G, J, K	50
CCR79CG823_	82,000	F, G, J, K	50

Add appropriate failure rate level (M, P, R or S)
 Add appropriate cap. tolerance letter

SURFACE MOUNT TANTALUM PRODUCTS

AVX is a world wide leading supplier of tantalum capacitors. Tantalum capacitors provide high capacitance, high reliability, stable electrical performance under high temperature, and no piezo noise effect.

TBJ

Fully Qualified to MIL-PRF-55365/8

DSCC 07016 & 95158

High reliability, low ESR

TRJ

High Ripple and Surge Capability

TAJ

Tested to CECC Specification

30801-005 and 30801-011

TMJ

Next generation of statistical screening and process control enhancement

TBM

Ultra-low ESR, available in space-level

TRM

Ultra-Low ESR, Improved Reliability

TCH

Low ESR, Hermetically Sealed

THH

Very high temperature, hermetically sealed

TAZ

Extension of CWR09, fully qualified to MIL-PRF-55365/11

TBC

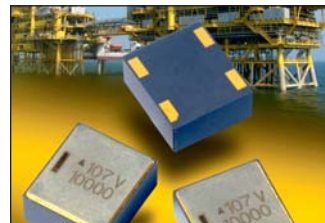
World's smallest military-approved tantalum chip capacitors.

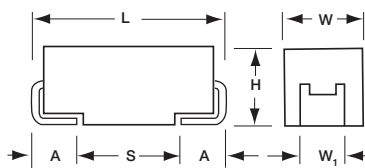
TCB

COTS-Plus version of TCR

TCR

Reduced ignition failure





MARKING

(Brown marking on gold body)



Polarity Stripe (+)

"J" for "JAN" Brand
Capacitance Code

Rated Voltage
Manufacturer's ID

Fully qualified to MIL-PRF-55365/8, the CWR11 is the military version of EIA-535BAAC, with four case sizes designed for maximum packaging efficiency on 8mm & 12mm tape for high volume production (ensuring no TCE mismatch with any substrate). This construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. The part also carries full polarity, capacitance / voltage and JAN brand marking.

The series is qualified to MIL-PRF-55365 Weibull "B", "C", "D" and "T" levels, with all surge options ("A", "B" & "C") available.

For Space Level applications, AVX SRC9000 qualification is recommended (see ratings table for part number availability).

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these are "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365).

The molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

CASE DIMENSIONS: millimeters (inches)

Case Code	EIA Metric	Length (L)	Width (W)	Height (H)	Term. Width (W ₁) ±0.10 (±0.004)	Term. Length A ±0.30(±0.012)	S min
A	3216-18	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	1.60±0.20 (0.063±0.008)	1.20 (0.047)	0.80 (0.031)	1.80 (0.071)
B	3528-21	3.50±0.20 (0.138±0.008)	2.80±0.20 (0.110±0.008)	1.90±0.20 (0.075±0.008)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	6032-28	6.00±0.30 (0.236±0.012)	3.20±0.30 (0.126±0.012)	2.50±0.30 (0.098±0.012)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	7343-31	7.30±0.30 (0.287±0.012)	4.30±0.30 (0.169±0.012)	2.80±0.30 (0.110±0.012)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

CAPACITANCE AND RATED VOLTAGE, V_R (MIL VOLTAGE CODE) RANGE CASE SIZE

Capacitance		Rated voltage DC (V _R) to 85°C							
µF	Code	4V (C)	6V (D)	10V (F)	15V (H)	20V (J)	25V (K)	35V (M)	50V (N)
0.10	104							A	A
0.15	154							A	B
0.22	224							A	B
0.33	334						A	A	B
0.47	474					A	A	B	C
0.68	684				A	A	B	B	C
1.0	105			A	A	A	B	B	C
1.5	155		A	A	A	B	B	C	D
2.2	225	A	A	A	B	B	C	C	D
3.3	335		A	B	B	B	C	C	D
4.7	475	A	B	B	B	C	C	D	D
6.8	685	B	B	B		C	D	D	
10	106	B	B		C		D		
15	156	B	C	C		D	D		
22	226		C		D	D			
33	336	C		D	D				
47	476		D						
68	686	D	D						
100	107	D							

HOW TO ORDER

COTS-PLUS & MIL QPL (CWR11):

TBJ	D	686	*	006	C	□	#	@	0	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level S = Std. Conformance L = Group A M = MIL (JAN) CWR11	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	Qualification Level 0 = N/A T = T Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	Surge Test Option 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull

CWR11 P/N CROSS REFERENCE:

CWR11	D	^	686	*	@	+	□
Type	Voltage Code C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	Termination Finish H = Solder Plated K = Solder Fused C = Hot Solder Dipped B = Gold Plated	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER	Surge Test Option A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull If blank, None required	Packaging Bulk = Standard TR = 7" T&R TR13 = 13" T&R W = Waffle See page 7 for additional packaging options.

SPACE LEVEL OPTIONS TO SRC9000*:

TBJ	D	686	*	006	C	□	L	@	9	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level L = Group A	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	Qualification Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated	Surge Test Option 45 = 10 cycles, -55°C & +85°C before Weibull

*Contact factory for AVX SRC9000 Space Level SCD details.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C									
Capacitance Range:	0.10 µF to 100 µF									
Capacitance Tolerance:	±5%; ±10%; ±20%									
Rated Voltage (V _R)	≤ 85°C:	4	6	10	16	20	25	35	50	
Category Voltage (V _C)	≤ 125°C:	2.7	4	6.7	10	13.3	16.7	23.3	33.3	
Surge Voltage (V _S)	≤ 85°C:	5.3	8	13.3	20	26.7	33.3	46.7	66.7	
Surge Voltage (V _S)	≤ 125°C:	3.5	5.3	8.7	13.3	17.8	22.2	31.1	44.5	
Temperature Range:	-55°C to +125°C									

RATING & PART NUMBER REFERENCE

CWR11 P/N		AVX COTS-Plus P/N	AVX SRC3000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55366/8				Typical RMS Ripple Data by Rating				
Cap @ 120Hz	DC Rated Voltage @ +85°C	ESR @ +25°C	DCL max +25°C	+125°C	+85°C	+100kHz	DF Max +85/125°C	-25°C	+25°C	85°C	125°C	85°C	125°C
µF @ 25°C	V @ +85°C	Ohms @ +25°C	(µA)	(µA)	(%)	(%)	(%)	W	A (100kHz)	A (100kHz)	V (100kHz)	V (100kHz)	V (100kHz)
A	2.2	4	5	6	6	9	9	0.075	0.10	0.09	0.04	0.77	0.70
A	4.7	4	5	6	6	9	9	0.075	0.10	0.09	0.04	0.77	0.70
B	6.8	4	5.5	6	6	9	9	0.085	0.12	0.11	0.05	0.68	0.62
B	10	4	6	7.2	6	9	9	0.085	0.16	0.14	0.06	0.55	0.49
C	33	4	1.3	13	15.6	6	9	0.110	0.22	0.20	0.09	0.49	0.44
D	68	4	2.7	27	32.4	6	9	0.150	0.37	0.33	0.15	0.41	0.37
A	100	4	0.9	4	40	8	12	0.150	0.41	0.37	0.16	0.37	0.33
A	1.5	6	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
A	2.2	6	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
A	3.3	6	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
B	4.7	6	5.5	6	6	6	6	0.085	0.12	0.11	0.05	0.68	0.62
B	6.8	6	6	7.2	6	6	6	0.085	0.16	0.14	0.06	0.55	0.49
B	10	6	3.5	6	7.2	6	6	0.085	0.16	0.14	0.06	0.55	0.49
C	15	6	3	9	10.8	6	9	0.110	0.19	0.17	0.08	0.57	0.52
C	22	6	2.2	14	16.8	6	9	0.110	0.22	0.20	0.09	0.49	0.44
D	47	6	1.1	28	33.6	6	9	0.150	0.37	0.33	0.15	0.41	0.37
D	68	6	0.9	43	51.6	6	9	0.150	0.41	0.37	0.16	0.37	0.33
A	1	10	10	0.5	6	6	6	0.075	0.09	0.08	0.03	0.87	0.78
A	1.5	10	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
A	2.2	10	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
B	3.3	10	5.5	6	6	6	6	0.085	0.12	0.11	0.05	0.68	0.62
B	4.7	10	4.5	6	6	6	6	0.085	0.14	0.12	0.05	0.62	0.56
B	6.8	10	3.5	7	8.4	6	9	0.085	0.16	0.14	0.06	0.55	0.49
C	15	10	2.5	15	18	6	6	0.110	0.21	0.19	0.08	0.52	0.47
C	22	10	1.1	33	39.6	6	9	0.150	0.37	0.33	0.15	0.41	0.37
D	47	10	0.9	47	56.4	6	9	0.150	0.41	0.37	0.16	0.37	0.33
A	0.68	15	12	0.5	6	6	6	0.075	0.08	0.07	0.03	0.95	0.85
A	1	15	10	0.5	6	6	6	0.075	0.09	0.08	0.03	0.87	0.78
A	1.5	15	8	0.5	6	6	6	0.075	0.10	0.09	0.04	0.77	0.70
B	2.2	15	5.5	6	6	6	6	0.085	0.12	0.11	0.05	0.68	0.62
B	3.3	15	5	6	6	6	6	0.085	0.13	0.12	0.05	0.65	0.59
B	4.7	15	4	7	8.4	6	8	0.085	0.15	0.13	0.06	0.58	0.52
C	10	15	2.5	16	19.2	6	8	0.110	0.21	0.19	0.08	0.52	0.47
D	22	15	1.1	33	39.6	6	8	0.150	0.37	0.33	0.15	0.41	0.37
D	33	15	0.9	53	53	6	9	0.150	0.41	0.37	0.16	0.37	0.33
A	0.47	20	14	0.5	6	6	6	0.075	0.07	0.07	0.03	1.02	0.92
A	0.68	20	12	0.5	6	6	6	0.075	0.08	0.07	0.03	0.95	0.85
A	1	20	10	0.5	6	6	6	0.075	0.09	0.08	0.03	0.87	0.78
A	1.5	20	6	0.5	6	6	6	0.085	0.12	0.11	0.05	0.71	0.64
B	2.2	20	5	6	6	6	6	0.085	0.13	0.12	0.05	0.65	0.59
B	3.3	20	4	7	8.4	6	8	0.085	0.15	0.13	0.06	0.58	0.52
B	4.7	20	3	10	12	6	8	0.110	0.19	0.17	0.08	0.57	0.52
C	6.8	20	2.4	14	16.8	6	9	0.110	0.21	0.19	0.09	0.51	0.46
D	15	20	1.1	3	30	36	8	0.150	0.37	0.33	0.15	0.41	0.37
D	22	20	0.9	4.4	44	44	9	0.150	0.41	0.37	0.16	0.37	0.33
A	0.33	25	15	0.5	6	6	6	0.075	0.07	0.06	0.03	1.06	0.95
A	0.47	25	14	0.5	6	6	6	0.075	0.07	0.07	0.03	1.02	0.92
A	0.68	25	7.5	0.5	6	6	6	0.085	0.11	0.10	0.04	0.80	0.72
B	1	25	6.5	0.5	6	6	6	0.085	0.11	0.10	0.05	0.74	0.67
B	1.5	25	6.5	0.5	6	6	6	0.085	0.11	0.10	0.05	0.74	0.67
B	2.2	25	3.5	0.6	7.2	6	9	0.110	0.18	0.16	0.07	0.62	0.56
C	3.3	25	3.5	0.9	10.8	6	8	0.110	0.18	0.16	0.07	0.62	0.56
C	4.7	25	2.5	1.2	14.4	6	9	0.110	0.21	0.19	0.08	0.52	0.47
D	6.8	25	1.4	1.7	20.4	6	9	0.150	0.33	0.29	0.13	0.46	0.41

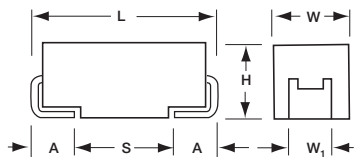
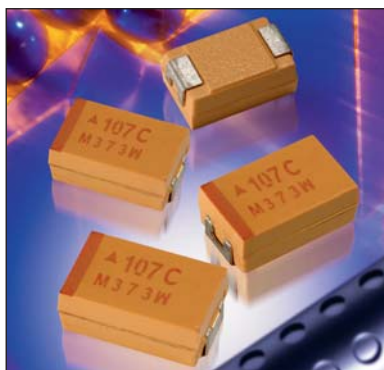
All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

RATING & PART NUMBER REFERENCE

CWR1 P/N			AVX COTS-Plus P/N			AVX SRC3000 P/N			Parametric Specifications by Rating per MIL-PRF-55365/8										Typical RMS Ripple Data by Rating									
Cap @ 120Hz	DC Rated Voltage @ +85°C	ESR @ 100kHz	DCL max +25°C	DCL max +85°C	DCL max +125°C	DF Max +85/125°C	DF Max -55°C	Power Dissipation	25°C Ripple A (100kHz)	85°C Ripple A (100kHz)	125°C Ripple A (100kHz)	25°C Ripple V (100kHz)	85°C Ripple V (100kHz)	125°C Ripple V (100kHz)	25°C Ripple A (100kHz)	85°C Ripple A (100kHz)	125°C Ripple A (100kHz)	25°C Ripple V (100kHz)	85°C Ripple V (100kHz)	125°C Ripple V (100kHz)								
µF @ 25°C	V @ +85°C	Ohms @ +25°C	µA	µA	µA	(%)	(%)	W	A	A	A	V	V	V	A	A	A	V	V	V								
D	10	25	2.5	25	30	6	8	9	0.150	0.35	0.32	0.14	0.42	0.38	0.15	0.15	0.15	0.39	0.35	0.35								
D	15	25	3.8	38	45.6	6	9	9	0.150	0.39	0.35	0.15	0.39	0.35	0.15	0.15	0.15	0.39	0.35	0.35								
A	0.1	35	0.5	5	6	4	6	6	0.075	0.06	0.05	0.02	0.134	1.21	0.02	0.02	0.02	1.34	1.21	1.21								
A	0.15	35	0.5	5	6	4	6	6	0.075	0.06	0.05	0.02	1.25	1.13	0.02	0.02	0.02	1.25	1.13	1.13								
A	0.22	35	0.5	5	6	4	6	6	0.075	0.06	0.06	0.03	1.16	1.05	0.03	0.03	0.03	1.16	1.05	1.05								
A	0.33	35	0.5	5	6	4	6	6	0.075	0.07	0.06	0.03	1.06	0.95	0.03	0.03	0.03	1.06	0.95	0.95								
B	0.47	35	0.5	5	6	4	6	6	0.085	0.09	0.08	0.04	0.92	0.83	0.04	0.04	0.04	0.92	0.83	0.83								
B	0.68	35	0.5	5	6	4	6	6	0.085	0.10	0.09	0.04	0.82	0.74	0.04	0.04	0.04	0.82	0.74	0.74								
B	1	35	6.5	5	6	4	6	6	0.085	0.11	0.10	0.05	0.74	0.67	0.05	0.05	0.05	0.74	0.67	0.67								
C	1.5	35	4.5	5	6	6	8	9	0.110	0.16	0.14	0.06	0.70	0.63	0.06	0.06	0.06	0.70	0.63	0.63								
C	2.2	35	3.5	8	9.6	6	8	9	0.110	0.18	0.16	0.07	0.62	0.56	0.07	0.07	0.07	0.62	0.56	0.56								
C	3.3	35	2.5	1.2	12	14.4	8	9	0.110	0.21	0.19	0.08	0.52	0.47	0.08	0.08	0.08	0.52	0.47	0.47								
D	4.7	35	1.5	1.7	17	20.4	6	8	0.150	0.32	0.28	0.13	0.47	0.43	0.13	0.13	0.13	0.47	0.43	0.43								
D	6.8	35	1.3	2.4	24	28.8	6	9	0.150	0.34	0.31	0.14	0.44	0.40	0.14	0.14	0.14	0.44	0.40	0.40								
A	0.1	50	22	0.5	5	12	6	8	0.075	0.06	0.05	0.02	1.28	1.16	0.02	0.02	0.02	1.28	1.16	1.16								
B	0.15	50	17	0.5	5	6	4	6	0.085	0.07	0.06	0.03	1.20	1.08	0.03	0.03	0.03	1.20	1.08	1.08								
B	0.22	50	14	0.5	5	6	4	6	0.085	0.08	0.07	0.03	1.09	0.98	0.03	0.03	0.03	1.09	0.98	0.98								
B	0.33	50	12	0.5	5	6	4	6	0.085	0.08	0.08	0.03	1.01	0.91	0.03	0.03	0.03	1.01	0.91	0.91								
C	0.47	50	8	0.5	5	6	4	6	0.110	0.12	0.11	0.05	0.94	0.84	0.05	0.05	0.05	0.94	0.84	0.84								
C	0.68	50	7	0.5	5	6	4	6	0.110	0.13	0.11	0.05	0.88	0.79	0.05	0.05	0.05	0.88	0.79	0.79								
C	1	50	6	0.5	5	6	4	6	0.110	0.14	0.12	0.05	0.81	0.73	0.05	0.05	0.05	0.81	0.73	0.73								
D	1.5	50	4	0.8	8	9.6	6	8	0.150	0.19	0.17	0.05	0.77	0.70	0.05	0.05	0.05	0.77	0.70	0.70								
D	2.2	50	2.5	1.1	11	13.2	6	8	0.150	0.24	0.22	0.10	0.61	0.55	0.10	0.10	0.10	0.61	0.55	0.55								
D	3.3	50	2	1.7	17	20.4	6	9	0.150	0.27	0.25	0.11	0.55	0.49	0.11	0.11	0.11	0.55	0.49	0.49								
D	4.7	50	1.5	2.4	24	28.8	6	9	0.150	0.32	0.28	0.13	0.47	0.43	0.13	0.13	0.13	0.47	0.43	0.43								

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.



MARKING

(Brown marking on gold body)



Polarity Stripe (+)
Capacitance Code
Rated Voltage
Manufacturer's ID
Lot Number

The DSCC 07016 & 95158 families, based on the CWR11 form factor, are high reliability series encompassing the current range of EIA Low ESR ratings. DSCC 07016 has the widest range of case sizes, capacitance / voltage ratings, and is offered with Weibull Grade "B" and "C" reliability with all MIL-PRF-55365 Rev. G surge test options ("A", "B" & "C").

For Space Level applications, AVX SRC9000 qualification is recommend. Please refer to the TBJ COTS-Plus SRC9000 datasheet for part number availability.

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these correspond to "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365).

The molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
V	2924	7361-38	7.30 (0.287)	6.10 (0.240)	3.55 (0.140)	3.10 (0.120)	1.30 (0.051)	4.40 (0.173)

W₁ dimension applies to the termination width for A dimensional area only.

CAPACITANCE AND RATED VOLTAGE, V_R (EIA VOLTAGE CODE) RANGE LETTER DENOTES CASE SIZE (ESR LIMITS IN PARENTHESES)

Capacitance		Rated Voltage DC (V _R) to 85°C							
μF	Code	4V (G)	6V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.15	154								A(15000)
0.22	224								A(18000)
0.47	474								A(9500)/B(9500)
0.68	684						A(10000)	A(8000)	A(7900)
1.0	105						A(8000)	A(7500)	A(6600)/B(7000)
1.5	155					A(6500)	A(3000,7500)	A(7500)/B(5200)	C(2000)/D(1500)
2.2	225				A(5500)	A(3000)	A(7000)/B(2000)	B(2000)	D(1200)
3.3	335		A(8000)		A(3500,5000)		B(2000)	B(1000)	D(800)
4.7	475		A(6000)	A(5000)	A(2000)	A(1800,4000) B(1000)	A(3100) B(700,1500)	B(1500) C(600)/D(450)	D(300)
6.8	685		A(5000)	A(4000)	A(1500)/B(1200)	B(1000)	B(700,2800) C(700)	C(350)/D(400) E(300)	D(300,600)
10	106		A(4000)	A(1800,3000)	A(3000)/B(900)	B(500,1000) C(700)	C(300,500)	C(1600)/D(125,300) E(250)	
15	156		A(3500)	A(1000,3200) B(600)	B(500,800)	B(500)/C(450) D(275)	D(275)/E(200)	C(450)/D(100,300) E(225)	
22	226		A(3000)/B(600)	B(500,700) C(300)	B(500,600) C(150,375)	B(600)/C(400) D(275)	C(275,400) D(100,200)/E(225)	D(125,400) E(125,300)	
33	336	A(3000)	B(600)	A(700)/B(425,650) C(500)	C(100,300) D(250)	C(300) D(100, 200)	C(300) E(100,175)	D(90,300) E(300)	D(200,300)
47	476		C(300)	C(200,350) D(200)	C(110,350) D(80,200)	D(100,200) E(150)	D(175,250)	E(250)/V(200)	
68	686	A(1500)	B(500)/C(200) D(175)	C(80,300) D(150)/E(150)	D(150)	D(70,200) E(150,200)	V(95)		
100	107	A(1400) B(900)	C(75,150)	C(75,200) D(50,100)/E(100)	D(50,125) E(125)	V(60)			
150	157		D(125)/E(125)	D(50,100)/E(100)	D(60,150)/V(45)				
220	227		D(100,125) E(100)	D(60,150) E(50,100)	V(60)				
330	337		E(50,150)	D(60,150) E(50,100)/V(40)					
470	477		E(50,200)/V(40)	E(50,200)/V(40)					
1000	108	E(200)							

NOTE: EIA standards for Low ESR solid tantalum capacitors allow an ESR movement of 1.25 times initial limit post mounting.

HOW TO ORDER

DSCC DWG P/N:

<p>07016</p> <p>DSCC DWG 07016</p>	<p>-001</p> <p>Dash Number See Rating Tables</p>	<p>K</p> <p>Capacitance Tolerance K = ±10% M = ±20%</p>	<p>B</p> <p>Reliability Grade B = B Weibull C = C Weibull D = D Weibull</p>	<p>C</p> <p>Termination Finish B = Gold Plated (10 microinch minimum) H = Solder Plated (50 microinch minimum) C = Hot Solder Dip (60 microinch minimum)</p>	<p>A</p> <p>Surge Test Option A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull Z = None required Per MIL-PRF-55365</p>
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LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT

RoHS
COMPLIANT

For RoHS compliant products,
please select correct termination style.

<p>95158</p> <p>DSCC DWG 95158</p>	<p>-01</p> <p>Dash Number See Rating Tables</p>	<p>K</p> <p>Capacitance Tolerance K = ±10% M = ±20%</p>	<p>H</p> <p>Termination Finish B = Gold Plated (10 microinch minimum) H = Solder Plated (100 microinch minimum)</p>
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LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT

RoHS
COMPLIANT

For RoHS compliant products,
please select correct termination style.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C									
Capacitance Range:	0.15 µF to 1000 µF									
Capacitance Tolerance:	±10%; ±20%									
Rated Voltage (V _R)	≤ 85°C:	4	6	10	16	20	25	35	50	
Category Voltage (V _C)	≤ 125°C:	2.7	4	7	10	13	17	23	33	
Surge Voltage (V _S)	≤ 85°C:	5.2	8	13	20	26	32	46	65	
Surge Voltage (V _S)	≤ 125°C:	3.4	5	8	12	16	20	28	40	
Temperature Range:	-55°C to +125°C									

RATING & PART NUMBER REFERENCE		Parametric Specifications by Rating per DSCC 95158 or 07016 where applicable										Typical RMS Ripple Data by Rating											
		Capacitance					ESR					DC Rated Voltage				Power Dissipation				Ripple			
		Cap @ 120kHz	Cap @ 25°C	V @ +85°C	V @ +25°C	DF Max +65/125°C	ESR @ 100kHz	ESR @ +25°C	ESR @ +85°C	DCL max +85°C	DCL max +125°C	DF Max +65/125°C	Power Dissipation W	25°C Ripple (100kHz) A	85°C Ripple (100kHz) A	125°C Ripple (100kHz) A	25°C Ripple (100kHz) V	85°C Ripple (100kHz) V	125°C Ripple (100kHz) V				
07016001	* @ +A	33	4	4	3000	1.4	14	17	32	10	12	14	9	0.075	0.16	0.20	0.09	0.34	0.30				
07016002	* @ +A	68	4	4	1500	2.7	27	32	40	30	36	42	10	0.075	0.22	0.20	0.09	0.34	0.30				
07016003	* @ +A	100	4	4	1400	4	40	48	48	30	36	42	10	0.075	0.23	0.21	0.09	0.32	0.29				
07016004	* @ +A	100	4	4	900	4	40	48	48	8	10	12	10	0.085	0.31	0.28	0.12	0.28	0.25				
07016005	* @ +A	1,000	4	4	200	40	400	480	480	60	90	90	90	0.165	0.91	0.82	0.36	0.18	0.16				
07016006	* @ +A	3.3	6	6	8000	0.5	5	6	6	6	9	9	9	0.075	0.10	0.09	0.04	0.77	0.70				
07016007	* @ +A	4.7	6	6	6000	0.5	5	6	6	6	9	9	9	0.075	0.11	0.10	0.04	0.67	0.60				
07016008	* @ +A	6.8	6	6	5000	0.5	5	6	6	6	9	9	9	0.075	0.12	0.11	0.05	0.61	0.55				
07016009	* @ +A	10	6	6	4000	0.6	10	11	11	6	9	10	10	0.075	0.14	0.12	0.05	0.55	0.49				
07016010	* @ +A	15	6	6	3500	0.9	10	11	11	6	9	10	10	0.075	0.15	0.13	0.06	0.51	0.46				
07016011	* @ +A	22	6	6	3000	1.4	14	17	17	6	9	10	10	0.075	0.16	0.14	0.06	0.47	0.43				
07016012	* @ +A	22	6	6	600	1.4	14	17	17	6	9	10	10	0.085	0.38	0.34	0.15	0.23	0.20				
07016013	* @ +A	33	6	6	600	2.1	21	25	25	6	9	10	10	0.085	0.38	0.34	0.15	0.23	0.20				
07016014	* @ +A	47	6	6	300	3	30	36	36	6	9	10	10	0.110	0.61	0.54	0.24	0.18	0.16				
07016015	* @ +A	68	6	6	500	4.3	43	51	51	8	10	12	12	0.085	0.41	0.37	0.16	0.21	0.19				
07016016	* @ +A	68	6	6	200	4.3	43	51	51	6	9	10	10	0.110	0.74	0.67	0.30	0.15	0.13				
95158 01	* ^	68	6	6	175	3.3	19.8	33	33	4	6	6	6	0.150	0.93	0.83	0.37	0.16	0.15				
07016017	* @ +A	100	6	6	150	6.3	63	76	76	6	9	10	10	0.110	0.86	0.77	0.34	0.13	0.12				
07016018	* @ +A	100	6	6	75	6.3	63	76	76	6	9	10	10	0.110	1.21	1.09	0.48	0.09	0.08				
07016019	* @ +A	150	6	6	125	9.5	95	113	113	6	9	10	10	0.150	1.10	0.99	0.44	0.14	0.12				
95158 02	* ^	150	6	6	125	7.2	43.2	72	72	6	8	8	8	0.165	1.15	1.03	0.46	0.14	0.13				
07016020	* @ +A	220	6	6	125	13.9	139	166	166	8	10	12	12	0.150	1.10	0.99	0.44	0.14	0.12				
95158 25	* ^	220	6	6	100	13.2	132	165	165	8	10	12	12	0.150	1.22	1.10	0.49	0.12	0.11				
95158 03	* ^	220	6	6	100	13.2	132	165	165	8	10	12	12	0.165	1.28	1.16	0.51	0.13	0.12				
07016021	* @ +A	330	6	6	150	20.8	208	249	249	8	10	12	12	0.165	1.05	0.94	0.42	0.16	0.14				
07016022	* @ +A	330	6	6	50	20.8	208	249	249	8	10	12	12	0.165	1.82	1.63	0.73	0.09	0.08				
07016023 M	@ +A	470	6	6	200	29.6	296	355	355	10	12	14	14	0.165	0.91	0.82	0.36	0.18	0.16				
07016024 M	@ +A	470	6	6	50	29.6	296	355	355	10	12	14	14	0.165	1.82	1.63	0.73	0.09	0.08				
07016025	* @ +A	470	6	6	40	29.6	296	355	355	10	12	12	12	0.250	2.50	2.25	1.00	0.10	0.09				
07016026	* @ +A	4.7	10	10	5000	0.5	5	6	6	6	9	10	10	0.075	0.12	0.11	0.05	0.61	0.55				
07016027	* @ +A	6.8	10	10	4000	0.7	7	8	8	6	9	10	10	0.075	0.14	0.12	0.05	0.55	0.49				
07016028	* @ +A	10	10	10	3000	1	10	12	12	6	9	10	10	0.075	0.16	0.14	0.06	0.47	0.43				
07016029	* @ +A	10	10	10	1800	1	10	12	12	6	9	10	10	0.075	0.20	0.18	0.08	0.37	0.33				
07016030	* @ +A	15	10	10	3200	1.6	16	19	19	6	9	10	10	0.075	0.15	0.14	0.06	0.49	0.44				
07016031	* @ +A	15	10	10	1000	1.6	16	19	19	6	9	10	10	0.075	0.27	0.25	0.11	0.27	0.25				
07016032	* @ +A	15	10	10	600	1.6	16	19	19	6	9	10	10	0.085	0.38	0.34	0.15	0.23	0.20				
07016033	* @ +A	22	10	10	700	2.2	22	26	26	6	9	10	10	0.085	0.35	0.31	0.14	0.24	0.22				
07016034	* @ +A	22	10	10	500	2.2	22	26	26	6	9	10	10	0.085	0.41	0.37	0.16	0.21	0.19				
07016035	* @ +A	22	10	10	300	2.2	22	26	26	6	9	10	10	0.110	0.61	0.54	0.24	0.18	0.16				
07016036	* @ +A	33	10	10	700	3.3	33	40	40	8	10	12	12	0.075	0.33	0.29	0.13	0.23	0.21				
07016037	* @ +A	33	10	10	650	3.3	33	40	40	6	9	10	10	0.085	0.36	0.33	0.14	0.24	0.21				
07016038	* @ +A	33	10	10	425	3.3	33	40	40	6	9	10	10	0.085	0.45	0.40	0.18	0.19	0.17				
07016039	* @ +A	33	10	10	500	3.3	33	40	40	6	9	10	10	0.110	0.47	0.42	0.19	0.23	0.21				
07016040	* @ +A	47	10	10	350	4.7	47	56	56	6	9	10	10	0.110	0.56	0.50	0.22	0.20	0.18				
07016041	* @ +A	47	10	10	200	4.7	47	56	56	6	9	10	10	0.110	0.74	0.67	0.30	0.15	0.13				
95158 -04	* ^	47	10	10	200	3.8	22.8	38	38	4	6	6	6	0.150	0.87	0.78	0.35	0.17	0.16				
07016042	* @ +A	68	10	10	300	6.8	68	82	82	8	10	12	12	0.110	0.61	0.54	0.24	0.18	0.16				
07016043	* @ +A	68	10	10	80	6.8	68	82	82	8	10	12	12	0.110	1.17	1.06	0.47	0.09	0.08				
07016044	* @ +A	68	10	10	150	6.8	68	82	82	6	9	10	10	0.150	1.00	0.90	0.40	0.15	0.14				
95158 05	* ^	68	10	10	150	5.4	32.4	54	54	4	6	6	6	0.165	1.05	0.94	0.42	0.16	0.14				
07016045	* @ +A	100	10	10	200	10	100	120	120	8	10	12	12	0.110	0.74	0.67	0.30	0.15	0.13				
07016046	* @ +A	100	10	10	75	10	100	120	120	8	10	12	12	0.110	1.21	1.09	0.48	0.09	0.08				
95158 06	* ^	100	10	10	100	10	100	125	125	8	10	12	12	0.150	1.22	1.10	0.49	0.12	0.11				
07016047	* @ +A	100	10	10	50	10	100	120	120	6	9	10	10	0.150	1.73	1.56	0.69	0.09	0.08				
95158 07	* ^	100	10	10	100	8	48	80	80	6	8	8	8	0.165	1.28	1.16	0.51	0.13	0.12				

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

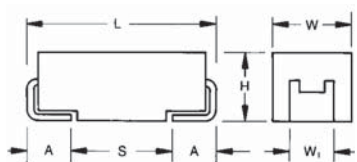
RATING & PART NUMBER REFERENCE	Parametric Specifications by Rating per DSCC 95158 or 07016 where applicable										Typical RMS Ripple Data by Rating									
	Cap @ 120Hz		DC Rated Voltage		ESR @ 100kHz		DCL max		DF Max		Power Dissipation		25°C		125°C		85°C		125°C	
	µF @ +25°C	V @ +85°C	mOhms @ +25°C	µA +25°C	µA +125°C	(%) +(85/125)°C	(%) -55°C	W	A (100kHz)	A (100kHz)	V (100kHz)	V (100kHz)	A (100kHz)	A (100kHz)	V (100kHz)	V (100kHz)	A (100kHz)	A (100kHz)	V (100kHz)	V (100kHz)
DSCC P/N	Case																			
95158 26	* ^	D	150	10	15	150	187.5	8	10	12	12	0.150	1.22	1.10	0.49	0.12	0.11	0.05	0.05	
07016 048	* @ ^ +	D	150	10	15	150	180	8	10	12	12	0.150	1.73	1.56	0.69	0.09	0.08	0.03	0.03	
95158 08	* ^	E	150	10	15	150	187.5	8	10	12	12	0.165	1.28	1.16	0.51	0.13	0.12	0.05	0.05	
07016 049	* @ ^ +	D	220	10	220	220	264	8	10	12	12	0.150	1.00	0.90	0.40	0.15	0.14	0.06	0.06	
07016 050	M @ ^ +	D	220	10	15	150	180	8	10	12	12	0.150	1.73	1.56	0.69	0.09	0.08	0.03	0.03	
95158 28	* ^	E	220	10	15	150	187.5	8	10	12	12	0.165	1.82	1.16	0.51	0.13	0.12	0.05	0.04	
07016 051	* @ ^ +	E	220	10	22	220	264	8	10	12	12	0.165	1.28	1.63	0.73	0.09	0.08	0.04	0.04	
07016 052	M @ ^ +	D	330	10	33	330	396	8	10	12	12	0.150	1.00	0.90	0.40	0.15	0.14	0.06	0.06	
07016 053	M @ ^ +	D	330	10	33	330	396	8	10	12	12	0.150	1.73	1.56	0.69	0.09	0.08	0.03	0.03	
07016 054	* @ ^ +	E	330	10	33	330	396	8	10	12	12	0.165	1.28	1.16	0.51	0.13	0.12	0.05	0.05	
07016 055	* @ ^ +	E	330	10	33	330	396	8	10	12	12	0.165	1.82	1.63	0.73	0.09	0.08	0.04	0.04	
07016 056	* @ ^ +	V	330	10	33	330	396	8	10	12	12	0.250	2.50	2.25	1.00	0.10	0.09	0.04	0.04	
07016 057	M @ ^ +	E	470	10	47	470	564	10	12	14	14	0.165	0.91	0.82	0.36	0.18	0.16	0.07	0.07	
07016 058	M @ ^ +	E	470	10	47	470	564	10	12	14	14	0.165	1.82	1.63	0.73	0.09	0.08	0.04	0.04	
07016 059	* @ ^ +	V	470	10	47	470	564	10	12	14	14	0.250	2.50	2.25	1.00	0.10	0.09	0.04	0.04	
07016 060	* @ ^ +	A	2	16	5500	5	6	6	9	10	10	0.075	0.12	0.11	0.05	0.64	0.58	0.26	0.26	
07016 061	* @ ^ +	A	3.3	16	5000	0.5	5	6	6	9	10	0.075	0.12	0.11	0.05	0.61	0.55	0.24	0.24	
07016 062	* @ ^ +	A	3.3	16	3500	0.5	5	6	6	9	10	0.075	0.15	0.13	0.06	0.51	0.46	0.20	0.20	
07016 063	* @ ^ +	A	4.7	16	2000	0.8	10	6	6	9	10	0.075	0.17	0.08	0.39	0.35	0.15	0.15	0.15	
07016 064	* @ ^ +	A	6.8	16	1500	1.1	11	6	6	9	10	0.075	0.22	0.20	0.09	0.34	0.30	0.13	0.13	
07016 065	* @ ^ +	B	6.8	16	1200	1.1	13	6	6	9	10	0.085	0.27	0.24	0.11	0.32	0.29	0.13	0.13	
07016 066	* @ ^ +	A	10	16	3000	1.6	16	6	6	9	10	0.075	0.16	0.14	0.06	0.47	0.43	0.19	0.19	
07016 067	* @ ^ +	B	10	16	900	1.6	16	6	6	9	10	0.085	0.32	0.29	0.13	0.26	0.23	0.10	0.10	
07016 068	* @ ^ +	B	15	16	800	2.4	24	6	6	9	10	0.085	0.33	0.29	0.13	0.26	0.23	0.10	0.10	
07016 069	* @ ^ +	B	15	16	500	2.4	24	6	6	9	10	0.085	0.41	0.37	0.16	0.21	0.19	0.08	0.08	
07016 070	* @ ^ +	B	22	16	600	3.6	36	6	6	9	10	0.085	0.38	0.34	0.15	0.23	0.20	0.09	0.09	
07016 071	* @ ^ +	C	22	16	375	3.6	36	6	6	9	10	0.110	0.54	0.49	0.22	0.20	0.18	0.08	0.08	
07016 072	* @ ^ +	C	22	16	150	3.6	36	6	6	9	10	0.110	0.86	0.77	0.34	0.13	0.12	0.05	0.05	
07016 073	* @ ^ +	B	22	16	500	3.6	36	6	6	9	10	0.085	0.41	0.37	0.16	0.21	0.19	0.08	0.08	
07016 074	* @ ^ +	C	33	16	300	5.3	53	6	6	9	10	0.110	0.61	0.54	0.24	0.18	0.16	0.07	0.07	
07016 075	* @ ^ +	C	33	16	100	5.3	53	6	6	9	10	0.110	1.05	0.94	0.42	0.10	0.09	0.04	0.04	
95158 09	* ^	D	33	16	250	4.2	25.2	4	6	6	6	0.150	0.77	0.70	0.31	0.19	0.17	0.08	0.08	
07016 076	* @ ^ +	D	47	16	350	7.6	76	6	6	9	10	0.110	0.56	0.50	0.22	0.20	0.18	0.08	0.08	
07016 077	* @ ^ +	C	47	16	110	7.6	76	6	6	9	10	0.110	1.00	0.90	0.40	0.11	0.10	0.04	0.04	
07016 078	* @ ^ +	D	47	16	80	7.6	76	6	6	9	10	0.150	1.37	1.23	0.55	0.11	0.10	0.04	0.04	
95158 10	* ^	D	47	16	200	7.5	75	6	6	9	9	0.150	0.87	0.78	0.35	0.17	0.16	0.07	0.07	
07016 079	* @ ^ +	D	68	16	150	10.9	109	6	6	9	10	0.150	1.00	0.90	0.40	0.15	0.14	0.06	0.06	
07016 080	* @ ^ +	D	100	16	125	16	160	6	6	9	10	0.150	1.10	0.99	0.44	0.14	0.12	0.05	0.05	
07016 081	* @ ^ +	D	100	16	50	16	160	6	6	9	10	0.150	1.73	1.56	0.69	0.09	0.08	0.03	0.03	
95158 11	* ^	E	100	16	125	16	160	200	8	12	12	0.165	1.15	1.03	0.46	0.14	0.13	0.06	0.06	
07016 082	M @ ^ +	D	150	16	150	24	240	6	6	9	10	0.150	1.00	0.90	0.40	0.15	0.14	0.06	0.06	
07016 083	M @ ^ +	D	150	16	60	24	240	6	6	9	10	0.150	1.58	1.42	0.63	0.09	0.09	0.04	0.04	
07016 084	* @ ^ +	V	150	16	45	24	480	6	8	10	10	0.250	2.36	2.12	0.94	0.11	0.10	0.04	0.04	
07016 085	* @ ^ +	V	220	16	50	35.2	352	8	10	12	12	0.250	2.24	2.01	0.89	0.11	0.10	0.04	0.04	
07016 086	* @ ^ +	A	1.5	20	6500	0.5	5	6	6	6	6	0.075	0.11	0.10	0.04	0.70	0.63	0.28	0.28	
07016 087	* @ ^ +	A	2.2	20	3000	0.5	5	6	6	6	6	0.075	0.16	0.14	0.06	0.47	0.43	0.19	0.19	
07016 088	* @ ^ +	A	4.7	20	4000	1	10	12	6	8	10	0.075	0.14	0.12	0.05	0.55	0.49	0.22	0.22	
07016 089	* @ ^ +	A	4.7	20	1800	1	10	12	6	8	10	0.075	0.20	0.18	0.08	0.27	0.33	0.15	0.15	
07016 090	* @ ^ +	B	4.7	20	1000	2	20	24	6	8	10	0.085	0.29	0.26	0.12	0.29	0.26	0.12	0.12	
07016 091	* @ ^ +	B	6.8	20	1000	1.4	14	17	6	8	10	0.085	0.29	0.26	0.12	0.29	0.26	0.12	0.12	
07016 092	* @ ^ +	B	10	20	1000	0.7	7	8	6	8	10	0.085	0.29	0.26	0.12	0.29	0.26	0.12	0.12	
07016 093	* @ ^ +	B	10	20	500	0.7	7	8	6	8	10	0.085	0.41	0.37	0.16	0.21	0.19	0.08	0.08	
07016 094	* @ ^ +	C	10	20	700	1.4	14	17	6	8	10	0.110	0.40	0.36	0.16	0.28	0.25	0.11	0.11	
07016 095	* @ ^ +	B	15	20	500	3	30	36	6	8	10	0.085	0.41	0.37	0.16	0.21	0.19	0.08	0.08	
07016 096	* @ ^ +	C	15	20	450	3	30	36	6	8	10	0.110	0.49	0.44	0.20	0.22	0.20	0.09	0.09	
95158 12	* ^	D	15	20	275	2.4	24	24	4	6	6	0.150	0.74	0.66	0.30	0.20	0.18	0.08	0.08	

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
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RATING & PART NUMBER REFERENCE		Parametric Specifications by Rating per DSCC 95158 or 07016 where applicable										Typical RMS Ripple Data by Rating											
		Cap @ 120Hz		DC Rated Voltage		ESR @ 100kHz		DCL max		DF Max		Power Dissipation		25°C		85°C		125°C		85°C		125°C	
		µF @ 25°C	V @ +85°C	mOhms @ +25°C	µA @ +25°C	µA @ +85°C	µA @ +125°C	(%) +25°C	(%) +65/125°C	(%) -55°C	W	Ripple A (100kHz)	Ripple A (100kHz)	Ripple A (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	Ripple V (100kHz)	
DSCC P/N	Case																						
95158 20	* ^	6.8	35	300	1.9	11.4	19	4	6	6	6	6	6	0.165	0.74	0.67	0.30	0.22	0.20	0.20	0.09	0.09	
07016144	* @ ^ +	10	35	1600	3.5	35	42	6	9	9	9	9	9	0.110	0.26	0.24	0.10	0.42	0.38	0.38	0.17	0.17	
95158 27	* ^	10	35	300	3.5	35	42	4	6	6	6	6	6	0.150	0.71	0.64	0.28	0.21	0.19	0.19	0.08	0.08	
07016145	* @ ^ +	10	35	125	3.5	35	42	6	9	9	9	9	9	0.150	1.10	0.99	0.44	0.14	0.12	0.12	0.05	0.05	
95158 21	* ^	10	35	250	2.8	16.8	28	4	6	6	6	6	6	0.165	0.81	0.73	0.32	0.20	0.18	0.18	0.08	0.08	
07016146	* @ ^ +	15	35	450	5.3	53	64	6	9	9	9	9	9	0.110	0.49	0.44	0.20	0.22	0.20	0.09	0.09	0.09	
07016147	* @ ^ +	15	35	300	5.3	53	64	6	9	9	9	9	9	0.150	0.71	0.64	0.28	0.21	0.19	0.19	0.08	0.08	
07016148	* @ ^ +	15	35	100	5.3	53	64	6	9	9	9	9	9	0.150	1.22	1.10	0.49	0.12	0.11	0.11	0.05	0.05	
95158 22	* ^	15	35	225	5.3	53	65.6	6	9	9	9	9	9	0.165	0.86	0.77	0.34	0.19	0.17	0.17	0.08	0.08	
07016149	* @ ^ +	22	35	400	7.7	77	92	6	9	9	9	9	9	0.150	0.61	0.55	0.24	0.24	0.22	0.20	0.10	0.10	
07016150	* @ ^ +	22	35	125	7.7	77	92	6	9	9	9	9	9	0.150	1.10	0.99	0.44	0.14	0.12	0.12	0.05	0.05	
95158 23	* ^	22	35	300	7.7	77	96.3	6	9	9	9	9	9	0.165	0.74	0.67	0.30	0.22	0.20	0.20	0.09	0.09	
07016151	* @ ^ +	22	35	125	7.7	77	92	6	9	9	9	9	9	0.165	1.15	1.03	0.46	0.14	0.13	0.13	0.06	0.06	
07016152	M @ ^ +	33	35	300	11.6	116	139	6	9	9	9	9	9	0.150	0.71	0.64	0.28	0.21	0.19	0.19	0.08	0.08	
07016153	M @ ^ +	33	35	200	11.6	116	139	6	9	9	9	9	9	0.150	0.87	0.78	0.35	0.17	0.16	0.16	0.07	0.07	
07016154	M @ ^ +	33	35	300	11.6	116	139	6	9	9	9	9	9	0.165	0.74	0.67	0.30	0.22	0.20	0.20	0.09	0.09	
07016155	M @ ^ +	47	35	250	16.5	165	197	6	9	9	9	9	9	0.165	0.81	0.73	0.32	0.20	0.18	0.18	0.08	0.08	
07016156	M @ ^ +	47	35	200	16.5	165	197	6	9	9	9	9	9	0.250	1.12	1.01	0.45	0.22	0.20	0.20	0.09	0.09	
07016157	M @ ^ +	A	50	15000	0.5	5	6	4	6	6	6	6	6	0.075	0.07	0.06	0.03	1.06	0.95	0.95	0.42	0.42	
07016158	M @ ^ +	A	50	18000	0.5	5	6	4	6	6	6	6	6	0.075	0.06	0.06	0.03	1.16	1.05	1.05	0.46	0.46	
07016159	* @ ^ +	A	50	9500	0.5	5	6	4	6	6	6	6	6	0.075	0.09	0.08	0.04	0.84	0.76	0.76	0.34	0.34	
07016160	* @ ^ +	B	50	9500	0.5	5	6	4	6	6	6	6	6	0.085	0.09	0.09	0.04	0.90	0.81	0.81	0.36	0.36	
07016161	* @ ^ +	A	50	7900	0.5	5	6	4	6	6	6	6	6	0.075	0.10	0.09	0.04	0.77	0.69	0.69	0.31	0.31	
07016162	M @ ^ +	A	1.0	50	6600	0.5	5	6	4	6	6	6	6	0.075	0.11	0.10	0.04	0.70	0.63	0.63	0.28	0.28	
07016163	* @ ^ +	B	1.0	50	7000	0.5	5	6	4	6	6	6	6	0.085	0.11	0.10	0.04	0.77	0.69	0.69	0.31	0.31	
07016164	* @ ^ +	C	1.5	50	2000	0.8	8	6	8	8	8	8	8	0.110	0.23	0.21	0.09	0.47	0.42	0.42	0.19	0.19	
07016165	* @ ^ +	D	1.5	50	1500	0.8	8	6	8	8	8	8	8	0.150	0.32	0.28	0.13	0.47	0.43	0.43	0.19	0.19	
07016166	* @ ^ +	D	2.2	50	1200	1.1	11	6	8	8	8	8	8	0.150	0.35	0.32	0.14	0.42	0.38	0.38	0.17	0.17	
07016167	* @ ^ +	D	3.3	50	800	1.7	17	6	9	9	9	9	9	0.150	0.43	0.39	0.17	0.35	0.31	0.31	0.14	0.14	
07016168	* @ ^ +	D	4.7	50	300	2.4	24	6	9	9	9	9	9	0.150	0.71	0.64	0.28	0.21	0.19	0.19	0.08	0.08	
07016169	* @ ^ +	D	6.8	50	600	3.4	34	6	6	6	6	6	6	0.150	0.50	0.45	0.20	0.30	0.27	0.27	0.12	0.12	
07016170	* @ ^ +	D	6.8	50	300	3.4	34	6	6	6	6	6	6	0.150	0.71	0.64	0.28	0.21	0.19	0.19	0.08	0.08	

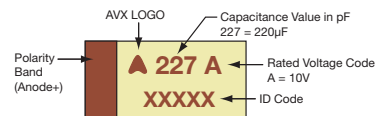
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MARKING

A, B, C, D, E, U CASE



FEATURES

- Improved reliability – 2x standard
- DCL reduced by 25% to 0.0075 CV
- Robust against higher thermo-mechanical stresses during assembly process
- CV range: 0.10-680µF / 4-50V
- 6 case sizes available
- 130 low ESR parts released
- Automotive, medical, aerospace, military and other high-end applications



SnPb termination option is not RoHS compliant.

APPLICATIONS

- Automotive ECU
- ABS
- Airbag systems
- Avionics,
- Industrial control units

CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W,±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
U	2924	7361-43	7.30 (0.287)	6.10 (0.240)	4.10 (0.162)	3.10 (0.120)	1.30 (0.051)	4.40 (0.173)

W: dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TRJ	B	105	*	035	R	RJ	—
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	Tolerance K=±10% M=±20%	Rated DC Voltage 004 = 4V 006 = 6.3V 010 = 10V 016 = 16V 020 = 20V 025 = 25V 035 = 35V 050 = 50V	Packaging R = Pure Tin 7" Reel S = Pure Tin 13" Reel A = Gold Plating 7" Reel B = Gold Plating 13" Reel H = Tin Lead 7" Reel (Contact Manufacturer) K = Tin Lead 13" Reel (Contact Manufacturer) H, K = Non RoHS	Standard Suffix OR 0100 Low ESR in mΩ	Additional characters may be added for special requirements V = Dry pack Option (selected codes only)

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C									
Capacitance Range:	0.10 µF to 680 µF									
Capacitance Tolerance:	±10%; ±20%									
Leakage Current DCL:	0.0075CV or 0.3µA whichever is the greater									
Rated Voltage (V _R)	≤ +85°C:	4	6.3	10	16	20	25	35	50	
Category Voltage (V _C)	≤ +125°C:	2.7	4	7	10	13	17	23	33	
Surge Voltage (V _S)	≤ +85°C:	5.2	8	13	20	26	32	46	65	
Surge Voltage (V _S)	≤ +125°C:	3.4	5	8	13	16	20	28	40	
Temperature Range:	-55°C to +125°C									
Reliability:	0.5% per 1000 hours at 85°C, V _R with 0.1Ω/V series impedance, 60% confidence level									
Termination Plating:	Sn Plating (standard), Gold and SnPb Plating upon request Meets requirements of AEC-Q200									

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) to 85°C							
μF	Code	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.10	104							A	
0.15	154							A, A(6000)	
0.22	224							A, A(6000)	A, A(7000)
0.33	334							A, A(6000)	A
0.47	474						A, A(7000)	A, A(4000)	B
0.68	684						A, A(6000)	A, A(6000)	B, B(2000)
1.0	105				A	A, A(3000)	A, A(3000)	A, B, A(3000), B(2000)	C, B, B(2000)
1.5	155			A		A, A(3000)	A, B, A(3000)	A, B, A(2000), B(2500)	C, C(1500)
2.2	225			A	A, A(3500)	A, A(3000)	A, B, A(1600), B(1200)	B, B(2000)	C, D, C(1000), D(1200)
3.3	335				A, B, A(3500)	A, B, A(2500), B(1300)	B, B(2000)	B, C, D, B(1000), C(800)	C, D, C(1000), D(800)
4.7	475			A, A(2000)	A, B, A(2000), B(1500)	A, B, A(1800), B(1000)	B, B(1000)	B, C, D, B(1500), C(600)	D, D(600)
6.8	685			A, B, A(1800)	A, B, C, A(1500), B(1200)	B, C, B(1000)	B, C, B(1000), C(600)	C, D, C(600)	D
10	106		A, B, A(1500)	A, B, A(1800), B(800)	B, C, B(800)	B, C, B(1000), C(500)	C, D, C(600)	C, D, C(600), D(250,400)	E, E(300,400)
15	156	B	A, B, A(1500), B(700)	A, B, C, A(1000), B(600)	B, B(800)	B, C, D, B(500), C(400)	C, D, C(500), D(300)	D, D(225)	U
22	226		A, B, C, A(900), B(600)	B, B(700)	B, C, D, B(600), C(350)	C, D, C(400), D(150,300)	D, D(300)	D, D(200,400)	U
33	336	C	B, C, B(600)	B, C, D, B(650), C(300)	C, C(300)	C, D, C(300), D(250)	D, D(400)	E, E(150,250)	
47	476		B, C, B(500), C(250)	C, D, C(300)	C, D, C(350), D(200)	D, D(200)	D, E, D(250), E(150)	U, U(200)	
68	686		C, C(200)	C, C(300)	C, D, C(200), D(150)	D, E, D(200), E(120,200)	U		
100	107		C, C(300)	C, D, E, C(200), D(100,150), E(100)	D, E, D(150), E(150)	E, E(150)	U		
150	157		C, D, C(300), D(150)	D, E, D(150), E(150)	E, E(150)	U, U(250)			
220	227		D, D(150)	D, E, E(150)	U, U(200)				
330	337		D, E, E(150)	E, E(100)	U, U(200)				
470	477		E, E(200)	U, U(200)					
680	687		U, U(250)						

Not recommended for new designs, higher voltage or smaller case size substitution are offered.

Available Ratings, (ESR ratings in mOhms in brackets)

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. %	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
4 Volt @ 85°C													
TRJB156*004#RJ	B	15	4	85	2.7	125	0.45	6	3000	1	168	151	67
TRJC336*004#RJ	C	33	4	85	2.7	125	1	6	2000	1	235	211	94
6.3 Volt @ 85°C													
TRJA106*006#RJ	A	10	6.3	85	4	125	0.45	6	2200	1	185	166	74
TRJA106*006#1500	A	10	6.3	85	4	125	0.45	6	1500	1	224	201	89
TRJB106*006#RJ	B	10	6.3	85	4	125	0.45	6	3000	1	168	151	67
TRJA156*006#RJ	A	15	6.3	85	4	125	0.68	6	2030	1	192	173	77
TRJA156*006#1500	A	15	6.3	85	4	125	0.68	6	1500	1	224	201	89
TRJB156*006#RJ	B	15	6.3	85	4	125	0.68	6	2030	1	205	184	82
TRJB156*006#0700	B	15	6.3	85	4	125	0.68	6	700	1	348	314	139
TRJA226*006#RJ	A	22	6.3	85	4	125	0.99	6	1700	1	210	189	84
TRJA226*006#0900	A	22	6.3	85	4	125	0.99	6	900	1	289	260	115
TRJB226*006#RJ	B	22	6.3	85	4	125	0.99	6	1880	1	213	191	85
TRJB226*006#0600	B	22	6.3	85	4	125	0.99	6	600	1	376	339	151
TRJC226*006#RJ	C	22	6.3	85	4	125	0.99	6	2000	1	235	211	94
TRJB336*006#RJ	B	33	6.3	85	4	125	1.5	6	1740	1	221	199	88
TRJB336*006#0600	B	33	6.3	85	4	125	1.5	6	600	1	376	339	151
TRJC336*006#RJ	C	33	6.3	85	4	125	1.5	6	1800	1	247	222	99
TRJB476*006#RJ	B	47	6.3	85	4	125	2.1	6	1620	1	229	206	92
TRJB476*006#0500	B	47	6.3	85	4	125	2.1	6	500	1	412	371	165
TRJC476*006#RJ	C	47	6.3	85	4	125	2.1	6	540	1	451	406	181
TRJC476*006#0250	C	47	6.3	85	4	125	2.1	6	250	1	663	597	265
TRJC686*006#RJ	C	68	6.3	85	4	125	3.1	6	490	1	474	426	190
TRJC686*006#0200	C	68	6.3	85	4	125	3.1	6	200	1	742	667	297
TRJC107*006#RJ	C	100	6.3	85	4	125	4.5	6	440	1	500	450	200
TRJC107*006#0300	C	100	6.3	85	4	125	4.5	6	300	1	606	545	242
TRJC157*006#RJ	C	150	6.3	85	4	125	6.8	8	500	1	469	422	188
TRJC157*006#0300	C	150	6.3	85	4	125	6.8	8	300	1	606	545	242
TRJD157*006#RJ	D	150	6.3	85	4	125	6.8	6	400	1	612	551	245
TRJD157*006#0150	D	150	6.3	85	4	125	6.8	6	150	1	1000	900	400
TRJD227*006#RJ	D	220	6.3	85	4	125	9.9	8	360	1	645	581	258
TRJD227*006#0150	D	220	6.3	85	4	125	9.9	8	150	1	1000	900	400
TRJD337*006#RJ	D	330	6.3	85	4	125	14	8	400	1	612	551	245
TRJE337*006#RJ	E	330	6.3	85	4	125	14	8	330	1 ¹⁾	707	636	283
TRJE337*006#0150	E	330	6.3	85	4	125	14	8	150	1 ¹⁾	1049	944	420
TRJE477*006#RJ	E	470	6.3	85	4	125	21	8	250	1 ¹⁾	812	731	325
TRJE477*006#0200	E	470	6.3	85	4	125	21	8	200	1 ¹⁾	908	817	363
TRJU687*006#RJV	U	680	6.3	85	4	125	30	30	500	3	574	517	230
TRJU687*006#R0250V	U	680	6.3	85	4	125	30	30	250	3	812	731	325
10 Volt @ 85°C													
TRJA155*010#RJ	A	1.5	10	85	7	125	0.3	6	7000	1	104	93	41
TRJA225*010#RJ	A	2.2	10	85	7	125	0.3	6	7000	1	104	93	41
TRJA475*010#RJ	A	4.7	10	85	7	125	0.35	6	2900	1	161	145	64
TRJA475*010#2000	A	4.7	10	85	7	125	0.35	6	2000	1	194	174	77
TRJA685*010#RJ	A	6.8	10	85	7	125	0.51	6	2650	1	168	151	67
TRJA685*010#1800	A	6.8	10	85	7	125	0.51	6	1800	1	204	184	82
TRJB685*010#RJ	B	6.8	10	85	7	125	0.51	6	3000	1	168	151	67
TRJA106*010#RJ	A	10	10	85	7	125	0.75	6	2200	1	185	166	74
TRJA106*010#1800	A	10	10	85	7	125	0.75	6	1800	1	204	184	82
TRJB106*010#RJ	B	10	10	85	7	125	0.75	6	2200	1	197	177	79
TRJB106*010#0800	B	10	10	85	7	125	0.75	6	800	1	326	293	130
TRJA156*010#RJ	A	15	10	85	7	125	1.1	6	1800	1	204	184	82
TRJA156*010#1000	A	15	10	85	7	125	1.1	6	1000	1	274	246	110
TRJB156*010#RJ	B	15	10	85	7	125	1.1	6	2030	1	205	184	82
TRJB156*010#0600	B	15	10	85	7	125	1.1	6	600	1	376	339	151
TRJC156*010#RJ	C	15	10	85	7	125	1.1	6	2000	1	235	211	94
TRJB226*010#RJ	B	22	10	85	7	125	1.7	6	1880	1	213	191	85
TRJB226*010#0700	B	22	10	85	7	125	1.7	6	700	1	348	314	139
TRJB336*010#RJ	B	33	10	85	7	125	2.5	6	1000	1	292	262	117
TRJB336*010#0650	B	33	10	85	7	125	2.5	6	650	1	362	325	145
TRJC336*010#RJ	C	33	10	85	7	125	2.5	6	590	1	432	389	173
TRJC336*010#0300	C	33	10	85	7	125	2.5	6	300	1	606	545	242
TRJD336*010#RJ	D	33	10	85	7	125	2.5	6	1100	1	369	332	148
TRJC476*010#RJ	C	47	10	85	7	125	3.5	6	540	1	451	406	181
TRJC476*010#0300	C	47	10	85	7	125	3.5	6	300	1	606	545	242
TRJD476*010#RJ	D	47	10	85	7	125	3.5	6	400	1	612	551	245
TRJC686*010#RJ	C	68	10	85	7	125	5.1	6	490	1	474	426	190
TRJC686*010#0300	C	68	10	85	7	125	5.1	6	300	1	606	545	242
TRJC107*010#RJ	C	100	10	85	7	125	7.5	8	500	1	469	422	188
TRJC107*010#0200	C	100	10	85	7	125	7.5	8	200	1	742	667	297

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. %	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
TRJD107*010#RJ	D	100	10	85	7	125	7.5	6	440	1	584	525	234
TRJD107*010#0100	D	100	10	85	7	125	7.5	6	100	1	1225	1102	490
TRJD107*010#0150	D	100	10	85	7	125	7.5	6	150	1	1000	900	400
TRJE107*010#RJ	E	100	10	85	7	125	7.5	6	440	1 ¹⁾	612	551	245
TRJE107*010#0100	E	100	10	85	7	125	7.5	6	100	1 ¹⁾	1285	1156	514
TRJD157*010#RJ	D	150	10	85	7	125	11	8	400	1	612	551	245
TRJD157*010#0150	D	150	10	85	7	125	11	8	150	1	1000	900	400
TRJE157*010#RJ	E	150	10	85	7	125	11	8	400	1 ¹⁾	642	578	257
TRJE157*010#0150	E	150	10	85	7	125	11	8	150	1 ¹⁾	1049	944	420
TRJD227*010#RJ	D	220	10	85	7	125	17	8	500	1	548	493	219
TRJE227*010#RJ	E	220	10	85	7	125	17	8	360	1 ¹⁾	677	609	271
TRJE227*010#0150	E	220	10	85	7	125	17	8	150	1 ¹⁾	1049	944	420
TRJE337*010#RJ	E	330	10	85	7	125	25	8	300	1 ¹⁾	742	667	297
TRJE337*010#0100	E	330	10	85	7	125	25	8	100	1 ¹⁾	1285	1156	514
TRJU477*010RRJV	U	470	10	85	7	125	35	30	400	3	642	578	257
TRJU477*010R0200V	U	470	10	85	7	125	35	30	200	3	908	817	363
16 Volt @ 85°C													
TRJA105*016#RJ	A	1.0	16	85	10	125	0.3	6	10000	1	87	78	35
TRJA225*016#RJ	A	2.2	16	85	10	125	0.3	6	4550	1	128	116	51
TRJA225*016#3500	A	2.2	16	85	10	125	0.3	6	3500	1	146	132	59
TRJA335*016#RJ	A	3.3	16	85	10	125	0.4	6	3740	1	142	127	57
TRJA335*016#3500	A	3.3	16	85	10	125	0.4	6	3500	1	146	132	59
TRJB335*016#RJ	B	3.3	16	85	10	125	0.4	6	4500	1	137	124	55
TRJA475*016#RJ	A	4.7	16	85	10	125	0.56	6	3160	1	154	139	62
TRJA475*016#2000	A	4.7	16	85	10	125	0.56	6	2000	1	194	174	77
TRJB475*016#RJ	B	4.7	16	85	10	125	0.56	6	3160	1	164	148	66
TRJB475*016#1500	B	4.7	16	85	10	125	0.56	6	1500	1	238	214	95
TRJA685*016#RJ	A	6.8	16	85	10	125	0.82	4	2000	1	194	174	77
TRJA685*016#1500	A	6.8	16	85	10	125	0.82	4	1500	1	224	201	89
TRJB685*016#RJ	B	6.8	16	85	10	125	0.82	6	2650	1	179	161	72
TRJB685*016#1200	B	6.8	16	85	10	125	0.82	6	1200	1	266	240	106
TRJC685*016#RJ	C	6.8	16	85	10	125	0.82	6	2500	1	210	189	84
TRJB106*016#RJ	B	10	16	85	10	125	1.2	6	2200	1	197	177	79
TRJB106*016#0800	B	10	16	85	10	125	1.2	6	800	1	326	293	130
TRJC106*016#RJ	C	10	16	85	10	125	1.2	6	2000	1	235	211	94
TRJB156*016#RJ	B	15	16	85	10	125	1.8	6	2030	1	205	184	82
TRJB156*016#0800	B	15	16	85	10	125	1.8	6	800	1	326	293	130
TRJB226*016#RJ	B	22	16	85	10	125	2.6	6	1100	1	278	250	111
TRJB226*016#0600	B	22	16	85	10	125	2.6	6	600	1	376	339	151
TRJC226*016#RJ	C	22	16	85	10	125	2.6	6	700	1	396	357	159
TRJC226*016#0350	C	22	16	85	10	125	2.6	6	350	1	561	505	224
TRJD226*016#RJ	D	22	16	85	10	125	2.6	6	1100	1	369	332	148
TRJC336*016#RJ	C	33	16	85	10	125	4	6	590	1	432	389	173
TRJC336*016#0300	C	33	16	85	10	125	4	6	300	1	606	545	242
TRJC476*016#RJ	C	47	16	85	10	125	5.6	6	540	1	451	406	181
TRJC476*016#0350	C	47	16	85	10	125	5.6	6	350	1	561	505	224
TRJD476*016#RJ	D	47	16	85	10	125	5.6	6	540	1	527	474	211
TRJD476*016#0200	D	47	16	85	10	125	5.6	6	200	1	866	779	346
TRJC686*016#RJ	C	68	16	85	10	125	8.2	6	490	1	474	426	190
TRJC686*016#0200	C	68	16	85	10	125	8.2	6	200	1	742	667	297
TRJD686*016#RJ	D	68	16	85	10	125	8.2	6	490	1	553	498	221
TRJD686*016#0150	D	68	16	85	10	125	8.2	6	150	1	1000	900	400
TRJD107*016#RJ	D	100	16	85	10	125	12	6	440	1	584	525	234
TRJD107*016#0150	D	100	16	85	10	125	12	6	150	1	1000	900	400
TRJE107*016#RJ	E	100	16	85	10	125	12	6	440	1 ¹⁾	612	551	245
TRJE107*016#0150	E	100	16	85	10	125	12	6	150	1 ¹⁾	1049	944	420
TRJE157*016#RJ	E	150	16	85	10	125	16	6	300	1 ¹⁾	742	667	297
TRJE157*016#0150	E	150	16	85	10	125	16	6	150	1 ¹⁾	1049	944	420
TRJU227*016RRJV	U	220	16	85	10	125	26.4	12	500	3	574	517	230
TRJU227*016R0200V	U	220	16	85	10	125	26.4	12	200	3	908	817	363
TRJU337*016RRJV	U	330	16	85	10	125	39	30	400	3	642	578	257
TRJU337*016R0200V	U	330	16	85	10	125	39	30	200	3	908	817	363
20 Volt @ 85°C													
TRJA105*020#RJ	A	1	20	85	13	125	0.3	4	6630	1	106	96	43
TRJA105*020#3000	A	1	20	85	13	125	0.3	4	3000	1	158	142	63
TRJA155*020#RJ	A	1.5	20	85	13	125	0.3	6	5460	1	117	105	47
TRJA155*020#3000	A	1.5	20	85	13	125	0.3	6	3000	1	158	142	63
TRJA225*020#RJ	A	2.2	20	85	13	125	0.33	6	4550	1	128	116	51
TRJA225*020#3000	A	2.2	20	85	13	125	0.33	6	3000	1	158	142	63
TRJA335*020#RJ	A	3.3	20	85	13	125	0.5	6	3740	1	142	127	57
TRJA335*020#2500	A	3.3	20	85	13	125	0.5	6	2500	1	173	156	69

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. %	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
TRJB335*020#RJ	B	3.3	20	85	13	125	0.5	6	3740	1	151	136	60
TRJB335*020#1300	B	3.3	20	85	13	125	0.5	6	1300	1	256	230	102
TRJA475*020#RJ	A	4.7	20	85	13	125	0.71	5	2500	1	184	166	74
TRJA475*020#1800	A	4.7	20	85	13	125	0.71	5	1800	1	217	196	87
TRJB475*020#RJ	B	4.7	20	85	13	125	0.71	6	3160	1	164	148	66
TRJB475*020#1000	B	4.7	20	85	13	125	0.71	6	1000	1	292	262	117
TRJB685*020#RJ	B	6.8	20	85	13	125	1	6	2650	1	179	161	72
TRJB685*020#1000	B	6.8	20	85	13	125	1	6	1000	1	292	262	117
TRJC685*020#RJ	C	6.8	20	85	13	125	1	6	2000	1	235	211	94
TRJB106*020#RJ	B	10	20	85	13	125	1.5	6	2200	1	197	177	79
TRJB106*020#1000	B	10	20	85	13	125	1.5	6	1000	1	292	262	117
TRJC106*020#RJ	C	10	20	85	13	125	1.5	6	800	1	371	334	148
TRJC106*020#0500	C	10	20	85	13	125	1.5	6	500	1	469	422	188
TRJB156*020#RJ	B	15	20	85	13	125	2.3	6	1400	1	280	252	112
TRJB156*020#0500	B	15	20	85	13	125	2.3	6	500	1	469	422	188
TRJC156*020#RJ	C	15	20	85	13	125	2.3	6	720	1	391	352	156
TRJC156*020#0400	C	15	20	85	13	125	2.3	6	400	1	524	472	210
TRJD156*020#RJ	D	15	20	85	13	125	2.3	6	1100	1	369	332	148
TRJC226*020#RJ	C	22	20	85	13	125	3.3	6	650	1	411	370	165
TRJC226*020#0400	C	22	20	85	13	125	3.3	6	400	1	524	472	210
TRJD226*020#RJ	D	22	20	85	13	125	3.3	6	650	1	480	432	192
TRJD226*020#0150	D	22	20	85	13	125	3.3	6	150	1	1000	900	400
TRJD226*020#0300	D	22	20	85	13	125	3.3	6	300	1	707	636	283
TRJC336*020#RJ	C	33	20	85	13	125	5	6	590	1	432	389	173
TRJC336*020#0300	C	33	20	85	13	125	5	6	300	1	606	545	242
TRJD336*020#RJ	D	33	20	85	13	125	5	6	590	1	504	454	202
TRJD336*020#0250	D	33	20	85	13	125	5	6	250	1	775	697	310
TRJD476*020#RJ	D	47	20	85	13	125	7.1	6	540	1	527	474	211
TRJD476*020#0200	D	47	20	85	13	125	7.1	6	200	1	866	779	346
TRJD686*020#RJ	D	68	20	85	13	125	10	6	490	1	553	498	221
TRJD686*020#0200	D	68	20	85	13	125	10	6	200	1	866	779	346
TRJE686*020#RJ	E	68	20	85	13	125	10	6	490	1 ¹⁾	580	522	232
TRJE686*020#0120	E	68	20	85	13	125	10	6	120	1 ¹⁾	1173	1055	469
TRJE686*020#0200	E	68	20	85	13	125	10	6	200	1 ¹⁾	908	817	363
TRJE107*020#RJ	E	100	20	85	13	125	15	6	300	1 ¹⁾	742	667	297
TRJE107*020#0150	E	100	20	85	13	125	15	6	150	1 ¹⁾	1049	944	420
TRJU157*020RRJV	U	150	20	85	13	125	22	30	500	3	574	517	230
TRJU157*020R0250V	U	150	20	85	13	125	22	30	250	3	812	731	325
25 Volt @ 85°C													
TRJA474*025#RJ	A	0.47	25	85	17	125	0.3	4	9530	1	89	80	35
TRJA474*025#7000	A	0.47	25	85	17	125	0.3	4	7000	1	104	93	41
TRJA684*025#RJ	A	0.68	25	85	17	125	0.3	4	7980	1	97	87	39
TRJA684*025#6000	A	0.68	25	85	17	125	0.3	4	6000	1	112	101	45
TRJA105*025#RJ	A	1	25	85	17	125	0.3	4	6630	1	106	96	43
TRJA105*025#3000	A	1	25	85	17	125	0.3	4	3000	1	158	142	63
TRJA155*025#RJ	A	1.5	25	85	17	125	0.3	6	5460	1	117	105	47
TRJA155*025#3000	A	1.5	25	85	17	125	0.3	6	3000	1	158	142	63
TRJB155*025#RJ	B	1.5	25	85	17	125	0.3	6	5000	1	130	117	52
TRJA225*025#RJ	A	2.2	25	85	17	125	0.41	6	2900	1	161	145	64
TRJA225*025#1600	A	2.2	25	85	17	125	0.41	6	1600	1	217	195	87
TRJB225*025#RJ	B	2.2	25	85	17	125	0.41	6	4550	1	137	123	55
TRJB225*025#1200	B	2.2	25	85	17	125	0.41	6	1200	1	266	240	106
TRJB335*025#RJ	B	3.3	25	85	17	125	0.62	6	3740	1	151	136	60
TRJB335*025#2000	B	3.3	25	85	17	125	0.62	6	2000	1	206	186	82
TRJB475*025#RJ	B	4.7	25	85	17	125	0.88	6	3160	1	164	148	66
TRJB475*025#1000	B	4.7	25	85	17	125	0.88	6	1000	1	292	262	117
TRJB685*025#RJ	B	6.8	25	85	17	125	1.3	6	1500	1	238	214	95
TRJB685*025#1000	B	6.8	25	85	17	125	1.3	6	1000	1	292	262	117
TRJC685*025#RJ	C	6.8	25	85	17	125	1.3	6	1070	1	321	289	128
TRJC685*025#0600	C	6.8	25	85	17	125	1.3	6	600	1	428	385	171
TRJC106*025#RJ	C	10	25	85	17	125	1.9	6	800	1	371	334	148
TRJC106*025#0600	C	10	25	85	17	125	1.9	6	600	1	428	385	171
TRJD106*025#RJ	D	10	25	85	17	125	1.9	6	1200	1	354	318	141
TRJC156*025#RJ	C	15	25	85	17	125	2.8	6	720	1	391	352	156
TRJC156*025#0500	C	15	25	85	17	125	2.8	6	500	1	469	422	188
TRJD156*025#RJ	D	15	25	85	17	125	2.8	6	720	1	456	411	183
TRJD156*025#0300	D	15	25	85	17	125	2.8	6	300	1	707	636	283
TRJD226*025#RJ	D	22	25	85	17	125	4.1	6	650	1	480	432	192
TRJD226*025#0300	D	22	25	85	17	125	4.1	6	300	1	707	636	283
TRJD336*025#RJ	D	33	25	85	17	125	6.2	6	590	1	504	454	202
TRJD336*025#0400	D	33	25	85	17	125	6.2	6	400	1	612	551	245

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. %	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
TRJD476*025#RJ	D	47	25	85	17	125	8.8	6	540	1	527	474	211
TRJD476*025#0250	D	47	25	85	17	125	8.8	6	250	1	775	697	310
TRJE476*025#RJ	E	47	25	85	17	125	8.8	6	540	1 ¹⁾	553	497	221
TRJE476*025#0150	E	47	25	85	17	125	8.8	6	150	1 ¹⁾	1049	944	420
TRJU686*025RRJV	U	68	25	85	17	125	12	30	500	3	574	517	230
TRJU107*025RRJV	U	100	25	85	17	125	18	30	500	3	574	517	230
35 Volt @ 85°C													
TRJA104*035#RJ	A	0.1	35	85	23	125	0.3	4	20000	1	61	55	24
TRJA154*035#RJ	A	0.15	35	85	23	125	0.3	4	16470	1	67	61	27
TRJA154*035#6000	A	0.15	35	85	23	125	0.3	4	6000	1	112	101	45
TRJA224*035#RJ	A	0.22	35	85	23	125	0.3	4	13710	1	74	67	30
TRJA224*035#6000	A	0.22	35	85	23	125	0.3	4	6000	1	112	101	45
TRJA334*035#RJ	A	0.33	35	85	23	125	0.3	4	11280	1	82	73	33
TRJA334*035#6000	A	0.33	35	85	23	125	0.3	4	6000	1	112	101	45
TRJA474*035#RJ	A	0.47	35	85	23	125	0.3	4	9530	1	89	80	35
TRJA474*035#4000	A	0.47	35	85	23	125	0.3	4	4000	1	137	123	55
TRJA684*035#RJ	A	0.68	35	85	23	125	0.3	4	7980	1	97	87	39
TRJA684*035#6000	A	0.68	35	85	23	125	0.3	4	6000	1	112	101	45
TRJA105*035#RJ	A	1	35	85	23	125	0.3	4	6630	1	106	96	43
TRJA105*035#3000	A	1	35	85	23	125	0.3	4	3000	1	158	142	63
TRJB105*035#RJ	B	1	35	85	23	125	0.3	4	3400	1	158	142	63
TRJB105*035#2000	B	1	35	85	23	125	0.3	4	2000	1	206	186	82
TRJA155*035#RJ	A	1.5	35	85	23	125	0.39	6	3100	1	166	149	66
TRJA155*035#2000	A	1.5	35	85	23	125	0.39	6	2000	1	206	186	82
TRJB155*035#RJ	B	1.5	35	85	23	125	0.39	6	5460	1	125	112	50
TRJB155*035#2500	B	1.5	35	85	23	125	0.39	6	2500	1	184	166	74
TRJB225*035#RJ	B	2.2	35	85	23	125	0.58	6	4550	1	137	123	55
TRJB225*035#2000	B	2.2	35	85	23	125	0.58	6	2000	1	206	186	82
TRJB335*035#RJ	B	3.3	35	85	23	125	0.87	6	3740	1	151	136	60
TRJB335*035#1000	B	3.3	35	85	23	125	0.87	6	1000	1	292	262	117
TRJC335*035#RJ	C	3.3	35	85	23	125	0.87	6	1840	1	245	220	98
TRJC335*035#0800	C	3.3	35	85	23	125	0.87	6	800	1	371	334	148
TRJD335*035#RJ	D	3.3	35	85	23	125	0.87	6	2000	1	274	246	110
TRJB475*035#RJ	B	4.7	35	85	23	125	1.2	6	2200	1	224	201	89
TRJB475*035#1500	B	4.7	35	85	23	125	1.2	6	1500	1	271	244	108
TRJC475*035#RJ	C	4.7	35	85	23	125	1.2	6	1410	1	279	251	112
TRJC475*035#0600	C	4.7	35	85	23	125	1.2	6	600	1	428	385	171
TRJD475*035#RJ	D	4.7	35	85	23	125	1.2	6	1500	1	316	285	126
TRJC685*035#RJ	C	6.8	35	85	23	125	1.8	6	1070	1	321	289	128
TRJC685*035#0600	C	6.8	35	85	23	125	1.8	6	600	1	428	385	171
TRJD685*035#RJ	D	6.8	35	85	23	125	1.8	6	1300	1	340	306	136
TRJC106*035#RJ	C	10	35	85	23	125	2.6	6	800	1	371	334	148
TRJC106*035#0600	C	10	35	85	23	125	2.6	6	600	1	428	385	171
TRJD106*035#RJ	D	10	35	85	23	125	2.6	6	800	1	433	390	173
TRJD106*035#0250	D	10	35	85	23	125	2.6	6	250	1	775	697	310
TRJD106*035#0400	D	10	35	85	23	125	2.6	6	400	1	612	551	245
TRJD156*035#RJ	D	15	35	85	23	125	3.9	6	720	1	456	411	183
TRJD156*035#0225	D	15	35	85	23	125	3.9	6	225	1	816	735	327
TRJD226*035#RJ	D	22	35	85	23	125	5.8	6	650	1	480	432	192
TRJD226*035#0200	D	22	35	85	23	125	5.8	6	200	1	866	779	346
TRJD226*035#0400	D	22	35	85	23	125	5.8	6	400	1	612	551	245
TRJE336*035#RJ	E	33	35	85	23	125	8.7	6	590	1 ¹⁾	529	476	212
TRJE336*035#0150	E	33	35	85	23	125	8.7	6	150	1 ¹⁾	1049	944	420
TRJE336*035#0250	E	33	35	85	23	125	8.7	6	250	1 ¹⁾	812	731	325
TRJU476*035RRJV	U	47	35	85	23	125	12.3	10	400	3	642	578	257
TRJU476*035R0200V	U	47	35	85	23	125	12.3	10	200	3	908	8.17	363
50 Volt @ 85°C													
TRJA224*050#RJ	A	0.22	50	85	33	125	0.3	4	7500	1	100	90	40
TRJA224*050#7000	A	0.22	50	85	33	125	0.3	4	7000	1	104	93	41
TRJA334*050#RJ	A	0.33	50	85	33	125	0.3	4	7000	1	104	93	41
TRJB474*050#RJ	B	0.47	50	85	33	125	0.3	4	5000	1	130	117	52
TRJB684*050#RJ	B	0.68	50	85	33	125	0.3	4	4000	1	146	131	58
TRJB684*050#2000	B	0.68	50	85	33	125	0.3	4	2000	1	206	186	82
TRJB105*050#RJ	B	1	50	85	33	125	0.4	4	3400	1	158	142	63
TRJB105*050#2000	B	1	50	85	33	125	0.4	4	2000	1	206	186	82
TRJC105*050#RJ	C	1	50	85	33	125	0.4	4	3000	1	191	172	77
TRJC155*050#RJ	C	1.5	50	85	33	125	0.6	6	2500	1	210	189	84
TRJC155*050#1500	C	1.5	50	85	33	125	0.6	6	1500	1	271	244	108
TRJC225*050#RJ	C	2.2	50	85	33	125	0.8	6	1700	1	254	229	102
TRJC225*050#1000	C	2.2	50	85	33	125	0.8	6	1000	1	332	298	133
TRJD225*050#RJ	D	2.2	50	85	33	125	0.8	4.5	2000	1	274	246	110

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. %	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
TRJD225*050#1200	D	2.2	50	85	33	125	0.8	4.5	1200	1	354	318	141
TRJC335*050#RJ	C	3.3	50	85	33	125	1.2	6	1400	1	280	252	112
TRJC335*050#1000	C	3.3	50	85	33	125	1.2	6	1000	1	332	298	133
TRJD335*050#RJ	D	3.3	50	85	33	125	1.2	4.5	1100	1	369	332	148
TRJD335*050#0800	D	3.3	50	85	33	125	1.2	4.5	800	1	433	390	173
TRJD475*050#RJ	D	4.7	50	85	33	125	1.8	4.5	900	1	408	367	163
TRJD475*050#0600	D	4.7	50	85	33	125	1.8	4.5	600	1	500	450	200
TRJD685*050#RJ	D	6.8	50	85	33	125	2.6	4.5	700	1	463	417	185
TRJE106*050#RJ	E	10	50	85	33	125	3.8	4.5	700	1 ¹⁾	486	437	194
TRJE106*050#0300	E	10	50	85	33	125	3.8	4.5	300	1 ¹⁾	742	667	297
TRJE106*050#0400	E	10	50	85	33	125	3.8	4.5	400	1 ¹⁾	642	578	257
TRJU156*050RRJV	U	15	50	85	33	125	5.6	30	500	3	574	517	230
TRJU226*050RRJV	U	22	50	85	33	125	8.2	30	500	3	574	517	230

¹⁾ Dry pack option (see How to order) recommended for reduction of stress during soldering. Dry pack parts should be treated as MSL 3.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

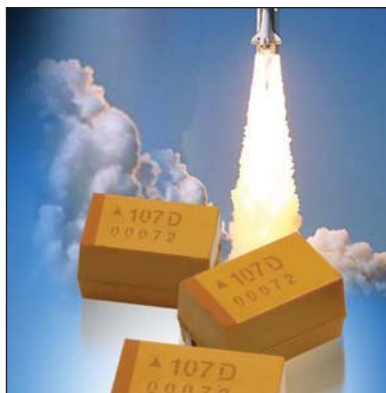
The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

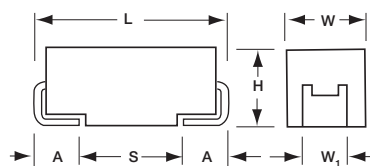
QUALIFICATION TABLE

TEST	TRJ professional series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Storage Life	125°C, 0V, 2000h			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Humidity	Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	1.5 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Biased Humidity	Determine after leaving for 1000 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15	ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+12/-0%	±5%	
	3	+20±2	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
	4	+85+3/-0	15	ESR	1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	
	5	+125+3/-0	15								
6	+20±2	15									
Surge Voltage	Test temperature: 125°C+3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±5% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						

*Initial Limit



Capacitors, Fixed, Leadless Surface Mount, Chip, Solid electrolyte Tantalum for use in ESCC space programs, according to ESCC Generic Specification 3012 and associated Detail Specification 3012/001 as recommended by the Space Components Coordination Group (ranges in table below).



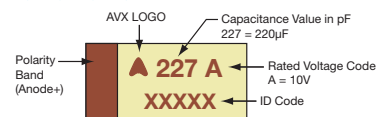
CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	Variant	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	3216-18	01	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	3528-21	02	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	6032-28	13	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	7343-31	14	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	7343-43	17	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W₁ dimension applies to the termination width for A dimensional area only.

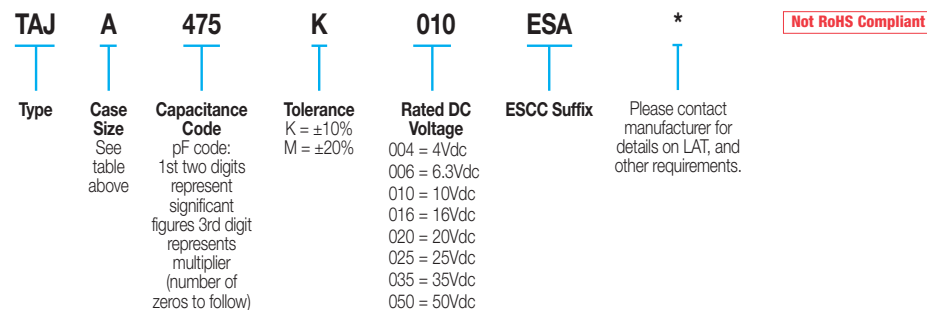
MARKING

A, B, C, D, E CASE

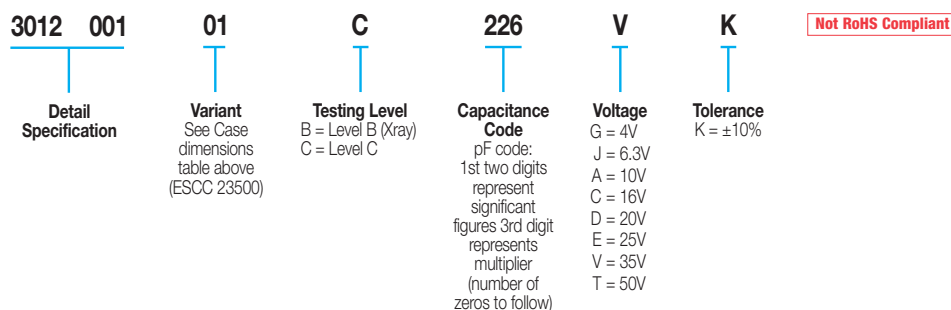


HOW TO ORDER

AVX PART NUMBER:



ESCC PART NUMBER – MANDATORY FOR ORDERING:



**CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE
(LETTER DENOTES CASE SIZE)**

Capacitance		Rated Voltage DC (V_R) at 85°C							
μF	Code	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.10	104							A	A
0.15	154							A	B
0.22	224							A	B
0.33	334							A	B
0.47	474						A	A/B	C
0.68	684					A	A	A/B	C
1.0	105				A	A	A	B	C
1.5	155			A	A	A	B	B/C	D
2.2	225		A	A	A/B	B	B	B/C	D
3.3	335	A	A	A	A/B	B	B/C	C	D
4.7	475	A	A	A/B	B	B/C	C	C/D	D
6.8	685	A	A/B	B	B/C	C	C/D	D	
10	106	A/B	B	B/C	C	C	C/D	D	
15	156	B	B/C	C	C	C/D	D	D	
22	226	B/C	C	C	C/D	D	D	E	
33	336	C	C	C/D	D	D	E		
47	476	C/D	C/D	D	D	E			
68	686	C/D	D	D	D	E			
100	107	D	D	D	E				
150	157	D	D	E					
220	227	E	E	E					

LAT TESTING

AVX can perform the following Lot Acceptance Test according to ESCC

- LAT 3 Qty. 10 pcs. - 4 pieces of which are “destructive samples”, the remaining 6 pieces may be for part of the Order Qty. OR be additional to the order Qty.
- LAT 2 Qty. 26 pcs. - including the 10 pieces of LAT3. The additional 16 pieces are “destructive samples”.
- LAT 1 Qty. 34 pcs. - including the 26 pieces of LAT2. The additional 8 pieces are all “destructive samples”.

OPTION

Packaging: Tape and reel available on request – Contact marketing.



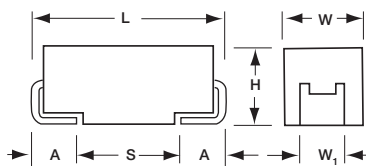
Capacitors, Fixed, Leadless Surface Mount, Chip, Solid electrolyte Tantalum for use in avionics and industrial applications, tested to CECC Specification 30801-005 and 30801-011 (CTC4).



CASE DIMENSIONS: millimeters (inches)

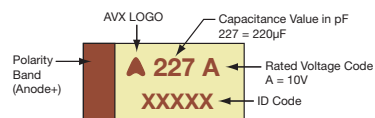
Code	EIA Code	Variant	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	3216-18	01&11	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	3528-21	02&12	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	6032-28	03&13	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	7343-31	04&14	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W₁ dimension applies to the termination width for A dimensional area only.



MARKING

A, B, C, D CASE



HOW TO ORDER

TAJ	A	475	K	010	R	FJ
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Tolerance K = ±10% M = ±20%	Rated DC Voltage 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Termination Finish R = 7" T/R 100% Tin S = 13" T/R 100% Tin A = Gold Plating 7" Reel B = Gold Plating 13" Reel H = Tin Lead 7" Reel K = Tin Lead 13" Reel	Suffix FJ = CECC 30801-011(CTC4) Y = CECC 30801-005

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT
RoHS COMPLIANT
For RoHS compliant products, please select correct termination style.

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C								
Capacitance Range:	0.10 µF to 100 µF								
Capacitance Tolerance:	±10%; ±20%								
Rated Voltage DC (V _R)	≤ +85°C:	6.3	10	16	20	25	35	50	
Category Voltage (V _C)	≤ +125°C:	4	7	10	13	17	23	33	
Surge Voltage (V _S)	≤ +85°C:	8	13	20	26	32	46	65	
Surge Voltage (V _S)	≤ +125°C:	5	8	13	16	20	28	40	
Temperature Range:	-55°C to +125°C								
Reliability:	1% per 1000 hours at 85°C, V _R with 0.1Ω/V series Impedance, 60% confidence level								

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

BS CECC30801-005

Capacitance		Rated Voltage DC (V_R) at 85°C						
μF	Code	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.10	104						A	A
0.15	154						A	A/B
0.22	224						A	A/B
0.33	334						A	B
0.47	474					A	A/B	C
0.68	684				A	A	A/B	C
1.0	105			A	A	A	B	C
1.5	155		A	A	A	A/B	B/C	D
2.2	225	A	A	A/B	B	B	B/C	D
3.3	335	A	A	A/B	B	B/C	C/D	D
4.7	475	A	A/B	B/C	B/C	C	C/D	D
6.8	685	A/B	B	B/C	C/D	C/D	D	D
10	106	A/B	B/C	B/C/D	C	C/D	D	
15	156	B/C	B/C/D	C	C/D	D	D	
22	226	B/C/D	C	C/D	D	D		
33	336	C	C/D	D	D			
47	476	C/D	D	D				
68	686	C/D	D	D				
100	107	D	D					

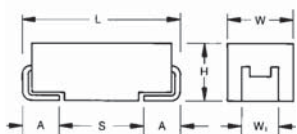
BS CECC30801-011 (CTC4)

Capacitance		Rated Voltage DC (V_R) at 85°C						
μF	Code	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.10	104						A	A
0.15	154						A	B
0.22	224						A	B
0.33	334						A	B
0.47	474					A	B	C
0.68	684				A		B	C
1.0	105			A			B	C
1.5	155		A			B	C	D
2.2	225	A			B		C	D
3.3	335			B			C	D
4.7	475		B			C	D	D
6.8	685	B			C		D	D
10	106			C		D	D	
15	156		C		D	D		
22	226	C		D	D			
33	336		D	D				
47	476	D	D					
68	686	D						

NOTE: Voltage ratings are minimum values. AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

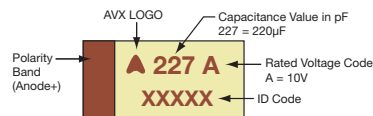


TMJ CONSTRUCTION



MARKING

A, B, C, D, E, U CASE



The AVX S1gma™ series is offering a next generation of statistical screening and process control enhancement of tantalum capacitors for professional applications with improved reliability and extremely low DCL needs.



FEATURES

- 55 to +125°C operation temperature
- Basic reliability better than 0.5%/1000 hours
- (2x improvement over commercial series)
- improved DCL limits 0.001CV* and 0.005CV

S1gma™ Prime – Utilises 3 S1gma™ electrical screening to remove possible maverick parts from the distribution.

S1gma™ Premium – S1gma™ Prime, with addition of capability statistical screening utilising the AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operational life.

S1gma™ Pro Custom – A custom option where specific parameter limits and screening methods can be agreed based on 3 S1gma™ and Q-Process statistical screening based on capability techniques.

*selected codes, 0.001CV limit is available with S1gma™ Premium and Pro Custom options only

APPLICATIONS

- Wireless battery operated sensors
- TPM
- Automotive
- Avionics
- Safety systems
- Energy harvesting

For additional information on Q-process please consult the AVX technical publication “Reaching the Highest Reliability for Tantalum Capacitors” (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)

CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
U	2924	7361-43	7.30 (0.287)	6.10 (0.240)	4.10 (0.162)	3.10 (0.120)	1.30 (0.051)	4.40 (0.173)

W1 dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TMJ	D	227	K	006	#	C	^	A
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	Tolerance K = ±10%	Rated DC Voltage 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Packaging R = Pure Tin 7" Reel H = Tin Lead 7" Reel (Contact Manufacturer) Non RoHS	ESR Range C = Standard L = Low ESR	Suffix QX = S1gma™ Prime QY = S1gma™ Premium xx = S1gma™ Pro Custom	DCL A = 0.001CV C = 0.005CV

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C								
Capacitance Range:	0.22 µF to 680 µF								
Capacitance Tolerance:	±10%								
Leakage Current DCL:	(A) 0.001CV, (C) 0.005CV								
Rated Voltage (V _R)	≤ +85°C:	6.3	10	16	20	25	35	50	
Category Voltage (V _C)	≤ +125°C:	4	7	10	13	17	23	33	
Surge Voltage (V _S)	≤ +85°C:	8	13	20	26	32	46	65	
Surge Voltage (V _S)	≤ +125°C:	5	8	13	16	20	28	40	
Temperature Range:	-55°C to +125°C								
Reliability:	0.5% per 1000 hours at 85°C, VR with 0.1Ω/V series impedance, 60% confidence level AEC-Q200 per request								

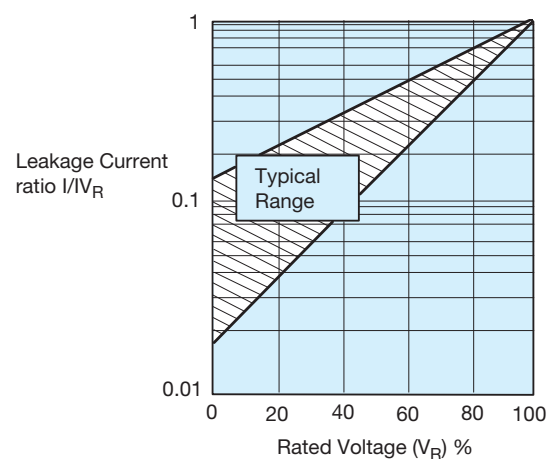
CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage (V_R) to 85°C (Voltage Code)						
μF	Code	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.22	224							A
0.33	334						A	A
0.47	474						A	B
0.68	684						A	B
1.0	105					A	B	C
1.5	155				A	A	B	C
2.2	225			A	A	B	B	C
3.3	335			A	A	B	B	C
4.7	475		A	A	B	B	C	D
6.8	685		A	B	B	C	C	D
10	106	A	A	B	C	C	C	E
15	156	A	B	B	C	C	D	U
22	226	B	B	C	C	D	D	U
33	336	B	C	C	D	D	E	
47	476	C	C	D	D	D	U	
68	686	C	C	D	E	U		
100	107	C	D	E	E	U		
150	157	D	D	E	U			
220	227	D	E	U				
330	337	E	E					
470	477	E	U					
680	687	U						

Available Ratings

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

LEAKAGE CURRENT vs. RATED VOLTAGE



RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL (µA) Max.	DF % Max.	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
6.3 Volt @ 85°C													
TMJA106K006#CQYA	A	10	6.3	85	4	125	0.1	6	1500	3	224	201	89
TMJA106K006#C^C	A	10	6.3	85	4	125	0.3	6	1500	3	224	201	89
TMJA156K006#CQYA	A	15	6.3	85	4	125	0.1	6	1500	3	224	201	89
TMJA156K006#C^C	A	15	6.3	85	4	125	0.45	6	1500	3	224	201	89
TMJB226K006#C^C	B	22	6.3	85	4	125	0.66	6	600	3	376	339	151
TMJB336K006#C^C	B	33	6.3	85	4	125	0.99	6	600	3	376	339	151
TMJC476K006#CQYA	C	47	6.3	85	4	125	0.28	6	300	3	606	545	242
TMJC476K006#C^C	C	47	6.3	85	4	125	1.41	6	300	3	606	545	242
TMJC686K006#CQYA	C	68	6.3	85	4	125	0.41	6	300	3	606	545	242
TMJC686K006#C^C	C	68	6.3	85	4	125	2.04	6	300	3	606	545	242
TMJC107K006#CQYA	C	100	6.3	85	4	125	0.60	6	300	3	606	545	242
TMJC107K006#C^C	C	100	6.3	85	4	125	3	6	300	3	606	545	242
TMJD157K006#CQYA	D	150	6.3	85	4	125	0.90	6	200	3	866	779	346
TMJD157K006#C^C	D	150	6.3	85	4	125	4.5	6	200	3	866	779	346
TMJD227K006#CQYA	D	220	6.3	85	4	125	1.32	8	200	3	866	779	346
TMJD227K006#C^C	D	220	6.3	85	4	125	6.6	8	200	3	866	779	346
TMJE337K006#C^C	E	330	6.3	85	4	125	9.9	8	200	3	908	817	363
TMJE477K006#CQYA	E	470	6.3	85	4	125	2.82	8	200	3	908	817	363
TMJE477K006#C^C	E	470	6.3	85	4	125	14.1	8	200	3	908	817	363
TMJU687K006#C^C	U	680	6.3	85	4	125	20.4	12	250	3	812	731	325
10 Volt @ 85°C													
TMJA475K010#CQXC	A	4.7	10	85	7	125	0.24	6	2000	3	194	174	77
TMJA685K010#CQYA	A	6.8	10	85	7	125	0.1	6	2000	3	194	174	77
TMJA685K010#C^C	A	6.8	10	85	7	125	0.34	6	2000	3	194	174	77
TMJA106K010#CQYA	A	10	10	85	7	125	0.10	6	2000	3	194	174	77
TMJA106K010#C^C	A	10	10	85	7	125	0.5	6	2000	3	194	174	77
TMJB156K010#C^C	B	15	10	85	7	125	0.75	6	700	3	348	314	139
TMJB226K010#C^C	B	22	10	85	7	125	1.1	6	700	3	348	314	139
TMJC336K010#C^C	C	33	10	85	7	125	1.65	6	300	3	606	545	242
TMJC476K010#C^C	C	47	10	85	7	125	2.35	6	300	3	606	545	242
TMJC686K010#C^C	C	68	10	85	7	125	3.4	6	300	3	606	545	242
TMJD107K010#C^C	D	100	10	85	7	125	5.00	6	150	3	1000	900	400
TMJD157K010#C^C	D	150	10	85	7	125	7.50	8	150	3	1000	900	400
TMJE227K010#C^C	E	220	10	85	7	125	11	8	150	3	1049	944	420
TMJE337K010#CQYA	E	330	10	85	7	125	3.3	8	150	3	1049	944	420
TMJE337K010#C^C	E	330	10	85	7	125	16.5	8	150	3	1049	944	420
TMJU477K010#C^C	U	470	10	85	7	125	23.5	12	200	3	908	817	363
16 Volt @ 85°C													
TMJA225K016#CQXC	A	2.2	16	85	10	125	0.18	6	3500	3	146	132	59
TMJA335K016#CQXC	A	3.3	16	85	10	125	0.26	6	3500	3	146	132	59
TMJA475K016#C^C	A	4.7	16	85	10	125	0.38	6	3500	3	146	132	59
TMJB685K016#C^C	B	6.8	16	85	10	125	0.54	6	1200	3	266	240	106
TMJB106K016#C^C	B	10	16	85	10	125	0.80	6	1200	3	266	240	106
TMJB156K016#C^C	B	15	16	85	10	125	1.20	6	1200	3	266	240	106
TMJC226K016#C^C	C	22	16	85	10	125	1.76	6	350	3	561	505	224
TMJC336K016#C^C	C	33	16	85	10	125	2.64	6	350	3	561	505	224
TMJD476K016#C^C	D	47	16	85	10	125	3.76	6	200	3	866	779	346
TMJD686K016#C^C	D	68	16	85	10	125	5.44	6	200	3	866	779	346
TMJE107K016#C^C	E	100	16	85	10	125	8.00	6	150	3	1049	944	420
TMJE157K016#C^C	E	150	16	85	10	125	12	6	150	3	1049	944	420
TMJU227K016#C^C	U	220	16	85	10	125	17.6	1	200	3	908	817	363
20 Volt @ 85°C													
TMJA155K020#CQXC	A	1.5	20	85	13	125	0.15	6	3000	3	158	142	63
TMJA225K020#CQXC	A	2.2	20	85	13	125	0.22	6	3000	3	158	142	63
TMJA335K020#C^C	A	3.3	20	85	13	125	0.33	6	3000	3	158	142	63
TMJB475K020#C^C	B	4.7	20	85	13	125	0.47	6	1000	3	292	262	117
TMJB685K020#C^C	B	6.8	20	85	13	125	0.68	6	1000	3	292	262	117
TMJC106K020#C^C	C	10	20	85	13	125	1	6	500	3	469	422	188
TMJC156K020#C^C	C	15	20	85	13	125	1.5	6	500	3	469	422	188
TMJC226K020#C^C	C	22	20	85	13	125	2.2	6	500	3	469	422	188
TMJD336K020#C^C	D	33	20	85	13	125	3.3	6	250	3	775	697	310
TMJD476K020#C^C	D	47	20	85	13	125	4.70	6	250	3	775	697	310
TMJE686K020#C^C	E	68	20	85	13	125	6.8	6	200	3	908	817	363
TMJE107K020#C^C	E	100	20	85	13	125	10	6	200	3	908	817	363
TMJU157K020#CQXC	U	150	20	85	13	125	15	12	250	3	812	731	325
25 Volt @ 85°C													
TMJA105K025#CQXC	A	1	25	85	17	125	0.13	4	3000	3	158	142	63
TMJA155K025#CQXC	A	1.5	25	85	17	125	0.19	6	3000	3	158	142	63
TMJB225K025#C^C	B	2.2	25	85	17	125	0.28	6	2000	3	206	186	82
TMJB335K025#C^C	B	3.3	25	85	17	125	0.41	6	2000	3	206	186	82

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL (µA) Max.	DF % Max.	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)		
											25°C	85°C	125°C
TMJB475K025#C^C	B	4.7	25	85	17	125	0.59	6	2000	3	206	186	82
TMJC685K025#C^C	C	6.8	25	85	17	125	0.85	6	600	3	428	385	171
TMJC106K025#C^C	C	10	25	85	17	125	1.25	6	600	3	428	385	171
TMJC156K025#C^C	C	15	25	85	17	125	1.88	6	600	3	428	385	171
TMJD226K025#CQYA	D	22	25	85	17	125	0.55	6	400	3	612	551	245
TMJD226K025#C^C	D	22	25	85	17	125	2.75	6	400	3	612	551	245
TMJD336K025#CQYA	D	33	25	85	17	125	0.82	6	400	3	612	551	245
TMJD336K025#C^C	D	33	25	85	17	125	4.13	6	400	3	612	551	245
TMJD476K025#C^C	D	47	25	85	17	125	5.88	6	400	3	612	551	245
TMJU686K025#CQXC	U	68	25	85	17	125	8.5	12	450	3	606	545	242
TMJU107K025#CQXC	U	100	25	85	17	125	12.5	12	450	3	606	545	242
35 Volt @ 85°C													
TMJA334K035#CQXC	A	0.33	35	85	23	125	0.1	4	6000	3	112	101	45
TMJA474K035#CQXC	A	0.47	35	85	23	125	0.1	4	6000	3	112	101	45
TMJA684K035#CQXC	A	0.68	35	85	23	125	0.12	4	6000	3	112	101	45
TMJB105K035#CQXC	B	1	35	85	23	125	0.18	4	2500	3	184	166	74
TMJB155K035#C^C	B	1.5	35	85	23	125	0.26	6	2500	3	184	166	74
TMJB225K035#C^C	B	2.2	35	85	23	125	0.39	6	2500	3	184	166	74
TMJB335K035#C^C	B	3.3	35	85	23	125	0.58	6	2500	3	184	166	74
TMJC475K035#CQYA	C	4.7	35	85	23	125	0.16	6	600	3	428	385	171
TMJC475K035#C^C	C	4.7	35	85	23	125	0.82	6	600	3	428	385	171
TMJC685K035#C^C	C	6.8	35	85	23	125	1.19	6	600	3	428	385	171
TMJC106K035#C^C	C	10	35	85	23	125	1.75	6	600	3	428	385	171
TMJD156K035#CQYA	D	15	35	85	23	125	0.52	6	400	3	612	551	245
TMJD156K035#C^C	D	15	35	85	23	125	2.63	6	400	3	612	551	245
TMJD226K035#CQYA	D	22	35	85	23	125	0.77	6	400	3	612	551	245
TMJD226K035#C^C	D	22	35	85	23	125	3.85	6	400	3	612	551	245
TMJE336K035#CQYA	E	33	35	85	23	125	1.15	6	250	3	812	731	325
TMJE336K035#C^C	E	33	35	85	23	125	5.78	6	250	3	812	731	325
TMJU476K035#CQXC	U	47	35	85	23	125	8.23	12	300	3	742	667	297
TMJU476K035#CQYA	U	47	35	85	23	125	1.64	12	300	3	742	667	297
50 Volt @ 85°C													
TMJA224K050#CQXC	A	0.22	50	85	33	125	0.1	4	7000	3	104	93	41
TMJA334K050#CQXC	A	0.33	50	85	33	125	0.1	4	7000	3	104	93	41
TMJB474K050#CQXC	B	0.47	50	85	33	125	0.12	4	2000	3	206	186	82
TMJB684K050#CQXC	B	0.68	50	85	33	125	0.17	4	2000	3	206	186	82
TMJC105K050#C^C	C	1	50	85	33	125	0.25	4	1500	3	271	244	108
TMJC155K050#C^C	C	1.5	50	85	33	125	0.38	6	1500	3	271	244	108
TMJC225K050#CQYA	C	2.2	50	85	33	125	0.11	6	1500	3	271	244	108
TMJC225K050#C^C	C	2.2	50	85	33	125	0.55	6	1500	3	271	244	108
TMJC335K050#CQYA	C	3.3	50	85	33	125	0.17	6	1500	3	271	244	108
TMJC335K050#C^C	C	3.3	50	85	33	125	0.83	6	1500	3	271	244	108
TMJD475K050#C^C	D	4.7	50	85	33	125	1.18	4.5	600	3	500	450	200
TMJD685K050#C^C	D	6.8	50	85	33	125	1.7	4.5	600	3	500	450	200
TMJE106K050#CQYA	E	10	50	85	33	125	0.5	4.5	400	3	642	578	257
TMJE106K050#C^C	E	10	50	85	33	125	2.5	4.5	400	3	642	578	257
TMJU156K050#CQXC	U	15	50	85	33	125	3.75	12	450	3	606	545	242
TMJU226K050#CQXC	U	22	50	85	33	125	5.5	12	450	3	606	545	242

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

QUALIFICATION TABLE

TEST	TMJ S1gma™ series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Storage Life	Determine after application of 125°C temperature, unpowered for 2000 +48/-0 hours at 125 ± 2°C and then leaving 1 - 2 hours at room temperature.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Humidity	Determine after leaving for 500 hours at 65 ± 2°C and 90 - 95% relative humidity and then leaving 1 - 2 hours at room temperature.			Visual examination	no visible damage						
				DCL	3 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Biased Humidity	Determine after leaving for 1000 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	3 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	15 x IL*	1.5 x IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+15/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15	ESR	1.25 x IL*						
	5	+125+3/-0	15		2.5 x IL*						
	6	+20±2	15		1.25 x IL*						
Surge Voltage	Test temperature: 125°C+3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min (30 sec charge, 5 min 30 sec discharge)			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±5% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						

*Initial Limit



TBM Space Level series is screened to SRC9000 and utilizes an internal multi-anode design to achieve ultra-low ESR which improves performance in high ripple power application.

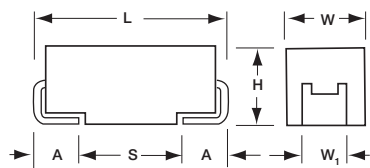
TBM Space Level is available with Weibull Grade "C" reliability and MIL-PRF-55365 Rev. G surge test option "C".

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these

correspond to "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365).

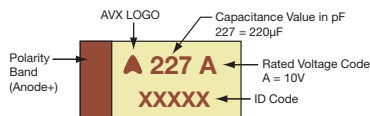
The molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.



MARKING

D, E CASE



CASE DIMENSIONS: millimeters (inches)

Code	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W _t ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
D	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W_t dimension applies to the termination width for A dimensional area only.

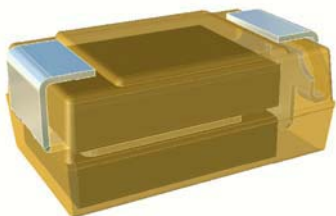
CAPACITANCE AND RATED VOLTAGE RANGE LETTER DENOTES CASE SIZE ESR LIMIT IN BRACKETS

Capacitance		Rated Voltage DC (V _R) to 85°C								
µF	Code	2.5V (e)	4V (G)	6V (J)	10V (A)	12V (B)	16V (C)	20V (D)	25V (E)	35V (V)
22	226									D(70) E(60,100)
33	336								D(65)	E(50,65)
47	476								E(65)	
68	686									
100	107							E(35,45)		
150	157						E(30,40)			
220	227				D(35)	E(35)				
330	337		D(35)	D(35)	E(35)					
470	477		D(35)	E(30)						
680	687		E(23)							
1000	108	D(25)	E(23)							
1500	158	E(18)								

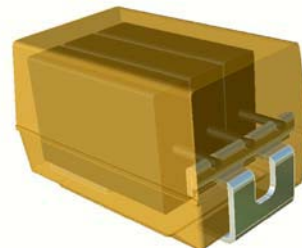
Available Ratings: ESR limits quoted in brackets (mOhms)

Notes: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards. EIA standards for Low ESR solid tantalum capacitors allow an ESR movement of 1.25 times initial limit post mounting.

TBM D MULTIANODE CONSTRUCTION



TBM E MULTIANODE CONSTRUCTION



HOW TO ORDER

SPACE LEVEL OPTIONS TO SRC9000:

TBM	E	477	*	006	L	□	L	@	9	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10%	Voltage Code 002 = 2.5Vdc 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 012 = 12Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level L = Group A	Reliability Grade Weibull: C = 0.01%/1000 hrs. 90% conf.	Qualification Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated	Surge Test Option 45 = 10 cycles, -55°C & +85°C before Weibull



TECHNICAL SPECIFICATIONS

Technical Data: Unless otherwise specified, all technical data relate to an ambient temperature of +25°C

Capacitance Range:	22 µF to 1500 µF										
Capacitance Tolerance:	±10%; ±20%										
Rated Voltage DC (V _R)	≤ +85°C:	2.5	4	6	10	12	16	20	25	35	
Category Voltage (V _C)	≤ +125°C:	1.7	2.7	4	7	8.4	10	13	17	23	
Surge Voltage (V _S)	≤ +85°C:	3.3	5.2	8	13	15.6	20	26	32	46	
Surge Voltage (V _S)	≤ +125°C:	2.2	3.4	5	8	9.6	12	16	20	28	
Temperature Range:	-55°C to +125°C										

RATING & PART NUMBER REFERENCE		Parametric Specifications by Rating										Typical RMS Ripple Data by Rating											
		Cap @ 120Hz µF @ 25°C	DC Rated Voltage @ +85°C V @ +85°C	ESR @ 100kHz mOhms @ +25°C	DCL max		DF max		Power Dissipation W	25°C		125°C		85°C		25°C		125°C		85°C			
					+25°C	+85°C	+125°C	+25°C		+85/125°C	-55°C	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)
					(µA)	(µA)	(µA)	(%)		(%)	(%)	A	A	A	A	A	V	V	V	V	V	V	V
AVX P/N	Case																						
2.5 Volt @ 85°C (1.7 Volt @ 125°C)																							
TBMD108*002L□□C9*45	D	1000	2.5	25	18.8	188	376	8	11	12	0.255	3.194	2.874	1.277	0.080	0.072	0.032						
TBME158*002C□□C9*45	E	1500	2.5	18	28.1	281	562	6	9	10	0.270	3.873	3.486	1.549	0.070	0.063	0.028						
4 Volt @ 85°C (2.7 Volt @ 125°C)																							
TBMD337*004L□□C9*45	D	330	4	35	9.9	99	198	8	11	12	0.255	2.699	2.429	1.080	0.094	0.085	0.038						
TBMD477*004L□□C9*45	D	470	4	35	14.1	141	282	8	11	12	0.255	2.699	2.429	1.080	0.094	0.085	0.038						
TBME687*004C□□C9*45	E	680	4	23	20.4	204	408	6	9	10	0.270	3.426	3.084	1.370	0.079	0.071	0.032						
TBME108*004C□□C9*45	E	1000	4	23	30	300	600	6	9	10	0.270	3.426	3.084	1.370	0.079	0.071	0.032						
6 Volt @ 85°C (4 Volt @ 125°C)																							
TBMD337*006L□□C9*45	D	330	6	35	14.9	149	298	8	11	12	0.255	2.699	2.429	1.080	0.094	0.085	0.038						
TBME477*006C□□C9*45	E	470	6	30	21.2	212	424	6	9	10	0.270	3.000	2.700	1.200	0.090	0.081	0.036						
10 Volt @ 85°C (7 Volt @ 125°C)																							
TBMD227*010L□□C9*45	D	220	10	35	16.5	165	330	8	11	12	0.255	2.699	2.429	1.080	0.094	0.085	0.038						
TBME337*010C□□C9*45	E	330	10	35	24.8	248	496	6	9	10	0.270	2.777	2.500	1.111	0.097	0.087	0.039						
12 Volt @ 85°C (8.4 Volt @ 125°C)																							
TBME227*012C□□C9*45	E	220	12	35	19.8	198	396	6	9	10	0.270	2.777	2.500	1.111	0.097	0.087	0.039						
16 Volt @ 85°C (10 Volt @ 125°C)																							
TBME157*016L□□C9*45	E	150	16	30	18	180	360	6	9	10	0.270	3.000	2.700	1.200	0.090	0.081	0.036						
TBME157*016C□□C9*45	E	150	16	40	18	180	360	6	9	10	0.270	2.598	2.338	1.039	0.104	0.094	0.042						
20 Volt @ 85°C (13 Volt @ 125°C)																							
TBME107*020L□□C9*45	E	100	20	35	15	150	300	6	9	10	0.270	2.777	2.500	1.111	0.097	0.087	0.039						
TBME107*020C□□C9*45	E	100	20	45	15	150	300	6	9	10	0.270	2.449	2.205	0.980	0.110	0.099	0.044						
25 Volt @ 85°C (17 Volt @ 125°C)																							
TBMD336*025L□□C9*45	D	33	25	65	6.2	62	124	8	11	12	0.255	1.981	1.783	0.792	0.129	0.116	0.051						
TBME476*025L□□C9*45	E	47	25	65	8.8	88	176	6	9	10	0.270	2.038	1.834	0.815	0.132	0.119	0.063						
35 Volt @ 85°C (23 Volt @ 125°C)																							
TBMD226*035L□□C9*45	D	22	35	70	5.8	58	116	8	11	12	0.255	1.909	1.718	0.763	0.134	0.120	0.063						
TBME226*035L□□C9*45	E	22	35	60	5.8	58	116	6	9	10	0.270	2.121	1.909	0.849	0.127	0.115	0.051						
TBME226*035C□□C9*45	E	22	35	100	5.8	58	116	6	9	10	0.270	1.643	1.479	0.657	0.164	0.148	0.066						
TBME336*035L□□C9*45	E	33	35	50	8.7	87	174	6	9	10	0.270	2.324	2.091	0.930	0.116	0.105	0.046						
TBME336*035C□□C9*45	E	33	35	65	8.7	87	174	6	9	10	0.270	2.038	1.834	0.815	0.132	0.119	0.063						

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.



FEATURES

- Improved reliability – 0.5%/1khrs (twice better than standard)
- DCL reduced by 25% to 0.0075 CV
- Robust against higher thermo-mechanical stresses during assembly process
- Multi-anode construction
- Super low ESR
- CV range 4.7-1500 μ F / 2.5-50V
- “Mirror” construction used with D case capacitors reduces ESL to half
- Automotive, medical, aerospace, military and other hi-end application

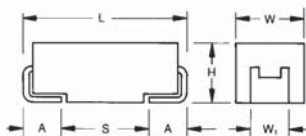


LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



RoHS
COMPLIANT

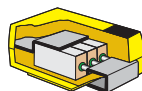
*SnPb termination option is not
RoHS compliant.*



APPLICATIONS

- Automotive, Avionics and Industrial high power DC/DC convertors

MULTIANODE CONSTRUCTION

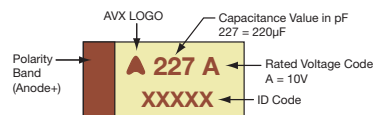


MULTIANODE TRMD LOW SELF INDUCTANCE CONSTRUCTION “MIRROR” DESIGN



MARKING

D, E CASE



CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L \pm 0.20 (0.008)	W \pm 0.20 (0.008) -0.10 (0.004)	H \pm 0.20 (0.008) -0.10 (0.004)	W \pm 0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W₁ dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TRM	E	108	*	004	R	0023
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	Tolerance K= \pm 10% M= \pm 20%	Rated DC Voltage 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 012 = 12Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Packaging R = Pure Tin 7" Reel S = Pure Tin 13" Reel H = Tin Lead 7" Reel (Contact Manufacturer) K = Tin Lead 13" Reel (Contact Manufacturer) H, K = Non RoHS	ESR in m Ω

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C										
Capacitance Range:	4.7 μ F to 1500 μ F										
Capacitance Tolerance:	\pm 10%; \pm 20%										
Rated Voltage (V _R)	\leq +85°C:	2.5	4	6.3	10	12	16	20	25	35	50
Category Voltage (V _C)	\leq +125°C:	1.7	2.7	4	7	8	10	13	17	23	33
Surge Voltage (V _S)	\leq +85°C:	3.3	5.2	8	13	16	20	26	32	46	65
Surge Voltage (V _S)	\leq +125°C:	2.2	3.4	5	8	10	13	16	20	28	40
Temperature Range:	-55°C to +125°C										
Reliability:	0.5% per 1000 hours at 85°C, V _R with 0.1 Ω /V series impedance, 60% confidence level										
	Meets requirements of AEC-Q200										

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _r) to 85°C									
μF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	12V (B)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
4.7	475										D(200)
6.8	685										
10	106									D(120)	E(150)*
15	156										
22	226									D(70)/E(60,100)	
33	336								D(65)	E(50,65)	
47	476						D(100)	D(55)	E(65)		
68	686										
100	107						D(55)*	E(35,45)			
150	157				D(45)		E(30,40)				
220	227				D(35)	E(35)					
330	337		D(35)	D(35)	E(35)						
470	477		D(35)	E(30)							
680	687		E(23)								
1000	108	D(25)	E(23)								
1500	158	E(18)									
2200	228										

Available Ratings, (ESR ratings in mOhms in brackets)

Engineering samples - please contact manufacturer

*Codes under development - subject to change

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (A)		
											25°C	85°C	125°C
2.5 Volt @ 85°C													
TRMD108*002#0025	D	1000	2.5	85	1.7	125	18.8	8	25	3	3.194	2.874	1.277
TRME158*002#0018	E	1500	2.5	85	1.7	125	28.1	6	18	3	3.873	3.486	1.549
4 Volt @ 85°C													
TRMD337*004#0035	D	330	4	85	2.7	125	9.9	8	35	3	2.699	2.429	1.080
TRMD477*004#0035	D	470	4	85	2.7	125	14.1	8	35	3	2.699	2.429	1.080
TRME687*004#0023	E	680	4	85	2.7	125	20.4	6	23	3	3.426	3.084	1.370
TRME108*004#0023	E	1000	4	85	2.7	125	30	6	23	3	3.426	3.084	1.370
6.3 Volt @ 85°C													
TRMD337*006#0035	D	330	6.3	85	4	125	14.9	8	35	3	2.699	2.429	1.080
TRME477*006#0030	E	470	6.3	85	4	125	21.2	6	30	3	3.000	2.700	1.200
10 Volt @ 85°C													
TRMD157*010#0045	D	150	10	85	7	125	11.3	8	45	3	2.380	2.142	0.952
TRMD227*010#0035	D	220	10	85	7	125	16.5	8	35	3	2.699	2.429	1.080
TRME337*010#0035	E	330	10	85	7	125	24.8	6	35	3	2.777	2.500	1.111
12 Volt @ 85°C													
TRME227*012#0035	E	220	12	85	8.4	125	19.8	6	35	3	2.777	2.500	1.111
16 Volt @ 85°C													
TRMD476*016#0100	D	47	16	85	10	125	5.6	8	100	3	1.597	1.437	0.639
TRME157*016#0030	E	150	16	85	10	125	18	6	30	3	3.000	2.700	1.200
TRME157*016#0040	E	150	16	85	10	125	18	6	40	3	2.598	2.338	1.039
20 Volt @ 85°C													
TRMD476*020#0055	D	47	20	85	13	125	7.1	8	55	3	2.153	1.938	0.861
TRME107*020#0035	E	100	20	85	13	125	15	6	35	3	2.777	2.500	1.111
TRME107*020#0045	E	100	20	85	13	125	15	6	45	3	2.449	2.205	0.980
25 Volt @ 85°C													
TRMD336*025#0065	D	33	25	85	17	125	6.2	8	65	3	1.981	1.783	0.792
TRME476*025#0065	E	47	25	85	17	125	8.8	6	65	3	2.038	1.834	0.815
35 Volt @ 85°C													
TRMD106*035#0120	D	10	35	85	23	125	2.6	8	120	3	1.458	1.312	0.583
TRMD226*035#0070	D	22	35	85	23	125	5.8	8	70	3	1.909	1.718	0.763
TRME226*035#0060	E	22	35	85	23	125	5.8	6	60	3	2.121	1.909	0.849
TRME226*035#0100	E	22	35	85	23	125	5.8	6	100	3	1.643	1.479	0.657
TRME336*035#0050	E	33	35	85	23	125	8.7	6	50	3	2.324	2.091	0.930
TRME336*035#0065	E	33	35	85	23	125	8.7	6	65	3	2.038	1.834	0.815
50 Volt @ 85°C													
TRMD475*050#0200	D	4.7	50	85	33	125	1.8	8	200	3	1.129	1.016	0.452

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

QUALIFICATION TABLE

TEST	TRM professional multianode series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Storage Life	125°C, 0V, 2000h			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Humidity	Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	1.5 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Biased Humidity	Determine after leaving for 1000 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within ±10% of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-10%	±5%	+10/-0%	+12/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15	ESR	1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	
	5	+125+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 125°C+3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±5% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						

*Initial Limit



FEATURES

- Aerospace & Hi-Rel applications
- Low ESR conductive polymer electrode
- Endurance up to 10 000 hrs. on selected codes
- Ceramic case hermetic packaging
- Stability under humidity and ambient atmosphere exposure
- Large case sizes including CTC-21D provide high capacitance values
- Developed with ESA to suit aerospace applications
- Ongoing ESA qualification
- Manufacturing and screening utilizing AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operation life



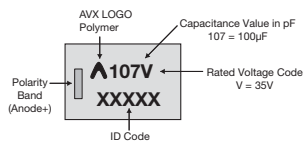
Elektra Award 2015

APPLICATIONS

- Aerospace
- Defence
- Power supplies
- Pulse power

MARKING

9 CASE

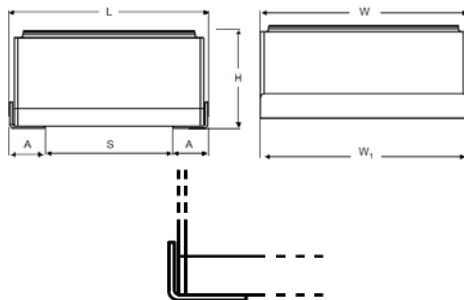


For additional information on Q-process please consult the AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)

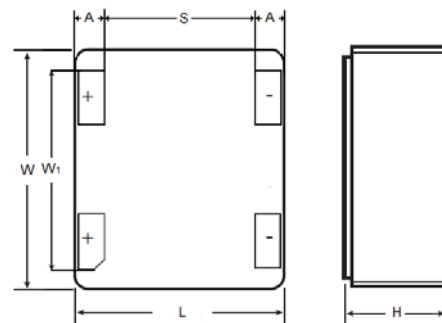
CASE DIMENSIONS: millimeters (inches)

Code	Type	L	W	H Max.	W ₁	A	S Min.
9 (CTC-21D)	J-lead (L-shape)	11.50 ± 0.50 (0.453 ± 0.020)	12.50 ± 0.50 (0.492 ± 0.020)	6.15 (0.242)	12.50 ± 0.50 (0.492 ± 0.020)	1.90 ± 0.50 (0.075 ± 0.020)	7.00 (0.276)
9 (CTC-21D)	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	12.50 ± 0.20 (0.492 ± 0.008)	5.95 (0.234)	10.50 ± 0.20 (0.413 ± 0.008)	1.50 ± 0.20 (0.059 ± 0.008)	7.80 (0.307)

'J' Lead Termination (L-shape)



Undertab Termination



CAPACITANCE AND VOLTAGE RANGE (CASE CODE BEFORE THE BRACKETS)

Capacitance		Rated Voltage DC (V _R) at 85°C								
μF	Code	10V	16V	20V	25V	35V	50V	63V	75V	100V
15	156									9(150)*
22	226								9(120)*	9(150)
33	336							9(100)*	9(120)	
47	476						9(70)	9(100)*		
68	686						9(70)*			
100	107				9(50)*	9(55)				
150	157			9(45)*	9(50)	9(55)				
220	227	9(40)*	9(40)	9(45)*	9(50)*					
330	337	9(40)	9(40)*	9(45)*						
470	477	9(40)*	9(40)*							
680	687	9(40)*	9(40)*							

Available Ratings, (ESR ratings in mOhms in brackets)

Engineering samples - please contact manufacturer

*Codes under development – upon request, please contact manufacturer

HOW TO ORDER

AVX PART NUMBER

TCH	9	687	M	016	W	0040	U
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Tolerance M = ±20%	Rated DC Voltage 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 063 = 63Vdc 075 = 75Vdc 100 = 100Vdc	Packaging W = Waflle B = Bulk	ESR in mΩ	Termination J = 'J' lead L-shape (Gold) L = 'J' lead L-shape (Sn/Pb) U = Undertab



For RoHS compliant products, please select correct termination style.

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C											
Capacitance Range:	22 μF to 330 μF (for extended range under development, contact manufacturer)											
Capacitance Tolerance:	±20%											
Leakage Current DCL:	0.1CV											
Rated Voltage (V _R)	≤ +85°C:	10	16	20	25	35	50	63	75	100		
Category Voltage (V _C)	≤ +125°C:	7	11	13.5	17	23.5	33	42	50	66		
Temperature Range:	-55°C to +125°C											
Reliability:	1% per 1000 hours at 85°C, V _r with 0.1Ω/Vseries impedance, 60% confidence level											
Termination Finish:	Gold Plating (Undertab), Gold Plating (J-lead), Sn/Pb Plating (J-lead)											

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (μA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (A)		
											25°C	85°C	125°C
10 Volt @ 85°C													
TCH9337M010W0040#	9	330	10	85	7	125	330	8	40	1	3.16	2.84	1.26
16 Volt @ 85°C													
TCH9227M016W0040#	9	220	16	85	10	125	352	8	40	1	3.16	2.84	1.26
25 Volt @ 85°C													
TCH9157M025W0050#	9	150	25	85	17	125	375	8	50	1	2.83	2.55	1.13
35 Volt @ 85°C													
TCH9107M035W0055#	9	100	35	85	23	125	350	8	55	1	2.69	2.42	1.08
TCH9157M035W0055#	9	150	35	85	23	125	525	8	55	1	2.69	2.42	1.08
50 Volt @ 85°C													
TCH9476M050W0070#	9	47	50	85	33	125	235	8	70	1	2.39	2.15	0.96
75 Volt @ 85°C													
TCH9336M075W0120#	9	33	75	85	50	125	248	8	120	1	1.82	1.64	0.73
100 Volt @ 85°C													
TCH9226M100W0150#	9	22	100	85	66	125	220	8	150	1	1.63	1.47	0.65

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with a maximum DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

QUALIFICATION TABLE

TEST	TCH low ESR hermetic series (Temperature range -55°C to +125°C)									
	Condition			Characteristics						
Endurance	Determine after application of rated voltage for 2000 (10000) +48/0 hours at 85±2°C and then leaving min. 2 hours at room temperature. Also determine of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving min. 2 hours at room temperature. Power supply impedance to be < 3Ω.			Visual examination	no visible damage					
				DCL	1.25 x initial limit					
				ΔC/C	within ±20% of initial value					
				DF	1.5 x initial limit					
				ESR	2 x initial limit					
Storage Life	125°C, 0V, 2000h			Visual examination	no visible damage					
				DCL	2 x initial limit					
				ΔC/C	within ±20% of initial value					
				DF	1.5 x initial limit					
				ESR	2 x initial limit					
Humidity	Determine after storage without applied voltage at 40±2°C and 90±2% relative humidity for 56 days and then recovery min. 2 hours at room temperature.			Visual examination	no visible damage					
				DCL	1.25 x initial limit					
				ΔC/C	within ±10% of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					
Temperature Stability	Step	Temperature°C	Duration (min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C
	1	+22	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	2	-55	15	ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
	3	+22	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85	15	ESR	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.5 x IL*	1.5 x IL*	1.25 x IL*
	5	+125	15							
6	+22	15								
Surge Voltage	Test temperature: 85°C+3/0°C Surge voltage: 1.3 x rated voltage Series protection resistance: 33Ω Discharge resistance: 33Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage					
				DCL	initial limit					
				ΔC/C	within ±20% of initial value					
				DF	initial limit					
				ESR	1.25 x initial limit					

*Initial Limit



FEATURES

- High temperature applications
- Operational condition 230°C / 0.5U_R / 1000hrs or 200°C / 0.5U_R / 10.000hrs
- Ceramic case hermetic packaging
- Large case sizes including CTC-21D provide high capacitance values
- Manufacturing and screening utilizing AVX patented Q-Process to effectively remove components that may experience excessive parametric shifts or instability in operation life



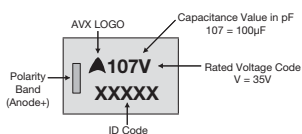
APPLICATIONS

- Oil drilling
- Extreme temperature applications

For additional information on Q-process please consult the AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)

MARKING

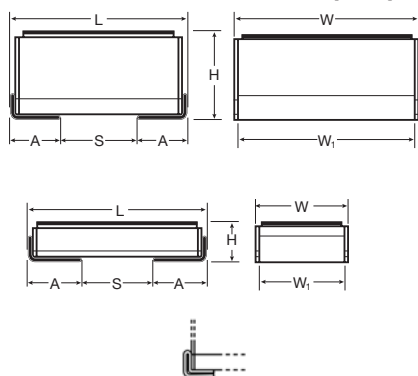
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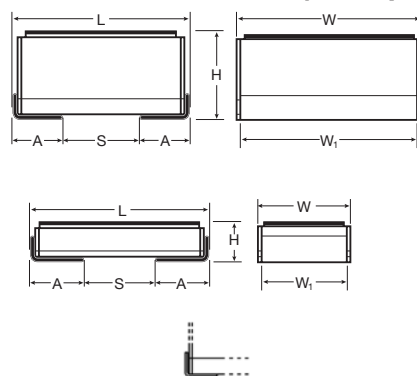
CASE DIMENSIONS: millimeters (inches)

Code	Type	L±0.50 (0.020)	W±0.50 (0.020)	H Max.	W ₁ ±0.50 (0.020)	A±0.50 (0.020)	S Min.
9 (CTC-21D)	J-lead (L-shape)	11.50 (0.453)	12.50 (0.492)	6.15 (0.242)	12.50 (0.492)	1.90 (0.075)	7.00 (0.276)
9 (CTC-21D)	J-lead (flex)	12.10 (0.476)	12.50 (0.492)	6.50 (0.256)	12.00 (0.472)	2.00 (0.079)	7.20 (0.283)
9 (CTC-21D)	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	12.50 ± 0.20 (0.492 ± 0.008)	5.95 (0.234)	10.50 ± 0.20 (0.413 ± 0.008)	1.50 ± 0.20 (0.059 ± 0.008)	7.80 (0.307)
I	J-lead (L-shape)	11.50 (0.453)	6.00 (0.236)	2.70 (0.106)	6.00 (0.236)	3.50 (0.138)	4.00 (0.157)
I	J-lead (flex)	11.90 (0.469)	6.00 (0.236)	3.00 (0.118)	5.50 (0.217)	3.60 (0.142)	4.20 (0.165)
I	Undertab	11.00 ± 0.20 (0.433 ± 0.008)	6.00 ± 0.20 (0.236 ± 0.008)	2.50 (0.098)	4.00 ± 0.20 (0.157 ± 0.008)	3.20 ± 0.20 (0.126 ± 0.008)	4.40 (0.173)

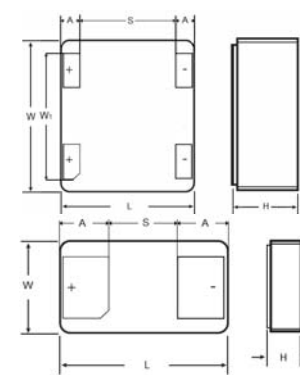
'J' Lead Termination (flex)



'J' Lead Termination (L-shape)



Undertab Termination



CAPACITANCE AND VOLTAGE RANGE (CODE DENOTES THE CASE SIZE)

Capacitance		Rated Voltage DC (V _R) at 175°C					
μF	Code	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	63V (J)
3.3	335					I*	I*
4.7	475					I*	I*
6.8	685				I	I	
10	106				I		
15	156		I*	I*	I*		
22	226	I	I*	I*	I*		
33	336	I*	I*	I*			9*
47	476	I	I*			9*	9
68	686					9*	
100	107			9*	9		
150	157		9*	9*	9*		
220	227	9*	9*				
330	337	9*					

Available Ratings

Engineering samples - please contact manufacturer

*Codes under development – upon request, please contact manufacturer

HOW TO ORDER

AVX PART NUMBER

THH	9	107	M	035	W	0250	J
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Tolerance M = ±20%	Rated DC Voltage 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 063 = 63Vdc	Packaging W = Waffle B = Bulk	ESR in mΩ	Termination J = 'J' lead (L-shape) W = 'J' lead (flex) U = Undertab



For RoHS compliant products, please select correct termination style.

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C							
Capacitance Range:	6.8 μF to 100 μF (for extended range under development, contact manufacturer)							
Capacitance Tolerance:	±20%							
Leakage Current DCL:	0.01CV							
Rated Voltage (V _R)	≤ +85°C:	16	20	25	35	50	63	
Category Voltage (V _C)	≤ +230°C:	8	10	12	17	25	31	
Temperature Range:	-55°C to +230°C							
Reliability:	1% per 1000 hours at 85°C, V _r with 0.1Ω/V series impedance, 60% confidence level							
Termination Finish:	Gold Plating (Undertab), Gold Plating (J-lead L shape), Nickel Plating (J-lead flex)							

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	DCL Max. (μA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (A)		
										25°C	85°C	230°C
16 Volt @ 85°C												
THHI226M016W0500#	I	22	16	175	8	3.6	8	500	1	0.81	0.73	0.73
THHI476M016W0500#	I	47	16	175	8	7.5	8	500	1	0.81	0.73	0.73
35 Volt @ 85°C												
THHI685M035W0500#	I	6.8	35	175	17	2.4	8	500	1	0.81	0.73	0.73
THHI106M035W0500#	I	10	35	175	17	3.5	8	500	1	0.81	0.73	0.73
THH9107M035W0250#	9	100	35	175	17	35	8	250	1	1.26	1.13	1.13
50 Volt @ 85°C												
THHI685M050W0500#	I	6.8	50	175	25	3.4	8	500	1	0.81	0.73	0.73
63 Volt @ 85°C												
THH9476M063W0250#	9	47	63	175	31	29.6	8	250	1	1.26	1.13	1.13

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts.

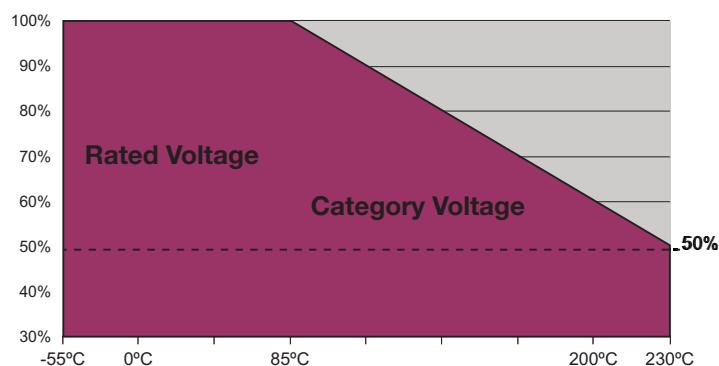
DCL is measured at rated voltage after 5 minutes.

ESR change post 1000hrs allowed up to 3 times catalog limit.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

TEMPERATURE VOLTAGE DERATING

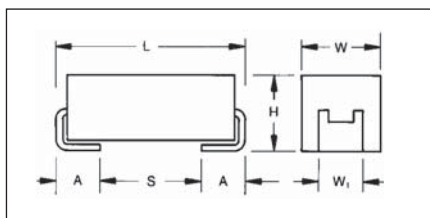
THH 230°C Voltage vs Temperature Rating for 1000 hrs service life



QUALIFICATION TABLE

TEST	THH 230°C hermetic series (Temperature range -55°C to +230°C)												
	Condition			Characteristics									
Endurance	Determine after application of 230°C temperature, category voltage for 1000+48/-0 hours and then leaving min. 2 hours at room temperature. Power supply impedance to be <3Ω.			Visual examination	no visible damage								
				DCL	1.25 x initial limit								
				ΔC/C	within ±20% of initial value								
				DF	1.5 x initial limit								
				ESR	3 x initial limit								
Endurance	Determine after application of 0.5U _R for 10000+48/-0 hours at 200°C temperature and then leaving min. 2 hours at room temperature. Power supply impedance to be <3Ω.			Visual examination	no visible damage								
				DCL	1.25 x initial limit								
				ΔC/C	within ±20% of initial value								
				DF	1.5 x initial limit								
				ESR	3 x initial limit								
Storage Life	230°C, 0V, 1000h + 48/-0 hours			Visual examination	no visible damage								
				DCL	initial limit								
				ΔC/C	within ±5% of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
Biased Humidity	Determine after leaving for 1000 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery min. 2 hours at room temperature.			Visual examination	no visible damage								
				DCL	initial limit								
				ΔC/C	within ±10% of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								
Temperature Stability	Step	Temperature°C	Duration (min)		+20°C	-55°C	+22°C	+85°C	+125°C	+175°C	+200°C	+230°C	+22°C
	1	+22	15										
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	n/a	n/a	n/a	IL*
	3	+22	15										
	4	+85	15	ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	+30/-0%	+30/-0%	+30/-0%	±5%
	5	+125	15										
	6	+175	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	2 x IL*	2 x IL*	2 x IL*	IL*
	7	+200	15										
	8	+230	15	ESR	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
9	+22	15											
Surge Voltage	Test temperature: 85°C±3/0°C Surge voltage: 1.3 x rated voltage Series protection resistance: 33Ω Discharge resistance: 33Ω Number of cycles: 1000x Cycle duration: 5 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage								
				DCL	initial limit								
				ΔC/C	within ±20% of initial value								
				DF	initial limit								
				ESR	1.25 x initial limit								

*Initial Limit



MARKING

(White marking on black body)



Polarity Stripe (+)

**Capacitance Code
Rated Voltage**

This is the original high reliability molded tantalum chip series and the case sizes still represent the most flexible of surface mount form factors. TAZ offers nine case sizes, eight of which (A through H) are fully qualified to MIL-PRF-55365/4, and also includes the original sub-miniature R case (non-QPL).

This series is fully interchangeable with CWR06 conformal types, while offering the advantages of molded body/compliant termination construction (ensuring no TCE mismatch with any substrate). This construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques.

The parts also carry full polarity and capacitance / voltage marking. The five smaller cases are characterized by their low profile construction, with the A case being the world's smallest molded military tantalum chip.

All 4V to 50V ratings are qualified to MIL-PRF-55365 Weibull "B", "C", "D" and "T" levels, with all surge options ("A", "B" & "C") available.

For Space Level applications, AVX SRC 9000 qualification is recommended (see ratings table for part number availability).

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these are "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365). In addition, the molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

CASE DIMENSIONS:

millimeters (inches)

Case Code	Length (L) ±0.38 (0.015)	Width (W) ±0.38 (0.015)	Height (H) ±0.38 (0.015)	Term. Width (W _t)	Term. Length (A) +0.25/-0.13 (+0.010/-0.005)	S min	Typical Weight (g)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	0.38 (0.015)	0.016
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	1.65 (0.065)	0.025
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	2.92 (0.115)	0.035
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	2.41+0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	1.65 (0.065)	0.045
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	2.41+0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	2.92 (0.115)	0.065
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	3.30±0.13 (0.130±0.005)	0.76 (0.030)	3.43 (0.135)	0.125
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	2.67±0.13 (0.105±0.005)	1.27 (0.050)	3.56 (0.140)	0.205
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	3.68+0.13/-0.51 (0.145+0.005/-0.020)	1.27 (0.050)	4.06 (0.160)	0.335
R	2.05 (0.081) ±0.20 (0.008)	1.30 (0.051) +0.20 (0.008) -0.10 (0.004)	1.20 (0.047) max	1.0±0.10 (0.039±0.004)	0.50 (0.020) +0.30 (0.012) -0.20 (0.008)	0.71 (0.028)	0.010

CWR09 MIL-PRF-55365/4

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) at 85°C							
μF	Code	4V (C)	6V (D)	10V (F)	15V (H)	20V (J)	25V (K)	35V (M)	50V (N)
0.10	104								A
0.15	154								A
0.22	224							A	B
0.33	334	R		R			A		B
0.47	474			R		A		B	C
0.68	684				A	B	B	C	D
1.0	105			A/R		B	C	D	E
1.5	155		A		B	C	D	E	F
2.2	225	A/R		B	C	D	E		F
3.3	335		B	C	D	E		F	G
4.7	475	B	C	D	E		F	G	H
6.8	685	C	D	E		F	G	H	
10	106	D	E		F		G		
15	156	E		F		G	H		
22	226		F		G	H			
33	336	F		G	H				
47	476		G	H					
68	686	G	H						
100	107	H							

HOW TO ORDER

COTS-PLUS & MIL QPL (CWR09):

TAZ	H	686	*	006	C	□	#	@	0	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level S = Std. Conformance L = Group A M = MIL (JAN) CWR09	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	Qualification Level 0 = N/A T = T Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	Surge Test Option 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull

For RoHS compliant products, please select correct termination style.

CWR09 P/N CROSS REFERENCE:

CWR09	D	^	686	*	@	+	□
Type	Voltage Code C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	Termination Finish H = Solder Plated K = Solder Fused C = Hot Solder Dipped B = Gold Plated	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER	Surge Test Option A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull If blank, None required	Packaging Bulk = Standard TR = 7" T&R TR13 = 13" T&R W = Waffle See page 7 for additional packaging options.

For RoHS compliant products, please select correct termination style.

SPACE LEVEL OPTIONS TO SRC9000*:

TAZ	H	686	*	006	C	□	L	@	9	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level L = Group A	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	Qualification Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated	Surge Test Option 45 = 10 cycles, -55°C & +85°C before Weibull

For RoHS compliant products, please select correct termination style.

*Contact factory for AVX SRC9000 Space Level SCD details.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C									
Capacitance Range:	0.10 µF to 100 µF									
Capacitance Tolerance:	±5%; ±10%; ±20%									
Rated Voltage (V _R)	≤ 85°C:	4	6	10	15	20	25	35	50	
Category Voltage (V _C)	≤ 125°C:	2.7	4	6.7	10	13.3	16.7	23.3	33.3	
Surge Voltage (V _S)	≤ 85°C:	5.3	8	13.3	20	26.7	33.3	46.7	66.7	
Surge Voltage (V _S)	≤ 125°C:	3.5	5.3	8.7	13.3	17.8	22.2	31.1	44.5	
Temperature Range:	-55°C to +125°C									



RATING & PART NUMBER REFERENCE

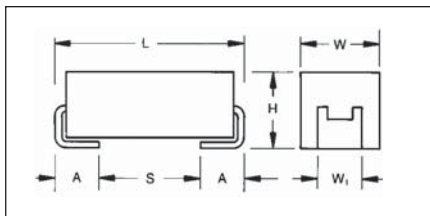
CWR09 P/N	AVX MIL & COTS-Plus P/N	AVX SRC9000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55365/4				Typical RMS Ripple Data by Rating									
				Cap @ 25°C µF	DC Rated Voltage @ +85°C V	ESR @ 100kHz @ +25°C Ohms	DCL max +25°C µA	DF Max +85/125°C %	Power Dissipation W	25°C		85°C		125°C		150°C	
										Cap @ 25°C µF	DC Rated Voltage @ +85°C V	ESR @ 100kHz @ +25°C Ohms	DCL max +25°C µA	DF Max +85/125°C %	Power Dissipation W	Ripple A	Ripple V
	TAZ R 334 * 0.04 C □ # 0 + + +		R	0.33	4	45	10	6	8	0.030	0.03	0.02	0.01	1.16	1.05	0.46	
	TAZ R 225 * 0.04 C □ # 0 + + +		R	2.2	4	12	10	6	8	0.030	0.05	0.02	0.02	0.60	0.54	0.24	
	CWR09/225 @	TAZ A 225 * 0.04 C □ # 0 + + +	A	2.2	4	8	10	6	8	0.050	0.08	0.07	0.03	0.63	0.57	0.25	
	CWR09/475 @	TAZ B 475 * 0.04 C □ # 0 + + +	B	4.7	4	8	10	6	8	0.070	0.09	0.08	0.04	0.75	0.67	0.30	
	CWR09/685 @	TAZ C 685 * 0.04 C □ # 0 + + +	C	6.8	4	5.5	10	6	8	0.075	0.12	0.11	0.05	0.64	0.58	0.26	
	CWR09/105 @	TAZ D 105 * 0.04 C □ # 0 + + +	D	10	4	4	10	6	8	0.080	0.14	0.13	0.06	0.57	0.51	0.23	
	CWR09/155 @	TAZ E 155 * 0.04 C □ # 0 + + +	E	15	4	3.5	10	6	8	0.090	0.16	0.14	0.06	0.56	0.51	0.22	
	CWR09/225 @	TAZ F 225 * 0.04 C □ # 0 + + +	F	22	4	2.2	20	24	8	0.100	0.21	0.19	0.09	0.47	0.42	0.19	
	CWR09/335 @	TAZ G 335 * 0.04 C □ # 0 + + +	G	33	4	2.2	20	24	8	0.125	0.34	0.30	0.13	0.37	0.33	0.15	
	CWR09/475 @	TAZ H 475 * 0.04 C □ # 0 + + +	H	47	4	1.1	30	36	10	0.150	0.41	0.37	0.16	0.37	0.33	0.15	
	CWR09/685 @	TAZ I 685 * 0.06 C □ # 0 + + +	I	68	6	0.9	4	40	48	0.030	0.02	0.02	0.01	1.22	1.10	0.49	
	CWR09/105 @	TAZ J 105 * 0.06 C □ # 0 + + +	J	105	6	0.9	4	40	48	0.030	0.05	0.05	0.02	0.55	0.49	0.22	
	CWR09/155 @	TAZ K 155 * 0.06 C □ # 0 + + +	K	155	6	0.9	4	40	48	0.030	0.07	0.07	0.03	0.71	0.64	0.28	
	CWR09/225 @	TAZ L 225 * 0.06 C □ # 0 + + +	L	225	6	0.9	4	40	48	0.030	0.09	0.09	0.04	0.75	0.67	0.30	
	CWR09/335 @	TAZ M 335 * 0.06 C □ # 0 + + +	M	335	6	0.9	4	40	48	0.030	0.12	0.11	0.05	0.64	0.58	0.26	
	CWR09/475 @	TAZ N 475 * 0.06 C □ # 0 + + +	N	475	6	0.9	4	40	48	0.030	0.16	0.14	0.06	0.60	0.54	0.24	
	CWR09/685 @	TAZ O 685 * 0.06 C □ # 0 + + +	O	685	6	0.9	4	40	48	0.030	0.20	0.18	0.08	0.50	0.45	0.20	
	CWR09/105 @	TAZ P 105 * 0.06 C □ # 0 + + +	P	105	6	0.9	4	40	48	0.030	0.25	0.20	0.10	0.45	0.40	0.15	
	CWR09/155 @	TAZ Q 155 * 0.06 C □ # 0 + + +	Q	155	6	0.9	4	40	48	0.030	0.30	0.25	0.12	0.37	0.33	0.15	
	CWR09/225 @	TAZ R 225 * 0.06 C □ # 0 + + +	R	225	6	0.9	4	40	48	0.030	0.35	0.30	0.13	0.37	0.33	0.15	
	CWR09/335 @	TAZ S 335 * 0.06 C □ # 0 + + +	S	335	6	0.9	4	40	48	0.030	0.40	0.35	0.14	0.37	0.33	0.15	
	CWR09/475 @	TAZ T 475 * 0.06 C □ # 0 + + +	T	475	6	0.9	4	40	48	0.030	0.45	0.40	0.15	0.37	0.33	0.15	
	CWR09/685 @	TAZ U 685 * 0.06 C □ # 0 + + +	U	685	6	0.9	4	40	48	0.030	0.50	0.45	0.16	0.37	0.33	0.15	
	CWR09/105 @	TAZ V 105 * 0.06 C □ # 0 + + +	V	105	6	0.9	4	40	48	0.030	0.55	0.50	0.17	0.37	0.33	0.15	
	CWR09/155 @	TAZ W 155 * 0.06 C □ # 0 + + +	W	155	6	0.9	4	40	48	0.030	0.60	0.55	0.18	0.37	0.33	0.15	
	CWR09/225 @	TAZ X 225 * 0.06 C □ # 0 + + +	X	225	6	0.9	4	40	48	0.030	0.65	0.60	0.19	0.37	0.33	0.15	
	CWR09/335 @	TAZ Y 335 * 0.06 C □ # 0 + + +	Y	335	6	0.9	4	40	48	0.030	0.70	0.65	0.20	0.37	0.33	0.15	
	CWR09/475 @	TAZ Z 475 * 0.06 C □ # 0 + + +	Z	475	6	0.9	4	40	48	0.030	0.75	0.70	0.21	0.37	0.33	0.15	
	CWR09/685 @	TAZ AA 685 * 0.06 C □ # 0 + + +	AA	685	6	0.9	4	40	48	0.030	0.80	0.75	0.22	0.37	0.33	0.15	
	CWR09/105 @	TAZ AB 105 * 0.06 C □ # 0 + + +	AB	105	6	0.9	4	40	48	0.030	0.85	0.80	0.23	0.37	0.33	0.15	
	CWR09/155 @	TAZ AC 155 * 0.06 C □ # 0 + + +	AC	155	6	0.9	4	40	48	0.030	0.90	0.85	0.24	0.37	0.33	0.15	
	CWR09/225 @	TAZ AD 225 * 0.06 C □ # 0 + + +	AD	225	6	0.9	4	40	48	0.030	0.95	0.90	0.25	0.37	0.33	0.15	
	CWR09/335 @	TAZ AE 335 * 0.06 C □ # 0 + + +	AE	335	6	0.9	4	40	48	0.030	1.00	0.95	0.26	0.37	0.33	0.15	
	CWR09/475 @	TAZ AF 475 * 0.06 C □ # 0 + + +	AF	475	6	0.9	4	40	48	0.030	1.05	1.00	0.27	0.37	0.33	0.15	
	CWR09/685 @	TAZ AG 685 * 0.06 C □ # 0 + + +	AG	685	6	0.9	4	40	48	0.030	1.10	1.05	0.28	0.37	0.33	0.15	
	CWR09/105 @	TAZ AH 105 * 0.06 C □ # 0 + + +	AH	105	6	0.9	4	40	48	0.030	1.15	1.10	0.29	0.37	0.33	0.15	
	CWR09/155 @	TAZ AI 155 * 0.06 C □ # 0 + + +	AI	155	6	0.9	4	40	48	0.030	1.20	1.15	0.30	0.37	0.33	0.15	
	CWR09/225 @	TAZ AJ 225 * 0.06 C □ # 0 + + +	AJ	225	6	0.9	4	40	48	0.030	1.25	1.20	0.31	0.37	0.33	0.15	
	CWR09/335 @	TAZ AK 335 * 0.06 C □ # 0 + + +	AK	335	6	0.9	4	40	48	0.030	1.30	1.25	0.32	0.37	0.33	0.15	
	CWR09/475 @	TAZ AL 475 * 0.06 C □ # 0 + + +	AL	475	6	0.9	4	40	48	0.030	1.35	1.30	0.33	0.37	0.33	0.15	
	CWR09/685 @	TAZ AM 685 * 0.06 C □ # 0 + + +	AM	685	6	0.9	4	40	48	0.030	1.40	1.35	0.34	0.37	0.33	0.15	
	CWR09/105 @	TAZ AN 105 * 0.06 C □ # 0 + + +	AN	105	6	0.9	4	40	48	0.030	1.45	1.40	0.35	0.37	0.33	0.15	
	CWR09/155 @	TAZ AO 155 * 0.06 C □ # 0 + + +	AO	155	6	0.9	4	40	48	0.030	1.50	1.45	0.36	0.37	0.33	0.15	
	CWR09/225 @	TAZ AP 225 * 0.06 C □ # 0 + + +	AP	225	6	0.9	4	40	48	0.030	1.55	1.50	0.37	0.37	0.33	0.15	
	CWR09/335 @	TAZ AQ 335 * 0.06 C □ # 0 + + +	AQ	335	6	0.9	4	40	48	0.030	1.60	1.55	0.38	0.37	0.33	0.15	
	CWR09/475 @	TAZ AR 475 * 0.06 C □ # 0 + + +	AR	475	6	0.9	4	40	48	0.030	1.65	1.60	0.39	0.37	0.33	0.15	
	CWR09/685 @	TAZ AS 685 * 0.06 C □ # 0 + + +	AS	685	6	0.9	4	40	48	0.030	1.70	1.65	0.40	0.37	0.33	0.15	
	CWR09/105 @	TAZ AT 105 * 0.06 C □ # 0 + + +	AT	105	6	0.9	4	40	48	0.030	1.75	1.70	0.41	0.37	0.33	0.15	
	CWR09/155 @	TAZ AU 155 * 0.06 C □ # 0 + + +	AU	155	6	0.9	4	40	48	0.030	1.80	1.75	0.42	0.37	0.33	0.15	
	CWR09/225 @	TAZ AV 225 * 0.06 C □ # 0 + + +	AV	225	6	0.9	4	40	48	0.030	1.85	1.80	0.43	0.37	0.33	0.15	
	CWR09/335 @	TAZ AW 335 * 0.06 C □ # 0 + + +	AW	335	6	0.9	4	40	48	0.030	1.90	1.85	0.44	0.37	0.33	0.15	
	CWR09/475 @	TAZ AX 475 * 0.06 C □ # 0 + + +	AX	475	6	0.9	4	40	48	0.030	1.95	1.90	0.45	0.37	0.33	0.15	
	CWR09/685 @	TAZ AY 685 * 0.06 C □ # 0 + + +	AY	685	6	0.9	4	40	48	0.030	2.00	1.95	0.46	0.37	0.33	0.15	
	CWR09/105 @	TAZ AZ 105 * 0.06 C □ # 0 + + +	AZ	105	6	0.9	4	40	48	0.030	2.05	2.00	0.47	0.37	0.33	0.15	
	CWR09/155 @	TAZ BA 155 * 0.06 C □ # 0 + + +	BA	155	6	0.9	4	40	48	0.030	2.10	2.05	0.48	0.37	0.33	0.15	
	CWR09/225 @	TAZ BB 225 * 0.06 C □ # 0 + + +	BB	225	6	0.9	4	40	48	0.030	2.15	2.10	0.49	0.37	0.33	0.15	
	CWR09/335 @	TAZ BC 335 * 0.06 C □ # 0 + + +	BC	335	6	0.9	4	40	48	0.030	2.20	2.15	0.50	0.37	0.33	0.15	
	CWR09/475 @	TAZ BD 475 * 0.06 C □ # 0 + + +	BD	475	6	0.9	4	40	48	0.030	2.25	2.20	0.51	0.37	0.33	0.15	
	CWR09/685 @	TAZ BE 685 * 0.06 C □ # 0 + + +	BE	685	6	0.9	4	40	48	0.030	2.30	2.25	0.52	0.37	0.33	0.15	
	CWR09/105 @	TAZ BF 105 * 0.06 C □ # 0 + + +	BF	105	6	0.9	4	40	48	0.030	2.35	2.30	0.53	0.37	0.33	0.15	
	CWR09/155 @	TAZ BG 155 * 0.06 C □ # 0 + + +	BG	155	6	0.9	4	40	48	0.030	2.40	2.35	0.54	0.37	0.33	0.15	
	CWR09/225 @	TAZ BH 225 * 0.06 C □ # 0 + + +	BH	225	6	0.9	4	40	48	0.030	2.45	2.40	0.55	0.37	0.33	0.15	
	CWR09/335 @	TAZ BI 335 * 0.06 C □ # 0 + + +	BI	335	6	0.9	4	40	48	0.030	2.50	2.45	0.56	0.37	0.33	0.15	
	CWR09/475 @	TAZ BJ 475 * 0.06 C □ # 0 + + +	BJ	475	6	0.9	4	40	48	0.030	2.55	2.50	0.57	0.37	0.33	0.15	
	CWR09/685 @	TAZ BK 685 * 0.06 C □ # 0 + + +	BK	685	6	0.9	4	40	48	0.030	2.60	2.55	0.58	0.37	0.33	0.15	
	CWR09/105 @	TAZ BL 105 * 0.06 C □ # 0 + + +	BL	105	6	0.9	4	40	48	0.030	2.65	2.60	0.59	0.37	0.33	0.15	
	CWR09/155 @	TAZ BM 155 * 0.06 C □ # 0 + + +	BM	155	6	0.9	4	40	48	0.030	2.70	2.65	0.60	0.37	0.33	0.15	
	CWR09/225 @	TAZ BN 225 * 0.06 C □ # 0 + + +	BN	225	6	0.9	4	40	48	0.030	2.75	2.70	0.61	0.37	0.33	0.15	
	CWR09/335 @	TAZ BO 335 * 0.06 C □ # 0 + + +	BO	335	6	0.9	4	40	48	0.030	2.80	2.75	0.62	0.37	0.33	0.15	
	CWR09/475 @	TAZ BP 475 * 0.06 C □ # 0 + + +	BP	475	6	0.9	4	40	48	0.030	2.85	2.80	0.63	0.37	0.33	0.15	
	CWR09/685 @	TAZ BQ 685 * 0.06 C □ # 0 + + +	BQ	685	6	0.9	4	40	48	0.030	2.90	2.85	0.64	0.37	0.33	0.15	
	CWR09/105 @	TAZ BR 105 * 0.06 C □ # 0 + + +	BR	105	6	0.9	4	40	48	0.030	2.95	2.90	0.65	0.37	0.33	0.15	
	CWR09/155 @	TAZ BS 155 * 0.06 C □ # 0 + + +	BS	155	6	0.9	4	40	48	0.030	3.00	2.95	0.66	0.37	0.33	0.15	
	CWR09/225 @	TAZ BT 225 * 0.06 C □ # 0 + + +	BT	22													

RATING & PART NUMBER REFERENCE

CWR09 P/N	AVX MIL & COTS-Plus p/n	AVX SRC9000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55365/4				Typical RMS Ripple Data by Rating													
				Cap @ 120Hz @ 25°C	DC Rated Voltage @ +85°C	ESR @ 100kHz @ +25°C	DF Max +85/125°C	DCL max		25°C		85°C		125°C		25°C		85°C		125°C	
								+25°C	+85°C	+125°C	+25°C	+85°C	+125°C	Power Dissipation	Ripple A	Ripple V	Ripple A	Ripple V	Ripple A	Ripple V	Ripple A
CWR09M224@+	TAZ A 224 * 035 C □ □ □ @ 9 A ++	TAZ A 224 * 035 C □ □ □ @ 9 A ++	A	0.22	35	18	8	10	12	6	8	0.050	0.05	0.02	0.95	0.85	0.38				
CWR09M474@+	TAZ B 474 * 035 C □ □ □ @ 9 A ++	TAZ B 474 * 035 C □ □ □ @ 9 A ++	B	0.47	35	10	8	10	12	6	8	0.070	0.08	0.03	0.84	0.75	0.33				
CWR09M684@+	TAZ C 684 * 035 C □ □ □ @ 9 A ++	TAZ C 684 * 035 C □ □ □ @ 9 A ++	C	0.68	35	8	8	10	12	6	8	0.075	0.10	0.09	0.04	0.77	0.31				
CWR09M105@+	TAZ D 105 * 035 C □ □ □ @ 9 A ++	TAZ D 105 * 035 C □ □ □ @ 9 A ++	D	1	35	6.5	8	10	12	6	8	0.080	0.11	0.10	0.04	0.72	0.29				
CWR09M155@+	TAZ E 155 * 035 C □ □ □ @ 9 A ++	TAZ E 155 * 035 C □ □ □ @ 9 A ++	E	1.5	35	4.5	8	10	12	6	8	0.080	0.14	0.13	0.06	0.64	0.25				
CWR09M335@+	TAZ F 335 * 035 C □ □ □ @ 9 A ++	TAZ F 335 * 035 C □ □ □ @ 9 A ++	F	3.3	35	2.5	8	10	12	6	8	0.100	0.20	0.18	0.08	0.50	0.20				
CWR09M475@+	TAZ G 475 * 035 C □ □ □ @ 9 A ++	TAZ G 475 * 035 C □ □ □ @ 9 A ++	G	4.7	35	1.5	8	20	24	6	8	0.125	0.29	0.26	0.12	0.43	0.17				
CWR09M685@+	TAZ H 685 * 035 C □ □ □ @ 9 A ++	TAZ H 685 * 035 C □ □ □ @ 9 A ++	H	6.8	35	1.3	8	30	36	6	8	0.150	0.34	0.31	0.14	0.44	0.18				
CWR09N104@+	TAZ A 104 * 050 C □ □ □ @ 9 A ++	TAZ A 104 * 050 C □ □ □ @ 9 A ++	A	0.1	50	22	8	10	12	6	8	0.050	0.05	0.04	0.02	1.05	0.94				
CWR09N154@+	TAZ A 154 * 050 C □ □ □ @ 9 A ++	TAZ A 154 * 050 C □ □ □ @ 9 A ++	A	0.15	50	17	8	10	12	6	8	0.050	0.05	0.02	0.92	0.83	0.42				
CWR09N224@+	TAZ B 224 * 050 C □ □ □ @ 9 A ++	TAZ B 224 * 050 C □ □ □ @ 9 A ++	B	0.22	50	14	8	10	12	6	8	0.070	0.07	0.06	0.03	0.99	0.40				
CWR09N334@+	TAZ B 334 * 050 C □ □ □ @ 9 A ++	TAZ B 334 * 050 C □ □ □ @ 9 A ++	B	0.33	50	12	8	10	12	6	8	0.070	0.08	0.07	0.03	0.92	0.37				
CWR09N474@+	TAZ C 474 * 050 C □ □ □ @ 9 A ++	TAZ C 474 * 050 C □ □ □ @ 9 A ++	C	0.47	50	8	8	10	12	6	8	0.075	0.10	0.09	0.04	0.77	0.31				
CWR09N684@+	TAZ D 684 * 050 C □ □ □ @ 9 A ++	TAZ D 684 * 050 C □ □ □ @ 9 A ++	D	0.68	50	7	8	10	12	6	8	0.080	0.11	0.10	0.04	0.75	0.30				
CWR09N105@+	TAZ E 105 * 050 C □ □ □ @ 9 A ++	TAZ E 105 * 050 C □ □ □ @ 9 A ++	E	1	50	6	8	10	12	6	8	0.090	0.12	0.11	0.06	0.73	0.29				
CWR09N155@+	TAZ F 155 * 050 C □ □ □ @ 9 A ++	TAZ F 155 * 050 C □ □ □ @ 9 A ++	F	1.5	50	4	8	10	12	6	8	0.100	0.16	0.14	0.06	0.63	0.25				
CWR09N225@+	TAZ F 225 * 050 C □ □ □ @ 9 A ++	TAZ F 225 * 050 C □ □ □ @ 9 A ++	F	2.2	50	2.5	8	20	24	6	8	0.100	0.20	0.18	0.08	0.50	0.20				
CWR09N335@+	TAZ G 335 * 050 C □ □ □ @ 9 A ++	TAZ G 335 * 050 C □ □ □ @ 9 A ++	G	3.3	50	2	8	20	24	6	8	0.125	0.25	0.23	0.10	0.50	0.20				
CWR09N475@+	TAZ H 475 * 050 C □ □ □ @ 9 A ++	TAZ H 475 * 050 C □ □ □ @ 9 A ++	H	4.7	50	1.5	8	30	36	6	8	0.150	0.32	0.28	0.13	0.47	0.19				

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.



MARKING

(White marking on black body)



Polarity Stripe (+)

**Capacitance Code
Rated Voltage**

An extended range of capacitor ratings beyond CWR09 that is fully qualified to MIL-PRF-55365/11, this series represents the most flexible of surface mount form factors, offering nine case sizes (the original A through H of CWR09) and adds the new X case size.

The molded body / compliant termination construction ensures no TCE mismatch with any substrate. This construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. The parts also carry full polarity and capacitance / voltage marking.

The four smaller cases are characterized by their low profile construction, with the A case being the world's smallest molded military tantalum chip.

The series is qualified to MIL-PRF-55365 Weibull "B", "C", "D" and "T" levels, with all surge options ("A", "B" & "C") available.

For Space Level applications, AVX SRC 9000 qualification is recommended (see ratings table for part number availability).

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these are "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365). In addition, the molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

CASE DIMENSIONS:

millimeters (inches)

Case Code	Length (L) ±0.38 (0.015)	Width (W) ±0.38 (0.015)	Height (H) ±0.38 (0.015)	Term. Width (W _t)	Term. Length (A) +0.25/-0.13 (+0.010/-0.005)	S min	Typical Weight (g)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	0.38 (0.015)	0.016
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	1.65 (0.065)	0.025
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	2.92 (0.115)	0.035
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	2.41+0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	1.65 (0.065)	0.045
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	2.41+0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	2.92 (0.115)	0.065
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	3.30±0.13 (0.130±0.005)	0.76 (0.030)	3.43 (0.135)	0.125
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	2.67±0.13 (0.105±0.005)	1.27 (0.050)	3.56 (0.140)	0.205
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	3.68+0.13/-0.51 (0.145+0.005/-0.020)	1.27 (0.050)	4.06 (0.160)	0.335
X	6.93 Max (0.273)	5.41 Max (0.213)	2.74 Max (0.108)	3.05±0.13 (0.120±0.005)	1.19 (0.047)	N/A	0.420

CWR19-MIL-PRF 55365/11

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage DC (V _R) at 85°C						
µF	Code	4V (C)	6V (D)	10V (F)	15V (H)	20V (J)	25V (K)	35V (M)
0.33	334							A
0.47	474						A	
0.68	684					A		
1.0	105				A	A	B	
1.5	155				A	B		
2.2	225			A	A	B	D	
3.3	335	A	A	A	B	D	E	
4.7	475	A	A	B/C	B/C/D	E		
6.8	685	A	B	B/C/D	D/E	E	F	G
10	106	B	B	B/C/D/E	D/E	E/F		H
15	156	B	B/D/E	D/E	E/F	F	G	X
22	226	B/D	D/E	E	F	G	G/H	
33	336	D/E	E	F	F/G	H	H	
47	476	E	F	F/G	G/H	H/X		
68	686	E	F/G	G	G/H			
100	107	F	G	G/H	H			
150	157	G	G	H/X				
220	227	H	H	H				
330	337	H	H					

HOW TO ORDER

COTS-PLUS & MIL QPL (CWR19):

TAZ	H	227	*	006	C	□	#	@	0	^	++
Type	Case Size	Capacitance Code	Capacitance Tolerance	Voltage Code	Standard or Low ESR Range	Packaging	Inspection Level	Reliability Grade	Qualification Level	Termination Finish	Surge Test Option
		pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20% K = ±10% J = ±5%	004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc	C = Std ESR L = Low ESR	B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	S = Std. Conformance L = Group A M = MIL (JAN) CWR19	Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	0 = N/A T = T Level 9 = SRC9000	H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull

For RoHS compliant products, please select correct termination style.

CWR19 P/N CROSS REFERENCE:

CWR19	D	^	227	*	@	H	+	□
Type	Voltage Code	Termination Finish	Capacitance Code	Capacitance Tolerance	Reliability Grade	Case Size	Surge Test Option	Packaging
	C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc	H = Solder Plated K = Solder Fused C = Hot Solder Dipped B = Gold Plated	pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20% K = ±10% J = ±5%	Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER		A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull Z = None required	Bulk = Standard TR13 = 13" T&R W = Waffle See page 7 for additional packaging options.

For RoHS compliant products, please select correct termination style.

SPACE LEVEL OPTIONS TO SRC9000*:

TAZ	H	227	*	006	C	□	L	@	9	^	++
Type	Case Size	Capacitance Code	Capacitance Tolerance	Voltage Code	Standard or Low ESR Range	Packaging	Inspection Level	Reliability Grade	Qualification Level	Termination Finish	Surge Test Option
		pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20% K = ±10% J = ±5%	004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc	C = Std ESR L = Low ESR	B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	L = Group A	Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	9 = SRC9000	H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated	45 = 10 cycles, -55°C & +85°C before Weibull

For RoHS compliant products, please select correct termination style.

*Contact factory for AVX SRC9000 Space Level SCD details.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C								
Capacitance Range:	0.33 μF to 330 μF								
Capacitance Tolerance:	±5%; ±10%; ±20%								
Rated Voltage (V _R)	≤ 85°C:	4	6	10	15	20	25	35	
Category Voltage (V _C)	≤ 125°C:	2.7	4	6.7	10	13.3	16.7	23.3	
Surge Voltage (V _S)	≤ 85°C:	5.3	8	13.3	20	26.7	33.3	46.7	
Surge Voltage (V _S)	≤ 125°C:	3.5	5.3	8.7	13.3	17.8	22.2	31.1	
Temperature Range:	-55°C to +125°C								



RATING & PART NUMBER REFERENCE

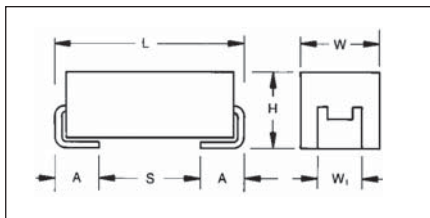
CWR19 P/N		AVX MIL & COTS-Plus P/N	AVX SRC3000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55365/11				Typical RMS Ripple Data by Rating						
Cap @ 120Hz	DC Rated Voltage @ 120Hz	ESR @ 100kHz	DCL max	DF Max	+25°C	+125°C	+25°C	Power Dissipation	25°C	85°C	125°C	25°C	85°C	125°C	
µF	V	Ohms	(µA)	(%)	(µA)	(µA)	(%)	W	A	A	V	A	V	V	
@ +25°C	@ +25°C	@ +25°C	+85°C	+125°C	+25°C	+125°C	+25°C	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	(100kHz)	
CWR19C335@A-C	TAZ A 335 * 004 C □ # @ 0 A ++	TAZ A 335 * 004 C □ # @ 0 A ++	TAZ A 335 * 004 C □ # @ 0 A ++	A	3.3	4	12	6	8	0.050	0.03	0.06	0.77	0.70	0.31
CWR19C475@A-C	TAZ A 475 * 004 C □ # @ 0 A ++	TAZ A 475 * 004 C □ # @ 0 A ++	TAZ A 475 * 004 C □ # @ 0 A ++	A	4.7	4	12	6	8	0.050	0.03	0.06	0.77	0.70	0.31
CWR19C685@A-C	TAZ A 685 * 004 C □ # @ 0 A ++	TAZ A 685 * 004 C □ # @ 0 A ++	TAZ A 685 * 004 C □ # @ 0 A ++	A	6.8	4	12	6	8	0.050	0.03	0.06	0.77	0.70	0.31
CWR19C106@B-C	TAZ B 106 * 004 C □ # @ 0 A ++	TAZ B 106 * 004 C □ # @ 0 A ++	TAZ B 106 * 004 C □ # @ 0 A ++	B	10	4	8	10	10	0.070	0.03	0.08	0.77	0.67	0.30
CWR19C156@B-C	TAZ B 156 * 004 C □ # @ 0 A ++	TAZ B 156 * 004 C □ # @ 0 A ++	TAZ B 156 * 004 C □ # @ 0 A ++	B	15	4	8	10	10	0.070	0.03	0.08	0.77	0.67	0.30
CWR19C226@B-C	TAZ B 226 * 004 C □ # @ 0 A ++	TAZ B 226 * 004 C □ # @ 0 A ++	TAZ B 226 * 004 C □ # @ 0 A ++	B	22	4	8	10	10	0.070	0.03	0.08	0.77	0.67	0.30
CWR19C226@D-C	TAZ D 226 * 004 C □ # @ 0 A ++	TAZ D 226 * 004 C □ # @ 0 A ++	TAZ D 226 * 004 C □ # @ 0 A ++	D	22	4	1	10	12	0.080	0.14	0.13	0.06	0.57	0.23
CWR19C336@D-C	TAZ D 336 * 004 C □ # @ 0 A ++	TAZ D 336 * 004 C □ # @ 0 A ++	TAZ D 336 * 004 C □ # @ 0 A ++	D	33	4	2	20	24	0.080	0.14	0.13	0.06	0.57	0.23
CWR19C336@E-C	TAZ E 336 * 004 C □ # @ 0 A ++	TAZ E 336 * 004 C □ # @ 0 A ++	TAZ E 336 * 004 C □ # @ 0 A ++	E	33	4	3	2	20	0.090	0.17	0.16	0.07	0.52	0.21
CWR19C476@E-C	TAZ E 476 * 004 C □ # @ 0 A ++	TAZ E 476 * 004 C □ # @ 0 A ++	TAZ E 476 * 004 C □ # @ 0 A ++	E	47	4	3	2	20	0.090	0.17	0.16	0.07	0.52	0.21
CWR19C686@E-C	TAZ E 686 * 004 C □ # @ 0 A ++	TAZ E 686 * 004 C □ # @ 0 A ++	TAZ E 686 * 004 C □ # @ 0 A ++	E	68	4	3	3	30	0.090	0.17	0.16	0.07	0.52	0.21
CWR19C107@F-H	TAZ F 107 * 004 C □ # @ 0 A ++	TAZ F 107 * 004 C □ # @ 0 A ++	TAZ F 107 * 004 C □ # @ 0 A ++	F	100	4	2	4	40	0.125	0.22	0.20	0.09	0.45	0.18
CWR19C157@G-H	TAZ G 157 * 004 C □ # @ 0 A ++	TAZ G 157 * 004 C □ # @ 0 A ++	TAZ G 157 * 004 C □ # @ 0 A ++	G	150	4	1	6	60	0.125	0.35	0.32	0.14	0.35	0.14
CWR19C227@H-H	TAZ H 227 * 004 C □ # @ 0 A ++	TAZ H 227 * 004 C □ # @ 0 A ++	TAZ H 227 * 004 C □ # @ 0 A ++	H	220	4	1	8	80	0.150	0.39	0.35	0.15	0.39	0.15
CWR19C337@H-H	TAZ H 337 * 004 C □ # @ 0 A ++	TAZ H 337 * 004 C □ # @ 0 A ++	TAZ H 337 * 004 C □ # @ 0 A ++	H	330	4	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.15
CWR19C337@A-C	TAZ A 337 * 006 C □ # @ 0 A ++	TAZ A 337 * 006 C □ # @ 0 A ++	TAZ A 337 * 006 C □ # @ 0 A ++	A	3.3	6	12	6	8	0.050	0.06	0.06	0.03	0.77	0.31
CWR19D475@A-C	TAZ A 475 * 006 C □ # @ 0 A ++	TAZ A 475 * 006 C □ # @ 0 A ++	TAZ A 475 * 006 C □ # @ 0 A ++	A	4.7	6	12	6	8	0.050	0.06	0.06	0.03	0.77	0.31
CWR19D685@B-C	TAZ B 685 * 006 C □ # @ 0 A ++	TAZ B 685 * 006 C □ # @ 0 A ++	TAZ B 685 * 006 C □ # @ 0 A ++	B	6.8	6	1	10	12	0.070	0.09	0.08	0.04	0.75	0.30
CWR19D106@B-C	TAZ B 106 * 006 C □ # @ 0 A ++	TAZ B 106 * 006 C □ # @ 0 A ++	TAZ B 106 * 006 C □ # @ 0 A ++	B	10	6	1	10	12	0.070	0.09	0.08	0.04	0.75	0.30
CWR19D156@B-C	TAZ B 156 * 006 C □ # @ 0 A ++	TAZ B 156 * 006 C □ # @ 0 A ++	TAZ B 156 * 006 C □ # @ 0 A ++	B	15	6	1	10	12	0.070	0.09	0.08	0.04	0.75	0.30
CWR19D226@D-C	TAZ D 226 * 006 C □ # @ 0 A ++	TAZ D 226 * 006 C □ # @ 0 A ++	TAZ D 226 * 006 C □ # @ 0 A ++	D	22	6	5	1	10	0.080	0.13	0.11	0.05	0.63	0.25
CWR19D226@E-C	TAZ E 226 * 006 C □ # @ 0 A ++	TAZ E 226 * 006 C □ # @ 0 A ++	TAZ E 226 * 006 C □ # @ 0 A ++	E	22	6	5	1	10	0.080	0.13	0.11	0.05	0.63	0.25
CWR19D337@E-C	TAZ E 337 * 006 C □ # @ 0 A ++	TAZ E 337 * 006 C □ # @ 0 A ++	TAZ E 337 * 006 C □ # @ 0 A ++	E	33	6	3	1	10	0.090	0.17	0.16	0.07	0.52	0.21
CWR19D476@F-H	TAZ F 476 * 006 C □ # @ 0 A ++	TAZ F 476 * 006 C □ # @ 0 A ++	TAZ F 476 * 006 C □ # @ 0 A ++	F	47	6	3.5	2	20	0.090	0.16	0.14	0.06	0.56	0.22
CWR19D686@G-C	TAZ G 686 * 006 C □ # @ 0 A ++	TAZ G 686 * 006 C □ # @ 0 A ++	TAZ G 686 * 006 C □ # @ 0 A ++	G	68	6	1.5	4	40	0.125	0.25	0.23	0.10	0.39	0.15
CWR19D107@G-C	TAZ G 107 * 006 C □ # @ 0 A ++	TAZ G 107 * 006 C □ # @ 0 A ++	TAZ G 107 * 006 C □ # @ 0 A ++	G	100	6	1.1	6	60	0.125	0.34	0.30	0.13	0.37	0.15
CWR19D157@H-C	TAZ H 157 * 006 C □ # @ 0 A ++	TAZ H 157 * 006 C □ # @ 0 A ++	TAZ H 157 * 006 C □ # @ 0 A ++	H	150	6	1.1	10	100	0.125	0.34	0.30	0.13	0.37	0.15
CWR19D227@H-C	TAZ H 227 * 006 C □ # @ 0 A ++	TAZ H 227 * 006 C □ # @ 0 A ++	TAZ H 227 * 006 C □ # @ 0 A ++	H	220	6	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.15
CWR19D337@H-C	TAZ H 337 * 006 C □ # @ 0 A ++	TAZ H 337 * 006 C □ # @ 0 A ++	TAZ H 337 * 006 C □ # @ 0 A ++	H	330	6	0.9	20	200	0.150	0.41	0.37	0.16	0.37	0.15
CWR19F225@A-C	TAZ A 225 * 010 C □ # @ 0 A ++	TAZ A 225 * 010 C □ # @ 0 A ++	TAZ A 225 * 010 C □ # @ 0 A ++	A	2.2	10	12	1	10	0.050	0.06	0.06	0.03	0.77	0.31
CWR19F335@A-C	TAZ A 335 * 010 C □ # @ 0 A ++	TAZ A 335 * 010 C □ # @ 0 A ++	TAZ A 335 * 010 C □ # @ 0 A ++	A	3.3	10	12	1	10	0.050	0.06	0.06	0.03	0.77	0.31
CWR19F475@B-C	TAZ B 475 * 010 C □ # @ 0 A ++	TAZ B 475 * 010 C □ # @ 0 A ++	TAZ B 475 * 010 C □ # @ 0 A ++	B	4.7	10	8	1	10	0.070	0.09	0.08	0.04	0.75	0.30
CWR19F685@B-C	TAZ B 685 * 010 C □ # @ 0 A ++	TAZ B 685 * 010 C □ # @ 0 A ++	TAZ B 685 * 010 C □ # @ 0 A ++	B	6.8	10	8	1	10	0.070	0.09	0.08	0.04	0.75	0.30
CWR19F106@B-C	TAZ B 106 * 010 C □ # @ 0 A ++	TAZ B 106 * 010 C □ # @ 0 A ++	TAZ B 106 * 010 C □ # @ 0 A ++	B	10	10	8	1	10	0.070	0.09	0.08	0.04	0.75	0.30
CWR19F475@C-C	TAZ C 475 * 010 C □ # @ 0 A ++	TAZ C 475 * 010 C □ # @ 0 A ++	TAZ C 475 * 010 C □ # @ 0 A ++	C	4.7	10	5.5	1	10	0.075	0.12	0.11	0.05	0.64	0.26
CWR19F685@C-C	TAZ C 685 * 010 C □ # @ 0 A ++	TAZ C 685 * 010 C □ # @ 0 A ++	TAZ C 685 * 010 C □ # @ 0 A ++	C	6.8	10	5.5	1	10	0.075	0.12	0.11	0.05	0.64	0.26
CWR19F106@C-C	TAZ C 106 * 010 C □ # @ 0 A ++	TAZ C 106 * 010 C □ # @ 0 A ++	TAZ C 106 * 010 C □ # @ 0 A ++	C	10	10	5.5	1	10	0.075	0.12	0.11	0.05	0.64	0.26
CWR19F685@D-C	TAZ D 685 * 010 C □ # @ 0 A ++	TAZ D 685 * 010 C □ # @ 0 A ++	TAZ D 685 * 010 C □ # @ 0 A ++	D	6.8	10	5	1	10	0.080	0.13	0.11	0.05	0.63	0.25
CWR19F106@D-C	TAZ D 106 * 010 C □ # @ 0 A ++	TAZ D 106 * 010 C □ # @ 0 A ++	TAZ D 106 * 010 C □ # @ 0 A ++	D	10	10	4	1	10	0.080	0.13	0.11	0.05	0.63	0.25
CWR19F156@D-C	TAZ D 156 * 010 C □ # @ 0 A ++	TAZ D 156 * 010 C □ # @ 0 A ++	TAZ D 156 * 010 C □ # @ 0 A ++	D	15	10	5	2	20	0.080	0.13	0.11	0.05	0.63	0.25
CWR19F106@E-C	TAZ E 106 * 010 C □ # @ 0 A ++	TAZ E 106 * 010 C □ # @ 0 A ++	TAZ E 106 * 010 C □ # @ 0 A ++	E	10	10	3.5	1	10	0.090	0.16	0.14	0.06	0.56	0.22
CWR19F156@E-C	TAZ E 156 * 010 C □ # @ 0 A ++	TAZ E 156 * 010 C □ # @ 0 A ++	TAZ E 156 * 010 C □ # @ 0 A ++	E	15	10	3	2	20	0.090	0.17	0.16	0.07	0.52	0.21
CWR19F225@E-C	TAZ E 225 * 010 C □ # @ 0 A ++	TAZ E 225 * 010 C □ # @ 0 A ++	TAZ E 225 * 010 C □ # @ 0 A ++	E	22	10	2	3	30	0.090	0.21	0.19	0.08	0.42	0.17
CWR19F336@F-H	TAZ F 336 * 010 C □ # @ 0 A ++	TAZ F 336 * 010 C □ # @ 0 A ++	TAZ F 336 * 010 C □ # @ 0 A ++	F	33	10	1.5	3	30	0.100	0.26	0.23	0.10	0.39	0.15
CWR19F476@F-H	TAZ F 476 * 010 C □ # @ 0 A ++	TAZ F 476 * 010 C □ # @ 0 A ++	TAZ F 476 * 010 C □ # @ 0 A ++	F	47	10	1.5	4	40	0.100	0.26	0.23	0.10	0.39	0.15
CWR19F686@G-C	TAZ G 686 * 010 C □ # @ 0 A ++	TAZ G 686 * 010 C □ # @ 0 A ++	TAZ G 686 * 010 C □ # @ 0 A ++	G	68	10	1.1	6	60	0.125	0.35	0.32	0.14	0.35	0.14
CWR19F107@G-C	TAZ G 107 * 010 C □ # @ 0 A ++	TAZ G 107 * 010 C □ # @ 0 A ++	TAZ G 107 * 010 C □ # @ 0 A ++	G	100	10	1.1	10	100	0.125	0.35	0.32	0.14	0.35	0.14
CWR19F157@H-C	TAZ H 157 * 010 C □ # @ 0 A ++	TAZ H 157 * 010 C □ # @ 0 A ++	TAZ H 157 * 010 C □ # @ 0 A ++	H	150	10	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.15
CWR19F227@H-C	TAZ H 227 * 010 C □ # @ 0 A ++	TAZ H 227 * 010 C □ # @ 0 A ++	TAZ H 227 * 010 C □ # @ 0 A ++	H	220	10	0.9	15	150	0.150	0.41	0.37	0.16	0.37	0.15
CWR19F157@X-C	TAZ X 157 * 010 C □ # @ 0 A ++	TAZ X 157 * 010 C □ # @ 0 A ++	TAZ X 157 * 010 C □ # @ 0 A ++	X	150	10	0.9	15	150	0.200	0.47	0.42	0.19	0.42	0.17

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

RATING & PART NUMBER REFERENCE

CWR19 P/N	AVX MIL & COTS-Plus P/N	AVX SRC9000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55365/11				Typical RMS Ripple Data by Rating											
				Cap @ 120Hz	DC Rated Voltage @ +85°C	ESR @ 100kHz	DF Max +65/125°C	25°C		85°C		125°C		25°C		85°C		125°C	
								µF	µA	µA	(%)	(%)	(%)	A	V	A	V	A	V
CWR19M105@A+H	TAZ A 105 * 015 C □ □ # @ 0 A ++	TAZ A 105 * 015 C □ □ L @ 9 A ++	A	1	15	15	6	8	0.050	0.06	0.05	0.02	0.87	0.78	0.35				
CWR19M155@A+H	TAZ A 155 * 015 C □ □ # @ 0 A ++	TAZ A 155 * 015 C □ □ L @ 9 A ++	A	1.5	15	15	6	8	0.050	0.06	0.05	0.02	0.87	0.78	0.35				
CWR19M225@A+H	TAZ A 225 * 015 C □ □ # @ 0 A ++	TAZ A 225 * 015 C □ □ L @ 9 A ++	A	2.2	15	15	6	8	0.050	0.06	0.05	0.02	0.87	0.78	0.35				
CWR19M335@B+H	TAZ B 335 * 015 C □ □ # @ 0 A ++	TAZ B 335 * 015 C □ □ L @ 9 A ++	B	3.3	15	9	1	10	0.070	0.09	0.06	0.04	0.79	0.71	0.32				
CWR19M475@B+H	TAZ B 475 * 015 C □ □ # @ 0 A ++	TAZ B 475 * 015 C □ □ L @ 9 A ++	B	4.7	15	5	1	10	0.070	0.12	0.11	0.05	0.59	0.53	0.24				
CWR19M475@C+H	TAZ C 475 * 015 C □ □ # @ 0 A ++	TAZ C 475 * 015 C □ □ L @ 9 A ++	C	4.7	15	5.5	1	10	0.075	0.12	0.11	0.05	0.64	0.58	0.28				
CWR19M475@D+H	TAZ D 475 * 015 C □ □ # @ 0 A ++	TAZ D 475 * 015 C □ □ L @ 9 A ++	D	4.7	15	6	1	10	0.080	0.12	0.10	0.05	0.69	0.62	0.28				
CWR19M685@D+H	TAZ D 685 * 015 C □ □ # @ 0 A ++	TAZ D 685 * 015 C □ □ L @ 9 A ++	D	6.8	15	6	1	10	0.080	0.12	0.10	0.05	0.69	0.62	0.28				
CWR19M106@E+H	TAZ E 106 * 015 C □ □ # @ 0 A ++	TAZ E 106 * 015 C □ □ L @ 9 A ++	E	10	15	4	2	20	0.090	0.15	0.14	0.06	0.60	0.54	0.24				
CWR19M156@E+H	TAZ E 156 * 015 C □ □ # @ 0 A ++	TAZ E 156 * 015 C □ □ L @ 9 A ++	E	15	15	4	2	20	0.090	0.15	0.14	0.06	0.60	0.54	0.24				
CWR19M335@F+H	TAZ F 335 * 015 C □ □ # @ 0 A ++	TAZ F 335 * 015 C □ □ L @ 9 A ++	F	33	15	3	3	30	0.100	0.18	0.16	0.07	0.55	0.49	0.22				
CWR19M475@F+H	TAZ F 475 * 015 C □ □ # @ 0 A ++	TAZ F 475 * 015 C □ □ L @ 9 A ++	F	47	15	3	3	30	0.100	0.18	0.16	0.07	0.55	0.49	0.22				
CWR19M685@G+H	TAZ G 685 * 015 C □ □ # @ 0 A ++	TAZ G 685 * 015 C □ □ L @ 9 A ++	G	68	15	1.1	10	100	0.125	0.34	0.30	0.13	0.37	0.33	0.15				
CWR19M476@G+H	TAZ G 476 * 015 C □ □ # @ 0 A ++	TAZ G 476 * 015 C □ □ L @ 9 A ++	G	47	15	1.1	10	100	0.125	0.34	0.30	0.13	0.37	0.33	0.15				
CWR19M686@H+H	TAZ H 686 * 015 C □ □ # @ 0 A ++	TAZ H 686 * 015 C □ □ L @ 9 A ++	H	68	15	1.1	10	100	0.125	0.34	0.30	0.13	0.37	0.33	0.15				
CWR19M476@H+H	TAZ H 476 * 015 C □ □ # @ 0 A ++	TAZ H 476 * 015 C □ □ L @ 9 A ++	H	47	15	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M688@H+H	TAZ H 688 * 015 C □ □ # @ 0 A ++	TAZ H 688 * 015 C □ □ L @ 9 A ++	H	68	15	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M107@H+H	TAZ H 107 * 015 C □ □ # @ 0 A ++	TAZ H 107 * 015 C □ □ L @ 9 A ++	H	100	15	0.9	10	150	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M684@H+H	TAZ A 684 * 020 C □ □ # @ 0 A ++	TAZ A 684 * 020 C □ □ L @ 9 A ++	A	0.68	20	15	1	10	0.12	6	8	0.050	0.06	0.02	0.87	0.78	0.35		
CWR19M105@A+H	TAZ A 105 * 020 C □ □ # @ 0 A ++	TAZ A 105 * 020 C □ □ L @ 9 A ++	A	1	20	15	1	10	0.12	6	8	0.050	0.06	0.02	0.87	0.78	0.35		
CWR19M155@B+H	TAZ B 155 * 020 C □ □ # @ 0 A ++	TAZ B 155 * 020 C □ □ L @ 9 A ++	B	1.5	20	9	1	10	0.12	6	8	0.070	0.09	0.08	0.04	0.79	0.71	0.32	
CWR19M225@B+H	TAZ B 225 * 020 C □ □ # @ 0 A ++	TAZ B 225 * 020 C □ □ L @ 9 A ++	B	2.2	20	9	1	10	0.12	6	8	0.070	0.09	0.08	0.04	0.79	0.71	0.32	
CWR19M335@D+H	TAZ D 335 * 020 C □ □ # @ 0 A ++	TAZ D 335 * 020 C □ □ L @ 9 A ++	D	3.3	20	6	1	10	0.12	6	8	0.080	0.12	0.10	0.05	0.69	0.62	0.28	
CWR19M475@E+H	TAZ E 475 * 020 C □ □ # @ 0 A ++	TAZ E 475 * 020 C □ □ L @ 9 A ++	E	4.7	20	6	1	10	0.12	6	8	0.090	0.13	0.12	0.05	0.67	0.60	0.27	
CWR19M685@E+H	TAZ E 685 * 020 C □ □ # @ 0 A ++	TAZ E 685 * 020 C □ □ L @ 9 A ++	E	6.8	20	5	2	20	0.12	6	8	0.090	0.13	0.12	0.05	0.67	0.60	0.27	
CWR19M106@E+H	TAZ E 106 * 020 C □ □ # @ 0 A ++	TAZ E 106 * 020 C □ □ L @ 9 A ++	E	10	20	5	2	20	0.12	6	8	0.090	0.13	0.12	0.05	0.67	0.60	0.27	
CWR19M106@F+H	TAZ F 106 * 020 C □ □ # @ 0 A ++	TAZ F 106 * 020 C □ □ L @ 9 A ++	F	10	20	3	2	20	0.12	6	8	0.100	0.18	0.16	0.07	0.55	0.49	0.22	
CWR19M156@F+H	TAZ F 156 * 020 C □ □ # @ 0 A ++	TAZ F 156 * 020 C □ □ L @ 9 A ++	F	15	20	3	2	20	0.12	6	8	0.100	0.18	0.16	0.07	0.55	0.49	0.22	
CWR19M226@G+H	TAZ G 226 * 020 C □ □ # @ 0 A ++	TAZ G 226 * 020 C □ □ L @ 9 A ++	G	22	20	2.5	4	40	0.125	0.22	0.20	0.09	0.56	0.50	0.22				
CWR19M336@H+H	TAZ H 336 * 020 C □ □ # @ 0 A ++	TAZ H 336 * 020 C □ □ L @ 9 A ++	H	33	20	0.9	6	60	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M476@H+H	TAZ H 476 * 020 C □ □ # @ 0 A ++	TAZ H 476 * 020 C □ □ L @ 9 A ++	H	47	20	0.9	6	60	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M476@X+H	TAZ X 476 * 020 C □ □ # @ 0 A ++	TAZ X 476 * 020 C □ □ L @ 9 A ++	X	47	20	0.9	10	100	0.200	0.47	0.42	0.19	0.42	0.38	0.17				
CWR19M474@A+H	TAZ A 474 * 025 C □ □ # @ 0 A ++	TAZ A 474 * 025 C □ □ L @ 9 A ++	A	0.47	25	15	1	10	0.12	6	8	0.050	0.06	0.05	0.02	0.87	0.78	0.35	
CWR19M105@B+H	TAZ B 105 * 025 C □ □ # @ 0 A ++	TAZ B 105 * 025 C □ □ L @ 9 A ++	B	1	25	10	1	10	0.12	6	8	0.070	0.08	0.06	0.03	0.84	0.75	0.33	
CWR19M225@D+H	TAZ D 225 * 025 C □ □ # @ 0 A ++	TAZ D 225 * 025 C □ □ L @ 9 A ++	D	2.2	25	6	1	10	0.12	6	8	0.080	0.12	0.10	0.05	0.69	0.62	0.28	
CWR19M335@E+H	TAZ E 335 * 025 C □ □ # @ 0 A ++	TAZ E 335 * 025 C □ □ L @ 9 A ++	E	3.3	25	4	1	10	0.12	6	8	0.090	0.12	0.10	0.05	0.69	0.62	0.28	
CWR19M685@F+H	TAZ F 685 * 025 C □ □ # @ 0 A ++	TAZ F 685 * 025 C □ □ L @ 9 A ++	F	6.8	25	3	2	20	0.12	6	8	0.100	0.18	0.16	0.07	0.55	0.49	0.22	
CWR19M156@G+H	TAZ G 156 * 025 C □ □ # @ 0 A ++	TAZ G 156 * 025 C □ □ L @ 9 A ++	G	15	25	1.4	4	40	0.125	0.30	0.27	0.12	0.42	0.38	0.17				
CWR19M226@G+H	TAZ G 226 * 025 C □ □ # @ 0 A ++	TAZ G 226 * 025 C □ □ L @ 9 A ++	G	22	25	1.4	6	60	0.125	0.30	0.27	0.12	0.42	0.38	0.17				
CWR19M336@H+H	TAZ H 336 * 025 C □ □ # @ 0 A ++	TAZ H 336 * 025 C □ □ L @ 9 A ++	H	33	25	0.9	6	60	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M476@H+H	TAZ H 476 * 025 C □ □ # @ 0 A ++	TAZ H 476 * 025 C □ □ L @ 9 A ++	H	47	25	0.9	10	100	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M334@A+H	TAZ A 334 * 035 C □ □ # @ 0 A ++	TAZ A 334 * 035 C □ □ L @ 9 A ++	A	0.33	35	22	1	10	0.12	6	8	0.050	0.05	0.04	0.02	1.05	0.94	0.42	
CWR19M685@G+H	TAZ G 685 * 035 C □ □ # @ 0 A ++	TAZ G 685 * 035 C □ □ L @ 9 A ++	G	6.8	35	1.5	3	30	0.125	0.29	0.26	0.12	0.43	0.39	0.17				
CWR19M106@H+H	TAZ H 106 * 035 C □ □ # @ 0 A ++	TAZ H 106 * 035 C □ □ L @ 9 A ++	H	10	35	0.9	4	40	0.150	0.41	0.37	0.16	0.37	0.33	0.15				
CWR19M156@X+H	TAZ X 156 * 035 C □ □ # @ 0 A ++	TAZ X 156 * 035 C □ □ L @ 9 A ++	X	15	35	0.9	6	60	0.200	0.47	0.42	0.19	0.42	0.38	0.17				

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz. 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.



MARKING

(White marking on black body)



Polarity Stripe (+)

Capacitance Code
Rated Voltage

A low ESR version of CWR09 and CWR19 that is fully qualified to MIL-PRF-55365/11, the CWR29 series represents the most flexible of surface mount form factors and the optimum power handling for all filtering applications. It is offered in nine case sizes (the original A through H of CWR09 and adding the new X case size).

The molded body / compliant termination construction ensures no TCE mismatch with any substrate. This construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. The parts also carry full polarity and capacitance / voltage marking.

The five smaller cases are characterized by their low profile construction, with the A case being the world's smallest molded military tantalum chip.

The series is qualified to MIL-PRF-55365 Weibull "B", "C", "D" and "T" levels, with all surge options ("A", "B" & "C") available.

For Space Level applications, AVX SRC 9000 qualification is recommended (see ratings table for part number availability).

There are four termination finishes available: solder plated, fused solder plated, hot solder dipped and gold plated (these are "H", "K", "C" and "B" termination, respectively, per MIL-PRF-55365). In addition, the molding compound has been selected to meet the requirements of UL94V-0 (Flame Retardancy) and outgassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

CASE DIMENSIONS:

millimeters (inches)

Case Code	Length (L) ±0.38 (0.015)	Width (W) ±0.38 (0.015)	Height (H) ±0.38 (0.015)	Term. Width (W _t)	Term. Length (A) +0.25/-0.13 (+0.010/-0.005)	S min	Typical Weight (g)
A	2.54 (0.100)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	0.38 (0.015)	0.016
B	3.81 (0.150)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	1.65 (0.065)	0.025
C	5.08 (0.200)	1.27 (0.050)	1.27 (0.050)	1.27±0.13 (0.050±0.005)	0.76 (0.030)	2.92 (0.115)	0.035
D	3.81 (0.150)	2.54 (0.100)	1.27 (0.050)	2.41±0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	1.65 (0.065)	0.045
E	5.08 (0.200)	2.54 (0.100)	1.27 (0.050)	2.41±0.13/-0.25 (0.095+0.005/-0.010)	0.76 (0.030)	2.92 (0.115)	0.065
F	5.59 (0.220)	3.43 (0.135)	1.78 (0.070)	3.30±0.13 (0.130±0.005)	0.76 (0.030)	3.43 (0.135)	0.125
G	6.73 (0.265)	2.79 (0.110)	2.79 (0.110)	2.67±0.13 (0.105±0.005)	1.27 (0.050)	3.56 (0.140)	0.205
H	7.24 (0.285)	3.81 (0.150)	2.79 (0.110)	3.68±0.13/-0.51 (0.145+0.005/-0.020)	1.27 (0.050)	4.06 (0.160)	0.335
X	6.93 Max (0.273)	5.41 Max (0.213)	2.74 Max (0.108)	3.05±0.13 (0.120±0.005)	1.19 (0.047)	N/A	0.420

CWR29-MIL-PRF 55365/11

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage DC (V _R) at 85°C							
µF	Code	4V (C)	6V (D)	10V (F)	15V (H)	20V (J)	25V (K)	35V (M)	50V (N)
0.10	104								A
0.15	154								A
0.22	224							A	B
0.33	334						A	A	B
0.47	474					A	A	B	C
0.68	684				A	A/B	B	C	D
1.0	105			A	A	A/B	B/C	D	E
1.5	155		A		A/B	B/C	D	E	F
2.2	225	A		A/B	A/C	B/D	D/E		F
3.3	335	A	A/B	A/C	B/D	D/E	E	F	G
4.7	475	A/B	A/C	B/C/D	B/C/D/E	E	F	G	H
6.8	685	A/C	B/D	B/C/D/E	D/E	E/F	F/G	G/H	
10	106	B/D	B/E	B/C/D/E	D/E/F	E/F	G	H	
15	156	B/E	B/D/E	D/E/F	E/F	F/G	G/H	X	
22	226	B/D	D/E/F	E	F/G	G/H	G/H		
33	336	D/E/F	E	F/G	F/G/H	H	H		
47	476	E	F/G	F/G/H	G/H	H/X			
68	686	E/G	F/G/H	G	G/H				
100	107	F/H	G	G/H	H				
150	157	G	G	H/X					
220	227	H	H	H					
330	337	H	H						

HOW TO ORDER

COTS-PLUS & MIL QPL (CWR29):

TAZ	H	227	*	006	C	□	#	@	0	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level S = Std. Conformance L = Group A M = MIL (JAN) CWR29	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	Qualification Level 0 = N/A T = T Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	Surge Test Option 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT
For RoHS compliant products, please select correct termination style.

CWR29 P/N CROSS REFERENCE:

CWR29	D	^	227	*	@	H	+	□
Type	Voltage Code C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	Termination Finish H = Solder Plated K = Solder Fused C = Hot Solder Dipped B = Gold Plated	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER	Case Size	Surge Test Option A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull Z = None required	Packaging Bulk = Standard TR = 7" T&R TR13 = 13" T&R W = Waffle See page 7 for additional packaging options.

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT
For RoHS compliant products, please select correct termination style.

SPACE LEVEL OPTIONS TO SRC9000*:

TAZ	H	227	*	006	C	□	L	@	9	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level L = Group A	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	Qualification Level 9 = SRC9000	Termination Finish H = Solder Plated 0 = Fused Solder Plated 8 = Hot Solder Dipped 9 = Gold Plated	Surge Test Option 45 = 10 cycles, -55°C & +85°C before Weibull

LEAD-FREE LEAD-FREE COMPATIBLE COMPONENT
For RoHS compliant products, please select correct termination style.

*Contact factory for AVX SRC9000 Space Level SCD details.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C									
Capacitance Range:	0.10 µF to 330 µF									
Capacitance Tolerance:	±5%; ±10%; ±20%									
Rated Voltage (V _R)	≤ 85°C:	4	6	10	15	20	25	35	50	
Category Voltage (V _C)	≤ 125°C:	2.7	4	6.7	10	13.3	16.7	23.3	33.3	
Surge Voltage (V _S)	≤ 85°C:	5.3	8	13.3	20	26.7	33.3	46.7	66.7	
Surge Voltage (V _S)	≤ 125°C:	3.5	5.3	8.7	13.3	17.8	22.2	31.1	44.5	
Temperature Range:	-55°C to +125°C									

RATING & PART NUMBER REFERENCE		Parametric Specifications by Rating per MIL-PRF-55365/11										Typical RMS Ripple Data by Rating									
CWR29 P/N	AVX MIL & COTS-Plus P/N	AVX SRC9000 P/N	Case	DC Rated Voltage @ 120Hz		ESR @ 25°C		DCL max @ 85°C		DF Max @ (65/125)°C		Power Dissipation		25°C Ripple		85°C Ripple		125°C Ripple			
				V @ +85°C	V @ +25°C	Ohms	(µA)	(%)	(%)	W	A (100kHz)	V (100kHz)	A (100kHz)	A (100kHz)	V (100kHz)	A (100kHz)	V (100kHz)	A (100kHz)			
CWR29C0225@A-□	TAZ A 225 * 004 L □ # @ 0 A ++	TAZ A 225 * 004 L □ □ @ 9 A ++	A	2.2	4	4	1	10	12	6	8	8	0.050	0.11	0.10	0.04	0.45	0.40	0.18		
CWR29C0335@A-□	TAZ A 335 * 004 L □ # @ 0 A ++	TAZ A 335 * 004 L □ □ @ 9 A ++	A	3.3	4	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29C0475@A-□	TAZ A 475 * 004 L □ # @ 0 A ++	TAZ A 475 * 004 L □ □ @ 9 A ++	A	4.7	4	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29C0475@B-□	TAZ B 475 * 004 L □ # @ 0 A ++	TAZ B 475 * 004 L □ □ @ 9 A ++	B	4.7	4	3.2	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29C0685@A-□	TAZ A 685 * 004 L □ # @ 0 A ++	TAZ A 685 * 004 L □ □ @ 9 A ++	A	6.8	4	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29C0685@C-□	TAZ C 685 * 004 L □ # @ 0 A ++	TAZ C 685 * 004 L □ □ @ 9 A ++	C	6.8	4	2.2	1	10	12	6	8	8	0.075	0.18	0.17	0.07	0.41	0.37	0.16		
CWR29C108@B-□	TAZ B 108 * 004 L □ # @ 0 A ++	TAZ B 108 * 004 L □ □ @ 9 A ++	B	10	4	3.2	1	10	12	6	8	10	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29C108@D-□	TAZ D 108 * 004 L □ # @ 0 A ++	TAZ D 108 * 004 L □ □ @ 9 A ++	D	10	4	1.3	1	10	12	6	8	10	0.080	0.25	0.22	0.10	0.32	0.29	0.13		
CWR29C158@B-□	TAZ B 158 * 004 L □ # @ 0 A ++	TAZ B 158 * 004 L □ □ @ 9 A ++	B	15	4	3.2	1	10	12	6	8	10	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29C158@E-□	TAZ E 158 * 004 L □ # @ 0 A ++	TAZ E 158 * 004 L □ □ @ 9 A ++	E	15	4	1	1	10	12	6	8	10	0.090	0.30	0.27	0.12	0.30	0.27	0.12		
CWR29C226@B-□	TAZ B 226 * 004 L □ # @ 0 A ++	TAZ B 226 * 004 L □ □ @ 9 A ++	B	22	4	3.2	1	10	12	6	8	10	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29C226@D-□	TAZ D 226 * 004 L □ # @ 0 A ++	TAZ D 226 * 004 L □ □ @ 9 A ++	D	22	4	1.3	1	10	12	6	8	10	0.080	0.25	0.22	0.10	0.32	0.29	0.13		
CWR29C335@D-□	TAZ D 335 * 004 L □ # @ 0 A ++	TAZ D 335 * 004 L □ □ @ 9 A ++	D	33	4	1.3	2	20	24	8	10	12	0.080	0.25	0.22	0.10	0.32	0.29	0.13		
CWR29C335@E-□	TAZ E 335 * 004 L □ # @ 0 A ++	TAZ E 335 * 004 L □ □ @ 9 A ++	E	33	4	0.9	2	20	24	8	10	12	0.090	0.32	0.28	0.13	0.28	0.26	0.11		
CWR29C335@F-□	TAZ F 335 * 004 L □ # @ 0 A ++	TAZ F 335 * 004 L □ □ @ 9 A ++	F	33	4	0.6	2	20	24	8	10	12	0.100	0.41	0.37	0.16	0.24	0.22	0.10		
CWR29C475@B-□	TAZ B 475 * 006 L □ # @ 0 A ++	TAZ B 475 * 006 L □ □ @ 9 A ++	B	47	4	0.9	3	30	36	8	10	12	0.090	0.32	0.28	0.13	0.28	0.26	0.11		
CWR29C475@E-□	TAZ E 475 * 006 L □ # @ 0 A ++	TAZ E 475 * 006 L □ □ @ 9 A ++	E	47	4	0.275	3	30	36	10	12	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07		
CWR29C475@G-□	TAZ G 475 * 006 L □ # @ 0 A ++	TAZ G 475 * 006 L □ □ @ 9 A ++	G	47	4	0.55	4	40	48	10	12	12	0.100	0.43	0.38	0.17	0.23	0.21	0.09		
CWR29C107@H-□	TAZ H 107 * 004 L □ # @ 0 A ++	TAZ H 107 * 004 L □ □ @ 9 A ++	H	100	4	0.18	4	40	48	10	12	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07		
CWR29C157@G-□	TAZ G 157 * 006 L □ # @ 0 A ++	TAZ G 157 * 006 L □ □ @ 9 A ++	G	150	4	0.25	6	60	72	10	12	12	0.125	0.71	0.64	0.28	0.18	0.16	0.07		
CWR29C227@H-□	TAZ H 227 * 004 L □ # @ 0 A ++	TAZ H 227 * 004 L □ □ @ 9 A ++	H	220	4	0.2	8	80	96	10	12	12	0.150	0.87	0.78	0.35	0.17	0.16	0.07		
CWR29C337@H-□	TAZ H 337 * 004 L □ # @ 0 A ++	TAZ H 337 * 004 L □ □ @ 9 A ++	H	330	4	0.18	10	100	120	10	12	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07		
CWR29D155@A-□	TAZ A 155 * 006 L □ # @ 0 A ++	TAZ A 155 * 006 L □ □ @ 9 A ++	A	1.5	6	4	1	10	12	6	8	8	0.050	0.11	0.10	0.04	0.45	0.40	0.18		
CWR29D335@A-□	TAZ A 335 * 006 L □ # @ 0 A ++	TAZ A 335 * 006 L □ □ @ 9 A ++	A	3.3	6	6	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29D335@B-□	TAZ B 335 * 006 L □ # @ 0 A ++	TAZ B 335 * 006 L □ □ @ 9 A ++	B	3.3	6	3.2	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29D475@A-□	TAZ A 475 * 006 L □ # @ 0 A ++	TAZ A 475 * 006 L □ □ @ 9 A ++	A	4.7	6	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29D475@C-□	TAZ C 475 * 006 L □ # @ 0 A ++	TAZ C 475 * 006 L □ □ @ 9 A ++	C	4.7	6	2.2	1	10	12	6	8	8	0.075	0.18	0.17	0.07	0.41	0.37	0.16		
CWR29D685@B-□	TAZ B 685 * 006 L □ # @ 0 A ++	TAZ B 685 * 006 L □ □ @ 9 A ++	B	6.8	6	3.2	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29D685@D-□	TAZ D 685 * 006 L □ # @ 0 A ++	TAZ D 685 * 006 L □ □ @ 9 A ++	D	6.8	6	1.5	1	10	12	6	8	8	0.080	0.23	0.21	0.09	0.35	0.31	0.14		
CWR29D108@B-□	TAZ B 108 * 006 L □ # @ 0 A ++	TAZ B 108 * 006 L □ □ @ 9 A ++	B	10	6	3.2	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29D108@E-□	TAZ E 108 * 006 L □ # @ 0 A ++	TAZ E 108 * 006 L □ □ @ 9 A ++	E	10	6	1	1	10	12	6	8	10	0.090	0.30	0.27	0.12	0.30	0.27	0.12		
CWR29D158@B-□	TAZ B 158 * 006 L □ # @ 0 A ++	TAZ B 158 * 006 L □ □ @ 9 A ++	B	15	6	3.2	1	10	12	6	8	10	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29D158@D-□	TAZ D 158 * 006 L □ # @ 0 A ++	TAZ D 158 * 006 L □ □ @ 9 A ++	D	15	6	1.7	1	10	12	6	8	10	0.080	0.22	0.20	0.09	0.37	0.33	0.15		
CWR29D158@E-□	TAZ E 158 * 006 L □ # @ 0 A ++	TAZ E 158 * 006 L □ □ @ 9 A ++	E	15	6	0.9	1	10	12	6	8	10	0.090	0.32	0.28	0.13	0.28	0.26	0.11		
CWR29D226@D-□	TAZ D 226 * 006 L □ # @ 0 A ++	TAZ D 226 * 006 L □ □ @ 9 A ++	D	22	6	1.7	1	10	12	6	8	10	0.080	0.22	0.20	0.09	0.37	0.33	0.15		
CWR29D475@F-□	TAZ F 475 * 006 L □ # @ 0 A ++	TAZ F 475 * 006 L □ □ @ 9 A ++	F	22	6	0.6	2	20	24	8	10	12	0.100	0.41	0.37	0.16	0.24	0.22	0.10		
CWR29D335@E-□	TAZ E 335 * 006 L □ # @ 0 A ++	TAZ E 335 * 006 L □ □ @ 9 A ++	E	33	6	1	2	20	24	8	10	12	0.080	0.22	0.20	0.09	0.37	0.33	0.15		
CWR29D475@F-□	TAZ F 475 * 006 L □ # @ 0 A ++	TAZ F 475 * 006 L □ □ @ 9 A ++	F	33	6	1	2	20	24	8	10	12	0.080	0.30	0.27	0.12	0.30	0.27	0.12		
CWR29D475@G-□	TAZ G 475 * 006 L □ # @ 0 A ++	TAZ G 475 * 006 L □ □ @ 9 A ++	G	33	6	1	3	30	36	8	10	12	0.100	0.32	0.28	0.13	0.32	0.28	0.13		
CWR29D475@H-□	TAZ H 475 * 006 L □ # @ 0 A ++	TAZ H 475 * 006 L □ □ @ 9 A ++	H	47	6	0.275	3	30	36	10	12	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07		
CWR29D685@G-□	TAZ G 685 * 006 L □ # @ 0 A ++	TAZ G 685 * 006 L □ □ @ 9 A ++	G	68	6	0.4	4	40	48	10	12	12	0.100	0.50	0.45	0.20	0.20	0.18	0.08		
CWR29D685@H-□	TAZ H 685 * 006 L □ # @ 0 A ++	TAZ H 685 * 006 L □ □ @ 9 A ++	H	68	6	0.25	4	40	48	10	12	12	0.125	0.71	0.64	0.28	0.18	0.16	0.07		
CWR29D108@G-□	TAZ G 108 * 006 L □ # @ 0 A ++	TAZ G 108 * 006 L □ □ @ 9 A ++	G	100	6	0.18	4	40	48	10	12	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07		
CWR29D108@H-□	TAZ H 108 * 006 L □ # @ 0 A ++	TAZ H 108 * 006 L □ □ @ 9 A ++	H	100	6	0.275	6	60	72	10	12	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07		
CWR29D157@G-□	TAZ G 157 * 006 L □ # @ 0 A ++	TAZ G 157 * 006 L □ □ @ 9 A ++	G	150	6	0.275	10	100	120	10	12	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07		
CWR29D227@H-□	TAZ H 227 * 006 L □ # @ 0 A ++	TAZ H 227 * 006 L □ □ @ 9 A ++	H	220	6	0.18	10	100	120	10	12	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07		
CWR29D337@H-□	TAZ H 337 * 006 L □ # @ 0 A ++	TAZ H 337 * 006 L □ □ @ 9 A ++	H	330	6	0.18	20	200	240	10	12	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07		
CWR29F105@A-□	TAZ A 105 * 010 L □ # @ 0 A ++	TAZ A 105 * 010 L □ □ @ 9 A ++	A	1	10	5	1	10	12	6	8	8	0.050	0.10	0.09	0.04	0.50	0.45	0.20		
CWR29F225@A-□	TAZ A 225 * 010 L □ # @ 0 A ++	TAZ A 225 * 010 L □ □ @ 9 A ++	A	2.2	10	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29F225@B-□	TAZ B 225 * 010 L □ # @ 0 A ++	TAZ B 225 * 010 L □ □ @ 9 A ++	B	2.2	10	3.2	1	10	12	6	8	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19		
CWR29F335@A-□	TAZ A 335 * 010 L □ # @ 0 A ++	TAZ A 335 * 010 L □ □ @ 9 A ++	A	3.3	10	6	1	10	12	6	8	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22		
CWR29F335@C-□	TAZ C 335 * 010 L □ # @ 0 A ++	TAZ C 335 * 010 L □ □ @ 9 A ++	C	3.3	10	2.2	1	10	12	6	8	8	0.075	0.18	0.17	0.07	0.41	0.37	0.16		
CWR29F475@B-□	TAZ B 475 * 010 L □ # @ 0 A ++	TAZ B 475 * 010 L □ □ @ 9 A ++	B	4.7	10	3.2	1	10	12	6	8	8	0.070	0.15	0.13						



RATING & PART NUMBER REFERENCE

CWR29 P/N	AVX MIL & COTS-Plus P/N	AVX SRC9000 P/N	Case	Parametric Specifications by Rating per MIL-PRF-55365/11				Typical RMS Ripple Data by Rating										
				Cap @ 25°C	DC Rated Voltage @ +25°C	ESR @ 100kHz @ +25°C	DF Max @ +85/125°C	-55°C		25°C		85°C		125°C				
								Cap @ 25°C	DC Rated Voltage @ +25°C	ESR @ 100kHz @ +25°C	DF Max @ +85/125°C	Cap @ 25°C	DC Rated Voltage @ +25°C	ESR @ 100kHz @ +25°C	DF Max @ +85/125°C	Cap @ 25°C	DC Rated Voltage @ +25°C	ESR @ 100kHz @ +25°C
CWR29F475@D-H	TAZ D 475 * 010 L @ 0 A ++	TAZ D 475 * 010 L @ 0 A ++	D	4.7	10	1.5	10	12	6	8	0.080	0.23	0.21	0.09	0.35	0.31	0.14	
CWR29F485@B-H	TAZ B 685 * 010 L @ 0 A ++	TAZ B 685 * 010 L @ 0 A ++	B	6.8	10	3.2	10	12	6	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19	
CWR29F485@C-H	TAZ C 685 * 010 L @ 0 A ++	TAZ C 685 * 010 L @ 0 A ++	C	6.8	10	2.2	10	12	6	8	0.070	0.18	0.17	0.07	0.47	0.37	0.16	
CWR29F485@D-H	TAZ D 685 * 010 L @ 0 A ++	TAZ D 685 * 010 L @ 0 A ++	D	6.8	10	1.7	10	12	6	8	0.080	0.22	0.20	0.09	0.37	0.33	0.15	
CWR29F485@E-H	TAZ E 685 * 010 L @ 0 A ++	TAZ E 685 * 010 L @ 0 A ++	E	6.8	10	1	10	12	6	8	0.080	0.30	0.27	0.12	0.30	0.27	0.12	
CWR29F105@B-H	TAZ B 105 * 010 L @ 0 A ++	TAZ B 105 * 010 L @ 0 A ++	B	10	10	3.2	10	12	6	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19	
CWR29F105@C-H	TAZ C 105 * 010 L @ 0 A ++	TAZ C 105 * 010 L @ 0 A ++	C	10	10	2.2	10	12	6	8	0.070	0.18	0.17	0.07	0.47	0.37	0.16	
CWR29F105@D-H	TAZ D 105 * 010 L @ 0 A ++	TAZ D 105 * 010 L @ 0 A ++	D	10	10	1.3	10	12	6	8	0.080	0.25	0.22	0.10	0.32	0.29	0.13	
CWR29F105@E-H	TAZ E 105 * 010 L @ 0 A ++	TAZ E 105 * 010 L @ 0 A ++	E	10	10	1	10	12	6	8	0.080	0.30	0.27	0.12	0.30	0.27	0.12	
CWR29F155@B-H	TAZ B 155 * 010 L @ 0 A ++	TAZ B 155 * 010 L @ 0 A ++	B	15	10	1.7	2	20	24	6	8	0.080	0.22	0.20	0.09	0.37	0.33	0.15
CWR29F155@C-H	TAZ C 155 * 010 L @ 0 A ++	TAZ C 155 * 010 L @ 0 A ++	C	15	10	0.9	2	20	24	6	8	0.080	0.32	0.28	0.13	0.28	0.26	0.11
CWR29F155@D-H	TAZ D 155 * 010 L @ 0 A ++	TAZ D 155 * 010 L @ 0 A ++	D	15	10	0.7	2	20	24	6	8	0.080	0.38	0.34	0.15	0.26	0.24	0.11
CWR29F155@E-H	TAZ E 155 * 010 L @ 0 A ++	TAZ E 155 * 010 L @ 0 A ++	E	15	10	0.6	3	30	36	8	10	0.090	0.39	0.35	0.15	0.23	0.21	0.09
CWR29F335@B-H	TAZ B 335 * 010 L @ 0 A ++	TAZ B 335 * 010 L @ 0 A ++	B	33	10	0.4	3	30	36	8	10	0.100	0.50	0.45	0.20	0.20	0.18	0.08
CWR29F335@C-H	TAZ C 335 * 010 L @ 0 A ++	TAZ C 335 * 010 L @ 0 A ++	C	33	10	0.275	3	30	36	10	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29F335@D-H	TAZ D 335 * 010 L @ 0 A ++	TAZ D 335 * 010 L @ 0 A ++	D	33	10	0.4	4	40	48	10	12	0.100	0.50	0.45	0.20	0.20	0.18	0.08
CWR29F335@E-H	TAZ E 335 * 010 L @ 0 A ++	TAZ E 335 * 010 L @ 0 A ++	E	33	10	0.25	4	40	48	10	12	0.125	0.71	0.64	0.28	0.18	0.16	0.07
CWR29F475@B-H	TAZ B 475 * 010 L @ 0 A ++	TAZ B 475 * 010 L @ 0 A ++	B	47	10	0.18	5	50	60	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29F475@C-H	TAZ C 475 * 010 L @ 0 A ++	TAZ C 475 * 010 L @ 0 A ++	C	47	10	0.18	6	60	72	10	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29F475@D-H	TAZ D 475 * 010 L @ 0 A ++	TAZ D 475 * 010 L @ 0 A ++	D	47	10	0.275	10	100	120	10	12	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29F475@E-H	TAZ E 475 * 010 L @ 0 A ++	TAZ E 475 * 010 L @ 0 A ++	E	47	10	0.18	10	100	120	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29F105@B-H	TAZ B 105 * 010 L @ 0 A ++	TAZ B 105 * 010 L @ 0 A ++	B	150	10	0.18	15	150	180	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29F155@B-H	TAZ B 155 * 010 L @ 0 A ++	TAZ B 155 * 010 L @ 0 A ++	B	150	10	0.065	15	150	180	10	12	0.200	1.75	1.58	0.70	0.11	0.10	0.05
CWR29F225@B-H	TAZ B 225 * 010 L @ 0 A ++	TAZ B 225 * 010 L @ 0 A ++	B	220	10	0.18	20	200	240	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29F335@B-H	TAZ B 335 * 010 L @ 0 A ++	TAZ B 335 * 010 L @ 0 A ++	B	0.68	15	6	1	10	12	6	8	0.050	0.09	0.08	0.04	0.55	0.49	0.22
CWR29H105@A-H	TAZ A 105 * 015 L @ 0 A ++	TAZ A 105 * 015 L @ 0 A ++	A	1	15	7.5	1	10	12	6	8	0.050	0.08	0.07	0.03	0.61	0.55	0.24
CWR29H155@A-H	TAZ A 155 * 015 L @ 0 A ++	TAZ A 155 * 015 L @ 0 A ++	A	1.5	15	7.5	1	10	12	6	8	0.050	0.08	0.07	0.03	0.61	0.55	0.24
CWR29H155@B-H	TAZ B 155 * 015 L @ 0 A ++	TAZ B 155 * 015 L @ 0 A ++	B	1.5	15	3.2	1	10	12	6	8	0.070	0.15	0.13	0.06	0.47	0.43	0.19
CWR29H225@A-H	TAZ A 225 * 015 L @ 0 A ++	TAZ A 225 * 015 L @ 0 A ++	A	2.2	15	7.5	1	10	12	6	8	0.050	0.08	0.07	0.03	0.61	0.55	0.24
CWR29H225@B-H	TAZ B 225 * 015 L @ 0 A ++	TAZ B 225 * 015 L @ 0 A ++	B	2.2	15	2.2	1	10	12	6	8	0.075	0.18	0.17	0.07	0.41	0.37	0.16
CWR29H335@A-H	TAZ A 335 * 015 L @ 0 A ++	TAZ A 335 * 015 L @ 0 A ++	A	3.3	15	3.6	1	10	12	6	8	0.070	0.14	0.13	0.06	0.50	0.45	0.20
CWR29H335@B-H	TAZ B 335 * 015 L @ 0 A ++	TAZ B 335 * 015 L @ 0 A ++	B	3.3	15	1.7	1	10	12	6	8	0.080	0.22	0.20	0.09	0.37	0.33	0.15
CWR29H475@A-H	TAZ A 475 * 015 L @ 0 A ++	TAZ A 475 * 015 L @ 0 A ++	A	4.7	15	2.2	1	10	12	6	8	0.070	0.18	0.17	0.07	0.37	0.34	0.15
CWR29H475@B-H	TAZ B 475 * 015 L @ 0 A ++	TAZ B 475 * 015 L @ 0 A ++	B	4.7	15	2	1	10	12	6	8	0.080	0.20	0.18	0.08	0.40	0.36	0.16
CWR29H475@C-H	TAZ C 475 * 015 L @ 0 A ++	TAZ C 475 * 015 L @ 0 A ++	C	4.7	15	2	1	10	12	6	8	0.080	0.20	0.18	0.08	0.40	0.36	0.16
CWR29H475@D-H	TAZ D 475 * 015 L @ 0 A ++	TAZ D 475 * 015 L @ 0 A ++	D	4.7	15	1.2	1	10	12	6	8	0.090	0.27	0.25	0.11	0.33	0.30	0.13
CWR29H475@E-H	TAZ E 475 * 015 L @ 0 A ++	TAZ E 475 * 015 L @ 0 A ++	E	4.7	15	0.9	1	10	12	6	8	0.080	0.32	0.28	0.13	0.28	0.26	0.11
CWR29H685@A-H	TAZ A 685 * 015 L @ 0 A ++	TAZ A 685 * 015 L @ 0 A ++	A	6.8	15	0.9	1	10	12	8	10	0.080	0.32	0.28	0.13	0.28	0.26	0.11
CWR29H685@B-H	TAZ B 685 * 015 L @ 0 A ++	TAZ B 685 * 015 L @ 0 A ++	B	6.8	15	1.2	2	20	24	6	8	0.080	0.20	0.18	0.08	0.40	0.36	0.16
CWR29H685@C-H	TAZ C 685 * 015 L @ 0 A ++	TAZ C 685 * 015 L @ 0 A ++	C	6.8	15	0.667	2	20	24	6	8	0.100	0.39	0.35	0.15	0.26	0.23	0.10
CWR29H685@D-H	TAZ D 685 * 015 L @ 0 A ++	TAZ D 685 * 015 L @ 0 A ++	D	6.8	15	1.2	2	20	24	6	8	0.090	0.27	0.25	0.11	0.33	0.30	0.13
CWR29H685@E-H	TAZ E 685 * 015 L @ 0 A ++	TAZ E 685 * 015 L @ 0 A ++	E	6.8	15	0.8	2	20	24	6	8	0.080	0.35	0.32	0.14	0.28	0.25	0.11
CWR29H105@A-H	TAZ A 105 * 015 L @ 0 A ++	TAZ A 105 * 015 L @ 0 A ++	A	10	15	0.8	3	30	36	8	10	0.100	0.50	0.45	0.20	0.20	0.18	0.08
CWR29H105@B-H	TAZ B 105 * 015 L @ 0 A ++	TAZ B 105 * 015 L @ 0 A ++	B	10	15	0.275	4	40	48	6	8	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29H105@C-H	TAZ C 105 * 015 L @ 0 A ++	TAZ C 105 * 015 L @ 0 A ++	C	10	15	0.8	5	50	60	6	8	0.100	0.35	0.32	0.14	0.28	0.25	0.11
CWR29H105@D-H	TAZ D 105 * 015 L @ 0 A ++	TAZ D 105 * 015 L @ 0 A ++	D	10	15	0.275	6	60	72	8	10	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29H105@E-H	TAZ E 105 * 015 L @ 0 A ++	TAZ E 105 * 015 L @ 0 A ++	E	10	15	0.18	5	50	60	8	10	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29H155@A-H	TAZ A 155 * 015 L @ 0 A ++	TAZ A 155 * 015 L @ 0 A ++	A	15	15	0.18	10	100	120	8	10	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29H155@B-H	TAZ B 155 * 015 L @ 0 A ++	TAZ B 155 * 015 L @ 0 A ++	B	15	15	0.275	10	100	120	8	10	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29H155@C-H	TAZ C 155 * 015 L @ 0 A ++	TAZ C 155 * 015 L @ 0 A ++	C	15	15	0.18	10	100	120	8	10	0.125	0.67	0.61	0.27	0.19	0.17	0.07
CWR29H155@D-H	TAZ D 155 * 015 L @ 0 A ++	TAZ D 155 * 015 L @ 0 A ++	D	15	15	0.18	15	150	180	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29H155@E-H	TAZ E 155 * 015 L @ 0 A ++	TAZ E 155 * 015 L @ 0 A ++	E	15	15	0.18	15	150	180	10	12	0.150	0.91	0.82	0.37	0.16	0.15	0.07
CWR29H475@A-H	TAZ A 475 * 020 L @ 0 A ++	TAZ A 475 * 020 L @ 0 A ++	A	0.47	20	7.5	1	10	12	8	10	0.050	0.08	0.07	0.03	0.61	0.55	0.24
CWR29H684@A-H	TAZ A 684 * 020 L @ 0 A ++	TAZ A 684 * 020 L @ 0 A ++	A	0.68	20	7.5	1	10	12	6	8	0.050	0.08	0.07	0.03	0.61	0.55	0.24

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

RATING & PART NUMBER REFERENCE			Parametric Specifications by Rating per MIL-PRF-55365/11										Typical RMS Ripple Data by Rating									
CWR29 P/N	AVX MIL & COTS-Plus P/N	AVX SRC3000 P/N	Case	Cap @ 120Hz	DC Rated Voltage @ +85°C	ESR @ 100kHz	DCL max		DF Max +85/125°C	+125°C	+25°C	-55°C	Power Dissipation	25°C		85°C		125°C				
							(µA)	(µA)						(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
CWR29V224@B+□	TAZ B 224 * 050 L □ # @ 0 ^ ++	AVX SRC3000 P/N	B	0.22	50	6.8	10	12	6	8	8	0.070	0.10	0.09	0.04	0.69	0.62	0.28				
CWR29V334@B+□	TAZ B 334 * 050 L □ # @ 0 ^ ++	TAZ B 224 * 050 L □ L @ 9 ^ ++	B	0.33	50	4.8	10	12	6	8	8	0.070	0.12	0.11	0.05	0.58	0.52	0.23				
CWR29V474@C+□	TAZ C 474 * 050 L □ # @ 0 ^ ++	TAZ B 334 * 050 L □ L @ 9 ^ ++	C	0.47	50	3.2	10	12	6	8	8	0.075	0.15	0.14	0.06	0.49	0.44	0.20				
CWR29V684@D+□	TAZ D 684 * 050 L □ # @ 0 ^ ++	TAZ C 474 * 050 L □ L @ 9 ^ ++	D	0.68	50	2.3	10	12	6	8	8	0.080	0.19	0.17	0.07	0.43	0.39	0.17				
CWR29V105@E+□	TAZ E 105 * 050 L □ # @ 0 ^ ++	TAZ D 684 * 050 L □ L @ 9 ^ ++	E	1	50	1.7	10	12	6	8	8	0.090	0.23	0.21	0.09	0.39	0.35	0.16				
CWR29V155@F+□	TAZ F 155 * 050 L □ # @ 0 ^ ++	TAZ E 105 * 050 L □ L @ 9 ^ ++	F	1.5	50	1.1	10	12	6	8	8	0.100	0.30	0.27	0.12	0.33	0.30	0.13				
CWR29V225@G+□	TAZ G 225 * 050 L □ # @ 0 ^ ++	TAZ F 155 * 050 L □ L @ 9 ^ ++	G	2.2	50	0.7	2	20	24	6	8	0.100	0.38	0.34	0.15	0.26	0.24	0.11				
CWR29V335@G+□	TAZ G 335 * 050 L □ # @ 0 ^ ++	TAZ G 225 * 050 L □ L @ 9 ^ ++	H	3.3	50	0.5	2	20	24	6	8	0.125	0.50	0.45	0.20	0.25	0.23	0.10				
CWR29V475@H+□	TAZ H 475 * 050 L □ # @ 0 ^ ++	TAZ G 335 * 050 L □ L @ 9 ^ ++	H	4.7	50	0.5	3	30	36	6	8	0.150	0.55	0.49	0.22	0.27	0.25	0.11				

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. **NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.**

Solid Tantalum Chip TAZ Tape and reel packaging for automatic component placement.

Please enter required Suffix on order. Bulk packaging is standard.

TAZ TAPING SUFFIX TABLE

Case Size reference	Tape width mm	P mm	180mm (7") reel		330mm (13") reel	
			Suffix	Qty.	Suffix	Qty.
A	8	4	R	2500	S	9000
R	8	4	R	2500	S	–
B	12	4	R	2500	S	9000
C	12	4	R	2500	S	9000
D	12	4	R	2500	S	8000
E	12	4	R	2500	S	8000
F	12	8	R	1000	S	3000
G	12	8	R	500	S	2500
H	12	8	R	500	S	2500
X	12	8	R	500	S	2000

Total Tape Thickness – K max	
TAZ	
Case size reference	Millimeters (Inches) DIM
A	2.0 (0.079)
R	2.0 (0.079)
B	4.0 (0.157)
D	4.0 (0.157)
E	4.0 (0.157)
F	4.0 (0.157)
G	4.0 (0.157)
H	4.0 (0.157)
X	4.0 (0.157)

Code	8mm Tape		12mm Tape	
P*	4±0.1 or 8±0.1	(0.157±0.004) (0.315±0.004)	4±0.1 or 8±0.1	(0.157±0.004) (0.315±0.004)
G	0.75 min	(0.03 min)	0.75 min	(0.03 min)
F	3.5±0.04	(0.138±0.002)	5.5±0.05	(0.22±0.002)
E	1.75±0.1	(0.069±0.004)	1.75±0.1	(0.069±0.004)
W	8±0.3	(0.315±0.012)	12±0.3	(0.472±0.012)
P ₂	2±0.05	(0.079±0.002)	2±0.05	(0.079±0.002)
P ₀	4±0.1	(0.157±0.004)	4±0.1	(0.157±0.004)
D	1.5±0.1 -0	(0.059±0.004) (-0)	1.5±0.1 -0	(0.059±0.004) (-0)
D ₁	1.0 min	(0.039 min)	1.5 min	(0.059 min)

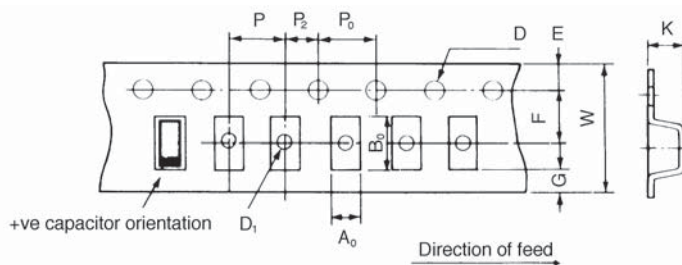
*See taping suffix tables for actual P dimension (component pitch).

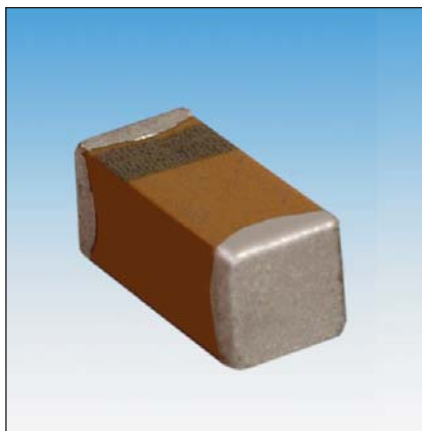
TAPE SPECIFICATION

Tape dimensions comply to EIA RS 481 A
Dimensions A₀ and B₀ of the pocket and the tape thickness, K, are dependent on the component size.

Tape materials do not affect component solderability during storage.

Carrier Tape Thickness <0.4mm



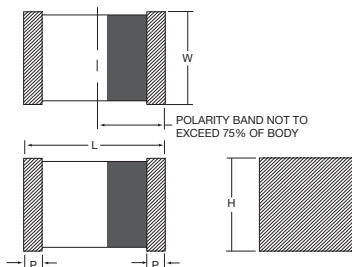


AVX announces the world's smallest military approved tantalum chip capacitors. The CWR15 offers 0603, 0805 and 1206 case sizes in capacitance/voltage combinations previously only available in much larger packages. The revolutionary AVX TACmicrochip® technology offers designers significant opportunity to downsize circuits for military and aerospace applications.

The product is manufactured in the AVX Tantalum high reliability facility in Biddeford, Maine which is also home to the CWR09, CWR11, CWR19 and CWR29 product lines. For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

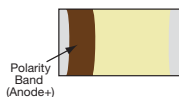
CASE DIMENSIONS: millimeters (inches)

Case Code	Length (L)	Width (W)	Height (H)	Term. Width (W _t)
A	3.20±0.20 (0.126±0.008)	1.60±0.20 (0.063±0.008)	1.60±0.20 (0.063±0.008)	0.15+0.35/-0.00 (0.006+0.014/-0.000)
L	1.60+0.25/-0.15 (0.063+0.010/-0.006)	0.84+0.20/-0.10 (0.033+0.008/-0.004)	0.84+0.20/-0.10 (0.033+0.008/-0.004)	0.15+0.35/-0.00 (0.006+0.014/-0.000)
R	2.00+0.25/-0.15 (0.079+0.010/-0.006)	1.35+0.20/-0.10 (0.053+0.008/-0.004)	1.35+0.20/-0.10 (0.053+0.008/-0.004)	0.15+0.35/-0.00 (0.006+0.014/-0.000)



MARKING

A, L, R CASE



CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Voltage Rating DC (V _R) at 85°C			
µF	Code	4V (C)	6V (D)	10V (F)	20V (J)
0.47	474			L	L
0.68	684			L	
1.0	105			L	
1.5	155			L	
2.2	225			L	
3.3	335		L	R	
4.7	475		L	R	
6.8	685	L	R	R	
10	106	R	R	R	
15	156	R	R	A	
22	226	R	A		
33	336	R	A		
47	476		A		
68	686	A			

Further extensions of the CWR15 product are planned for later in 2009. A new case size will be added, and the voltage range will be extended to 20 volts. Ratings of 100 µF at 4 volts to 10 µF at 20 volts will be included in this extension of the product line.

HOW TO ORDER

COTS-PLUS & MIL QPL (CWR15):

TBC	L	685	*	004	C	□	#	@	0	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 020 = 20Vdc	Standard or Low ESR Range C = Std ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level S = Std. Conformance L = Group A M = MIL (JAN) CWR15	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	Qualification Level 0 = N/A T = T Level 9 = SRC9000	Termination Finish 0 = Fused Solder Plated 9 = Gold Plated 7 = Matte Sn (COTS-Plus only)	Surge Test Option 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull



CWR15 P/N CROSS REFERENCE:

CWR15	F	C	685	*	-	L	+
Style	Voltage Code C = 4Vdc D = 6Vdc F = 10Vdc J = 20Vdc	Termination Finish B = Gold Plated K = Solder Fused For RoHS compliant products, please select correct termination style.	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents number of zeros to follow	Capacitance Tolerance J = ±5% K = ±10% M = ±20% See page 7 for additional packaging options.	Product Level Designator Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. T = T Level A = Non-ER	Case Size	Surge Test Option A = +25°C after Weibull B = -55°C & +85°C after Weibull C = -55°C & +85°C before Weibull Z = None Required

SPACE LEVEL OPTIONS TO SRC9000*:

TBC	L	685	*	004	C	□	L	@	9	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 020 = 20Vdc	Standard or Low ESR Range C = Std ESR L = Low ESR	Packaging B = Bulk R = 7" T&R S = 13" T&R W = Waffle See page 7 for additional packaging options.	Inspection Level L = Group A	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf.	Qualification Level 9 = SRC9000	Termination Finish 0 = Fused Solder Plated 9 = Gold Plated	Surge Test Option 45 = 10 cycles, -55°C & +85°C before Weibull



*Contact factory for AVX SRC9000 Space Level SCD details.

TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C					
Capacitance Range:	0.47 µF to 68 µF					
Capacitance Tolerance:	±5%; ±10%; ±20%					
Rated Voltage (V _R)	≤ 85°C:	4	6	10	20	
Category Voltage (V _C)	≤ 125°C:	2.7	4	6.7	13.3	
Surge Voltage (V _S)	≤ 85°C:	5.3	8	13.3	26.7	
Surge Voltage (V _S)	≤ 125°C:	3.5	5.3	8.7	17.8	
Temperature Range:	-55°C to +125°C					



RATING & PART NUMBER REFERENCE			Parametric Specifications by Rating per MIL-PRF-55365/12										Typical RMS Ripple Data by Rating										
CWR15 P/N	AVX MIL & COTS-Plus P/N	Case	AVX SRC9000 P/N	Cap @ 120Hz @ 25°C	DC Rated Voltage @ +85°C	ESR @ 100kHz @ +25°C	DCL max		DF Max		Power Dissipation	25°C		85°C		125°C		25°C		85°C		125°C	
							+25°C (µA)	+125°C (µA)	+25°C (%)	+85/125°C		+25°C (100kHz) A	100kHz (100kHz) A	100kHz (100kHz) A	100kHz (100kHz) V	100kHz (100kHz) V	100kHz (100kHz) V	100kHz (100kHz) V					
CWR15CK685*AL+	TBC L 685 * 004 C □ □ @ 9 A +	L	TBC L 685 * 004 C □ □ @ 9 A +	6.8	4	10	0.5	5	6	8	16	12	0.025	0.05	0.06	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15CK106*VR+	TBC R 106 * 004 C □ □ @ 9 A +	R	TBC R 106 * 004 C □ □ @ 9 A +	10	4	6	0.5	5	6	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15CK156*VR+	TBC R 156 * 004 C □ □ @ 9 A +	R	TBC R 156 * 004 C □ □ @ 9 A +	15	4	6	0.6	6	7	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15CK226*VR+	TBC R 226 * 004 C □ □ @ 9 A +	R	TBC R 226 * 004 C □ □ @ 9 A +	22	4	6	0.9	9	11	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15CK336*VR+	TBC R 336 * 004 C □ □ @ 9 A +	R	TBC R 336 * 004 C □ □ @ 9 A +	33	4	6	1.3	13	16	10	20	15	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15CK686*VA+	TBC A 686 * 004 C □ □ @ 9 A +	A	TBC A 686 * 004 C □ □ @ 9 A +	68	4	1	2.7	27	33	15	30	23	0.040	0.20	0.18	0.08	0.20	0.18	0.20	0.18	0.18	0.08	
CWR15DK335*AL+	TBC L 335 * 006 C □ □ @ 9 A +	L	TBC L 335 * 006 C □ □ @ 9 A +	3.3	6	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15DK475*AL+	TBC L 475 * 006 C □ □ @ 9 A +	L	TBC L 475 * 006 C □ □ @ 9 A +	4.7	6	10	0.5	5	6	8	16	12	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15DK685*VR+	TBC R 685 * 006 C □ □ @ 9 A +	R	TBC R 685 * 006 C □ □ @ 9 A +	6.8	6	6	0.5	5	6	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15DK106*VR+	TBC R 106 * 006 C □ □ @ 9 A +	R	TBC R 106 * 006 C □ □ @ 9 A +	10	6	6	0.6	6	7	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15DK156*VR+	TBC R 156 * 006 C □ □ @ 9 A +	R	TBC R 156 * 006 C □ □ @ 9 A +	15	6	6	0.9	9	11	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15DK226*VA+	TBC A 226 * 006 C □ □ @ 9 A +	A	TBC A 226 * 006 C □ □ @ 9 A +	22	6	6	1.4	14	17	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.49	0.44	0.20	0.20	
CWR15DK336*VA+	TBC A 336 * 006 C □ □ @ 9 A +	A	TBC A 336 * 006 C □ □ @ 9 A +	33	6	6	2	20	24	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.49	0.44	0.20	0.20	
CWR15DK476*VA+	TBC A 476 * 006 C □ □ @ 9 A +	A	TBC A 476 * 006 C □ □ @ 9 A +	47	6	4	2.8	28	34	15	30	23	0.040	0.10	0.09	0.04	0.40	0.36	0.40	0.36	0.16	0.16	
CWR15FK474*AL+	TBC L 474 * 010 C □ □ @ 9 A +	L	TBC L 474 * 010 C □ □ @ 9 A +	0.47	10	12	0.5	5	6	6	12	9	0.025	0.05	0.04	0.02	0.55	0.49	0.55	0.49	0.22	0.22	
CWR15FK684*AL+	TBC L 684 * 010 C □ □ @ 9 A +	L	TBC L 684 * 010 C □ □ @ 9 A +	0.68	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15FK105*AL+	TBC L 105 * 010 C □ □ @ 9 A +	L	TBC L 105 * 010 C □ □ @ 9 A +	1	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15FK155*AL+	TBC L 155 * 010 C □ □ @ 9 A +	L	TBC L 155 * 010 C □ □ @ 9 A +	1.5	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15FK225*AL+	TBC L 225 * 010 C □ □ @ 9 A +	L	TBC L 225 * 010 C □ □ @ 9 A +	2.2	10	10	0.5	5	6	6	12	9	0.025	0.05	0.05	0.02	0.50	0.45	0.50	0.45	0.20	0.20	
CWR15FK335*VR+	TBC R 335 * 010 C □ □ @ 9 A +	R	TBC R 335 * 010 C □ □ @ 9 A +	3.3	10	6	0.5	5	6	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15FK475*VR+	TBC R 475 * 010 C □ □ @ 9 A +	R	TBC R 475 * 010 C □ □ @ 9 A +	4.7	10	6	0.5	5	6	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15FK685*VR+	TBC R 685 * 010 C □ □ @ 9 A +	R	TBC R 685 * 010 C □ □ @ 9 A +	6.8	10	6	0.7	7	8.5	8	16	12	0.045	0.09	0.08	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15FK106*VR+	TBC R 106 * 010 C □ □ @ 9 A +	R	TBC R 106 * 010 C □ □ @ 9 A +	10	10	6	1	10	12	8	16	12	0.045	0.09	0.06	0.03	0.52	0.47	0.52	0.47	0.21	0.21	
CWR15FK156*VR+	TBC A 156 * 010 C □ □ @ 9 A +	A	TBC A 156 * 010 C □ □ @ 9 A +	15	10	6	1.5	15	18	10	20	15	0.040	0.08	0.07	0.03	0.49	0.44	0.49	0.44	0.20	0.20	
CWR15JK474*VR+	TBC L 474 * 020 C □ □ @ 9 A +	L	TBC L 474 * 020 C □ □ @ 9 A +	0.47	20	24	0.5	5	6	6	12	9	0.025	0.03	0.03	0.01	0.77	0.70	0.77	0.70	0.31	0.31	

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

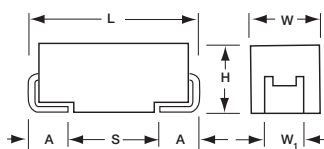


The TCB series is a COTS-Plus version of the professional grade TCR polymer series. Each batch of these components receives additional reliability level verification through life testing to 0.1%/1000 hours with a 90% confidence level.

Polymer capacitors utilize a conductive polymer electrode system which reduces the potential for an ignition failure mode and lowers the effective ESR. These units are also designed to

withstand biased humidity testing at 85°C/85% R.H. for 120 hours and are rated for operation up to 105°C.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog. For additional information, or to request a specific rating, please contact the factory.



For additional information on Q-process please consult the AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)

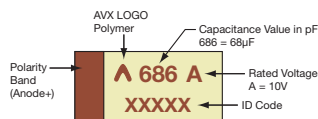
CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W₁ dimension applies to the termination width for A dimensional area only.

MARKING

B, C, D, E CASE



Under development

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage						
µF	Code	10V	16V	20V	25V	35V	50V	63V
0.47	474							B(400)*
0.68	684						B(300)*	B(300)*
1.0	105							
1.5	155					B(250)*		
2.2	255					B(250)*		C(200)*
3.3	335					B(250)*	C(200)*	C(200)*
4.7	475					C(200)*	D(150)*	
6.8	685					C(200)*		
10	106				B(200)*	C(200)*	D(120)*	
15	156		B(300)*					
22	226	B(300)*	B(200)*		D(100)*			
33	336	B(200)*			D(100)*			
47	476		D(70)	D(70)*				
68	686	D(70)						
100	107	D(70)*						

Available Ratings (ESR ratings in mOhms in brackets)

*Codes under development – subject to change

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher voltage ratings in the same case size to the same reliability standards

HOW TO ORDER

AVX PART NUMBER:

TCB	D	686	M	010	C	□	L	Q	0	^	++
Type	Case Size	Capacitance Code	Capacitance Tolerance	Voltage Code	ESR	Packaging	Inspection Level	Reliability Grade	Qualification Level	Termination Finish	DCL Option
		pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20%	010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc 063 = 63Vdc	C = Std ESR	R = 7" T&R S = 13" T&R	L = Lab Conformance	Q = 0.1%/1000 hrs. 90% conf.	0 = N/A	0 = Sn/Pb 7 = 100% Tin	OJ = 0.1CV OG = 0.05CV *Selected Codes



TECHNICAL SPECIFICATIONS

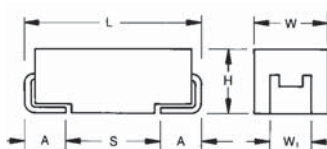
Technical Data:	All technical data relate to an ambient temperature of +25°C								
Capacitance Range:	47 µF to 68 µF (for extended range under development, contact manufacturer)								
Capacitance Tolerance:	±20%								
Leakage Current DCL:	(J) 0.1CV, (G) 0.05CV on selected codes								
Rate Voltage (V _R)	≤ +105°C:	10	16	20	25	35	50	63	
Surge Voltage (V _S)	≤ +85°C:	13	21	26	33	46	65	82	
Surge Voltage (V _S)	≤ +105°C:	10	16	20	25	35	50	63	
Temperature Range:	-55°C to +105°C								
Batch Reliability	0.1% per 1000 hours at 25°C, V _R with 0.1Ω/V series impedance, 90% confidence level→								

NOTE: Conductive Polymer Capacitors are designed to operate within the limits of the environmental conditions specified for each series. If operated continuously at their maximum temperature and / or humidity limit, or beyond these limits, capacitors may exhibit a parametric shift in capacitance and increases in ESR. These changes may occur earlier if the specified environmental conditions are exceeded. Similarly, their normal operational time period will be significantly extended if their general duty cycle includes operation below maximum temperature within humidity controlled environments. Careful attention should be paid to maximum temperature with associated high humidity environments as well as voltage derating, ripple current and current surges. Please reference the AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.

RATING & PART NUMBER REFERENCE		Parametric Specifications by Rating					Typical RMS Ripple Data by Rating						
		Capacitance @ 120Hz	DC Rated Voltage	ESR @ 100kHz	DCL max	DF Max	Power Dissipation	25-45°C	85°C	105°C	25-45°C	85°C	105°C
AVX Part Number	Case	µF @ 25°C	V @ +105°C	mOhms @ +25°C	(µA) @ +25°C	(µA) @ +105°C	(%)	W	mA (100kHz)	mA (100kHz)	mV (100kHz)	mV (100kHz)	mV (100kHz)
TCBD68M010C□□□□□□□□□□	D	68	10	70	68	816	6	0.225	1800	1300	125	125	91
TOBD47M016C□□□□□□□□□□	D	47	16	70	75	900	6	0.225	1800	1300	125	125	91

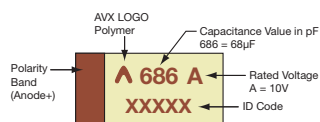
All technical data relates to an ambient temperature of +25C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes. ESR is allowed to increase by up to 1.25 times the catalog limit post mounting.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.



MARKING

B, C, D, E CASE



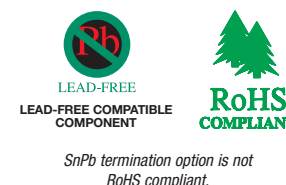
FEATURES

- Conductive polymer electrode
- Benign failure mode under recommended use conditions
- Robust design for long operation lifetime
- AVX maverick part control Q-process with statistical screening
- Improved basic reliability 0.5%/1000hrs
- 85°C/85r.h. 120 hours
- -55 to +105°C operation temperature
- DCL 0.1 CxV, 0.05CV on selected codes
- 3x reflow 260°C compatible
- Low ESR

APPLICATIONS

- Long life time DC/DC converter applications in Telecommunications, Industrial, Avionics

For additional information on Q-process please consult the AVX technical publication "Reaching the Highest Reliability for Tantalum Capacitors" (see the link: <http://www.avx.com/docs/techinfo/Qprocess.pdf>)



CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W,±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W1 dimension applies to the termination width for A dimensional area only.

*Codes under development

HOW TO ORDER

TCR	D	476	M	016	#	0070	J
Type	Case Size See table above	Capacitance Code pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	Tolerance M = ±20%	Rated DC Voltage 010 = 10Vdc 016 = 16Vdc	Packaging R = Pure Tin 7" Reel S = Pure Tin 13" Reel H = Tin Lead 7" Reel (contact manufacturer) K = Tin Lead 13" Reel (contact manufacturer)	ESR in mΩ	DCL J = 0.1CV G = 0.05CV* * selected codes

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C							
Capacitance Range:	0.47 µF to 100 µF							
Capacitance Tolerance:	±20%							
Leakage Current DCL:	(J) 0.1CV, (G) 0.05CV on selected codes							
Rated Voltage (V _R)	≤ +105°C:	10	16	20	25	35	50	63
Surge Voltage (V _S)	≤ +85°C:	13	21	26	33	46	65	82
Surge Voltage (V _S)	≤ +105°C:	10	16	20	25	35	50	63
Temperature Range:	-55°C to +105°C							
Reliability:	0.5% per 1000 hours at 85°C, V _R with 0.1Ω/V series impedance, 60% confidence level							

NOTE: Conductive Polymer Capacitors are designed to operate within the limits of the environmental conditions specified for each series. If operated continuously at their maximum temperature and / or humidity limit, or beyond these limits, capacitors may exhibit a parametric shift in capacitance and increases in ESR. These changes may occur earlier if the specified environmental conditions are exceeded. Similarly, their normal operational time period will be significantly extended if their general duty cycle includes operation below maximum temperature within humidity controlled environments. Careful attention should be paid to maximum temperature with associated high humidity environments as well as voltage derating, ripple current and current surges. Please reference the AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.

CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) to 105°C						
μF	Code	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	63V (J)
0.47	474							B(400)*
0.68	684						B(400)*	B(300)*
1	105						B(300)*	
1.5	155					B(250)*		
2.2	225					B(250)*		C(200)*
3.3	335					B(250)*	C(200)*	C(200)*
4.7	475					C(200)*	D(150)*	
6.8	685					C(200)*		
10	106				B(200)*	C(200)*	D(120)*	
15	156	B(300)*	B(300)*					
22	226	B(300)*	B(200)*		D(100)*			
33	336	B(200)*			D(100)*			
47	476		D(70)	D(70)*				
68	686	D(70)	D(70)*					
100	107	D(70)*						

Available Ratings, (ESR ratings in mOhms in brackets)

Engineering samples - please contact manufacturer

*Codes under development – subject to change

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	Maximum Operating Temperature (°C)	DCL Max. (μA)	DF Max. (%)	ESR Max @ 100kHz (mΩ)	MSL	100kHz RMS Current (mA)			
									45°C	85°C	105°C	125°C
10 Volt to 105°C												
TCRD686M010#0070J	D	68	10	105	68	6	70	3	1800	1300	800	-
16 Volt to 105°C												
TCRD476M016#0070J	D	47	16	105	75	6	70	3	1800	1300	800	-

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

ESR allowed to move up to 1.25 times catalog limit post mounting.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

QUALIFICATION TABLE

TEST	TCR series (Temperature range -55°C to +105°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine after application of 105°C temperature, rated voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within +20/-30% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Storage Life	105°C, 0V, 2000h			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				ΔC/C	within ±20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Humidity	Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	3 x initial limit						
				ΔC/C	within +30/-20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Biased Humidity	Determine after leaving for 120 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	3 x initial limit						
				ΔC/C	within +30/-20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+105°C	+20°C	
	1	+20±2	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55+0/-3	15		ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
	3	+20±2	15	DF		IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	4	+85+3/-0	15								
	5	+105+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 105°C+3/0°C Test voltage: Rated voltage at 105°C Surge voltage: 1.3 x rated voltage at 105°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within +10/-20% of initial value for Vr ≤ 10V within +20/-30% of initial value for Vr ≥ 16V						
				DF	1.25 x initial limit						

*Initial Limit



TANTALUM MODULES

AVX Tantalum Modules create a line of high voltage, high capacitance tantalum products by combining multiple tantalum capacitors into a single case.

TWM:

High capacitance modules capable of up to 6.6mF capacitance.

TCP

Stacked assembly modules with available testing to DSCC 09009.



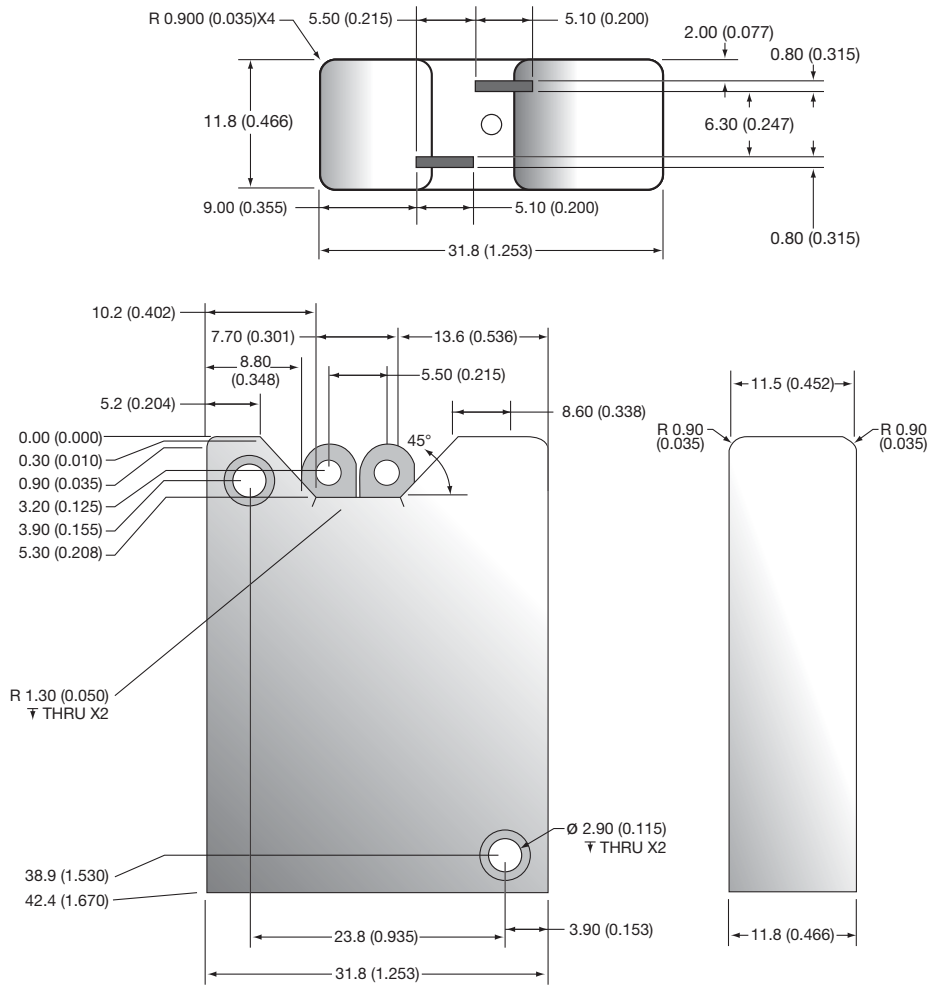
A KYOCERA GROUP COMPANY



AVX modular packaged
93026 style capacitors.

Capacitance Range: 200 μ F to 6600 μ F
Voltage Range: 25 to 125V
Temperature Range: -55°C to 125°C
Tolerance Range: 10%, 20%

DIMENSIONS: millimeters (inches)

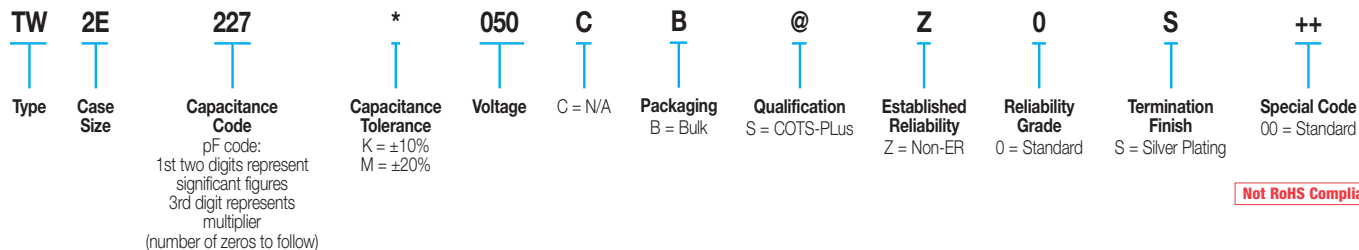


VOLTAGE RATINGS (Operating Temperature -55°C to 125°C)

Voltage (DC)	85°C	25	30	50	60	75	100	125
Rated Voltage: (Ur)	85°C	25	30	50	60	75	100	125
Derated Voltage: (Uc)	125°C	15	20	30	40	50	65	85
Surge Voltage: (Us)	85°C	28.8	34.5	57.5	69	86.3	115	144

HOW TO ORDER

AVX PART NUMBER:



Not RoHS Compliant

SnPb termination option is not RoHS compliant.

RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2}

Frequency of Applied Ripple Current		120Hz				800Hz				1kHz			
Ambient Still Air Temperature (°C)		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of	100%	0.60	0.39	–	–	0.71	0.43	–	–	0.72	0.45	–	–
85°C	90%	0.60	0.46	–	–	0.71	0.55	–	–	0.72	0.55	–	–
Rated	80%	0.60	0.52	0.35	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
Peak	70%	0.60	0.58	0.44	–	0.71	0.69	0.52	–	0.72	0.70	0.52	–
Voltage	66-2/3%	0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current		10kHz				40kHz				100kHz			
Ambient Still Air Temperature (°C)		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of	100%	0.88	0.55	–	–	1.00	0.63	–	–	1.10	0.69	–	–
85°C	90%	0.88	0.67	–	–	1.00	0.77	–	–	1.10	0.85	–	–
Rated	80%	0.88	0.76	0.52	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
Peak	70%	0.88	0.85	0.64	–	1.00	0.97	0.73	–	1.10	1.07	0.80	–
Voltage	66-2/3%	0.88	0.88	0.68	0.40	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (uF)	DC Rated Voltage (V)	ESR Max (ohms)	DC Leakage Max (uA)		Max Impedance (Ohms)	Maximum Capacitance Change* (%)			Max AC Ripple* (mA rms)
	25°C at 120Hz	85°C	120Hz	+25°C	+85 and +125°C	-55°C at 120 Hz	-55°C	+85°C	+125°C	85°C at 40kHz
25 VDC at 85°C 15 VDC at 125°C										
TW2D248*025CB@Z0S++	2400	25	0.33	10	40	3.50	-70	12	18	5200
TW3D368*025CB@Z0S++	3600	25	0.22	15	60	2.33	-70	12	18	7800
TW2E368*025CB@Z0S++	3600	25	0.25	12	50	3.50	-75	12	20	6200
TW2E448*025CB@Z0S++	4400	25	0.25	20	160	5.00	-90	30	50	6400
TW3E548*025CB@Z0S++	5400	25	0.17	18	75	2.33	-75	12	20	9300
TW3E668*025CB@Z0S++	6600	25	0.17	30	240	3.33	-90	30	50	9600
30 VDC at 85°C 20 VDC at 125°C										
TW2D208*030CB@Z0S++	2000	30	0.35	14	50	3.50	-70	10	18	5000
TW3D308*030CB@Z0S++	3000	30	0.23	21	75	2.33	-70	10	18	7500
TW2E308*030CB@Z0S++	3000	30	0.30	24	70	3.00	-72	10	20	6000
TW3E458*030CB@Z0S++	4500	30	0.20	36	105	2.00	-72	10	20	9000
50 VDC at 85°C 30 VDC at 125°C										
TW2D947*050CB@Z0S++	940	50	0.38	6	50	5.00	-50	8	15	4200
TW2E148*050CB@Z0S++	1360	50	0.35	10	80	4.00	-58	10	20	5500
TW3D148*050CB@Z0S++	1410	50	0.25	9	75	3.33	-50	8	15	6300
TW3E208*050CB@Z0S++	2040	50	0.23	15	120	2.67	-58	10	20	8250
TW2E308*050CB@Z0S++	3000	50	0.50	38	200	7.50	-90	25	35	6000
TW3E458*050CB@Z0S++	4500	50	0.33	57	300	5.00	-90	25	35	9000
TW3E908*050CB@Z0S++	9000	50	0.33	150	450	1.20	-80	60	85	9300
60 VDC at 85°C 40 VDC at 125°C										
TW2D787*060CB@Z0S++	780	60	0.45	6	50	7.50	-60	8	15	4200
TW2E118*060CB@Z0S++	1120	60	0.40	10	80	5.00	-58	8	15	5500
TW3D128*060CB@Z0S++	1170	60	0.30	9	75	5.00	-60	8	15	6300
TW3E178*060CB@Z0S++	1680	60	0.27	15	120	3.33	-58	8	15	8250
TW2E208*060CB@Z0S++	2000	60	0.50	24	180	10.00	-90	30	50	6400
TW3E308*060CB@Z0S++	3000	60	0.33	36	270	6.67	-90	30	50	9600
75 VDC at 85°C 50 VDC at 125°C										
TW2D667*075CB@Z0S++	660	75	0.50	6	60	6.00	-45	6	10	4200
TW2E947*075CB@Z0S++	940	75	0.45	10	100	6.00	-55	6	10	5500
TW3D997*075CB@Z0S++	990	75	0.33	9	90	4.00	-45	6	10	6300
TW3E148*075CB@Z0S++	1410	75	0.30	15	150	4.00	-55	6	10	8250
100 VDC at 85°C 65 VDC at 125°C										
TW2D307*100CB@Z0S++	300	100	0.80	6	50	11.00	-35	6	12	4200
TW2E447*100CB@Z0S++	440	100	0.60	10	100	7.50	-40	6	12	5500
TW3D457*100CB@Z0S++	450	100	0.53	9	75	7.33	-35	6	12	6300
TW3E667*100CB@Z0S++	660	100	0.40	15	150	5.00	-40	6	12	8250
125 VDC at 85°C 85 VDC at 125°C										
TW2D207*125CB@Z0S++	200	125	0.90	6	50	17.50	-35	5	12	4200
TW3D307*125CB@Z0S++	300	125	0.60	9	75	11.67	-35	5	12	6300
TW2E307*125CB@Z0S++	300	125	0.80	10	100	10.00	-35	6	12	5500
TW3E457*125CB@Z0S++	450	125	0.53	15	150	6.67	-35	6	12	8250

*For reference only, contact factory for more details



TCP Series tantalum modules represent high packing density for applications utilizing multiple components in a parallel configuration, and are available with testing to DSCC 09009.

These modules feature stacked assemblies of CWR29 capacitors which provide ultra low ESR and utilize established reliability capacitors (Weibull Grade voltage conditioning) in accordance with MIL-PRF-55365. They can also be supplied with SRC9000 Space Level components.

The stacked construction of fully molded capacitors is compatible with a wide range of SMT board assembly processes including reflow solder or conductive epoxy.

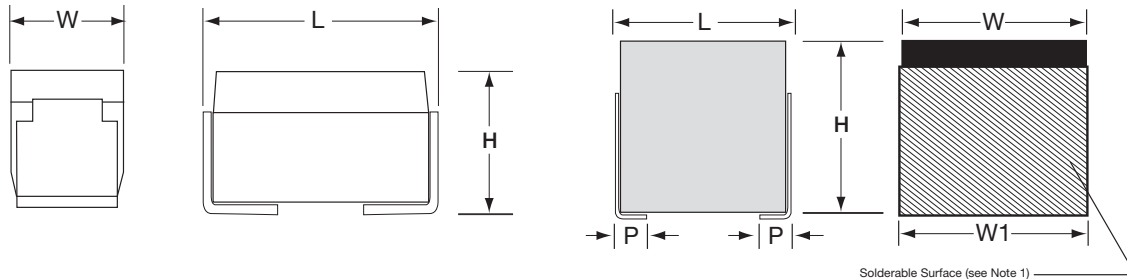
There are two termination finishes available: hot solder dipped (“C”) and gold plated (“B”).

The molding compound has been selected to meet the requirements of UL94V-0 and out-gassing requirements of ASTM E-595.

For moisture sensitivity levels please refer to the High Reliability Tantalum MSL section located in the back of the High Reliability Tantalum Catalog.

Note: Additional form factors and ratings are available. Contact plant for details.

DIMENSIONS



CASE DIMENSIONS:

millimeters (inches)

Case Code	Length (L) ±0.38 (0.015)	Width (W) ±0.38 (0.015)	Height (H) ±0.38 (0.015)	Term. Width (W _t) ±0.38 (0.015)	Term. Length (P) For Reference Only
2H	7.82 (0.308)	4.06 (0.160)	6.10 (0.240)	4.06 (0.160)	1.52 (0.060)
4H	7.82 (0.308)	8.13 (0.320)	6.10 (0.240)	8.13 (0.320)	1.52 (0.060)
6H	7.82 (0.308)	8.13 (0.320)	9.14 (0.360)	8.13 (0.320)	1.52 (0.060)

Additional form factors and ratings are available – contact plant for details.

CAPACITANCE AND RATED VOLTAGE CASE SIZE (ESR IN mΩ)

Capacitance		Rated voltage DC (V _R) to 85°C						
μF	Code	6V	10V	15V	20V	25V	35V	50V
9.4	945							2H (200)
18.8	196							4H (100)
20	206						2H (200)	
28.2	286							6H (67)
40	406						4H (100)	
60	606						6H (67)	
66	666					2H (85)		
94	946				2H (75)			
132	137					4H (43)		
188	197					4H (38)		
198	207					6H (28)		
200	207			2H (63)				
282	287				6H (25)			
400	407			4H (31)				
440	447		2H (50)					
600	607			6H (21)				
660	667	2H (50)						
880	887		4H (25)					
1,320	138	4H (25)	6H (17)					
1,980	208	6H (17)						

HOW TO ORDER

TC	2H	945	K	050	L	R	#	@	0	^	++
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10% J = ±5%	Voltage Code 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Standard or Low ESR Range L = Low ESR	Packaging B = Bulk R = 7" T&R	Inspection Level S = Std. Conformance L = Group A D = DSCC DWG	Reliability Grade Weibull: B = 0.1%/1000 hrs. 90% conf. C = 0.01%/1000 hrs. 90% conf. D = 0.001%/1000 hrs. 90% conf. Z = Non-ER	Qualification Level 0 = N/A 9 = SRC9000	Termination Finish 8 = Hot Solder Dipped 9 = Gold Plated	Surge Test Option 00 = None 23 = 10 Cycles, +25°C 24 = 10 Cycles, -55°C & +85°C 45 = 10 cycles, -55°C & +85°C before Weibull



DSCC DWG P/N:

09009	-01	K	B	C	A
DSCC DWG 09009	Dash Number See Rating Tables	Capacitance Tolerance K = ±10% M = ±20%	Reliability Grade B = B Weibull C = C Weibull D = D Weibull	Termination Finish B = Gold Plated (10 microinch minimum) C = Hot Solder Dip (60 microinch minimum)	Surge Test Option A = 10 cycles, +25°C B = 10 cycles, -55°C & +85°C C = 10 cycles, -55°C & +85°C before Weibull Z = None required Per MIL-PRF-55365



TECHNICAL SPECIFICATIONS

Technical Data:	Unless otherwise specified, all technical data relate to an ambient temperature of 25°C								
Capacitance Range:	9.4 µF to 1,980 µF								
Capacitance Tolerance:	±5%; ±10%; ±20%								
Rated Voltage (V _R)	≤ 85°C:	6	10	15	20	25	35	50	
Category Voltage (V _C)	≤ 125°C:	4	6.7	10	13.3	16.7	23.3	33.3	
Surge Voltage (V _S)	≤ 85°C:	8	13.3	20	26.7	33.3	46.7	66.7	
Surge Voltage (V _S)	≤ 125°C:	5.3	8.7	13.3	17.8	22.2	31.1	44.5	
Temperature Range:	-55°C to +125°C								

RATINGS & PART NUMBER REFERENCE

2-STACK		Parametric Specifications by Rating				Typical RMS Ripple Data by Rating										
AVX P/N	DSCC P/N	Case	Cap µF	Volt V	ESR @ 100 kHz +25°C mΩ	DC Leakage (max) µA		Dissipation Factor (max) %		100kHz Ripple Current Rating		100kHz Ripple Voltage Rating				
						+25°C	+85°C	+25°C	+85°C	+25°C	+85°C	+25°C	+85°C			
TC2H667*006L□#000++	09009-001*0+▲	2H	660	6	50	39.6	396	495	10	12	2.45	2.20	0.98	0.12	0.11	0.05
TC2H447*010L□#000++	09009-002*0+▲	2H	440	10	50	44	440	550	10	12	2.45	2.20	0.98	0.12	0.11	0.05
TC2H207*015L□#000++	09009-003*0+▲	2H	200	15	63	30	300	375	10	12	2.19	1.97	0.88	0.14	0.12	0.05
TC2H946*020L□#000++	09009-004*0+▲	2H	94	20	75	18.8	188	235	8	10	2.00	1.80	0.80	0.15	0.14	0.06
TC2H666*025L□#000++	09009-005*0+▲	2H	66	25	85	16.5	165	206	8	10	1.88	1.69	0.75	0.16	0.14	0.06
TC2H206*035L□#000++	09009-006*0+▲	2H	20	35	200	7	70	88	8	10	1.22	1.10	0.49	0.24	0.22	0.10
TC2H945*050L□#000++	09009-007*0+▲	2H	9.4	50	200	4.7	47	59	6	8	1.22	1.10	0.49	0.24	0.22	0.10

4-STACK		Parametric Specifications by Rating				Typical RMS Ripple Data by Rating										
AVX P/N	DSCC P/N	Case	Cap µF	Volt V	ESR @ 100 kHz +25°C mΩ	DC Leakage (max) µA		Dissipation Factor (max) %		100kHz Ripple Current Rating		100kHz Ripple Voltage Rating				
						+25°C	+85°C	+25°C	+85°C	+25°C	+85°C	+25°C	+85°C			
TC4H138*006L□#000++	09009-008*0+▲	4H	1320	6	25	79.2	792	990	10	12	4.90	4.41	1.96	0.12	0.11	0.05
TC4H887*010L□#000++	09009-009*0+▲	4H	880	10	25	88	880	1100	10	12	4.90	4.41	1.96	0.12	0.11	0.05
TC4H407*015L□#000++	09009-010*0+▲	4H	400	15	31	60	600	750	10	12	4.38	3.94	1.75	0.14	0.12	0.05
TC4H197*020L□#000++	09009-011*0+▲	4H	188	20	38	37.6	376	470	8	10	4.00	3.60	1.60	0.15	0.14	0.06
TC4H137*025L□#000++	09009-012*0+▲	4H	132	25	43	33	330	413	8	10	3.74	3.36	1.49	0.16	0.14	0.06
TC4H406*035L□#000++	09009-013*0+▲	4H	40	35	100	14	140	175	8	10	2.45	2.20	0.98	0.24	0.22	0.10
TC4H196*050L□#000++	09009-014*0+▲	4H	18.8	50	100	9.4	94	118	6	8	2.45	2.20	0.98	0.24	0.22	0.10

6-STACK		Parametric Specifications by Rating				Typical RMS Ripple Data by Rating										
AVX P/N	DSCC P/N	Case	Cap µF	Volt V	ESR @ 100 kHz +25°C mΩ	DC Leakage (max) µA		Dissipation Factor (max) %		100kHz Ripple Current Rating		100kHz Ripple Voltage Rating				
						+25°C	+85°C	+25°C	+85°C	+25°C	+85°C	+25°C	+85°C			
TC6H208*006L□#000++	09009-015*0+▲	6H	1980	6	17	118.8	1188	1485	10	12	7.35	6.61	2.94	0.12	0.11	0.05
TC6H138*010L□#000++	09009-016*0+▲	6H	1320	10	17	132	1320	1650	10	12	7.35	6.61	2.94	0.12	0.11	0.05
TC6H607*015L□#000++	09009-017*0+▲	6H	600	15	21	90	900	1125	10	12	6.57	5.92	2.63	0.14	0.12	0.05
TC6H287*020L□#000++	09009-018*0+▲	6H	282	20	25	56.4	564	705	8	10	6.00	5.40	2.40	0.15	0.14	0.06
TC6H207*025L□#000++	09009-019*0+▲	6H	198	25	28	49.5	495	619	8	10	5.67	5.10	2.27	0.16	0.14	0.06
TC6H606*035L□#000++	09009-020*0+▲	6H	60	35	67	21	210	263	8	10	3.67	3.31	1.47	0.24	0.22	0.10
TC6H286*050L□#000++	09009-021*0+▲	6H	28.2	50	67	14.1	141	176	6	8	3.67	3.31	1.47	0.24	0.22	0.10

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

WET TANTALUM CAPACITOR PRODUCTS

AVX has a range of electrolyte-impregnated tantalum capacitors which create very high capacitance products.

TWC

COTS-Plus wet tantalum designed to withstand harsh environments.

TWC-Y

COTS-Plus wet tantalum designed for temperatures up to 200°C.

TWA

COTS-Plus wet tantalum in DSCC compatible case sizes.

TWA-Y

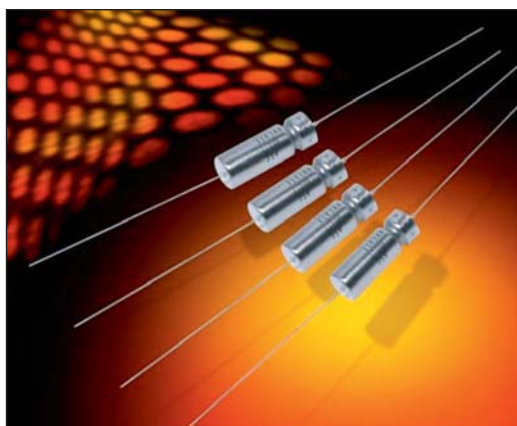
Wet tantalum designed for temperatures up to 200°C.

MIL-PRF-39006

Military Conventional

Wet tantalum meeting MIL-PRF-39006, for which AVX is a qualified supplier.



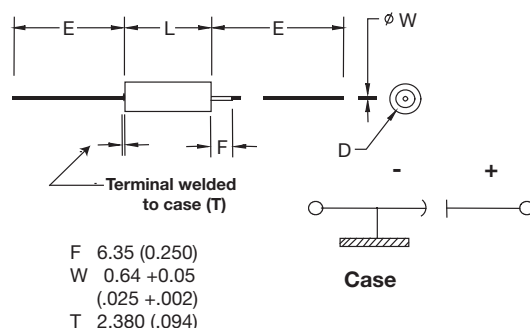


The TWC series represents a COTS-Plus version of conventional wet electrolytic tantalum capacitors. This data sheet incorporates all ratings available in MIL-PRF-39006 /22 /25 /30 and /31. Contact the factory about cap and voltage design possibilities beyond those contained in this datasheet.

This design includes a welded tantalum can and header assembly that provides a hermetic seal to withstand harsh environments and includes selected Group A testing from MIL-PRF-39006.

For military qualified versions please refer to the MIL-PRF-39006 datasheet located on the AVX website.

OUTLINE DIMENSIONS



CASE DIMENSIONS: millimeters (inches)

DSCC Case Size	AVX Case Size	L	D		E
			Basic Case	Insulated Case Max	
		+0.79 (0.031) -0.41 (0.016)	±0.41 (0.016)		±6.35 (0.250)
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

VOLTAGE RATINGS (Operating Temperature -55°C to 125°C)

Voltage (DC)												
Rated Voltage: (V_r)	85°C	6	8	10	15	25	30	50	60	75	100	125
Derated Voltage: (V_c)	125°C	4	5	6	10	15	20	30	40	50	65	85
Surge Voltage: (V_s)	85°C	6.9	9.2	11.5	17.3	28.8	34.5	57.5	69	86.3	115	144

HOW TO ORDER

AVX PART NUMBER:

TWC	D	826	*	125		L	S	Z	0	^	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance K = ±10% M = ±20%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	ESR C = Standard ESR L = Low ESR	Qualification S = Std. Conformance L = Group A	Reliability Grade Z = Non-ER	Qualification Level 0 = Standard 9 = SRW9000	Termination Finish 0 = Sn/Pb 60/40 7 = 100% Tin	Custom Test Options 00 = Standard OH = High Vibration*

*High vibration qualified parts are currently under development. Please contact the factory for additional details and availability.

SPACE LEVEL OPTIONS TO SRW9000*:

TWC	D	826	*	125		L	L	Z	9	0	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance K = ±10% M = ±20%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	ESR C = Standard ESR L = Low ESR	Qualification L = Group A	Reliability Grade Z = Non-ER	Qualification Level 9 = SRW9000	Termination Finish 0 = Sn/Pb 60/40	Custom Test Options 00 = Standard OH = High Vibration*

Not RoHS Compliant

*Check with factory for availability and testing details.

RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2/}

Frequency of Applied Ripple Current	120Hz				800Hz				1kHz				
	≤55	85	105	125	≤55	85	105	125	≤55	85	105	125	
Ambient Still Air Temperature (°C)													
% of	100%	0.60	0.39	–	–	0.71	0.43	–	–	0.72	0.45	–	–
85°C	90%	0.60	0.46	–	–	0.71	0.55	–	–	0.72	0.55	–	–
Rated	80%	0.60	0.52	0.35	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
Peak	70%	0.60	0.58	0.44	–	0.71	0.69	0.52	–	0.72	0.70	0.52	–
Voltage	66-2/3%	0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current	10kHz				40kHz				100kHz				
	≤55	85	105	125	≤55	85	105	125	≤55	85	105	125	
Ambient Still Air Temperature (°C)													
% of	100%	0.88	0.55	–	–	1.00	0.63	–	–	1.10	0.69	–	–
85°C	90%	0.88	0.67	–	–	1.00	0.77	–	–	1.10	0.85	–	–
Rated	80%	0.88	0.76	0.52	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
Peak	70%	0.88	0.85	0.64	–	1.00	0.97	0.73	–	1.10	1.07	0.80	–
Voltage	66-2/3%	0.88	0.88	0.68	0.40	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

STANDARD RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF (Max)	ESR Max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
			+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		Standard	AVX
TWCA306*006□CSZ0*00	30	6	1	2	9	3.98	100	-40	10.5	12	820	T1	A
TWCA306*006□LSZ0*00					4.5	1.99							
TWCA686*006□CSZ0*00	68	6	1	2	15	3.16	60	-40	14	16	960	T1	A
TWCA686*006□LSZ0*00					7.5	1.58							
TWCB147*006□CSZ0*00	140	6	1	3	21	1.99	40	-40	14	16	1,200	T2	B
TWCB147*006□LSZ0*00					10.5	0.99							
TWCB277*006□CSZ0*00	270	6	1	6.5	45	2.21	25	-44	17.5	20	1,375	T2	B
TWCB277*006□LSZ0*00					22.5	1.11							
TWCD337*006□CSZ0*00	330	6	2	7.9	36	1.45	20	-44	14	16	1,800	T3	D
TWCD337*006□LSZ0*00					18	0.73							
TWCD567*006□CSZ0*00	560	6	2	13	55	1.3	25	-64	17.5	20	1,900	T3	D
TWCD567*006□LSZ0*00					27.5	0.65							
TWCE128*006□CSZ0*00	1,200	6	3	14	90	1	20	-80	25	25	2,265	T4	E
TWCE128*006□LSZ0*00					45	0.5							
TWCA256*008□CSZ0*00	25	8	1	2	7.5	3.98	100	-40	10.5	12	820	T1	A
TWCA256*008□LSZ0*00					3.75	1.99							
TWCA566*008□CSZ0*00	56	8	1	2	14	3.32	59	-40	14	16	900	T1	A
TWCA566*008□LSZ0*00					7	1.66							
TWCB127*008□CSZ0*00	120	8	1	2	20	2.21	50	-44	17.5	20	1,220	T2	B
TWCB127*008□LSZ0*00					10	1.11							
TWCB227*008□CSZ0*00	220	8	1	7	37	2.23	30	-44	17.5	20	1,370	T2	B
TWCB227*008□LSZ0*00					18.5	1.12							
TWCD297*008□CSZ0*00	290	8	2	6	34	1.56	25	-64	17.5	20	1,770	T3	D
TWCD297*008□LSZ0*00					17	0.78							
TWCD437*008□CSZ0*00	430	8	2	14	46	1.42	25	-64	17.5	20	1,825	T3	D
TWCD437*008□LSZ0*00					23	0.71							
TWCE857*008□CSZ0*00	850	8	4	16	60	0.94	22	-80	25	25	2,330	T4	E
TWCE857*008□LSZ0*00					30	0.47							
TWCA206*010□CSZ0*00	20	10	1	2	6	3.98	175	-32	10.5	12	820	T1	A
TWCA206*010□LSZ0*00					3	1.99							
TWCA476*010□CSZ0*00	47	10	1	2	13	3.67	100	-36	14	16	855	T1	A
TWCA476*010□LSZ0*00					6.5	1.84							
TWCB107*010□CSZ0*00	100	10	1	4	15	1.99	60	-36	14	16	1,200	T2	B
TWCB107*010□LSZ0*00					7.5	0.99							
TWCB187*010□CSZ0*00	180	10	1	7	30	2.21	40	-36	14	16	1,365	T2	B
TWCB187*010□LSZ0*00					15	1.11							
TWCD257*010□CSZ0*00	250	10	2	10	30	1.59	30	-40	14	16	1,720	T3	D
TWCD257*010□LSZ0*00					15	0.8							
TWCD397*010□CSZ0*00	390	10	2	16	44	1.5	25	-64	17.5	20	1,800	T3	D
TWCD397*010□LSZ0*00					22	0.75							
TWCE757*010□CSZ0*00	750	10	4	16	50	0.88	23	-80	25	25	2,360	T4	E
TWCE757*010□LSZ0*00					25	0.44							
TWCA156*015□CSZ0*00	15	15	1	2	5	4.42	155	-24	10.5	12	780	T1	A
TWCA156*015□LSZ0*00					2.5	2.21							
TWCA336*015□CSZ0*00	33	15	1	2	10	4.02	90	-28	14	16	820	T1	A
TWCA336*015□LSZ0*00					5	2.01							
TWCB706*015□CSZ0*00	70	15	1	4	13	2.46	75	-28	14	16	1,150	T2	B
TWCB706*015□LSZ0*00					6.5	1.23							
TWCB127*015□CSZ0*00	120	15	1	7	18	1.99	50	-28	17.5	20	1,450	T2	B
TWCB127*015□LSZ0*00					9	0.99							
TWCD177*015□CSZ0*00	170	15	2	10	25	1.95	35	-32	14	16	1,480	T3	D
TWCD177*015□LSZ0*00					12.5	0.98							
TWCD277*015□CSZ0*00	270	15	2	16	32	1.57	30	-56	17.5	20	1,740	T3	D
TWCD277*015□LSZ0*00					16	0.79							
TWCE547*015□CSZ0*00	540	15	6	24	40	0.98	23	-80	25	25	2,330	T4	E
TWCE547*015□LSZ0*00					20	0.49							
TWCA106*025□CSZ0*00	10	25	1	2	4	5.31	220	-16	8	9	715	T1	A
TWCA106*025□LSZ0*00					2	2.66							
TWCA226*025□CSZ0*00	22	25	1	2	6.6	3.98	140	-20	10.5	12	825	T1	A
TWCA226*025□LSZ0*00					3.3	1.99							
TWCB506*025□CSZ0*00	50	25	1	2	11	2.92	70	-28	13	15	1,130	T2	B
TWCB506*025□LSZ0*00					5.5	1.46							

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

STANDARD RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF (Max)	ESR Max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
			+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		Standard	AVX
TWCB107*025□CSZ0^00	100	25	1	10	15	1.99	50	-28	13	15	1,435	T2	B
TWCB107*025□LSZ0^00					7.5	0.99							
TWCD127*025□CSZ0^00	120	25	2	6	21	2.32	38	-32	13	15	1,450	T3	D
TWCD127*025□LSZ0^00					10.5	1.16							
TWCD187*025□CSZ0^00	180	25	2	18	26	1.92	32	-48	13	15	1,525	T3	D
TWCD187*025□LSZ0^00					13	0.96							
TWCE357*025□CSZ0^00	350	25	7	28	35	1.33	24	-70	25	25	1,970	T4	E
TWCE357*025□LSZ0^00					17.5	0.67							
TWCA805*030□CSZ0^00	8	30	1	2	4	6.64	275	-16	8	12	640	T1	A
TWCA805*030□LSZ0^00					2	3.32							
TWCA156*030□CSZ0^00	15	30	1	2	5	4.42	175	-20	10.5	12	780	T1	A
TWCA156*030□LSZ0^00					2.5	2.21							
TWCB406*030□CSZ0^00	40	30	1	5	10	3.32	65	-24	10.5	12	1,120	T2	B
TWCB406*030□LSZ0^00					5	1.66							
TWCB686*030□CSZ0^00	68	30	1	8	13	2.54	60	-24	13	15	1,285	T2	B
TWCB686*030□LSZ0^00					6.5	1.27							
TWCD107*030□CSZ0^00	100	30	2	12	17	2.26	40	-28	10.5	12	1,450	T3	D
TWCD107*030□LSZ0^00					8.5	1.13							
TWCD157*030□CSZ0^00	150	30	2	18	23	2.03	35	-48	13	15	1,525	T3	D
TWCD157*030□LSZ0^00					11.5	1.02							
TWCE307*030□CSZ0^00	300	30	8	32	31	1.37	25	-60	25	25	1,950	T4	E
TWCE307*030□LSZ0^00					15.5	0.69							
TWCA505*050□CSZ0^00	5	50	1	2	3	7.96	400	-16	5	6	580	T1	A
TWCA505*050□LSZ0^00					1.5	3.98							
TWCA106*050□CSZ0^00	10	50	1	2	4	5.31	250	-24	8	9	715	T1	A
TWCA106*050□LSZ0^00					2	2.66							
TWCB256*050□CSZ0^00	25	50	1	5	8	4.25	95	-20	10.5	12	1,005	T2	B
TWCB256*050□LSZ0^00					4	2.13							
TWCB476*050□CSZ0^00	47	50	1	9	11	3.11	70	-28	13	15	1,155	T2	B
TWCB476*050□LSZ0^00					5.5	1.56							
TWCD606*050□CSZ0^00	60	50	2	12	12	2.65	45	-16	10.5	12	1,335	T3	D
TWCD606*050□LSZ0^00					6	1.33							
TWCD826*050□CSZ0^00	82	50	2	16	15	2.43	45	-32	13	15	1,400	T3	D
TWCD826*050□LSZ0^00					7.5	1.22							
TWCE167*050□CSZ0^00	160	50	8	32	17	1.41	27	-50	25	25	1,900	T4	E
TWCE167*050□LSZ0^00					8.5	0.71							
TWCA405*060□CSZ0^00	4	60	1	2	2.8	9.29	550	-16	5	6	525	T1	A
TWCA405*060□LSZ0^00					1.4	4.65							
TWCA825*060□CSZ0^00	8.2	60	1	2	4	6.47	275	-24	8	9	625	T1	A
TWCA825*060□LSZ0^00					2	3.24							
TWCB206*060□CSZ0^00	20	60	1	5	7	4.64	105	-16	10.5	12	930	T2	B
TWCB206*060□LSZ0^00					3.5	2.32							
TWCB396*060□CSZ0^00	39	60	1	9	10	3.4	90	-28	10.5	12	1,110	T2	B
TWCB396*060□LSZ0^00					5	1.7							
TWCD506*060□CSZ0^00	50	60	2	12	10	2.65	50	-16	10.5	12	1,330	T3	D
TWCD506*060□LSZ0^00					5	1.33							
TWCD686*060□CSZ0^00	68	60	2	16	13	2.54	50	-32	10.5	12	1,365	T3	D
TWCD686*060□LSZ0^00					7	1.27							
TWCE147*060□CSZ0^00	140	60	8	32	16	1.52	28	-40	20	20	1,850	T4	E
TWCE147*060□LSZ0^00					8	0.76							
TWCA355*075□CSZ0^00	3.5	75	1	2	2.5	9.48	650	-16	5	6	525	T1	A
TWCA355*075□LSZ0^00					1.25	4.74							
TWCA685*075□CSZ0^00	6.8	75	1	2	3.5	6.83	300	-20	8	9	610	T1	A
TWCA685*075□LSZ0^00					1.75	3.42							
TWCB156*075□CSZ0^00	15	75	1	5	6	5.31	150	-16	8	9	890	T2	B
TWCB156*075□LSZ0^00					3	2.66							
TWCB336*075□CSZ0^00	33	75	1	10	10	4.02	90	-24	10.5	15	1,000	T2	B
TWCB336*075□LSZ0^00					5	2.01							
TWCD406*075□CSZ0^00	40	75	2	12	9	2.99	60	-16	10.5	12	1,250	T3	D
TWCD406*075□LSZ0^00					4.5	1.5							
TWCD566*075□CSZ0^00	56	75	2	17	11	2.61	60	-28	10.5	15	1,335	T3	D
TWCD566*075□LSZ0^00					5.5	1.31							

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

STANDARD RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF (Max)	ESR Max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
			+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		Standard	AVX
TWCE117*075□CSZ0^00	110	75	9	36	12	1.45	29	-35	20	20	1,850	T4	E
TWCE117*075□LSZ0^00					6	0.73							
TWCA255*100□CSZ0^00	2.5	100	1	2	2	10.62	950	-16	7	8	505	T1	A
TWCA255*100□LSZ0^00					1	5.31							
TWCA475*100□CSZ0^00	4.7	100	1	2	3	8.47	500	-16	7	8	565	T1	A
TWCA475*100□LSZ0^00					1.5	4.24							
TWCB116*100□CSZ0^00	11	100	1	4	5	6.03	200	-16	8	8	835	T2	B
TWCB116*100□LSZ0^00					2.5	3.02							
TWCB226*100□CSZ0^00	22	100	1	9	7.5	4.52	100	-16	8	8	965	T2	B
TWCB226*100□LSZ0^00					3.75	2.26							
TWCD306*100□CSZ0^00	30	100	2	12	7	3.1	80	-16	8	8	1,240	T3	D
TWCD306*100□LSZ0^00					3.5	1.56							
TWCD436*100□CSZ0^00	43	100	2	17	8.5	2.62	70	-20	8	8	1,335	T3	D
TWCD436*100□LSZ0^00					4.25	1.31							
TWCE866*100□CSZ0^00	86	100	9	36	10	1.54	30	-25	15	15	1,800	T4	E
TWCE866*100□LSZ0^00					5	0.77							
TWCA175*125□CSZ0^00	1.7	125	1	2	2	15.61	1,250	-16	7	8	415	T1	A
TWCA175*125□LSZ0^00					1	7.81							
TWCA365*125□CSZ0^00	3.6	125	1	2	2.7	9.95	600	-16	7	8	520	T1	A
TWCA365*125□LSZ0^00					1.35	4.98							
TWCB905*125□CSZ0^00	9	125	1	5	5	7.37	240	-16	7	8	755	T2	B
TWCB905*125□LSZ0^00					2.5	3.69							
TWCB146*125□CSZ0^00	14	125	1	7	6	5.69	167	-16	7	8	860	T2	B
TWCB146*125□LSZ0^00					3	2.85							
TWCD186*125□CSZ0^00	18	125	2	9	5	3.69	129	-16	7	8	1,130	T3	D
TWCD186*125□LSZ0^00					2.5	1.85							
TWCD256*125□CSZ0^00	25	125	2	13	6	3.18	93	-16	7	8	1,200	T3	D
TWCD256*125□LSZ0^00					3	1.59							
TWCE566*125□CSZ0^00	56	125	10	40	6.5	1.54	32	-25	15	15	1,800	T4	E
TWCE566*125□LSZ0^00					3.25	0.77							

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

EXTENDED RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF (Max)	ESR Max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
			+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		Standard	AVX
TWCA227*006□CSZ0*00	220	6	2	9	50	3.02	36	-64	13	16	1,000	T1	A
TWCA227*006□LSZ0*00					25	1.51							
TWCB827*006□CSZ0*00	820	6	3	14	155	2.51	18	-88	16	20	1,500	T2	B
TWCB827*006□LSZ0*00					77.5	1.26							
TWCD158*006□CSZ0*00	1,500	6	5	20	172	1.52	18	-90	20	25	1,900	T3	D
TWCD158*006□LSZ0*00					86	0.76							
TWCE228*006□CSZ0*00	2,200	6	6	24	170	1.03	13	-90	25	30	2,300	T4	E
TWCE228*006□LSZ0*00					85	0.52							
TWCA187*008□CSZ0*00	180	8	2	9	41	3.02	45	-60	13	16	1,000	T1	A
TWCA187*008□LSZ0*00					20.5	1.51							
TWCB687*008□CSZ0*00	680	8	3	14	130	2.54	22	-83	16	20	1,500	T2	B
TWCB687*008□LSZ0*00					65	1.27							
TWCD158*008□CSZ0*00	1,500	8	5	20	170	1.5	18	-90	20	25	1,900	T3	D
TWCD158*008□LSZ0*00					85	0.75							
TWCE188*008□CSZ0*00	1,800	8	7	25	138	1.02	14	-90	25	30	2,300	T4	E
TWCE188*008□LSZ0*00					69	0.51							
TWCA157*010□CSZ0*00	150	10	2	9	34	3.01	54	-55	13	16	900	T1	A
TWCA157*010□LSZ0*00					17	1.51							
TWCB567*010□CSZ0*00	560	10	3	16	106	2.51	27	-77	16	20	1,450	T2	B
TWCB567*010□LSZ0*00					53	1.26							
TWCD128*010□CSZ0*00	1,200	10	5	20	137	1.51	18	-88	20	25	1,850	T3	D
TWCD128*010□LSZ0*00					68.5	0.76							
TWCE158*010□CSZ0*00	1,500	10	7	25	114	1.01	15	-88	25	30	2,300	T4	E
TWCE158*010□LSZ0*00					57	0.51							
TWCA107*015□CSZ0*00	100	15	2	9	30	3.98	72	-44	13	16	900	T1	A
TWCA107*015□LSZ0*00					15	1.99							
TWCB397*015□CSZ0*00	390	15	3	16	74	2.52	31	-66	16	20	1,450	T2	B
TWCB397*015□LSZ0*00					37	1.26							
TWCD827*015□CSZ0*00	820	15	6	24	111	1.8	22	-77	20	25	1,800	T3	D
TWCD827*015□LSZ0*00					55.5	0.9							
TWCE108*015□CSZ0*00	1,000	15	8	32	92	1.22	17	-77	25	30	2,300	T4	E
TWCE108*015□LSZ0*00					46	0.61							
TWCA686*025□CSZ0*00	68	25	2	9	22	4.29	90	-40	12	15	850	T1	A
TWCA686*025□LSZ0*00					11	2.15							
TWCB277*025□CSZ0*00	270	25	3	16	55	2.7	33	-62	13	16	1,400	T2	B
TWCB277*025□LSZ0*00					27.5	1.35							
TWCD567*025□CSZ0*00	560	25	7	28	76	1.8	24	-72	20	25	1,750	T3	D
TWCD567*025□LSZ0*00					38	0.9							
TWCE687*025□CSZ0*00	680	25	8	32	63	1.23	19	-72	25	30	2,100	T4	E
TWCE687*025□LSZ0*00					31.5	0.62							
TWCA566*030□CSZ0*00	56	30	2	9	22	5.21	100	-38	12	15	800	T1	A
TWCA566*030□LSZ0*00					11	2.61							
TWCB227*030□CSZ0*00	220	30	3	16	42	2.53	36	-60	13	16	1,200	T2	B
TWCB227*030□LSZ0*00					21	1.27							
TWCD477*030□CSZ0*00	470	30	8	32	64	1.81	25	-65	20	25	1,500	T3	D
TWCD477*030□LSZ0*00					32	0.91							
TWCE567*030□CSZ0*00	560	30	9	36	55	1.3	20	-65	25	30	2,000	T4	E
TWCE567*030□LSZ0*00					27.5	0.65							
TWCA336*050□CSZ0*00	33	50	2	9	12.3	4.95	135	-29	10	12	700	T1	A
TWCA336*050□LSZ0*00					6.15	2.48							
TWCB127*050□CSZ0*00	120	50	4	24	22.5	2.49	49	-42	12	15	1,200	T2	B
TWCB127*050□LSZ0*00					11.3	1.25							
TWCD277*050□CSZ0*00	270	50	8	32	37	1.82	29	-46	20	25	1,450	T3	D
TWCD277*050□LSZ0*00					18.5	0.91							
TWCE337*050□CSZ0*00	330	50	9	36	38	1.53	22	-46	25	30	1,900	T4	E
TWCE337*050□LSZ0*00					19	0.77							
TWCA276*060□CSZ0*00	27	60	3	12	10.2	5.01	144	-24	10	12	700	T1	A
TWCA276*060□LSZ0*00					5.1	2.51							
TWCB107*060□CSZ0*00	100	60	4	20	19	2.52	54	-36	12	15	1,100	T2	B
TWCB107*060□LSZ0*00					9.5	1.26							
TWCD227*060□CSZ0*00	220	60	8	32	30	1.81	29	-40	16	20	1,400	T3	D
TWCD227*060□LSZ0*00					15	0.91							

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

EXTENDED RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF (Max)	ESR Max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
			+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		Standard	AVX
TWCE277*060□CSZ0^00	270	60	9	36	27	1.33	23	-45	20	25	1,850	T4	E
TWCE277*060□LSZ0^00					13.5	0.67							
TWCA226*075□CSZ0^00	22	75	3	12	8.5	5.13	157	-19	10	12	600	T1	A
TWCA226*075□LSZ0^00					4.25	2.57							
TWCB826*075□CSZ0^00	82	75	4	24	15.2	2.46	63	-30	12	15	1,000	T2	B
TWCB826*075□LSZ0^00					7.6	1.23							
TWCD187*075□CSZ0^00	180	75	9	36	24.4	2.23	30	-35	16	20	1,300	T3	D
TWCD187*075□LSZ0^00					12.2	0.9							
TWCE227*075□CSZ0^00	220	75	10	40	37	1.8	24	-40	20	25	1,800	T4	E
TWCE227*075□LSZ0^00					18.5	1.12							
TWCA106*100□CSZ0^00	10	100	3	12	4.5	5.97	200	-17	10	12	800	T1	A
TWCA106*100□LSZ0^00					2.25	2.99							
TWCB396*100□CSZ0^00	39	100	5	24	10.4	3.54	80	-20	12	15	1,300	T2	B
TWCB396*100□LSZ0^00					5.2	1.77							
TWCD686*100□CSZ0^00	68	100	10	40	11.3	2.21	40	-30	14	16	1,600	T3	D
TWCD686*100□LSZ0^00					5.65	1.11							
TWCE127*100□CSZ0^00	120	100	12	48	25	2.76	30	-35	15	17	2,000	T4	E
TWCE127*100□LSZ0^00					12.5	1.38							
TWCA685*125□CSZ0^00	6.8	125	3	12	6	11.71	300	-14	10	12	700	T1	A
TWCA685*125□LSZ0^00					3	5.86							
TWCB276*125□CSZ0^00	27	125	5	24	7.2	3.54	90	-18	12	15	1,200	T2	B
TWCB276*125□LSZ0^00					3.6	1.77							
TWCD476*125□CSZ0^00	47	125	10	40	7.9	2.23	50	-26	14	16	1,500	T3	D
TWCD476*125□LSZ0^00					3.95	1.12							
TWCE826*125□CSZ0^00	82	125	12	48	17.4	2.82	32	-30	15	17	1,900	T4	E
TWCE826*125□LSZ0^00					8.7	1.41							

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

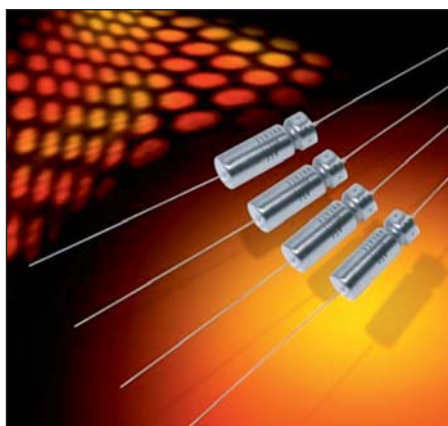
TESTING

All TWC COTS-Plus product is tested using MIL-PRF-39006 test procedures.

Lot Conformance Testing*

Inspection	Sampling Procedure
Constant Voltage Conditioning DC Leakage Capacitance Dissipation Factor Seal, Condition A or D	100% Inspection
Visual Examination Material Marking Workmanship	13 Samples

*Additional testing and inspection is available, please contact the factory for details.



The TWC-Y high temperature series represents a COTS-Plus version of conventional wet electrolytic tantalum capacitors that are designed for use at 200°C. The components listed are now capable of 500 hours of operation at extreme temperature with the applicable derated voltage.

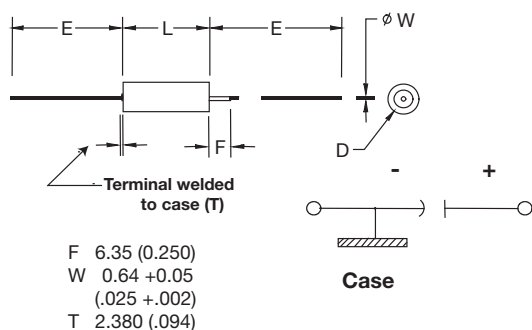
This design includes a welded tantalum can and header assembly that provides a hermetic seal to withstand harsh environments.

This is a new product line so please contact the factory for availability and additional details.

CASE DIMENSIONS: millimeters (inches)

Standard Case Size	AVX Case Size	L	D	D	E
		+0.79 (0.031) -0.41 (0.016)	Basic Case ±0.41 (0.016)	Insulated Case Max	±6.35 (0.250)
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

OUTLINE DIMENSIONS



200°C LIFE TEST:

These components are capable of 500 hours of operation at 200°C with the applicable 60% derated voltage. Following the life test components which are stabilized at 25°C ± 5°C shall exhibit:

Leakage less than 200% the original requirement or ± 10µA (whichever is greater)

ESR not greater than 200% the original requirement

Capacitance increase less than 10% or decrease less than 20% the initial measurement

HOW TO ORDER

AVX PART NUMBER:

TWC	B	476	*	050	□	C	Y	Z	^	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance M = ±20% K = ±10%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	ESR C = Standard ESR	Qualification Y = High Temp.	Reliability Z = Non-ER	Termination Finish 00 = Sn/Pb 60/40 07 = 100% Tin	Custom Test Options 00 = Standard



TECHNICAL SPECIFICATIONS

Technical Data: Unless otherwise specified, all technical data relate to an ambient temperature of +25°C

Capacitance Tolerance:	±10%; ±20%											
Rated Voltage (V _R)	≤ 85°C:	6	8	10	15	25	30	50	60	75	100	125
Category Voltage (V _C)	≤ 125°C:	4	5	7	10	15	20	30	40	50	65	85
High Temp, Voltage (V_T)	≤ 200°C:	3.6	4.8	6	9	12	18	30	36	45	60	75
Surge Voltage (V _S)	≤ 85°C:	6.9	9.2	11.5	17.3	28.8	34.5	57.5	69	86.3	115	144
Temperature Range:	-55°C to +200°C											

STANDARD RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) +25°C at 120Hz	DC Rated Voltage (V) at +85°C	DC Leakage (µA)		DF (max)	ESR Max (Ohms) at 120Hz	Maximum Capacitance Change (%)			Case Size	
			+25°C	+85°C & +125°C			-55°C	+85°C	+125°C	Standard	AVX
6 VDC at 85°C 4 VDC at 125°C 3.6 VDC at 200°C											
TWCB147*006□CYZ0^00	140	6	1	3	21	1.99	-40	14	16	T2	B
TWCD337*006□CYZ0^00	330	6	2	7.9	36	1.45	-44	14	16	T3	D
TWCD567*006□CYZ0^00	560	6	2	13	55	1.30	-64	17.5	20	T3	D
8 VDC at 85°C 5 VDC at 125°C 4.8 VDC at 200°C											
TWCB127*008□CYZ0^00	120	8	1	2	20	2.21	-44	17.5	20	T2	B
TWCD297*008□CYZ0^00	290	8	2	6	34	1.56	-64	17.5	20	T3	D
TWCD437*008□CYZ0^00	430	8	2	14	46	1.42	-64	17.5	20	T3	D
10 VDC at 85°C 7 VDC at 125°C 6 VDC at 200°C											
TWCB107*010□CYZ0^00	100	10	1	4	15	1.99	-36	14	16	T2	B
TWCD257*010□CYZ0^00	250	10	2	10	30	1.59	-40	14	16	T3	D
TWCD397*010□CYZ0^00	390	10	2	16	44	1.50	-64	17.5	20	T3	D
15 VDC at 85°C 10 VDC at 125°C 9 VDC at 200°C											
TWCB706*015□CYZ0^00	70	15	1	4	13	2.46	-28	14	16	T2	B
TWCD177*015□CYZ0^00	170	15	2	10	25	1.95	-32	14	16	T3	D
TWCD277*015□CYZ0^00	270	15	2	16	32	1.57	-56	17.6	20	T3	D
25 VDC at 85°C 15 VDC at 125°C 15 VDC at 200°C											
TWCA226*025□CYZ0^00	22	25	1	2	6.6	3.98	-20	10.5	12	T1	A
TWCA686*025□CYZ0^00	68	25	2	9	22	4.29	-50	12	15	T1	A
TWCB107*025□CYZ0^00	100	25	1	10	15	1.99	-28	13	15	T2	B
TWCD127*025□CYZ0^00	120	25	2	6	21	2.32	-32	13	15	T3	D
TWCD187*025□CYZ0^00	180	25	2	18	26	1.92	-48	13	15	T3	D
TWCB277*025□CYZ0^00	270	25	3	16	55	2.70	-62	13	16	T2	B
TWCD567*025□CYZ0^00	560	25	7	28	76	1.80	-77	20	25	T3	D
30 VDC at 85°C 20 VDC at 125°C 18 VDC at 200°C											
TWCA156*030□CYZ0^00	15	30	1	2	5	4.42	-20	10.5	12	T1	A
TWCA566*030□CYZ0^00	56	30	2	9	22	5.21	-48	12	15	T1	A
TWCB686*030□CYZ0^00	68	30	1	8	13	2.54	-24	13	15	T2	B
TWCD107*030□CYZ0^00	100	30	2	12	17	2.26	-28	10.5	12	T3	D
TWCD157*030□CYZ0^00	150	30	2	18	23	2.03	-48	13	15	T3	D
TWCB227*030□CYZ0^00	220	30	3	16	42	2.53	-60	13	16	T2	B
TWCE307*030□CYZ0^00	300	30	8	32	31	1.37	-60	25	25	T4	E
TWCD397*030□CYZ0^00	390	30	6	18	53	1.80	-65	18	25	T3	D
TWCD477*030□CYZ0^00	470	30	8	32	64	1.81	-70	20	25	T3	D
TWCE567*030□CYZ0^00	560	30	9	36	55	1.30	-65	25	30	T4	E
50 VDC at 85°C 30 VDC at 125°C 30 VDC at 200°C											
TWCA106*050□CYZ0^00	10	50	1	2	4	5.31	-24	8	9	T1	A
TWCA336*050□CYZ0^00	33	50	2	9	12.3	4.95	-39	10	12	T1	A
TWCB476*050□CYZ0^00	47	50	1	9	11	3.11	-28	13	15	T2	B
TWCD606*050□CYZ0^00	60	50	2	12	12	2.65	-16	10.5	12	T3	D
TWCD826*050□CYZ0^00	82	50	2	16	15	2.43	-32	13	15	T3	D
TWCB127*050□CYZ0^00	120	50	4	24	22.5	2.49	-42	12	15	T2	B
TWCE167*050□CYZ0^00	160	50	8	32	17	1.41	-50	25	25	T4	E
TWCD277*050□CYZ0^00	270	50	8	32	37	1.82	-51	20	25	T3	D
TWCE337*050□CYZ0^00	330	50	9	36	38	1.53	-46	25	30	T4	E
60V VDC at 85°C 40 VDC at 125°C 36 VDC at 200°C											
TWCA825*060□CYZ0^00	8.2	60	1	2	4	6.47	-24	8	9	T1	A
TWCA276*060□CYZ0^00	27	60	3	12	10.2	5.01	-34	10	12	T1	A
TWCD506*060□CYZ0^00	50	60	2	12	10	2.65	-16	10.5	12	T3	D
TWCD686*060□CYZ0^00	68	60	2	16	13	2.54	-32	10.5	12	T3	D
TWCB107*060□CYZ0^00	100	60	4	20	19	2.52	.36	12	15	T2	B
TWCE147*060□CYZ0^00	140	60	8	32	16	1.52	-40	20	20	T4	E
TWCD227*060□CYZ0^00	220	60	8	32	30	1.81	-45	16	20	T3	D
TWCE277*060□CYZ0^00	270	60	9	36	27	1.33	-45	20	25	T4	E
75V VDC at 85°C 50 VDC at 125°C 45 VDC at 200°C											
TWCA685*075□CYZ0^00	6.8	75	1	2	3.5	6.83	-20	8	9	T1	A
TWCA226*075□CYZ0^00	22	75	3	12	8.5	5.13	-29	10	12	T1	A
TWCD566*075□CYZ0^00	56	75	2	17	11	2.61	-28	10.5	15	T3	D
TWCB826*075□CYZ0^00	82	75	4	24	15.2	2.46	-30	12	15	T2	B
TWCE117*075□CYZ0^00	110	75	9	36	12	1.45	-35	20	20	T4	E
TWCD187*075□CYZ0^00	180	75	9	36	24.4	2.23	-40	16	20	T3	D
TWCE227*075□CYZ0^00	220	75	10	40	37	1.80	-40	20	25	T4	E
100 VDC at 85°C 65 VDC at 125°C 60 VDC at 200°C											
TWCB226*100□CYZ0^00	22	100	1	9	7.5	4.52	-16	8	8	T2	B
TWCE127*100□CYZ0^00	120	100	12	48	25	2.76	-35	15	17	T4	E
125 VDC at 85°C 85 VDC at 125°C 75 VDC at 200°C											
TWCB276*125□CYZ0^00	27	125	5	24	7.2	3.54	-18	12	15	T2	B
TWCE826*125□CYZ0^00	82	125	12	48	17.4	2.82	-30	15	17	T4	E

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.
 Note: AVX reserves the right to supply higher voltage rating in the same case size to the same reliability standards.

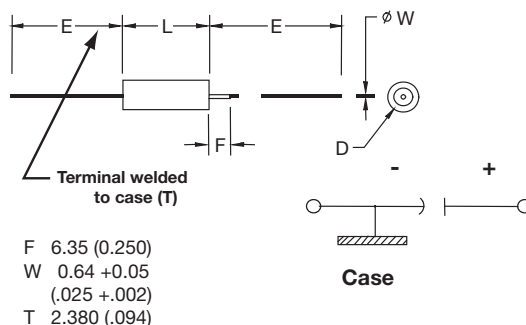


The TWA series is an axial leaded wet electrolytic tantalum capacitor with a unique cathode system that promotes very high CV (Capacitance/Voltage) per cc in traditional MIL-PRF-39006 case sizes.

The series also utilizes a welded tantalum can and header assembly to provide a hermetic seal and subsequent long operating lifetime.

The construction is similar to DSCC 93026 with capability of meeting harsh shock and vibration conditions.

OUTLINE DIMENSIONS



CASE DIMENSIONS: millimeters (inches)

DSCC Case Size	AVX Case Size	L +0.79 (0.031) -0.41 (0.016)	D		E ±6.35 (0.250)
			Without Insulating Sleeve ±0.41 (0.016)	With Insulating Sleeve Max	
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

VOLTAGE RATINGS (Operating Temperature -55°C to 125°C)

Voltage (DC)								
Rated Voltage: (V _R)	85°C	25	30	50	60	75	100	125
Derated Voltage: (V _D)	125°C	15	20	30	40	50	65	85
Surge Voltage: (V _S)	85°C	28.8	34.5	57.5	69	86.3	115	144

HOW TO ORDER

AVX PART NUMBER:

TWA	E	407	*	100	□	B	S	Z	0	^	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance K = ±10% M = ±20%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	Packaging B = Tray Pack	Qualification E = Extended range S = COTS+ L = Group A	Reliability Z = Non-ER	Qualification Level 0 = N/A	Termination Finish 0 = Sn/Pb 60/40 7 = Matte tin	Custom Test Options 00 = Standard 01 = Random vibration*

LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT

RoHS
COMPLIANT

For RoHS compliant products,
please select correct termination style.

* Please contact the factory for additional details and availability.

RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2/}

Frequency of Applied Ripple Current		120Hz				800Hz				1kHz			
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of 85°C	100%	0.60	0.39	–	–	0.71	0.43	–	–	0.72	0.45	–	–
	90%	0.60	0.46	–	–	0.71	0.55	–	–	0.72	0.55	–	–
Rated Peak	80%	0.60	0.52	0.35	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
	70%	0.60	0.58	0.44	–	0.71	0.69	0.52	–	0.72	0.70	0.52	–
Voltage 66-2/3%		0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current		10kHz				40kHz				100kHz			
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
% of 85°C	100%	0.88	0.55	–	–	1.00	0.63	–	–	1.10	0.69	–	–
	90%	0.88	0.67	–	–	1.00	0.77	–	–	1.10	0.85	–	–
Rated Peak	80%	0.88	0.76	0.52	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
	70%	0.88	0.85	0.64	–	1.00	0.97	0.73	–	1.10	1.07	0.80	–
Voltage 66-2/3%		0.88	0.88	0.68	0.40	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R) to 85°C							
μF	Code	15V	25V	30V	50V	60V	75V	100V	125V
10	106				A*				A
15	156							A	
22	226		A*			A*	A*		
33	336						A		
47	476				A*,B	A			B
68	686		A		A			B	
100	107			A		B	B		D
110	117						B		
120	127		A		A*,B				D
150	157				B	B	D*	D	E
220	227			B	B	D*	D*,E	D,E	E
270	277		B						
330	337		B	D*	D*,E	E*	D,E	E	
390	397	D				D			
400	407							E	
470	477			B,D*	D,E		E	E ^(M)	
560	567		B,D*	D*		E			
680	687		D*,E	D,E	E	E	E		
750	757		D,E	D,E	E	E	E	E	
1000	108		D,E	D,E	D,E	E	E		
1200	128		D		E				
1500	158		E	E					
1800	188		E						
2200	228		E			E ^(M)			
3000	308				E ^(M)				
4700	478		E						
5600	568		E*						

Available Ratings ^(M tolerance only)

Engineering samples - please contact manufacturer

*Codes under development

RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	ESR Max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
				+25°C	+85 & +125°C		-55°C	+85°C	+125°C		AVX	DSCC
15 VDC at 85°C 10 VDC at 125°C												
TWAD397*015□BSZ0*00	390	15	1.7	7	28	48	-70	25	25	1396	D	T3
25 VDC at 85°C 15 VDC at 125°C												
TWAA686*025□BEZ0*00	68	25	2.5	0.6	3	45	-40	12	15	850	A	T1
TWAA127*025□BSZ0000	120	25	1.3	1	5	25	-42	8	12	1250	A	T1
TWAA127*025□BEZ0*00*	120	25	2.3	2	10	35	-42	20	25	1250	A	T1
TWAB277*025□BEZ0*00	270	25	0.9	4	20	17.5	-50	8	15	1800	B	T2
TWAB337*025□BEZ0*00	330	25	1.3	2	20	25	-60	10	15	1550	B	T2
TWAB567*025□BSZ000	560	25	0.83	2	10	12	-65	10	15	2100	B	T2
TWAE687*025□BEZ0*00	680	25	0.75	3	12	12	-50	8	15	2100	E	T4
TWAD757*025□BEZ0*00	750	25	1	3	25	15	-50	8	15	2000	D	T3
TWAE757*025□BEZ0*00	750	25	0.75	3.5	16	9	-55	10	18	2200	E	T4
TWAD108*025□BEZ0*00	1000	25	1	4	30	15	-50	8	15	2300	D	T3
TWAE108*025□BEZ0*00	1000	25	0.7	4	20	9	-55	10	18	2400	E	T4
TWAD128*025□BSZ0000	1200	25	0.65	5	20	7	-70	12	18	2600	D	T3
TWAD128*025□BEZ0*00*	1200	25	1.4	7	35	12	-85	40	50	2600	D	T3
TWAE158*025□BEZ0*00	1500	25	0.5	6	24	7	-65	15	20	2850	E	T4
TWAE188*025□BSZ0000	1800	25	0.5	6	25	7	-75	12	20	3100	E	T4
TWAE228*025□BSZ0000	2200	25	0.5	10	80	10	-90	30	50	3200	E	T4
TWAE478*025□BSZ0*00	4700	25	0.5	30	180	5	-90	60	80	4250	E	T4
TWAE478*025□BEZ0*00*	4700	25	0.5	30	180	5	-90	60	80	4250	E	T4
30 VDC at 85°C 20 VDC at 125°C												
TWAA107*030□BSZ0000	100	30	1.3	1	5	25	-38	8	12	1200	A	T1
TWAA107*030□BEZ0*00*	100	30	2.3	2	10	35	-38	20	25	1200	A	T1
TWAB227*030□BEZ0*00	220	30	2	1.9	10	40	-40	8	15	1200	B	T2
TWAB477*030□BSZ0*00	470	30	0.85	2	10	15	-65	10	18	1800	B	T2
TWAD687*030□BEZ0*00	680	30	1	3.3	25	15	-50	8	15	1900	D	T3
TWAE687*030□BEZ0*00	680	30	0.8	4.5	18	10	-60	8	15	2100	E	T4
TWAD757*030□BEZ0*00	750	30	1	3.6	30	15	-50	8	15	2000	D	T3
TWAE757*030□BEZ0*00	750	30	0.8	5	20	10	-65	10	18	2200	E	T4
TWAD108*030□BSZ0000	1000	30	0.7	7	25	7	-70	10	18	2500	D	T3
TWAD108*030□BEZ0*00*	1000	30	1.4	10	50	12	-85	40	50	2500	D	T3
TWAE108*030□BEZ0*00	1000	30	0.7	5	20	7	-70	10	18	2500	E	T4
TWAE158*030□BSZ0000	1500	30	0.6	12	35	6	-72	10	20	3000	E	T4
50 VDC at 85°C 30 VDC at 125°C												
TWAB476*050□BSZ0*00	47	50	3	0.8	8	70	-28	13	15	1155	B	T2
TWAA686*050□BSZ0000	68	50	1.5	1	5	35	-25	8	15	1050	A	T1
TWAA686*050□BEZ0*00*	68	50	2.5	2	10	45	-25	20	25	1050	A	T1
TWAB127*050□BEZ0*00	120	50	2	2	10	40	-45	8	15	1200	B	T2
TWAB157*050□BEZ0*00	150	50	2	2	10	25	-50	8	15	1400	B	T2
TWAB227*050□BSZ0000	220	50	0.9	2	10	17.5	-50	8	15	1800	B	T2
TWAB227*050□BEZ0*00*	220	50	0.9	4	20	17.5	-50	8	15	1800	B	T2
TWAE337*050□BEZ0*00	330	50	0.8	2.5	25	15	-50	8	15	1900	E	T4
TWAD477*050□BSZ0000	470	50	0.75	3	25	10	-50	8	15	2100	D	T3
TWAD477*050□BEZ0*00*	470	50	1	3	25	11	-50	8	15	2100	D	T3
TWAE477*050□BEZ0*00	470	50	0.75	3	30	10	-50	8	15	2200	E	T4
TWAE687*050□BSZ0000	680	50	0.7	5	40	8	-58	10	20	2750	E	T4
TWAE687*050□BEZ0*00*	680	50	0.7	5	40	8	-58	10	20	2750	E	T4
TWAE757*050□BEZ0*00	750	50	0.6	12	60	8	-50	15	20	2800	E	T4
TWAD108*050□BEZ0*00	1000	50	1.5	20	125	12	-90	100	140	2500	D	T3
TWAE108*050□BSZ0*00	1000	50	1.0	12	90	20	-90	30	50	3200	E	T4
TWAE108*050□BEZ0*00*	1000	50	0.7	11	110	20	-70	30	40	3200	E	T4
TWAE128*050□BSZ0*00	1200	50	1.0	12	90	20	-90	30	50	3200	E	T4
TWAE308M050□BSZ0*00	3000	50	0.3	30	150	3.5	-80	60	85	3100	E	T4
TWAE308M050□BEZ0*00*	3000	50	0.3	30	150	3.5	-80	60	85	3100	E	T4
60 VDC at 85°C 40 VDC at 125°C												
TWAA476*060□BSZ0000	47	60	2	1	5	44	-25	8	12	1050	A	T1
TWAA476*060□BEZ0*00*	47	60	2	2	10	55	-25	15	25	1050	A	T1
TWAB107*060□BEZ0*00	100	60	2.5	1.7	10	40	-40	8	15	1100	B	T2
TWAB157*060□BSZ0000	150	60	1.1	2	10	20	-40	8	15	1650	B	T2
TWAD397*060□BSZ0000	390	60	0.9	3	25	15	-60	8	15	2100	D	T3
TWAD397*060□BEZ0*00*	390	60	0.9	3	25	15	-60	8	15	2100	D	T3
TWAE567*060□BSZ0000	560	60	0.8	5	40	10	-58	8	15	2750	E	T4
TWAE567*060□BEZ0*00*	560	60	0.8	5	40	10	-58	8	15	2750	E	T4
TWAE687*060□BEZ0*00	680	60	0.6	13	65	8	-50	15	20	2800	E	T4

RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	ESR Max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size	
				+25°C	+85 & +125°C		-55°C	+85°C	+125°C		AVX	DSCC
75 VDC at 85°C 50 VDC at 125°C												
TWAE757*060□BEZ0^00	750	60	0.6	15	75	8	-50	15	20	2800	E	T4
TWAE108*060□BSZ0000	1000	60	1	12	90	20	-90	30	50	3200	E	T4
TWAE108*060□BEZ0^00*	1000	60	0.5	20	60	4.5	-70	30	60	3200	E	T4
TWAE228M060□BEZ0^00	2200	60	0.5	40	120	3.0	-80	60	80	3000	E	T4
TWAA336*075□BSZ0000	33	75	2.5	1	5	66	-25	5	9	1050	A	T1
TWAA336*075□BEZ0^00*	33	75	2.5	2	10	70	-25	15	25	1050	A	T1
TWAB107*075□BEZ0^00	100	75	2.5	2	10	40	-35	6	10	1400	B	T2
TWAB117*075□BSZ0000	110	75	1.3	2	10	24	-35	6	10	1650	B	T2
TWAE227*075□BEZ0^00	220	75	1.1	2.5	30	20	-50	6	10	1800	E	T4
TWAD337*075□BSZ0000	330	75	1	3	30	12	-45	6	10	2100	D	T3
TWAD337*075□BEZ0^00*	330	75	1.2	3	30	15	-60	10	20	2100	D	T3
TWAE337*075□BEZ0^00	330	75	1	3	40	12	-50	6	10	2200	E	T4
TWAE477*075□BSZ0000	470	75	0.9	5	50	12	-55	6	10	2750	E	T4
TWAE477*075□BEZ0^00*	470	75	0.9	5	50	12	-55	6	10	2750	E	T4
TWAE687*075□BEZ0^00	680	75	0.9	11	110	10	-70	30	40	2750	E	T4
TWAE757*075□BEZ0^00	750	75	0.7	12	120	10	-70	30	40	3800	E	T4
TWAE108*075□BEZ0^00	1000	75	0.5	30	90	4.5	-70	30	60	3500	E	T4
100 VDC at 85°C 65 VDC at 125°C												
TWAA156*100=BSZ0000	15	100	3.5	1	5	125	-18	3	10	1050	A	T1
TWAB686*100=BSZ0000	68	100	2.1	2	10	37	-30	4	12	1650	B	T2
TWAB686*100=BEZ0^00*	68	100	2.5	2	10	37	-30	4	12	1650	B	T2
TWAD157*100=BSZ0000	150	100	1.6	3	25	22	-35	6	12	2100	D	T3
TWAD157*100=BEZ0^00*	150	100	1.6	3	25	22	-35	6	12	2100	D	T3
TWAD227*100=BEZ0^00	220	100	1.4	5	25	18	-50	10	15	2500	D	T3
TWAE227*100=BSZ0000	220	100	1.2	5	50	15	-40	6	12	2750	E	T4
TWAE227*100=BEZ0^00*	220	100	1.2	5	50	15	-40	6	12	2750	E	T4
TWAE337*100=BSZ0^00	330	100	0.8	6	60	10	-45	7	20	3600	E	T4
TWAE337*100=BEZ0^00*	330	100	0.8	6	60	10	-45	7	20	3600	E	T4
TWAE407*100=BSZ0^00	400	100	0.8	10	150	10	-50	10	35	4100	E	T4
TWAE407*100=BEZ0^00*	400	100	0.8	10	150	10	-50	10	35	4100	E	T4
TWAE477M100=BEZ0^00	470	100	0.7	25	250	10	-50	10	35	4100	E	T4
TWAE757*100=BEZ0^00	750	100	0.6	30	150	5	-60	30	80	6700	E	T4
125 VDC at 85°C 85 VDC at 125°C												
TWAA106*125□BSZ0000	10	125	5.5	1	5	175	-15	3	10	1050	A	T1
TWAB476*125□BSZ0000	47	125	2.3	2	10	47	-25	5	12	1650	B	T2
TWAB476*125□BEZ0^00*	47	125	2.3	2	10	47	-25	5	12	1650	B	T2
TWAD107*125□BSZ0000	100	125	1.8	3	25	35	-35	5	12	2100	D	T3
TWAD107*125□BEZ0^00*	100	125	1.8	3	25	35	-35	5	12	2100	D	T3
TWAD127*125□BEZ0^00	120	125	1.8	3	25	35	-35	5	12	2100	D	T3
TWAE157*125□BSZ0000	150	125	1.6	5	50	20	-35	6	12	2750	E	T4
TWAE157*125□BEZ0^00*	150	125	1.6	5	50	20	-35	6	16	2750	E	T4
TWAE227*125□BEZ0^00	220	125	1.4	10	50	12	-40	8	15	3600	E	T4

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

*Not recommended for new designs, for new design use part number with Inspection level "S" – COTS-Plus

$$DF = 2\pi fC \times (ESR)$$

$$2\pi = 6.28$$

$$f = 120\text{Hz}$$

C = Actual measured capacitance

ESR = Actual measured ESR



The TWA-Y series represents a high temperature version of conventional wet electrolytic tantalum capacitors that are designed for use at 200°C. High capacitance cathode system allows high level of CV (Capacitance/Voltage) in standard case sizes.

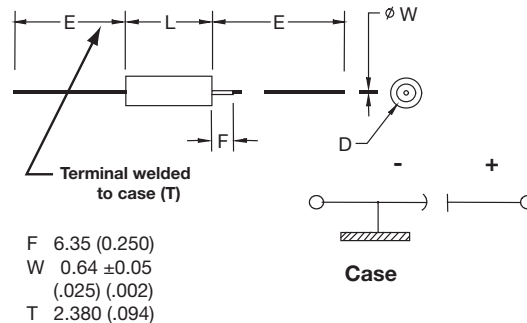
Selected values of the TWA-Y are capable of up to 2000 hours of operation at extreme temperatures with the applicable derated voltage.

Mechanical testing being conducted in accordance to MIL-STD- 202, High Frequency vibration - method 204, test condition "D" Mechanical Shock Test - method 213, test condition "I".

This design includes a welded tantalum can and header assembly that provides a hermetic seal to withstand also harsh shock and vibration requirements.

Contact the factory for additional options for customized component design.

OUTLINE DIMENSIONS



CHECK FOR UP-TO-DATE DATASHEET AT
<http://datasheets.avx.com/TWA-Y.pdf>

CASE DIMENSIONS: millimeters (inches)

DSCC Case Size	AVX Case Size	L +0.79 (0.031) -0.41 (0.016)	D		E ±6.35 (0.250)
			Without Insulating Sleeve ±0.41 (0.016)	With Insulating Sleeve Max	
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

VOLTAGE RATINGS (Operating Temperature -55°C to 200°C)

Voltage (DC)									
Rated Voltage: (V _R)	85°C	15	25	30	50	60	75	100	125
Derated Voltage: (V _C)	125°C	10	15	20	30	40	50	65	85
High Temperature Voltage: (V _T)	200°C	9	12	18	30	36	45	60	75

HOW TO ORDER

AVX PART NUMBER:

TWA	E	757	*	075	□	B	Y	Z	0	^	00
Type	Case Size	Capacitance Code pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	Capacitance Tolerance K = ±10% M = ±20%	Voltage Code	Insulation Sleeve C = Without Sleeve S = With Sleeve	Packaging B = Tray Pack	Inspection Level Y = High Temp	Reliability Z = Non-ER	Qualification Level 0 = N/A	Termination Finish 0 = Sn/Pb 60/40 7 = Matte tin	Custom Test Options 00 = Standard

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT
For RoHS compliant products, please select correct termination style.

RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2/}

Frequency of Applied Ripple Current		120Hz				800Hz				1kHz				
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125	
Ambient Still Air Temperature (°C)	% of	100%	0.60	0.39	–	–	0.71	0.43	–	–	0.72	0.45	–	–
	85°C	90%	0.60	0.46	–	–	0.71	0.55	–	–	0.72	0.55	–	–
Rated Peak	80%	0.60	0.52	0.35	–	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
	70%	0.60	0.58	0.44	–	–	0.71	0.69	0.52	–	0.72	0.70	0.52	–
Voltage	66-2/3%	0.60	0.60	0.46	0.27	–	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current		10kHz				40kHz				100kHz				
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125	
Ambient Still Air Temperature (°C)	% of	100%	0.88	0.55	–	–	1.00	0.63	–	–	1.10	0.69	–	–
	85°C	90%	0.88	0.67	–	–	1.00	0.77	–	–	1.10	0.85	–	–
Rated Peak	80%	0.88	0.76	0.52	–	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
	70%	0.88	0.85	0.64	–	–	1.00	0.97	0.73	–	1.10	1.07	0.80	–
Voltage	66-2/3%	0.88	0.88	0.68	0.40	–	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) to 85°C							
µF	Code	15V	25V	30V	50V	60V	75V	100V	125V
10	106				A				
15	156			A					
22	226		A			A	A		
27	276					A			
33	336	A			A		A		
47	476				B	A			B
50	506					B			
56	566		A	A			B		
60	606				B				
68	686		A		A	B		B	
82	826				B		B		D
100	107		B	A,B		B			D
120	127		A,B		B				
150	157			B				D	E
180	187						D		
220	227			B	B	D	E	E	E
270	277		B		D	E			
300	307			D					
330	337				E			E	
390	397	D		D					
400	407							E	
470	477			B			E	E ^(M)	
560	567		B,E	E				E*	
680	687						E		
750	757						E	E	
1000	108			D	E	E	E		
1200	128		D						
3000	308		E ^(M)						

Available Ratings ^(M tolerance only)

Engineering samples - please contact manufacturer

*Codes under development

RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	ESR Max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size		Lifetime at 200°C (hrs.)
				+25°C	+85 & +125°C		-55°C	+85°C	+125°C		AVX	DSCC	
15 VDC at 85°C 10 VDC at 125°C 9 VDC at 200°C													
TWAA336*015□BYZ0^00	33	15	4	1	2	90	-28	14	16	820	A	T1	2000
TWAD397*015□BYZ0^00	390	15	1.7	7	28	48	-70	25	25	1396	D	T3	1000
25 VDC at 85°C 15 VDC at 125°C 12 VDC at 200°C													
TWAA226*025□BYZ0^00	22	25	4	1	2	140	-20	10.5	12	825	A	T1	2000
TWAA566*025□BYZ0^00	56	25	4	1	2	140	-20	10.5	12	825	A	T1	500
TWAA686*025□BYZ0^00	68	25	4	1	2	140	-20	10.5	12	825	A	T1	500
TWAB107*025□BYZ0^00	100	25	2.5	1	10	60	-35	13	15	-	B	T2	2000
TWAA127*025□BYZ0^00	120	25	2.3	2	10	35	-42	20	25	1250	A	T1	500
TWAB127*025□BYZ0^00	120	25	2.3	2	10	60	-32	13	15	-	B	T2	500
TWAB277*025□BYZ0^00	270	25	0.9	4	20	17.5	-50	8	15	1800	B	T2	1000
TWAB567*025□BYZ0^00	560	25	1.0	2	10	12	-65	10	15	2100	B	T2	1000
TWAE567*025□BYZ0^00	560	25	1.3	9	36	25	-65	25	30	-	E	T4	2000
TWAD128*025□BYZ0^00	1200	25	1.4	7	35	12	-85	40	50	2600	D	T3	500
TWAE308M025□BYZ0^00	3000	25	0.5	15	30	3.5	-80	60	85	3100	E	T4	500
30 VDC at 85°C 20 VDC at 125°C 18 VDC at 200°C													
TWAA156*030□BYZ0^00	15	30	4.4	1	2	200	-20	10.5	0	-	A	T1	2000
TWAA566*030□BYZ0^00	56	30	5.2	2	9	200	-48	12	15	-	A	T1	2000
TWAA107*030□BYZ0^00	100	30	2.3	2	10	35	-38	20	25	1200	A	T1	500
TWAB107*030□BYZ0^00	100	30	2.3	2	12	60	-30	10.5	12	-	B	T2	500
TWAB157*030□BYZ0^00	150	30	2.5	2	18	40	-48	13	15	1100	B	T2	2000
TWAB227*030□BYZ0^00	220	30	0.9	4	20	17.5	-50	8	15	1800	B	T2	1000
TWAB477*030□BYZ0^00	470	30	1.0	2	10	15	-65	10	18	1800	B	T2	1000
TWAD307*030□BYZ0^00	300	30	1.8	8	32	25	-51	20	25	-	D	T3	2000

RATINGS & PART NUMBER REFERENCE

AVX Part Number	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	ESR Max (ohms) at 120Hz	DC Leakage max (µA)		Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size		Lifetime at 200°C (hrs.)
				+25°C	+85 & +125°C		-55°C	+85°C	+125°C		AVX	DSCC	
TWAD397*030□BYZ0^00	390	30	1.8	6	18	25	-65	18	25	-	D	T3	2000
TWAE567*030□BYZ0^00	560	30	1.3	9	36	25	-65	25	30	-	E	T4	2000
TWAD108*030□BYZ0^00	1000	30	1.4	10	50	12	-85	40	50	2500	D	T3	500
50 VDC at 85°C 30 VDC at 125°C 30 VDC at 200°C													
TWAA106*050□BYZ0^00	10	50	5.3	1	2	250	-24	8	9	715	A	T1	2000
TWAA336*050□BYZ0^00	33	50	5	2	9	200	-39	10	12	-	A	T1	2000
TWAB476*050□BYZ0^00	47	50	3	0.8	8	70	-28	13	15	1155	B	T2	500
TWAB606*050□BYZ0^00	60	50	2.6	2	12	60	-30	10.5	12	-	B	T2	500
TWAA686*050□BYZ0^00	68	50	2.5	2	10	45	-25	20	25	1050	A	T1	1000
TWAB826*050□BYZ0^00	82	50	2.4	2	16	60	-32	13	15	-	B	T2	500
TWAB127*050□BYZ0^00	120	50	2.5	4	24	40	-42	12	15	-	B	T2	2000
TWAB227*050□BYZ0^00	220	50	0.9	4	20	17.5	-50	8	15	1800	B	T2	1000
TWAD277*050□BYZ0^00	270	50	1.8	8	32	25	-51	20	25	-	D	T3	2000
TWAE337*050□BYZ0^00	330	50	1.5	9	36	25	-46	25	30	1900	E	T4	2000
TWAE108*050□BYZ0^00	1000	50	0.7	11	110	20	-70	30	40	3200	E	T4	500
60 VDC at 85°C 40 VDC at 125°C 36 VDC at 200°C													
TWAA226*060□BYZ0^00	22	60	5	3	12	200	-34	10	12	500	A	T1	2000
TWAA276*060□BYZ0^00	27	60	5	3	12	200	-34	10	12	-	A	T1	2000
TWAA476*060□BYZ0^00	47	60	2	2	10	55	-25	15	25	1050	A	T1	500
TWAB506*060□BYZ0^00	50	60	2.6	2	12	60	-30	10.5	12	-	B	T2	500
TWAB686*060□BYZ0^00	68	60	2.5	2	16	60	-32	10.5	12	-	B	T2	500
TWAB107*060□BYZ0^00	100	60	2.5	1.7	10	40	-40	8	15	1100	B	T2	2000
TWAD227*060□BYZ0^00	220	60	1.8	8	32	25	-45	16	20	-	D	T3	2000
TWAE277*060□BYZ0^00	270	60	1.3	9	36	25	-45	20	25	-	E	T4	2000
TWAE108*060□BYZ0^00	1000	60	0.5	20	60	4.5	-70	30	60	3200	E	T4	1000
75 VDC at 85°C 50 VDC at 125°C 45 VDC at 200°C													
TWAA226*075□BYZ0^00	22	75	5.1	3	12	157	-19	10	12	600	A	T1	2000
TWAA336*075□BYZ0^00	33	75	2.5	2	10	70	-25	15	25	1050	A	T1	1000
TWAB566*075□BYZ0^00	56	75	2.6	2	17	60	-30	10.5	15	-	B	T2	500
TWAB826*075□BYZ0^00	82	75	2.5	4	24	37	-30	12	15	-	B	T2	500
TWAD187*075□BYZ0^00	180	75	2.2	9	36	25	-40	16	20	-	D	T3	2000
TWAE227*075□BYZ0^00	220	75	1.2	5	50	20	-40	8	15	1800	E	T4	2000
TWAE477*075□BYZ0^00	470	75	0.9	10	125	10	-50	10	35	2750	E	T4	1000
TWAE687*075□BYZ0^00	680	75	0.9	11	110	10	-70	30	40	2750	E	T4	500
TWAE757*075□BYZ0^00	750	75	0.7	12	120	10	-70	30	40	3800	E	T4	500
TWAE108*075□BYZ0^00	1000	75	0.5	30	90	4.5	-70	30	60	3500	E	T4	1000
100 VDC at 85°C 65 VDC at 125°C 60 VDC at 200°C													
TWAB686*100□BYZ0^00	68	100	2.5	2	10	37	-30	4	12	1650	B	T2	500
TWAD157*100□BYZ0^00	150	100	1.6	3	25	22	-35	6	12	2100	D	T3	2000
TWAE227*100□BYZ0^00	220	100	1.2	5	50	15	-40	6	12	2750	E	T4	2000
TWAE337*100□BYZ0^00	330	100	0.8	6	60	10	-45	7	20	3600	E	T4	2000
TWAE407*100□BYZ0^00	400	100	0.8	10	150	10	-50	10	35	4100	E	T4	2000
TWAE477M100□BYZ0^00	470	100	0.7	25	250	10	-50	10	35	4100	E	T4	2000
TWAE757*100□BYZ0^00	750	100	0.6	30	150	5	-60	30	80	6700	E	T4	500
125 VDC at 85°C 85 VDC at 125°C 75 VDC at 200°C													
TWAB476*125□BYZ0^00	47	125	2.3	2	10	47	-25	5	12	1650	B	T2	1000
TWAD826*125□BYZ0^00	82	125	2.8	12	48	50	-30	15	17	-	D	T3	2000
TWAD107*125□BYZ0^00	100	125	1.8	3	25	35	-35	5	12	2100	D	T3	2000
TWAE157*125□BYZ0^00	150	125	1.6	5	50	20	-35	6	16	2750	E	T4	2000
TWAE227*125□BYZ0^00	220	125	1.4	10	50	12	-40	8	15	3600	E	T4	2000

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

NOTE: AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

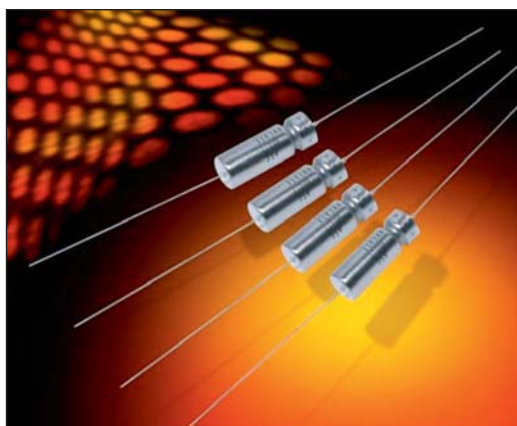
$$DF = 2\pi f C \times (ESR)$$

$$2\pi = 6.28$$

$$f = 120\text{Hz}$$

C = Actual measured capacitance

ESR = Actual measured ESR



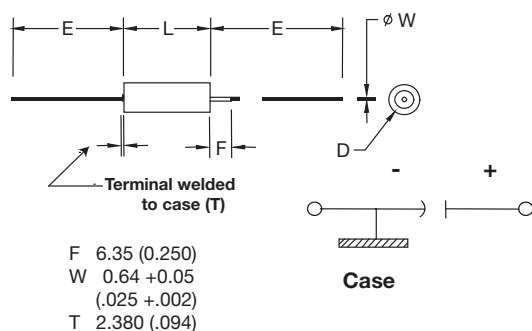
This data sheet contains the MIL-PRF-39006 ratings for which AVX is a qualified approved supplier. This will be continually updated as the qualification expands. For COTS-Plus equivalent ratings please refer to the TWC data sheet located on the website.

This design is an axial leaded tubular case. It includes a welded tantalum can and header assembly that provides a hermetic seal to withstand harsh environments. The 1000 hour failure rates of 1%, 0.1% and 0.01% correspond to “M”, “P”, and “R” respectively. For details on testing conditions please refer to MIL-PRF-39006.

Currently qualified M39006 ratings include T2-T4 case sizes:

	M Level Reliability Dashes	P Level Reliability Dashes	R Level Reliability Dashes
M39006/22	6V-100V	6V-100V	6V-100V
M39006/25	6V-100V	6V-100V	6V-100V
M39006/30	6V-100V	6V-100V	6V-100V
M39006/31	6V-100V	6V-100V	6V-100V

OUTLINE DIMENSIONS



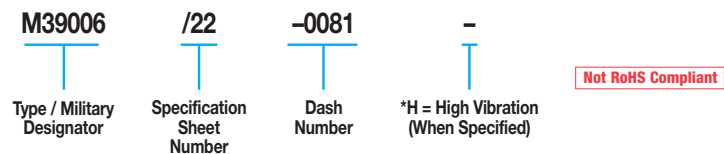
CASE DIMENSIONS: millimeters (inches)

DSCC Case Size	AVX Case Size	L	D	D	E
		+0.79 (0.031) -0.41 (0.016)	Basic Case ±0.41 (0.016)	Insulated Case Max	±6.35 (0.250)
T1	A	11.51 (0.453)	4.78 (0.188)	5.56 (0.219)	38.10 (1.500)
T2	B	16.28 (0.641)	7.14 (0.281)	7.92 (0.312)	57.15 (2.250)
T3	D	19.46 (0.766)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)
T4	E	26.97 (1.062)	9.52 (0.375)	10.31 (0.406)	57.15 (2.250)

VOLTAGE RATINGS (Operating Temperature -55°C to 125°C)

Voltage (DC)												
Rated Voltage: (V _r)	85°C	6	8	10	15	25	30	50	60	75	100	125
Derated Voltage: (V _d)	125°C	4	5	6	10	15	20	30	40	50	65	85
Surge Voltage: (V _s)	85°C	6.9	9.2	11.5	17.3	28.8	34.5	57.5	69	86.3	115	144

HOW TO ORDER MILITARY M39006 PART NUMBER:



*High vibration qualified parts are currently under development. Please contact the factory for additional details and availability.

RIPPLE CURRENT MULTIPLIERS vs. Frequency, temperature and applied voltage^{1/2/3/}

Frequency of Applied Ripple Current		120Hz				800Hz				1kHz			
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
Ambient Still Air Temperature (°C)	100%	0.60	0.39	–	–	0.71	0.43	–	–	0.72	0.45	–	–
	90%	0.60	0.46	–	–	0.71	0.55	–	–	0.72	0.55	–	–
Rated Peak	80%	0.60	0.52	0.35	–	0.71	0.62	0.42	–	0.72	0.62	0.42	–
	70%	0.60	0.58	0.44	–	0.71	0.69	0.52	–	0.72	0.70	0.52	–
Voltage	66-2/3%	0.60	0.60	0.46	0.27	0.71	0.71	0.55	0.32	0.72	0.72	0.55	0.32

Frequency of Applied Ripple Current		10kHz				40kHz				100kHz			
		≤55	85	105	125	≤55	85	105	125	≤55	85	105	125
Ambient Still Air Temperature (°C)	100%	0.88	0.55	–	–	1.00	0.63	–	–	1.10	0.69	–	–
	90%	0.88	0.67	–	–	1.00	0.77	–	–	1.10	0.85	–	–
Rated Peak	80%	0.88	0.76	0.52	–	1.00	0.87	0.59	–	1.10	0.96	0.65	–
	70%	0.88	0.85	0.64	–	1.00	0.97	0.73	–	1.10	1.07	0.80	–
Voltage	66-2/3%	0.88	0.88	0.68	0.40	1.00	1.00	0.77	0.45	1.10	1.10	0.85	0.50

1/ At 125°C the rated voltage of the capacitors decreases to 66 2/3 of the 85°C rated voltage.

2/ The peak of the applied ac ripple voltage plus the applied dc voltage must not exceed the dc voltage rating of the capacitors.

3/ The ripple current listed in the parametric tables represents a rating calculated by using a maximum internal temperature rise (ΔT) at 50°C at 40 kHz at 85°C ambient temperature, with a maximum peak rated voltage of 66.67 percent of the 85°C peak voltage rating.

M39006 /22 RATINGS AND DASH NUMBER REFERENCE

M39006/22 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0007	-0227	-0447	20	140	6	1	3	21	1.99	40	-40	14	16	1200	T2
-0008	-0228	-0448	10												
-0009	-0229	-0449	5												
-0010	-0230	-0450	20	270	6	1	6.5	45	2.21	25	-44	17.5	20	1375	T2
-0011	-0231	-0451	10												
-0012	-0232	-0452	5												
-0013	-0233	-0453	20	330	6	2	7.9	36	1.45	20	-44	14	16	1800	T3
-0014	-0234	-0454	10												
-0015	-0235	-0455	5												
-0016	-0236	-0456	20	560	6	2	13	55	1.3	25	-64	17.5	20	1900	T3
-0017	-0237	-0457	10												
-0018	-0238	-0458	5												
-0019	-0239	-0459	20	1200	6	3	14	90	1	20	-80	25	25	2265	T4
-0020	-0240	-0460	10												
-0027	-0247	-0467	20												
-0028	-0248	-0468	10	120	8	1	2	20	2.21	50	-44	17.5	20	1220	T2
-0029	-0249	-0469	5												
-0030	-0250	-0470	20												
-0031	-0251	-0471	10	220	8	1	7	37	2.23	30	-44	17.5	20	1370	T2
-0032	-0252	-0472	5												
-0033	-0253	-0473	20												
-0034	-0254	-0474	10	290	8	2	6	34	1.56	25	-64	17.5	20	1770	T3
-0035	-0255	-0475	5												
-0036	-0256	-0476	20												
-0037	-0257	-0477	10	430	8	2	14	46	1.42	25	-64	17.5	20	1825	T3
-0038	-0258	-0478	5												
-0039	-0259	-0479	20												
-0040	-0260	-0480	10	850	8	4	16	60	0.94	22	-80	25	25	2330	T4
-0047	-0267	-0487	20												
-0048	-0268	-0488	10												
-0049	-0269	-0489	5	100	10	1	4	15	1.99	60	-36	14	16	1200	T2
-0050	-0270	-0490	20												
-0051	-0271	-0491	10												
-0052	-0272	-0492	5	180	10	1	7	30	2.21	40	-36	14	16	1.365	T2
-0053	-0273	-0493	20												
-0054	-0274	-0494	10												
-0055	-0275	-0495	5	250	10	2	10	30	1.59	30	-40	14	16	1720	T3
-0056	-0276	-0496	20												
-0057	-0277	-0497	10												
-0058	-0278	-0498	5	390	10	2	16	44	1.5	25	-64	17.5	20	1800	T3
-0059	-0279	-0499	20												
-0060	-0280	-0500	10												
-0067	-0287	-0507	20	750	10	4	16	50	0.88	23	-80	25	25	2360	T4
-0068	-0288	-0508	10												
-0069	-0289	-0509	5												
-0070	-0290	-0510	20	70	15	1	4	13	2.46	75	-28	14	16	1150	T2
-0071	-0291	-0511	10												
-0072	-0292	-0512	5												
-0073	-0293	-0513	20	120	15	1	7	18	1.99	50	-28	17.5	20	1450	T2
-0074	-0294	-0514	10												
-0075	-0295	-0515	5												
-0076	-0296	-0516	20	170	15	2	10	25	1.95	35	-32	14	16	1480	T3
-0077	-0297	-0517	10												
-0078	-0298	-0518	5												
-0079	-0299	-0519	20	270	15	2	16	32	1.57	30	-56	17.5	20	1740	T3
-0080	-0300	-0520	10												
-0087	-0307	-0527	20												
-0088	-0308	-0528	10	540	15	6	24	40	0.98	23	-80	25	25	2330	T4
-0089	-0309	-0529	5												
-0090	-0310	-0530	20												
-0091	-0311	-0531	10	50	25	1	2	11	2.92	70	-28	13	15	1130	T2
-0092	-0312	-0532	5												
-0093	-0313	-0533	20												
-0094	-0314	-0534	10	100	25	1	10	15	1.99	50	-28	13	15	1435	T2
-0095	-0315	-0535	5												
-0096	-0316	-0536	20												
-0097	-0317	-0537	10	120	25	2	6	21	2.32	38	-32	13	15	1450	T3
-0098	-0318	-0538	5												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

M39006/22 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0099	-0319	-0539	20	350	25	7	28	35	1.33	24	-70	25	25	1970	T4
-0100	-0320	-0540	10												
-0107	-0327	-0547	20												
-0108	-0328	-0548	10	40	30	1	5	10	3.32	65	-24	10.5	12	1120	T2
-0109	-0329	-0549	5												
-0110	-0330	-0550	20												
-0111	-0331	-0551	10	68	30	1	8	13	2.54	60	-24	13	15	1285	T2
-0112	-0332	-0552	5												
-0113	-0333	-0553	20												
-0114	-0334	-0554	10	100	30	2	12	17	2.26	40	-28	10.5	12	1450	T3
-0115	-0335	-0555	5												
-0116	-0336	-0556	20												
-0117	-0337	-0557	10	150	30	2	18	23	2.03	35	-48	13	15	1525	T3
-0118	-0338	-0558	5												
-0119	-0339	-0559	20												
-0120	-0340	-0560	10	300	30	8	32	31	1.37	25	-60	25	25	1950	T4
-0127	-0347	-0567	20												
-0128	-0348	-0568	10												
-0129	-0349	-0569	5	25	50	1	5	8	4.25	95	-20	10.5	12	1005	T2
-0130	-0350	-0570	20												
-0131	-0351	-0571	10												
-0132	-0352	-0572	5	47	50	1	9	11	3.11	70	-28	13	15	1155	T2
-0133	-0353	-0573	20												
-0134	-0354	-0574	10												
-0135	-0355	-0575	5	60	50	2	12	12	2.65	45	-16	10.5	12	1335	T3
-0136	-0356	-0576	20												
-0137	-0357	-0577	10												
-0138	-0358	-0578	5	82	50	2	16	15	2.43	45	-32	13	15	1400	T3
-0139	-0359	-0579	20												
-0140	-0360	-0580	10												
-0147	-0367	-0587	20	160	50	8	32	17	1.41	27	-50	25	25	1900	T4
-0148	-0368	-0588	10												
-0149	-0369	-0589	5												
-0150	-0370	-0590	20	20	60	1	5	7	4.64	105	-16	10.5	12	930	T2
-0151	-0371	-0591	10												
-0152	-0372	-0592	5												
-0153	-0373	-0593	20	39	60	1	9	10	3.4	90	-28	10.5	12	1110	T2
-0154	-0374	-0594	10												
-0155	-0375	-0595	5												
-0156	-0376	-0596	20	50	60	2	12	10	2.65	50	-16	10.5	12	1330	T3
-0157	-0377	-0597	10												
-0158	-0378	-0598	5												
-0159	-0379	-0599	20	68	60	2	16	13	2.54	50	-32	10.5	12	1365	T3
-0160	-0380	-0600	10												
-0167	-0387	-0607	20												
-0168	-0388	-0608	10	140	60	8	32	16	1.52	28	-40	20	20	1850	T4
-0169	-0389	-0609	5												
-0170	-0390	-0610	20												
-0171	-0391	-0611	10	15	75	1	5	6	5.31	150	-16	8	9	890	T2
-0172	-0392	-0612	5												
-0173	-0393	-0613	20												
-0174	-0394	-0614	10	33	75	1	10	10	4.02	90	-24	10.5	15	1000	T2
-0175	-0395	-0615	5												
-0176	-0396	-0616	20												
-0177	-0397	-0617	10	40	75	2	12	9	2.99	60	-16	10.5	12	1250	T3
-0178	-0398	-0618	5												
-0179	-0399	-0619	20												
-0180	-0400	-0620	10	56	75	2	17	11	2.61	60	-28	10.5	15	1335	T3
-0187	-0407	-0627	20												
-0188	-0408	-0628	10												
-0189	-0409	-0629	5	110	75	9	36	12	1.45	29	-35	20	20	1850	T4
-0190	-0410	-0630	20												
-0191	-0411	-0631	10												
-0192	-0412	-0632	5	11	100	1	4	5	6.03	200	-16	8	8	835	T2
-0193	-0413	-0633	20												
-0194	-0414	-0634	10												
-0195	-0415	-0635	5	22	100	1	9	7.5	4.52	100	-16	8	8	965	T2
-0196	-0416	-0636	20												
-0197	-0417	-0637	10												
-0198	-0418	-0638	5	30	100	2	12	7	3.1	80	-16	8	8	1240	T3
-0199	-0419	-0639	20												
-0200	-0420	-0640	10												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

M39006/25 RATINGS AND DASH NUMBER REFERENCE

M39006/25 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0003	-0091	-0179	20	820	6	3	14	155	2.51	18	-88	16	20	1500	T2
-0004	-0092	-0180	10												
-0005	-0093	-0181	20	1500	6	5	20	172	1.52	18	-90	20	25	1900	T3
-0006	-0094	-0182	10												
-0007	-0095	-0183	20	2200	6	6	24	170	1.03	13	-90	25	30	2300	T4
-0008	-0096	-0184	10												
-0011	-0099	-0187	20	680	8	3	14	130	2.54	22	-83	16	20	1500	T2
-0012	-0100	-0188	10												
-0013	-0101	-0189	20	1500	8	5	20	170	1.5	18	-90	20	25	1900	T3
-0014	-0102	-0190	10												
-0015	-0103	-0191	20	1800	8	7	25	138	1.02	14	-90	25	30	2300	T4
-0016	-0104	-0192	10												
-0019	-0107	-0195	20	560	10	3	16	106	2.51	27	-77	16	20	1450	T2
-0020	-0108	-0196	10												
-0021	-0109	-0197	20	1200	10	5	20	137	1.51	18	-88	20	25	1850	T3
-0022	-0110	-0198	10												
-0023	-0111	-0199	20	1500	10	7	25	114	1.01	15	-88	25	30	2300	T4
-0024	-0112	-0200	10												
-0027	-0115	-0203	20	390	15	3	16	74	2.52	31	-66	16	20	1450	T2
-0028	-0116	-0204	10												
-0029	-0117	-0205	20	820	15	6	24	111	1.8	22	-77	20	25	1800	T3
-0030	-0118	-0206	10												
-0031	-0119	-0207	20	1000	15	8	32	92	1.22	17	-77	25	30	2300	T4
-0032	-0120	-0208	10												
-0035	-0123	-0211	20	270	25	3	16	55	2.7	33	-62	13	16	1400	T2
-0036	-0124	-0212	10												
-0037	-0125	-0213	20	560	25	7	28	76	1.8	24	-72	20	25	1750	T3
-0038	-0126	-0214	10												
-0039	-0127	-0215	20	680	25	8	32	63	1.23	19	-72	25	30	2100	T4
-0040	-0128	-0216	10												
-0043	-0131	-0219	20	220	30	3	16	42	2.53	36	-60	13	16	1200	T2
-0044	-0132	-0220	10												
-0045	-0133	-0221	20	470	30	8	32	64	1.81	25	-65	20	25	1500	T3
-0046	-0134	-0222	10												
-0047	-0135	-0223	20	560	30	9	36	55	1.3	20	-65	25	30	2000	T4
-0048	-0136	-0224	10												
-0051	-0139	-0227	20	120	50	4	24	22.5	2.49	49	-42	12	15	1200	T2
-0052	-0140	-0228	10												
-0053	-0141	-0229	20	270	50	8	32	37	1.82	29	-46	20	25	1450	T3
-0054	-0142	-0230	10												
-0055	-0143	-0231	20	330	50	9	36	38	1.53	22	-46	25	30	1900	T4
-0056	-0144	-0232	10												
-0059	-0147	-0235	20	100	60	4	20	19	2.52	54	-36	12	15	1100	T2
-0060	-0148	-0236	10												
-0061	-0149	-0237	20	220	60	8	32	30	1.81	29	-40	16	20	1400	T3
-0062	-0150	-0238	10												
-0063	-0151	-0239	20	270	60	9	36	27	1.33	23	-45	20	25	1850	T4
-0064	-0152	-0240	10												
-0067	-0155	-0243	20	82	75	4	24	15.2	2.46	63	-30	12	15	1000	T2
-0068	-0156	-0244	10												
-0069	-0157	-0245	20	180	75	9	36	24.4	2.23	30	-35	16	20	1300	T3
-0070	-0158	-0246	10												
-0071	-0159	-0247	20	220	75	10	40	37	1.8	24	-40	20	25	1800	T4
-0072	-0160	-0248	10												
-0075	-0163	-0251	20	39	100	5	24	10.4	3.54	80	-20	12	15	1300	T2
-0076	-0164	-0252	10												
-0077	-0165	-0253	20	68	100	10	40	11.3	2.21	40	-30	14	16	1600	T3
-0078	-0166	-0254	10												
-0079	-0167	-0255	20	120	100	12	48	25	2.76	30	-35	15	17	2000	T4
-0080	-0168	-0256	10												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

M39006 /30 RATINGS AND DASH NUMBER REFERENCE

M39006/30 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0007	-0227	-0447	20	140	6	1	3	10.5	0.99	40	-40	14	16	1200	T2
-0008	-0228	-0448	10												
-0009	-0229	-0449	5												
-0010	-0230	-0450	20	270	6	1	6.5	22.5	1.11	25	-44	17.5	20	1375	T2
-0011	-0231	-0451	10												
-0012	-0232	-0452	5												
-0013	-0233	-0453	20	330	6	2	7.9	18	0.73	20	-44	14	16	1800	T3
-0014	-0234	-0454	10												
-0015	-0235	-0455	5												
-0016	-0236	-0456	20	560	6	2	13	27.5	0.65	25	-64	17.5	20	1900	T3
-0017	-0237	-0457	10												
-0018	-0238	-0458	5												
-0019	-0239	-0459	20	1200	6	3	14	45	0.5	20	-80	25	25	2265	T4
-0020	-0240	-0460	10												
-0027	-0247	-0467	20												
-0028	-0248	-0468	10	120	8	1	2	10	1.11	50	-44	17.5	20	1220	T2
-0029	-0249	-0469	5												
-0030	-0250	-0470	20												
-0031	-0251	-0471	10	220	8	1	7	18.5	1.12	30	-44	17.5	20	1370	T2
-0032	-0252	-0472	5												
-0033	-0253	-0473	20												
-0034	-0254	-0474	10	290	8	2	6	17	0.78	25	-64	17.5	20	1770	T3
-0035	-0255	-0475	5												
-0036	-0256	-0476	20												
-0037	-0257	-0477	10	430	8	2	14	23	0.71	25	-64	17.5	20	1825	T3
-0038	-0258	-0478	5												
-0039	-0259	-0479	20												
-0040	-0260	-0480	10	850	8	4	16	30	0.47	22	-80	25	25	2330	T4
-0047	-0267	-0487	20												
-0048	-0268	-0488	10												
-0049	-0269	-0489	5	100	10	1	4	7.5	0.99	60	-36	14	16	1200	T2
-0050	-0270	-0490	20												
-0051	-0271	-0491	10												
-0052	-0272	-0492	5	180	10	1	7	15	1.11	40	-36	14	16	1.365	T2
-0053	-0273	-0493	20												
-0054	-0274	-0494	10												
-0055	-0275	-0495	5	250	10	2	10	15	0.8	30	-40	14	16	1720	T3
-0056	-0276	-0496	20												
-0057	-0277	-0497	10												
-0058	-0278	-0498	5	390	10	2	16	22	0.75	25	-64	17.5	20	1800	T3
-0059	-0279	-0499	20												
-0060	-0280	-0500	10												
-0067	-0287	-0507	20	750	10	4	16	25	0.44	23	-80	25	25	2360	T4
-0068	-0288	-0508	10												
-0069	-0289	-0509	5												
-0070	-0290	-0510	20	70	15	1	4	6.5	1.23	75	-28	14	16	1150	T2
-0071	-0291	-0511	10												
-0072	-0292	-0512	5												
-0073	-0293	-0513	20	120	15	1	7	9	0.99	50	-28	17.5	20	1450	T2
-0074	-0294	-0514	10												
-0075	-0295	-0515	5												
-0076	-0296	-0516	20	170	15	2	10	12.5	0.98	35	-32	14	16	1480	T3
-0077	-0297	-0517	10												
-0078	-0298	-0518	5												
-0079	-0299	-0519	20	270	15	2	16	16	0.79	30	-56	17.5	20	1740	T3
-0080	-0300	-0520	10												
-0087	-0307	-0527	20												
-0088	-0308	-0528	10	540	15	6	24	20	0.49	23	-80	25	25	2330	T4
-0089	-0309	-0529	5												
-0090	-0310	-0530	20												
-0091	-0311	-0531	10	50	25	1	10	7.5	0.99	50	-28	13	15	1435	T2
-0092	-0312	-0532	5												
-0093	-0313	-0533	20												
-0094	-0314	-0534	10	100	25	1	10	7.5	0.99	50	-28	13	15	1435	T2
-0095	-0315	-0535	5												
-0096	-0316	-0536	20												
-0097	-0317	-0537	10	120	25	2	6	10.5	1.16	38	-32	13	15	1450	T3
-0098	-0318	-0538	5												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

M39006/30 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0099	-0319	-0539	20	350	25	7	28	17.5	0.67	24	-70	25	25	1970	T4
-0100	-0320	-0540	10												
-0107	-0327	-0547	20												
-0108	-0328	-0548	10	40	30	1	5	5	1.66	65	-24	10.5	12	1120	T2
-0109	-0329	-0549	5												
-0110	-0330	-0550	20												
-0111	-0331	-0551	10	68	30	1	8	6.5	1.27	60	-24	13	15	1285	T2
-0112	-0332	-0552	5												
-0113	-0333	-0553	20												
-0114	-0334	-0554	10	100	30	2	12	8.5	1.13	40	-28	10.5	12	1450	T3
-0115	-0335	-0555	5												
-0116	-0336	-0556	20												
-0117	-0337	-0557	10	150	30	2	18	11.5	1.02	35	-48	13	15	1525	T3
-0118	-0338	-0558	5												
-0119	-0339	-0559	20												
-0120	-0340	-0560	10	300	30	8	32	15.5	0.69	25	-60	25	25	1950	T4
-0127	-0347	-0567	20												
-0128	-0348	-0568	10												
-0129	-0349	-0569	5	25	50	1	5	4	2.13	95	-20	10.5	12	1005	T2
-0130	-0350	-0570	20												
-0131	-0351	-0571	10												
-0132	-0352	-0572	5	47	50	1	9	5.5	1.56	70	-28	13	15	1155	T2
-0133	-0353	-0573	20												
-0134	-0354	-0574	10												
-0135	-0355	-0575	5	60	50	2	12	6	1.33	45	-16	10.5	12	1335	T3
-0136	-0356	-0576	20												
-0137	-0357	-0577	10												
-0138	-0358	-0578	5	82	50	2	16	7.5	1.22	45	-32	13	15	1400	T3
-0139	-0359	-0579	20												
-0140	-0360	-0580	10												
-0147	-0367	-0587	20	160	50	8	32	8.5	0.71	27	-50	25	25	1900	T4
-0148	-0368	-0588	10												
-0149	-0369	-0589	5												
-0150	-0370	-0590	20	20	60	1	5	3.5	2.32	105	-16	10.5	12	930	T2
-0151	-0371	-0591	10												
-0152	-0372	-0592	5												
-0153	-0373	-0593	20	39	60	1	9	5	1.7	90	-28	10.5	12	1110	T2
-0154	-0374	-0594	10												
-0155	-0375	-0595	5												
-0156	-0376	-0596	20	50	60	2	12	5	1.33	50	-16	10.5	12	1330	T3
-0157	-0377	-0597	10												
-0158	-0378	-0598	5												
-0159	-0379	-0599	20	68	60	2	16	6.5	1.27	50	-32	10.5	12	1365	T3
-0160	-0380	-0600	10												
-0167	-0387	-0607	20												
-0168	-0388	-0608	10	140	60	8	32	8	0.76	28	-40	20	20	1850	T4
-0169	-0389	-0609	5												
-0170	-0390	-0610	20												
-0171	-0391	-0611	10	15	75	1	5	3	2.66	150	-16	8	9	890	T2
-0172	-0392	-0612	5												
-0173	-0393	-0613	20												
-0174	-0394	-0614	10	33	75	1	10	5	2.01	90	-24	10.5	15	1000	T2
-0175	-0395	-0615	5												
-0176	-0396	-0616	20												
-0177	-0397	-0617	10	40	75	2	12	4.5	1.5	60	-16	10.5	12	1250	T3
-0178	-0398	-0618	5												
-0179	-0399	-0619	20												
-0180	-0400	-0620	10	56	75	2	17	5.5	1.31	60	-28	10.5	15	1335	T3
-0187	-0407	-0627	20												
-0188	-0408	-0628	10												
-0189	-0409	-0629	5	110	75	9	36	6	0.73	29	-35	20	20	1850	T4
-0190	-0410	-0630	20												
-0191	-0411	-0631	10												
-0192	-0412	-0632	5	11	100	1	4	2.5	3.02	200	-16	8	8	835	T2
-0193	-0413	-0633	20												
-0194	-0414	-0634	10												
-0195	-0415	-0635	5	22	100	1	9	3.75	2.26	100	-16	8	8	965	T2
-0196	-0416	-0636	20												
-0197	-0417	-0637	10												
-0198	-0418	-0638	5	30	100	2	12	3.5	1.55	80	-16	8	8	1240	T3
-0199	-0419	-0639	20												
-0200	-0420	-0640	10												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.

M39006 /31 RATINGS AND DASH NUMBER REFERENCE

M39006/31 Dashes			Tolerance ± (%)	Cap (µF) 25°C at 120Hz	DC Rated Voltage (V) at 85°C	DC Leakage (µA)		DF max (%)	ESR max (Ohms) at 120Hz	Impedance max (Ohms) -55°C at 120Hz	Maximum Capacitance Change (%)			AC Ripple (mA rms) 85°C at 40kHz	Case Size
M Level	P Level	R Level				+25°C	+85°C & +125°C				-55°C	+85°C	+125°C		
-0003	-0091	-0179	20	820	6	3	14	77.5	1.26	18	-88	16	20	1500	T2
-0004	-0092	-0180	10												
-0005	-0093	-0181	20	1500	6	5	20	86	0.76	18	-90	20	25	1900	T3
-0006	-0094	-0182	10												
-0007	-0095	-0183	20	2200	6	6	24	85	0.52	13	-90	25	30	2300	T4
-0008	-0096	-0184	10												
-0011	-0099	-0187	20	680	8	3	14	65	1.27	22	-83	16	20	1500	T2
-0012	-0100	-0188	10												
-0013	-0101	-0189	20	1500	8	5	20	85	0.75	18	-90	20	25	1900	T3
-0014	-0102	-0190	10												
-0015	-0103	-0191	20	1800	8	7	25	69	0.51	14	-90	25	30	2300	T4
-0016	-0104	-0192	10												
-0019	-0107	-0195	20	560	10	3	16	53	1.26	27	-77	16	20	1450	T2
-0020	-0108	-0196	10												
-0021	-0109	-0197	20	1200	10	5	20	68.5	0.76	18	-88	20	25	1850	T3
-0022	-0110	-0198	10												
-0023	-0111	-0199	20	1500	10	7	25	57	0.51	15	-88	25	30	2300	T4
-0024	-0112	-0200	10												
-0027	-0115	-0203	20	390	15	3	16	37	1.26	31	-66	16	20	1450	T2
-0028	-0116	-0204	10												
-0029	-0117	-0205	20	820	15	6	24	55.5	0.9	22	-77	20	25	1800	T3
-0030	-0118	-0206	10												
-0031	-0119	-0207	20	1000	15	8	32	46	0.61	17	-77	25	30	2300	T4
-0032	-0120	-0208	10												
-0035	-0123	-0211	20	270	25	3	16	27.5	1.35	33	-62	13	16	1400	T2
-0036	-0124	-0212	10												
-0037	-0125	-0213	20	560	25	7	28	38	0.9	24	-72	20	25	1750	T3
-0038	-0126	-0214	10												
-0039	-0127	-0215	20	680	25	8	32	31.5	0.62	19	-72	25	30	2100	T4
-0040	-0128	-0216	10												
-0043	-0131	-0219	20	220	30	3	16	21	1.27	36	-60	13	16	1200	T2
-0044	-0132	-0220	10												
-0045	-0133	-0221	20	470	30	8	32	32	0.91	25	-65	20	25	1500	T3
-0046	-0134	-0222	10												
-0047	-0135	-0223	20	560	30	9	36	27.5	0.65	20	-65	25	30	2000	T4
-0048	-0136	-0224	10												
-0051	-0139	-0227	20	120	50	4	24	11.3	1.25	49	-42	12	15	1200	T2
-0052	-0140	-0228	10												
-0053	-0141	-0229	20	270	50	8	32	18.5	0.91	29	-46	20	25	1450	T3
-0054	-0142	-0230	10												
-0055	-0143	-0231	20	330	50	9	36	19	0.77	22	-46	25	30	1900	T4
-0056	-0144	-0232	10												
-0059	-0147	-0235	20	100	60	4	20	9.5	1.26	54	-36	12	15	1100	T2
-0060	-0148	-0236	10												
-0061	-0149	-0237	20	220	60	8	32	15	0.91	29	-40	16	20	1400	T3
-0062	-0150	-0238	10												
-0063	-0151	-0239	20	270	60	9	36	13.5	0.67	23	-45	20	25	1850	T4
-0064	-0152	-0240	10												
-0067	-0155	-0243	20	82	75	4	24	7.6	1.23	63	-30	12	15	1000	T2
-0068	-0156	-0244	10												
-0069	-0157	-0245	20	180	75	9	36	12.2	0.9	30	-35	16	20	1300	T3
-0070	-0158	-0246	10												
-0071	-0159	-0247	20	220	75	10	40	18.5	1.12	24	-40	20	25	1800	T4
-0072	-0160	-0248	10												
-0075	-0163	-0251	20	39	100	5	24	5.2	1.77	80	-20	12	15	1300	T2
-0076	-0164	-0252	10												
-0077	-0165	-0253	20	68	100	10	40	5.65	1.11	40	-30	14	16	1600	T3
-0078	-0166	-0254	10												
-0079	-0167	-0255	20	120	100	12	48	12.5	1.38	30	-35	15	17	2000	T4
-0080	-0168	-0256	10												

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2V. DCL is measured at rated voltage after 5 minutes.



RF/MICROWAVE PRODUCTS

AVX has a range of electrolyte-impregnated tantalum capacitors which create very high capacitance products.

Accu-P

Thin film RF capacitors with low ESR, high Q, and extremely repeatable performance at high frequency.

Accu-P DLA Drawings

Thin film capacitors designed and tests to meet DLA drawing requirements.

CDR11-14

RF ceramic capacitors designed and tested to meet MIL-PRF-55681.

“U” Series

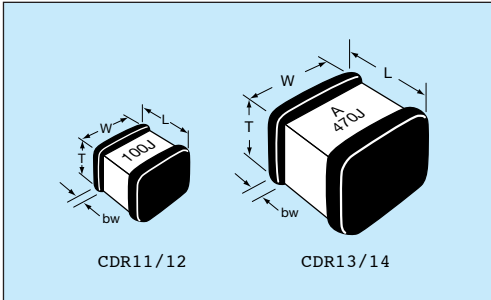
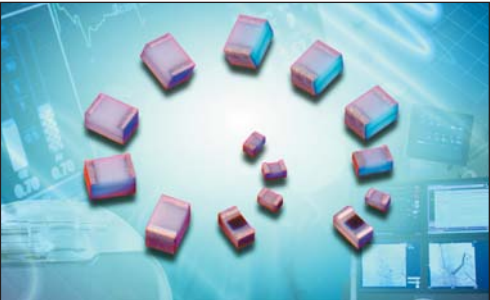
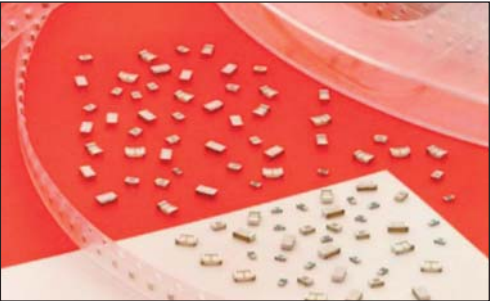
COG capacitors specially designed for ultra low ESR.

MLO Capacitors

Multilayer capacitors made from a AVX patented material.

Accu-L

Thin film inductors with extremely tight tolerance



THE IDEAL CAPACITOR

The non-ideal characteristics of a real capacitor can be ignored at low frequencies. Physical size imparts inductance to the capacitor and dielectric and metal electrodes result in resistive losses, but these often are of negligible effect on the circuit. At the very high frequencies of radio communication (>100MHz) and satellite systems (>1GHz), these effects become important. Recognizing that a real capacitor will exhibit inductive and resistive impedances in addition to capacitance, the ideal capacitor for these high frequencies is an ultra low loss component which can be fully characterized in all parameters with total repeatability from unit to unit.

Until recently, most high frequency/microwave capacitors were based on fired-ceramic (porcelain) technology. Layers of ceramic dielectric material and metal alloy electrode paste are interleaved and then sintered in a high temperature oven. This technology exhibits component variability in dielectric quality (losses, dielectric constant and insulation resistance), variability in electrode conductivity and variability in physical size (affecting inductance). An alternate thin-film technology has been developed which virtually eliminates these variances. It is this technology which has been fully incorporated into Accu-P® and Accu-P® to provide high frequency capacitors exhibiting truly ideal characteristics.

The main features of Accu-P® may be summarized as follows:

- High purity of electrodes for very low and repeatable ESR.
- Highly pure, low-K dielectric for high breakdown field, high insulation resistance and low losses to frequencies above 40GHz.
- Very tight dimensional control for uniform inductance, unit to unit.
- Very tight capacitance tolerances for high frequency signal applications.

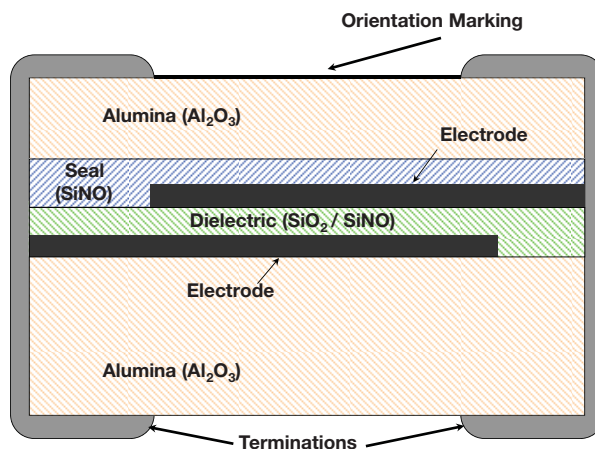
This accuracy sets apart these Thin-Film capacitors from ceramic capacitors so that the term Accu has been employed as the designation for this series of devices, an abbreviation for “accurate.”

THIN-FILM TECHNOLOGY

Thin-film technology is commonly used in producing semiconductor devices. In the last two decades, this technology has developed tremendously, both in performance and in process control. Today’s techniques enable line definitions of below 1µm, and the controlling of thickness of layers at 100Å (10⁻²µm). Applying this technology to the manufacture of capacitors has enabled the development of components where both electrical and physical properties can be tightly controlled.

The thin-film production facilities at AVX consist of:

- Class 1000 clean rooms, with working areas under laminar-flow hoods of class 100, (below 100 particles per cubic foot larger than 0.5µm).
- High vacuum metal deposition systems for high-purity electrode construction.
- Photolithography equipment for line definition down to 2.0µm accuracy.
- Plasma-enhanced CVD for various dielectric depositions (CVD=Chemical Vapor Deposition).
- High accuracy, microprocessor-controlled dicing saws for chip separation.
- High speed, high accuracy sorting to ensure strict tolerance adherence.



ACCU-P® CAPACITOR STRUCTURE

ACCU-P® TECHNOLOGY

The use of very low-loss dielectric materials, silicon dioxide and silicon oxynitride, in conjunction with highly conductive electrode metals results in low ESR and high Q. These high-frequency characteristics change at a slower rate with increasing frequency than for ceramic microwave capacitors.

Because of the thin-film technology, the above-mentioned frequency characteristics are obtained without significant compromise of properties required for surface mounting.

The main Accu-P® properties are:

- Internationally agreed sizes with excellent dimensional control.
- Ultra small size chip capacitors (01005) are available.
- Ultra tight capacitance tolerances.
- Low ESR at VHF, UHF and microwave frequencies.
- Enhanced RF power handling capability.
- High stability with respect to time, temperature, frequency and voltage variation.
- Nickel/solder-coated terminations to provide excellent solderability and leach resistance.

ACCU-P® FEATURES

Accu-P® meets the fast-growing demand for low-loss (high-Q) capacitors for use in surface mount technology especially for the mobile communications market, such as cellular radio of 450 and 900 MHz, UHF walkie-talkies, UHF cordless telephones to 2.3 GHz, low noise blocks at 11-12.5 GHz and for other VHF, UHF and microwave applications.

Accu-P® is currently unique in its ability to offer very low capacitance values (0.05pF) and very tight capacitance tolerances (± 0.01 pF).

- The RF power handling capability of the Accu-P® allows for its usage in both small signal and RF power applications.
- Thin Film Technology guarantees minimal batch to batch variability of parameters at high frequency.
- Inspection test and quality control procedures in accordance with ISO 9001, CECC, IECQ and USA MIL Standards yield products of the highest quality.
- Hand soldering Accu-P®: Due to their construction utilizing relatively high thermal conductivity materials, Accu-P's have become the preferred device in R & D labs and production environments where hand soldering is used.

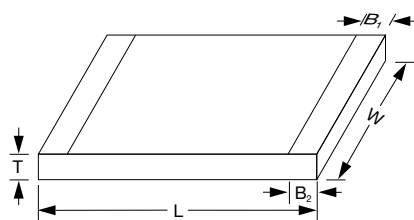
APPLICATIONS

Cellular Communications
CT2/PCN (Cordless Telephone/Personal Comm. Networks)
Satellite TV
Cable TV
GPS (Global Positioning Systems)
Vehicle Location Systems
Vehicle Alarm Systems
Paging
Military Communications

Radar Systems
Video Switching
Test & Measurements
Filters
VCO's
Matching Networks
RF Amplifiers

APPROVALS

ISO 9001



ACCU-P® (Signal and Power Type Capacitors)

	01005*	0201*	0402*	0603*	0805*	1210
L	0.405±0.020 (0.016±0.001)	0.60±0.05 (0.023±0.002)	1.00±0.1 (0.039±0.004)	1.60±0.1 (0.063±0.004)	2.01±0.1 (0.079±0.004)	3.02±0.1 (0.119±0.004)
W	0.215 ± 0.020 (0.0085 ± 0.001)	0.325±0.050 (0.0128±0.002)	0.55±0.07 (0.022±0.003)	0.81±0.1 (0.032±0.004)	1.27±0.1 (0.050±0.004)	2.5±0.1 (0.100±0.004)
T	0.145 ± 0.020 (0.006 ± 0.001)	0.225±0.050 (0.009±0.002)	0.40±0.1 (0.016±0.004)	0.63±0.1 (0.025±0.004)	0.93±0.2 (0.036±0.008)	0.93±0.2 (0.036±0.008)
B ₁	0.00 ^{+0.1} _{-0.0} (0.000 ^{+0.004} _{-0.000})	0.10±0.10 (0.004±0.004)	0.00 ^{+0.1} _{-0.0} (0.000 ^{+0.004} _{-0.000})	0.35±0.15 (0.014±0.006)	0.30±0.1 (0.012±0.004)	0.43±0.1 (0.017±0.004)
B ₂	0.10 ± 0.03 (0.004 ± 0.001)	0.15±0.05 (0.006±0.002)	0.20±0.1 (0.008±0.004)	0.35±0.15 (0.014±0.006)	0.30±0.1 (0.012±0.004)	0.43±0.1 (0.017±0.004)

*Mount Black Side Up

DIMENSIONS: millimeters (inches)

HOW TO ORDER

0402
T

Size
C005
0201
0402
0603
0805
1210*

3
T

Voltage
2 = 200V
1 = 100V
5 = 50V
3 = 25V
Y = 16V
Z = 10V

J
T

Temperature Coefficient (1)
J = 0±30ppm/°C
(-55°C to +125°C)
K = 0±60ppm/°C
(-55°C to +125°C)

4R7
T

Capacitance
Capacitance expressed in pF. (2 significant digits + number of zeros)
for values <10pF, letter R denotes decimal point.
Example:
68pF = 68R
8.2pF = 8R2

A
T

Tolerance for C≤2.0pF*
Z = ±0.01pF
P = ±0.02pF
Q = ±0.03pF
A = ±0.05pF
B = ±0.1pF
C = ±0.25pF
for C≤3.0pF
Q = ±0.03pF
A = ±0.05pF
B = ±0.1pF
C = ±0.25pF

B
T

Specification Code
B = Accu-P® technology

S
T

Termination Code
W = Nickel/Solder Coated
Accu-P® 0402 Sn90, Pb10***
T = Nickel/High Temperature Solder Coated
Accu-P® 0805, 1210**** Sn96, Ag4
Nickel/Solder Coated
Accu-P® 0603*** Sn63, Pb37
**S = Nickel/Lead Free Solder Coated
Accu-P® 01005, 0201, 0402, 0603 Sn100

TR
T

Packaging Code
TR = Tape & Reel

(1) TC's shown are per EIA/IEC Specifications.

Engineering Kits Available
see pages 118-119

*Tolerances as tight as ±0.01pF are available. Please consult the factory.

for C≤5.6pF

A = ±0.05pF
B = ±0.1pF
C = ±0.25pF

for 5.6pF<C<10pF

B = ±0.1pF
C = ±0.25pF
D = ±0.5pF

for C≥10pF

F = ±1%
G = ±2%
J = ±5%

**RoHS compliant

*** Not RoHS Compliant



LEAD-FREE

LEAD-FREE COMPATIBLE COMPONENT



RoHS COMPLIANT

For RoHS compliant products, please select correct termination style.

ELECTRICAL SPECIFICATIONS

Operating and Storage Temperature Range	-55°C to +125°C
Temperature Coefficients (1)	0 ± 30ppm/°C dielectric code "J" / 0 ± 60ppm/°C dielectric code "K"
Capacitance Measurement	1 MHz, 1 Vrms
Insulation Resistance (IR)	≥10 ¹¹ Ohms (≥10 ¹⁰ Ohms for 0201 and 0402 size)
Proof Voltage	2.5 U _R for 5 secs.
Aging Characteristic	Zero
Dielectric Absorption	0.01%

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
0.05	±0.02	20.9	599	402	0.055	650	3220	0.056	265	4010	0.057	195	4450
0.1	±0.02	19.4	574	316	0.110	614	2682	0.112	246	3036	0.113	188	3113
0.15	±0.02	17.9	510	280	0.163	550	2087	0.166	220	2404	0.168	170	2441
0.2	±0.02	16.4	445	245	0.216	520	1693	0.220	210	1971	0.223	160	1970
0.25	±0.02	15.5	436	240	0.262	510	1371	0.268	204	1604	0.272	153	1646
0.3	±0.02	14.6	427	235	0.309	500	1149	0.316	199	1337	0.320	146	1421
0.35	±0.02	14.1	423	232	0.360	494	1001	0.369	196	1177	0.374	144	1265
0.4	±0.02	12.5	418	230	0.411	489	874	0.421	193	1038	0.427	142	1129
0.45	±0.02	11.9	413	227	0.461	484	819	0.473	191	972	0.481	140	1066
0.5	±0.02	11.3	408	224	0.512	478	765	0.526	188	906	0.535	138	1003
0.55	±0.02	10.9	403	222	0.563	473	710	0.578	186	840	0.588	137	940
0.6	±0.02	10.4	398	219	0.614	468	667	0.631	183	791	0.642	135	882
0.65	±0.02	10.0	394	217	0.664	462	624	0.683	181	742	0.695	133	825
0.7	±0.02	9.5	389	214	0.715	457	580	0.735	178	693	0.749	131	767
0.75	±0.02	9.3	384	211	0.766	452	557	0.788	176	664	0.802	129	729
0.8	±0.02	9.1	379	209	0.817	446	534	0.840	173	635	0.856	127	692
0.85	±0.02	8.9	374	206	0.868	441	511	0.893	171	606	0.909	126	654
0.9	±0.02	8.8	370	203	0.918	436	487	0.945	168	577	0.963	124	616
0.95	±0.02	8.6	365	201	0.969	430	464	0.998	166	548	1.016	122	579
1	±0.02	8.4	360	198	1.020	425	441	1.050	163	519	1.070	120	541
1.05	±0.02	8.2	358	197	1.078	421	426	1.112	161	502	1.134	119	523
1.1	±0.02	8.0	355	195	1.135	418	410	1.173	159	486	1.199	117	505
1.15	±0.02	7.8	353	194	1.193	414	395	1.235	157	469	1.263	116	488
1.2	±0.02	7.6	350	193	1.251	411	379	1.296	155	452	1.327	115	470
1.25	±0.02	7.5	348	191	1.308	407	364	1.358	153	436	1.392	114	452
1.3	±0.02	7.4	345	190	1.366	403	348	1.419	151	419	1.456	112	434
1.35	±0.02	7.3	343	189	1.424	400	333	1.481	149	402	1.520	111	416
1.4	±0.02	7.2	340	187	1.481	396	317	1.542	147	386	1.585	110	398
1.45	±0.02	7.1	338	186	1.539	393	302	1.604	145	369	1.649	109	381
1.5	±0.02	7.0	335	184	1.597	389	287	1.665	144	353	1.713	107	363
1.55	±0.02	6.8	332	183	1.642	386	282	1.714	142	347	1.764	106	358
1.6	±0.02	6.7	330	181	1.687	382	277	1.762	141	342	1.815	105	352
1.65	±0.02	6.6	327	180	1.732	378	272	1.810	140	337	1.866	104	347
1.7	±0.02	6.5	324	178	1.777	375	267	1.859	138	331	1.917	103	342
1.75	±0.02	6.4	321	176	1.822	371	262	1.907	137	326	1.968	102	337
1.8	±0.02	6.3	318	175	1.866	367	257	1.955	136	321	2.018	101	331
1.85	±0.02	6.2	315	173	1.911	364	252	2.003	134	316	2.069	100	326
1.9	±0.02	6.2	312	172	1.956	360	247	2.052	133	310	2.120	99	321
1.95	±0.02	6.1	309	170	2.001	357	242	2.100	132	305	2.171	98	316
2	±0.03	6.0	306	168	2.046	353	237	2.148	131	300	2.222	97	310
2.1	±0.03	5.9	301	166	2.150	348	232	2.263	128	293	2.344	95	303
2.2	±0.03	5.7	296	163	2.254	343	227	2.377	125	287	2.467	93	296
2.3	±0.03	5.6	292	160	2.358	337	222	2.491	122	281	2.590	91	289
2.4	±0.03	5.5	287	158	2.462	332	217	2.606	120	274	2.712	89	282
2.5	±0.03	5.4	282	155	2.566	327	212	2.720	117	268	2.835	87	275
2.6	±0.03	5.3	277	152	2.670	322	207	2.834	114	262	2.958	85	268
2.7	±0.03	5.2	272	150	2.773	317	202	2.949	112	255	3.080	83	261
2.8	±0.03	5.1	269	148	2.878	312	199	3.066	110	252	3.209	81	258
2.9	±0.03	5.0	265	146	2.983	308	196	3.184	108	248	3.337	80	254
3	±0.03	4.9	261	144	3.088	304	193	3.301	106	245	3.465	78	251
3.1	±0.05	4.8	257	141	3.192	299	190	3.419	105	241	3.593	77	247
3.2	±0.05	4.7	253	139	3.297	295	187	3.536	103	238	3.722	76	244
3.3	±0.05	4.6	250	137	3.402	291	185	3.654	101	234	3.850	74	240
3.4	±0.05	4.6	246	135	3.506	286	182	3.771	99	231	3.978	73	237
3.5	±0.05	4.5	242	133	3.611	282	179	3.889	98	227	4.107	71	233
3.6	±0.05	4.5	238	131	3.716	278	176	4.006	96	224	4.235	70	230
3.7	±0.05	4.4	234	129	3.820	273	173	4.124	94	220	4.363	69	226
3.8	±0.05	4.4	230	127	3.925	269	170	4.241	92	217	4.492	67	223
3.9	±0.05	4.3	227	125	4.030	265	167	4.359	91	213	4.620	66	219

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
4	±0.05	4.3	224	123	4.138	262	165	4.484	89	210	4.760	65	216
4.1	±0.05	4.2	222	122	4.247	259	162	4.610	88	207	4.901	64	213
4.2	±0.05	4.2	220	121	4.356	257	159	4.735	87	204	5.041	63	210
4.3	±0.05	4.1	218	120	4.464	254	157	4.860	86	201	5.181	62	207
4.4	±0.05	4.1	216	119	4.573	252	154	4.986	85	198	5.322	61	204
4.5	±0.05	4.0	214	118	4.682	249	152	5.111	83	195	5.462	60	201
4.6	±0.05	4.0	212	116	4.790	246	149	5.237	82	192	5.602	59	198
4.7	±0.05	3.9	209	115	4.899	244	147	5.362	81	189	5.743	58	195
5.1	±0.05	3.8	201	110	5.334	233	136	5.863	76	178	6.304	54	183
5.6	±0.05	3.6	190	105	5.877	220	124	6.490	70	163	7.006	49	168
6.2	±0.1	3.5	177	97	6.488	208	126	7.290	65	167	7.993	45	174
6.8	±0.1	3.3	164	90	7.100	195	128	8.090	60	171	8.980	41	179
7.5	±0.1	3.2	153	84	7.901	182	125	9.129	56	166	10.27	38	173
8.2	±0.1	3.0	142	78	8.701	168	121	10.17	52	160	11.56	34	167
9.1	±0.1	2.9	135	74	9.676	159	118	11.57	49	154	13.49	32	161
10	±1%	2.8	128	70	10.65	151	114	12.96	45	148	15.41	29	155
11	±1%	2.7	120	66	11.73	141	110	14.52	42	142	17.55	27	148
12	±1%	2.5	112	62	12.82	132	105	16.07	39	135	19.68	24	141
13	±1%	2.4	105	58	13.92	124	104	17.82	36	135	22.38	22	142
14	±1%	2.4	98	54	15.02	116	103	19.57	32	135	25.08	19	142
15	±1%	2.3	91	50	16.12	108	102	21.32	29	135	27.78	17	143
16	±1%	2.2	86	47	17.37	102	103	24.04	27	135	NA	NA	NA
17	±1%	2.2	81	44	18.63	96	105	26.76	25	136	NA	NA	NA
18	±1%	2.1	76	42	19.88	90	106	29.48	23	136	NA	NA	NA
19	±1%	2.1	71	39	21.14	83	108	32.20	21	136	NA	NA	NA
20	±1%	2.1	65	36	22.39	77	109	34.92	19	136	NA	NA	NA
22	±1%	2.0	55	30	24.90	65	112	40.36	15	137	NA	NA	NA

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
0.05	±0.02	20.9	856	471	0.06	881	1411	0.06	562	1216	0.06	498	983
0.1	±0.02	19.4	848	466	0.11	873	1316	0.11	554	1115	0.11	490	914
0.15	±0.02	17.9	840	462	0.16	866	1222	0.16	547	1013	0.16	482	845
0.2	±0.02	16.4	832	457	0.21	858	1128	0.21	539	912	0.22	474	776
0.25	±0.02	15.5	823	453	0.26	850	1033	0.27	532	810	0.27	465	707
0.3	±0.02	14.6	815	448	0.31	842	939	0.32	525	708	0.32	457	638
0.35	±0.02	14.1	807	444	0.36	834	844	0.37	517	607	0.37	449	569
0.4	±0.02	12.5	799	439	0.41	827	750	0.42	510	505	0.42	441	500
0.45	±0.02	11.9	791	435	0.46	819	667	0.47	502	458	0.48	432	453
0.5	±0.02	11.3	783	430	0.51	811	583	0.52	495	410	0.53	424	407
0.55	±0.02	10.9	774	426	0.57	803	500	0.57	487	363	0.58	416	360
0.6	±0.02	10.4	766	421	0.62	796	465	0.62	480	343	0.63	408	339
0.65	±0.02	10.0	758	417	0.67	788	431	0.67	472	322	0.68	399	317
0.7	±0.02	9.5	750	413	0.72	780	396	0.72	465	302	0.73	391	296
0.75	±0.02	9.3	746	410	0.77	776	375	0.78	456	290	0.79	381	285
0.8	±0.02	9.1	743	408	0.82	772	354	0.83	447	277	0.84	370	273
0.85	±0.02	9.0	739	406	0.87	768	334	0.88	438	265	0.89	360	262
0.9	±0.02	8.8	735	404	0.92	764	313	0.93	429	253	0.95	350	250
0.95	±0.02	8.4	732	402	0.97	760	292	0.98	420	240	1.00	339	239
1	±0.02	8.0	728	400	1.02	756	271	1.04	411	228	1.05	329	227
1.05	±0.02	7.9	725	398	1.07	752	258	1.09	406	221	1.11	323	221
1.1	±0.02	7.8	721	397	1.12	749	245	1.14	401	214	1.16	318	214
1.15	±0.02	7.6	718	395	1.17	745	232	1.20	396	207	1.22	312	208
1.2	±0.02	7.4	714	393	1.22	742	218	1.25	391	200	1.27	306	202
1.25	±0.02	7.2	711	391	1.27	738	205	1.31	386	193	1.32	301	195
1.3	±0.02	7.0	707	389	1.32	734	192	1.36	381	185	1.38	295	189
1.35	±0.02	6.9	704	387	1.37	731	179	1.41	376	178	1.43	289	183
1.4	±0.02	6.8	700	385	1.42	727	165	1.47	371	171	1.49	283	177
1.45	±0.02	6.7	697	383	1.47	724	152	1.52	366	164	1.54	278	170
1.5	±0.02	6.5	693	381	1.52	720	139	1.58	361	157	1.60	272	164
1.55	±0.02	6.5	690	379	1.56	716	135	1.62	358	153	1.65	269	159
1.6	±0.02	6.5	686	377	1.61	713	130	1.67	355	148	1.70	267	155
1.65	±0.02	6.5	683	375	1.66	709	126	1.72	352	143	1.76	264	150
1.7	±0.02	6.4	679	373	1.71	705	122	1.77	349	139	1.81	261	146
1.75	±0.02	6.3	676	372	1.75	702	118	1.82	347	134	1.86	259	141
1.8	±0.02	6.2	672	370	1.80	698	113	1.87	344	130	1.92	256	137
1.85	±0.02	6.1	669	368	1.85	694	109	1.92	341	125	1.97	253	132
1.9	±0.02	6.0	665	366	1.90	690	105	1.97	338	121	2.02	251	128
1.95	±0.02	5.9	662	364	1.94	687	101	2.01	335	116	2.08	248	123
2	±0.03	5.7	658	362	1.99	683	96	2.06	332	112	2.13	245	119
2.1	±0.03	5.4	651	358	2.10	676	93	2.18	326	108	2.26	241	115
2.2	±0.03	5.1	643	354	2.21	669	89	2.30	321	104	2.38	236	112
2.3	±0.03	5.0	636	350	2.31	662	85	2.42	315	101	2.51	231	109
2.4	±0.03	4.9	629	346	2.42	656	81	2.54	309	97	2.64	226	106
2.5	±0.03	4.7	622	342	2.53	649	77	2.65	303	94	2.76	221	102
2.6	±0.03	4.6	614	338	2.64	642	74	2.77	298	90	2.89	216	99
2.7	±0.03	4.5	607	334	2.75	635	70	2.89	292	86	3.02	211	96
2.8	±0.03	4.5	600	330	2.85	628	68	3.01	288	83	3.15	207	92
2.9	±0.03	4.4	592	326	2.95	621	66	3.13	283	80	3.28	203	88
3	±0.03	4.4	585	322	3.06	614	64	3.24	279	76	3.41	200	84
3.1	±0.05	4.4	578	318	3.16	607	62	3.36	274	73	3.54	196	80
3.2	±0.05	4.3	570	314	3.27	600	60	3.48	270	70	3.67	192	76
3.3	±0.05	4.3	563	310	3.37	593	58	3.60	265	67	3.80	188	72
3.4	±0.05	4.3	556	306	3.47	586	57	3.71	261	63	3.93	184	68
3.5	±0.05	4.2	548	302	3.58	579	55	3.83	256	60	4.06	180	64
3.6	±0.05	4.2	541	298	3.68	572	53	3.95	252	57	4.19	177	60
3.7	±0.05	4.1	534	294	3.78	565	51	4.06	247	54	4.32	173	56
3.8	±0.05	4.0	526	289	3.89	558	49	4.18	243	50	4.45	169	52
3.9	±0.05	3.9	519	285	3.99	551	47	4.30	238	47	4.58	165	48

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
4	±0.05	3.9	513	282	4.10	545	47	4.42	235	47	4.73	162	48
4.1	±0.05	3.8	507	279	4.20	539	47	4.55	232	46	4.87	160	48
4.2	±0.05	3.8	501	275	4.30	534	46	4.67	228	46	5.01	157	48
4.3	±0.05	3.7	495	272	4.41	528	46	4.79	225	46	5.16	154	48
4.4	±0.05	3.7	489	269	4.51	522	46	4.92	222	46	5.30	151	47
4.5	±0.05	3.6	483	265	4.61	516	46	5.04	219	45	5.44	149	47
4.6	±0.05	3.6	477	262	4.72	511	45	5.16	216	45	5.59	146	47
4.7	±0.05	3.5	471	259	4.82	505	45	5.29	213	45	5.73	143	47
5.1	±0.05	3.4	446	245	5.23	482	44	5.78	200	43	6.30	133	47
5.6	±0.05	3.3	416	229	5.75	453	43	6.40	184	42	7.02	119	46
6.2	±0.1	3.0	388	213	6.41	427	44	7.26	167	44	8.11	107	47
6.8	±0.1	2.8	360	198	7.07	400	44	8.12	150	45	9.19	95	48
7.5	±0.1	2.7	338	186	7.85	378	45	9.17	139	47	10.57	86	49
8.2	±0.1	2.6	315	173	8.62	356	45	10.22	128	48	11.95	77	50
9.1	±0.1	2.5	292	160	9.63	333	45	11.75	115	47	14.23	69	50
10	±1%	2.4	268	148	10.65	310	45	13.28	103	47	16.50	61	49
11	±1%	2.3	242	133	11.77	285	44	14.98	89	46	19.04	51	49
12	±1%	2.2	217	119	12.90	259	44	16.68	75	45	21.57	42	48
13	±1%	2.2	202	111	14.03	241	44	18.83	68	47	25.73	38	49
14	±1%	2.1	187	103	15.17	223	44	20.97	62	49	29.89	33	49
15	±1%	2.1	172	94	16.30	204	45	23.12	56	51	34.05	29	50
16	±1%	2.0	157	87	17.53	187	44	25.91	50	49	41.44	25	49
17	±1%	1.9	143	79	18.75	169	43	28.70	45	46	48.82	21	47
18	±1%	1.8	129	71	19.98	152	42	31.49	39	44	56.21	17	46
19	±1%	1.8	121	67	21.11	143	42	33.51	36	44	60.92	15	47
20	±1%	1.8	110	61	22.25	131	41	35.53	33	43	65.63	14	48
22	±1%	1.8	98	54	24.51	116	41	39.57	26	42	75.05	10	51
24	±1%	1.8	87	48	27.51	104	37	54.94	21	35	NA	NA	NA
27	±1%	1.7	70	39	32.01	85	32	77.98	13	23	NA	NA	NA
30	±1%	1.7	65	36	35.89	78	28	106.50	10	12	NA	NA	NA
33	±1%	1.7	60	33	40.05	74	27	NA	NA	NA	NA	NA	NA
36	±1%	1.7	58	32	45.13	71	28	NA	NA	NA	NA	NA	NA
39	±1%	1.7	56	31	50.21	69	28	NA	NA	NA	NA	NA	NA
43	±1%	1.6	53	29	56.98	66	29	NA	NA	NA	NA	NA	NA
47	±1%	1.6	50	28	63.75	63	30	NA	NA	NA	NA	NA	NA
51	±1%	1.6	48	26	70.53	60	31	NA	NA	NA	NA	NA	NA
56	±1%	1.6	44	24	78.99	56	33	NA	NA	NA	NA	NA	NA
58	±1%	1.6	42	23	83.54	54	34	NA	NA	NA	NA	NA	NA
68	±1%	1.6	32	18	106.28	42	40	NA	NA	NA	NA	NA	NA

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
0.05	±0.02	25.6	1200	660	0.06	1333	945	0.06	556	832	0.06	397	880
0.1	±0.02	18.1	1156	636	0.11	1284	675	0.11	535	628	0.11	382	667
0.15	±0.02	14.8	1111	611	0.16	1235	555	0.16	514	533	0.16	367	567
0.2	±0.02	12.8	1067	587	0.21	1185	483	0.21	494	474	0.22	353	505
0.25	±0.02	11.4	1022	562	0.26	1136	433	0.27	473	433	0.27	338	462
0.3	±0.02	10.4	978	538	0.31	1086	397	0.32	453	402	0.32	323	430
0.35	±0.02	9.7	933	513	0.36	1037	368	0.37	432	378	0.37	309	404
0.4	±0.02	9.0	889	489	0.41	988	345	0.42	412	358	0.42	294	383
0.45	±0.02	8.5	844	464	0.46	938	326	0.47	391	341	0.48	279	365
0.5	±0.02	8.1	800	440	0.51	889	310	0.52	370	327	0.53	265	350
0.55	±0.02	7.7	788	434	0.57	875	296	0.57	363	315	0.58	261	337
0.6	±0.02	7.4	777	427	0.62	860	283	0.62	356	304	0.63	258	326
0.65	±0.02	7.1	765	421	0.67	846	273	0.67	348	294	0.68	255	315
0.7	±0.02	6.8	754	414	0.72	832	263	0.72	341	285	0.73	252	306
0.75	±0.02	6.6	742	408	0.77	817	254	0.78	334	277	0.79	248	298
0.8	±0.02	6.4	730	402	0.82	803	247	0.83	326	270	0.84	245	290
0.85	±0.02	6.2	719	395	0.87	789	239	0.88	319	264	0.89	242	283
0.9	±0.02	6.0	707	389	0.92	775	233	0.93	312	258	0.95	239	277
0.95	±0.02	5.9	696	383	0.97	760	227	0.98	304	252	1.00	235	271
1	±0.02	5.7	684	376	1.019	746	216	1.061	297	242	1.101	232	260
1.05	±0.02	5.6	667	367	1.076	731	213	1.126	290	239	1.171	226	256
1.1	±0.02	5.4	649	357	1.134	717	210	1.190	282	236	1.241	220	253
1.15	±0.02	5.3	632	347	1.192	702	206	1.254	275	233	1.311	214	250
1.2	±0.02	5.2	614	338	1.250	687	203	1.318	267	230	1.381	209	247
1.25	±0.02	5.1	605	333	1.307	677	200	1.382	262	227	1.451	203	244
1.3	±0.02	5.0	596	328	1.365	667	197	1.446	257	224	1.521	197	241
1.35	±0.02	4.9	587	323	1.423	658	194	1.511	252	221	1.591	191	238
1.4	±0.02	4.8	578	318	1.481	648	190	1.575	247	218	1.661	185	235
1.45	±0.02	4.8	569	313	1.538	638	187	1.639	242	215	1.731	179	232
1.5	±0.02	4.7	560	308	1.596	628	184	1.703	237	212	1.801	173	229
1.55	±0.02	4.6	551	303	1.645	620	181	1.760	233	209	1.866	170	226
1.6	±0.02	4.5	542	298	1.694	611	178	1.817	228	206	1.930	166	222
1.65	±0.02	4.5	534	293	1.743	603	175	1.874	224	203	1.995	163	219
1.7	±0.02	4.4	525	289	1.792	595	172	1.931	219	200	2.060	159	216
1.75	±0.02	4.3	516	284	1.841	587	169	1.988	215	197	2.124	156	213
1.8	±0.02	4.2	507	279	1.890	578	166	2.045	211	194	2.189	153	209
1.85	±0.02	4.2	498	274	1.939	570	163	2.102	206	191	2.253	149	206
1.9	±0.02	4.1	490	269	1.988	562	160	2.158	202	188	2.318	146	203
1.95	±0.02	4.1	481	264	2.037	553	157	2.215	197	185	2.383	142	199
2	±0.03	4.0	472	260	2.086	545	154	2.272	193	182	2.447	139	196
2.1	±0.03	3.9	462	254	2.190	535	151	2.402	187	180	2.604	134	193
2.2	±0.03	3.8	452	249	2.295	524	148	2.532	181	177	2.761	129	191
2.3	±0.03	3.8	442	243	2.400	514	145	2.662	175	175	2.917	124	188
2.4	±0.03	3.7	433	238	2.504	503	143	2.793	168	172	3.074	118	186
2.5	±0.03	3.6	423	232	2.609	493	140	2.923	162	170	3.230	113	183
2.6	±0.03	3.6	413	227	2.714	482	137	3.053	156	167	3.387	108	181
2.7	±0.03	3.5	403	222	2.818	472	134	3.183	150	165	3.543	103	178
2.8	±0.03	3.4	395	217	2.933	463	133	3.336	147	164	3.742	100	177
2.9	±0.03	3.4	388	213	3.047	453	131	3.489	144	162	3.940	97	175
3	±0.03	3.3	380	209	3.162	444	130	3.642	140	161	4.139	95	174
3.1	±0.05	3.2	372	205	3.276	435	129	3.795	137	160	4.337	92	172
3.2	±0.05	3.2	365	201	3.391	425	127	3.947	134	159	4.536	89	171
3.3	±0.05	3.1	357	196	3.506	416	126	4.100	131	157	4.734	86	169
3.4	±0.05	3.1	349	192	3.620	407	125	4.253	128	156	4.933	84	168
3.5	±0.05	3.1	342	188	3.735	397	123	4.406	125	155	5.131	81	166
3.6	±0.05	3.0	334	184	3.849	388	122	4.559	121	154	5.330	78	165
3.7	±0.05	3.0	326	179	3.964	379	121	4.712	118	152	5.528	75	164
3.8	±0.05	3.0	318	175	4.078	369	119	4.865	115	151	5.727	73	162
3.9	±0.05	2.9	311	171	4.193	360	118	5.018	112	150	5.925	70	161

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
4	±0.05	2.9	307	169	4.301	355	117	5.188	110	149	6.188	68	160
4.1	±0.05	2.8	303	167	4.410	351	116	5.358	108	148	6.450	67	159
4.2	±0.05	2.8	299	164	4.518	347	116	5.528	106	148	6.713	65	158
4.3	±0.05	2.7	295	162	4.627	342	115	5.698	104	147	6.975	64	157
4.4	±0.05	2.7	291	160	4.735	338	114	5.867	102	146	7.238	62	157
4.5	±0.05	2.7	287	158	4.843	333	113	6.037	100	146	7.500	61	156
4.6	±0.05	2.6	283	156	4.952	329	112	6.207	98	145	7.763	59	155
4.7	±0.05	2.6	279	154	5.060	324	112	6.377	96	144	8.025	58	154
5.1	±0.05	2.5	263	145	5.494	307	109	7.057	88	142	9.075	52	151
5.6	±0.05	2.4	244	134	6.035	285	105	7.906	78	138	10.39	44	147
6.2	±0.1	2.3	228	126	6.865	267	102	9.517	72	133	13.66	40	141
6.8	±0.1	2.2	213	117	7.694	250	100	11.13	66	128	16.93	35	135
7.5	±0.1	2.1	195	107	8.367	227	98	12.63	57	125	20.91	28	132
8.2	±0.1	2.0	176	97	9.041	205	96	14.14	49	123	24.88	21	129
9.1	±0.1	1.9	161	89	10.20	188	96	18.09	42	122	40.00	16	128
10	±1%	1.8	146	80	11.37	171	95	22.05	36	121	70.00	12	127
11	±1%	1.7	129	71	12.66	153	95	26.44	29	120	140.0	6	126
12	±1%	1.6	112	62	13.95	134	94	30.83	22	119	231.3	1	125
13	±1%	1.6	102	56	15.31	122	93	40.37	18	118	n/a	n/a	n/a
14	±1%	1.5	92	51	16.67	111	92	49.91	15	118	n/a	n/a	n/a
15	±1%	1.5	82	45	18.03	99	90	59.44	11	117	n/a	n/a	n/a
16	±1%	1.4	79	43	19.61	96	90	80.00	8	117	n/a	n/a	n/a
17	±1%	1.4	76	42	21.18	92	90	120.0	6	116	n/a	n/a	n/a
18	±1%	1.3	73	40	22.76	89	90	190.0	4	116	n/a	n/a	n/a
19	±1%	1.3	69	38	24.37	84	89	n/a	n/a	n/a	n/a	n/a	n/a
20	±1%	1.2	65	36	25.98	80	89	n/a	n/a	n/a	n/a	n/a	n/a
22	±1%	1.2	57	31	29.21	72	87	n/a	n/a	n/a	n/a	n/a	n/a
24	±1%	1.2	48	26	34.44	62	87	n/a	n/a	n/a	n/a	n/a	n/a
27	±1%	1.1	43	24	41.87	56	86	n/a	n/a	n/a	n/a	n/a	n/a
30	±1%	1.0	37	21	49.29	49	85	n/a	n/a	n/a	n/a	n/a	n/a
33	±1%	1.0	32	18	56.72	43	84	n/a	n/a	n/a	n/a	n/a	n/a
36	±1%	1.0	27	15	64.15	37	83	n/a	n/a	n/a	n/a	n/a	n/a
39	±1%	1.0	21	12	71.57	30	82	n/a	n/a	n/a	n/a	n/a	n/a

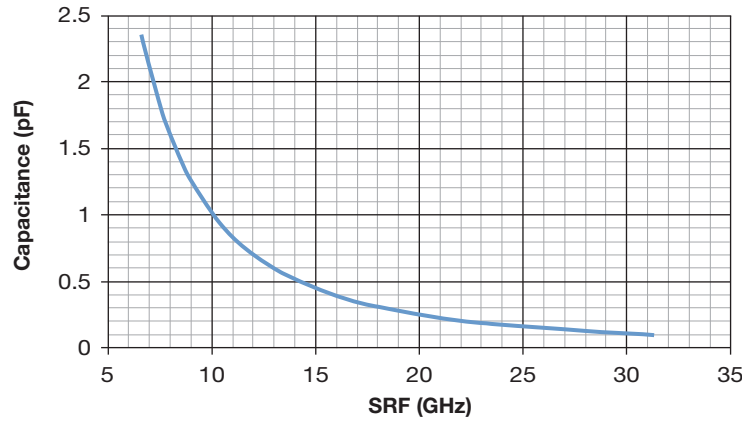
Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
0.1	±0.02	17.2	880	484	0.125	890	3296	0.125	545	2417	0.126	447	2265
0.15	±0.02	14.1	872	480	0.176	885	2073	0.178	530	1626	0.181	434	1546
0.2	±0.02	12.3	864	475	0.228	880	1492	0.231	516	1227	0.235	420	1178
0.25	±0.02	11.0	857	471	0.279	874	1156	0.284	501	986	0.290	407	955
0.3	±0.02	10.1	849	467	0.331	869	938	0.337	487	825	0.344	394	804
0.35	±0.02	9.4	841	462	0.382	864	787	0.390	472	710	0.399	380	695
0.4	±0.02	8.8	833	458	0.433	859	675	0.443	458	623	0.453	367	613
0.45	±0.02	8.3	825	454	0.485	853	590	0.496	443	555	0.508	353	549
0.5	±0.02	7.9	817	450	0.536	848	523	0.549	429	501	0.562	340	497
0.55	±0.02	7.5	811	446	0.584	843	469	0.600	420	456	0.616	331	454
0.6	±0.02	7.2	805	443	0.631	838	425	0.651	411	419	0.670	322	418
0.65	±0.02	6.9	798	439	0.679	834	387	0.702	402	387	0.724	313	388
0.7	±0.02	6.7	792	436	0.726	829	356	0.753	393	360	0.778	304	362
0.75	±0.02	6.5	786	432	0.774	824	329	0.804	384	337	0.832	295	339
0.8	±0.02	6.3	779	429	0.822	819	306	0.855	375	316	0.886	286	319
0.85	±0.02	6.1	773	425	0.869	814	285	0.906	366	298	0.940	277	301
0.9	±0.02	5.9	767	422	0.917	810	267	0.957	357	282	0.994	268	285
0.95	±0.02	5.8	760	418	0.964	805	251	1.008	348	267	1.049	260	271
1	±0.02	5.6	754	415	1.012	800	231	1.059	339	235	1.103	251	242
1.05	±0.02	5.5	747	411	1.065	794	223	1.120	335	228	1.170	247	235
1.1	±0.02	5.4	740	407	1.119	788	215	1.181	330	221	1.237	244	228
1.15	±0.02	5.3	732	403	1.172	782	208	1.242	326	214	1.304	240	220
1.2	±0.02	5.1	725	399	1.225	776	200	1.304	322	207	1.371	237	213
1.25	±0.02	5.0	718	395	1.279	770	192	1.365	318	200	1.438	233	206
1.3	±0.02	4.9	711	391	1.332	764	184	1.426	313	193	1.505	230	199
1.35	±0.02	4.9	704	387	1.386	758	176	1.487	309	186	1.573	226	192
1.4	±0.02	4.8	696	383	1.439	752	169	1.548	305	179	1.640	223	184
1.45	±0.02	4.7	689	379	1.492	746	161	1.609	300	172	1.707	219	177
1.5	±0.02	4.6	682	375	1.546	740	153	1.670	296	165	1.774	216	170
1.55	±0.02	4.6	675	371	1.600	733	151	1.734	292	163	1.850	212	168
1.6	±0.02	4.5	668	367	1.654	726	148	1.799	287	161	1.927	208	165
1.65	±0.02	4.4	660	363	1.708	719	146	1.864	283	159	2.003	204	163
1.7	±0.02	4.3	653	359	1.762	712	143	1.928	278	157	2.079	200	160
1.75	±0.02	4.3	646	355	1.816	705	141	1.993	274	155	2.156	197	158
1.8	±0.02	4.2	639	351	1.870	698	139	2.058	269	152	2.232	193	155
1.85	±0.02	4.2	632	347	1.924	691	136	2.122	265	150	2.308	189	153
1.9	±0.02	4.1	624	343	1.978	684	134	2.187	260	148	2.385	185	150
1.95	±0.02	4.1	617	339	2.033	677	131	2.252	256	146	2.461	181	148
2	±0.03	4.0	610	336	2.087	670	129	2.316	251	144	2.537	177	145
2.1	±0.03	3.9	597	328	2.183	658	127	2.440	245	142	2.690	171	143
2.2	±0.03	3.8	584	321	2.280	646	124	2.563	239	139	2.843	165	141
2.3	±0.03	3.8	571	314	2.377	634	122	2.687	233	137	2.996	159	139
2.4	±0.03	3.6	557	307	2.474	623	119	2.810	227	135	3.149	154	136
2.5	±0.03	3.6	544	299	2.571	611	117	2.934	221	133	3.301	148	134
2.6	±0.03	3.6	531	292	2.668	599	114	3.057	215	130	3.454	142	132
2.7	±0.03	3.4	518	285	2.764	587	112	3.181	209	128	3.607	136	130
2.8	±0.03	3.4	507	279	2.875	575	111	3.348	204	127	3.850	132	129
2.9	±0.03	3.4	497	273	2.987	564	110	3.514	199	125	4.093	129	127
3	±0.03	3.3	486	267	3.098	552	109	3.681	194	124	4.335	125	126
3.1	±0.05	3.3	475	261	3.209	540	108	3.848	189	123	4.578	121	125
3.2	±0.05	3.2	465	256	3.320	528	107	4.014	183	122	4.821	118	123
3.3	±0.05	3.1	454	250	3.431	517	106	4.181	178	120	5.064	114	122
3.4	±0.05	3.1	443	244	3.542	505	105	4.348	173	119	5.307	110	121
3.5	±0.05	3.1	433	238	3.653	493	104	4.515	168	118	5.549	107	119
3.6	±0.05	3.0	422	232	3.764	481	103	4.681	163	116	5.792	103	118
3.7	±0.05	3.0	412	226	3.875	470	102	4.848	158	115	6.035	99	116
3.8	±0.05	3.0	401	220	3.986	458	101	5.015	153	114	6.278	96	115
3.9	±0.05	2.9	390	215	4.097	446	100	5.182	148	113	6.521	92	114

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
4	±0.05	2.9	384	211	4.214	440	99	5.378	144	112	6.861	89	113
4.1	±0.05	2.9	378	208	4.331	434	98	5.574	141	112	7.201	86	113
4.2	±0.05	2.8	372	205	4.448	428	98	5.769	138	111	7.541	84	112
4.3	±0.05	2.7	366	202	4.564	422	97	5.965	134	111	7.881	81	111
4.4	±0.05	2.7	360	198	4.681	415	96	6.161	131	110	8.222	78	111
4.5	±0.05	2.7	355	195	4.798	409	96	6.357	128	110	8.562	75	110
4.6	±0.05	2.7	349	192	4.915	403	95	6.553	124	109	8.902	72	110
4.7	±0.05	2.6	343	188	5.032	397	94	6.749	121	109	9.242	69	109
5.1	±0.05	2.5	319	175	5.499	373	91	7.533	108	107	10.60	58	107
5.6	±0.05	2.4	289	159	6.083	342	88	8.513	91	104	12.30	44	104
6.2	±0.1	2.3	264	145	6.842	313	86	10.43	79	102	18.03	36	103
6.8	±0.1	2.2	239	131	7.601	283	84	12.35	68	101	23.76	28	102
7.5	±0.1	2.1	218	120	8.468	259	83	14.84	61	100	37.25	21	101
8.2	±0.1	2.0	198	109	9.334	234	82	17.32	55	100	50.74	15	100
9.1	±0.1	1.9	179	99	10.57	213	82	24.90	46	100	n/a	n/a	n/a
10	±1%	1.8	160	88	11.80	191	81	32.48	37	100	n/a	n/a	n/a
11	±1%	1.7	139	77	13.17	167	81	40.90	26	101	n/a	n/a	n/a
12	±1%	1.6	119	65	14.54	143	80	49.32	16	101	n/a	n/a	n/a
13	±1%	1.6	110	60	16.17	134	80	n/a	n/a	n/a	n/a	n/a	n/a
14	±1%	1.5	101	55	17.79	125	80	n/a	n/a	n/a	n/a	n/a	n/a
15	±1%	1.5	92	51	19.42	116	80	n/a	n/a	n/a	n/a	n/a	n/a
16	±1%	1.4	87	48	21.13	110	79	n/a	n/a	n/a	n/a	n/a	n/a
17	±1%	1.4	83	46	22.85	104	78	n/a	n/a	n/a	n/a	n/a	n/a
18	±1%	1.3	78	43	24.57	99	77	n/a	n/a	n/a	n/a	n/a	n/a
19	±1%	1.3	73	40	26.41	92	77	n/a	n/a	n/a	n/a	n/a	n/a
20	±1%	1.3	67	37	28.26	85	76	n/a	n/a	n/a	n/a	n/a	n/a
22	±1%	1.2	57	31	31.95	72	76	n/a	n/a	n/a	n/a	n/a	n/a
24	±1%	1.2	46	25	35.64	59	75	n/a	n/a	n/a	n/a	n/a	n/a
27	±1%	1.1	41	22	44.94	54	74	n/a	n/a	n/a	n/a	n/a	n/a
30	±1%	1.0	36	20	54.24	48	73	n/a	n/a	n/a	n/a	n/a	n/a
33	±1%	1.0	30	17	63.54	42	72	n/a	n/a	n/a	n/a	n/a	n/a
36	±1%	0.9	25	14	72.84	37	71	n/a	n/a	n/a	n/a	n/a	n/a
39	±1%	0.9	20	11	82.14	31	70	n/a	n/a	n/a	n/a	n/a	n/a
43	±1%	0.9	16	9	102.9	27	66	n/a	n/a	n/a	n/a	n/a	n/a
47	±1%	0.8	12	7	123.7	23	63	n/a	n/a	n/a	n/a	n/a	n/a

Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
0.1	±0.02	15.6	1190	654	0.136	1176	3633	0.136	606	2149	0.136	450	2068
0.15	±0.03	12.7	1179	648	0.190	1166	2129	0.190	597	1407	0.191	444	1370
0.2	±0.02	11.0	1168	642	0.244	1156	1457	0.244	589	1042	0.246	438	1023
0.25	±0.02	9.8	1156	636	0.297	1145	1086	0.299	581	826	0.301	432	816
0.3	±0.02	8.9	1145	630	0.351	1135	854	0.353	573	683	0.356	426	678
0.35	±0.02	8.3	1134	624	0.405	1125	697	0.408	565	581	0.411	421	580
0.4	±0.02	7.7	1123	618	0.459	1115	584	0.462	557	505	0.466	415	506
0.45	±0.02	7.3	1112	612	0.513	1105	500	0.516	549	447	0.521	409	449
0.5	±0.02	6.9	1101	606	0.567	1095	435	0.571	541	400	0.576	403	404
0.55	±0.02	6.6	1090	599	0.617	1084	384	0.621	532	362	0.627	397	366
0.6	±0.02	6.3	1079	593	0.666	1074	342	0.672	524	331	0.679	391	335
0.65	±0.02	6.0	1068	587	0.716	1064	308	0.723	516	304	0.731	385	309
0.7	±0.02	5.8	1057	581	0.765	1054	279	0.774	508	282	0.783	379	287
0.75	±0.02	5.6	1046	575	0.815	1044	255	0.824	500	262	0.834	374	267
0.8	±0.02	5.4	1035	569	0.864	1034	234	0.875	492	245	0.886	368	250
0.85	±0.02	5.3	1023	563	0.914	1024	216	0.926	484	230	0.938	362	236
0.9	±0.02	5.1	1012	557	0.963	1013	201	0.976	476	217	0.989	356	222
0.95	±0.02	5.0	1001	551	1.013	1003	187	1.027	467	205	1.041	350	210
1	±0.02	5.0	992	546	1.062	983	167	1.078	459	170	1.093	344	177
1.05	±0.02	4.9	981	539	1.107	975	163	1.124	451	167	1.141	338	174
1.1	±0.02	4.8	969	533	1.152	966	158	1.170	443	165	1.189	331	172
1.15	±0.02	4.7	958	527	1.196	958	154	1.217	435	162	1.236	325	169
1.2	±0.02	4.6	946	521	1.241	950	150	1.263	427	160	1.284	318	167
1.25	±0.02	4.5	935	514	1.285	942	146	1.309	419	157	1.332	312	164
1.3	±0.02	4.4	923	508	1.330	933	142	1.355	410	155	1.380	305	162
1.35	±0.02	4.3	912	502	1.375	925	138	1.402	402	152	1.428	299	159
1.4	±0.02	4.2	900	495	1.419	917	134	1.448	394	150	1.476	293	156
1.45	±0.02	4.1	889	489	1.464	908	129	1.494	386	147	1.524	286	154
1.5	±0.02	4.1	877	483	1.508	900	125	1.541	378	144	1.572	280	151
1.55	±0.02	4.0	862	474	1.567	890	123	1.618	371	143	1.638	274	150
1.6	±0.02	3.9	846	465	1.626	881	122	1.694	363	142	1.704	268	149
1.65	±0.02	3.9	831	457	1.685	871	120	1.771	356	140	1.770	262	148
1.7	±0.02	3.8	815	448	1.743	862	118	1.848	349	139	1.836	256	147
1.75	±0.02	3.7	800	440	1.802	852	116	1.925	342	138	1.902	250	145
1.8	±0.02	3.7	784	431	1.861	843	114	2.002	334	136	1.968	244	144
1.85	±0.02	3.6	769	423	1.920	833	112	2.079	327	135	2.034	239	143
1.9	±0.02	3.5	753	414	1.978	824	110	2.156	320	134	2.100	233	142
1.95	±0.02	3.4	737	406	2.037	814	108	2.233	313	132	2.167	227	141
2	±0.03	3.3	722	397	2.096	805	107	2.310	305	131	2.233	221	139
2.1	±0.03	3.2	691	380	2.213	786	103	2.464	291	128	2.365	209	137
2.2	±0.03	3.0	660	363	2.331	767	99	2.618	276	126	2.497	198	135
2.3	±0.03	2.9	644	354	2.420	747	97	2.681	268	123	2.613	191	132
2.4	±0.03	2.9	629	346	2.508	728	96	2.744	259	121	2.729	185	130
2.5	±0.03	2.8	614	338	2.597	709	94	2.807	251	118	2.845	179	128
2.6	±0.03	2.8	598	329	2.686	689	93	2.870	242	116	2.961	173	126
2.7	±0.03	2.7	583	321	2.775	670	91	2.933	234	114	3.077	167	123
2.8	±0.03	2.7	574	316	2.875	659	90	3.047	230	113	3.205	164	122
2.9	±0.03	2.7	566	311	2.975	647	89	3.162	227	112	3.334	161	121
3	±0.03	2.7	557	306	3.075	636	88	3.276	223	111	3.462	157	121
3.1	±0.05	2.7	548	302	3.174	625	87	3.390	220	110	3.590	154	120
3.2	±0.05	2.6	540	297	3.274	613	87	3.504	216	109	3.718	151	119
3.3	±0.05	2.6	531	292	3.374	602	86	3.619	213	108	3.847	148	118
3.4	±0.05	2.6	522	287	3.474	591	85	3.733	209	107	3.975	145	117
3.5	±0.05	2.6	514	283	3.574	579	84	3.847	206	106	4.103	141	116
3.6	±0.05	2.5	505	278	3.674	568	83	3.961	202	105	4.231	138	115
3.7	±0.05	2.5	496	273	3.773	556	82	4.076	198	104	4.359	135	114
3.8	±0.05	2.5	488	268	3.873	545	81	4.190	195	103	4.488	132	113
3.9	±0.05	2.4	479	264	3.973	534	80	4.304	191	102	4.616	129	112

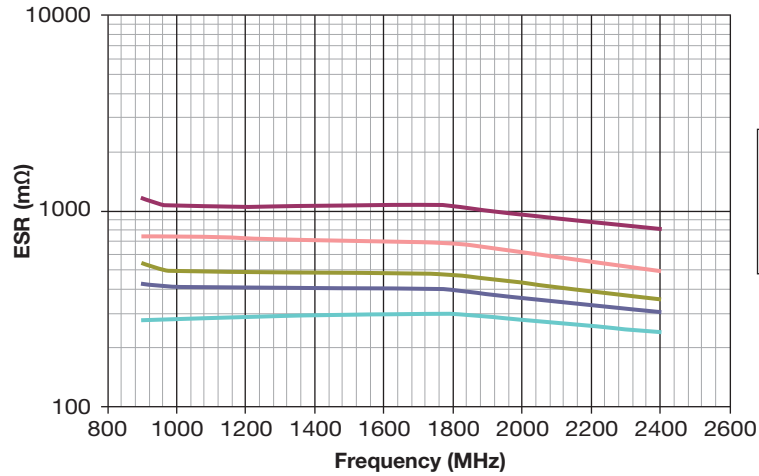
Capacitance @ 1MHz and Tolerance		Self Resonance Frequency (GHz) Typ.	Q Standard Value @ 1GHz		Frequency 900MHz			Frequency 1900MHz			Frequency 2400MHz		
C (pF)	Tol.		Typ.	Min.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.	C(eff) (pF) Typ.	Q Typ.	ESR (mOhm) Typ.
4	±0.05	2.4	473	260	4.083	528	79	4.435	189	101	4.768	127	112
4.1	±0.05	2.4	467	257	4.192	522	78	4.565	186	100	4.919	125	111
4.2	±0.05	2.4	462	254	4.302	516	78	4.695	183	100	5.071	123	110
4.3	±0.05	2.3	456	251	4.411	511	77	4.825	180	99	5.223	121	110
4.4	±0.05	2.3	450	247	4.521	505	76	4.956	178	98	5.375	119	109
4.5	±0.05	2.3	444	244	4.630	499	75	5.086	175	98	5.526	117	108
4.6	±0.05	2.3	438	241	4.740	493	75	5.216	172	97	5.678	115	108
4.7	±0.05	2.2	432	238	4.849	487	74	5.347	170	96	5.830	113	107
5.1	±0.05	2.1	408	225	5.288	464	71	5.868	159	93	6.437	106	105
5.6	±0.05	2.0	379	208	5.835	435	67	6.519	145	90	7.195	96	102
6.2	±0.1	1.9	355	195	6.440	408	65	7.176	137	86	7.897	91	96
6.8	±0.1	1.8	330	182	7.044	380	62	7.832	129	83	8.599	85	91
7.5	±0.1	1.7	308	169	7.823	351	61	8.927	115	81	10.08	74	89
8.2	±0.1	1.7	285	157	8.601	322	60	10.02	100	78	11.55	63	87
9.1	±0.1	1.6	266	146	9.600	304	58	11.55	93	77	13.93	57	85
10	±1%	1.5	247	136	10.60	285	57	13.09	85	76	16.30	50	84
11	±1%	1.5	225	124	11.71	265	56	14.79	76	74	18.94	43	82
12	±1%	1.4	204	112	12.82	244	54	16.49	68	73	21.57	36	81
13	±1%	1.3	193	106	13.97	230	53	18.64	61	72	26.09	32	80
14	±1%	1.3	181	99	15.13	215	53	20.80	55	71	30.61	28	79
15	±1%	1.2	169	93	16.28	200	52	22.95	48	70	35.13	24	78
16	±1%	1.2	164	90	17.51	195	51	26.01	46	69	46.51	22	76
17	±1%	1.2	159	88	18.75	189	50	29.07	43	67	57.90	19	75
18	±1%	1.1	154	85	19.98	183	49	32.14	41	66	69.29	17	73
19	±1%	1.1	150	82	21.21	178	49	36.34	39	66	n/a	n/a	n/a
20	±1%	1.1	145	80	22.43	172	49	40.55	38	65	n/a	n/a	n/a
22	±1%	1.0	136	75	24.88	162	49	48.96	34	64	n/a	n/a	n/a
24	±1%	1.0	126	70	27.34	151	48	57.38	31	63	n/a	n/a	n/a
27	±1%	0.9	112	62	31.02	135	48	70.00	26	62	n/a	n/a	n/a
30	±1%	0.9	101	56	36.14	121	48	n/a	n/a	n/a	n/a	n/a	n/a
33	±1%	0.8	90	50	41.27	108	48	n/a	n/a	n/a	n/a	n/a	n/a
36	±1%	0.8	79	44	46.39	95	48	n/a	n/a	n/a	n/a	n/a	n/a
39	±1%	0.8	68	38	51.52	82	48	n/a	n/a	n/a	n/a	n/a	n/a
43	±1%	0.7	54	30	58.35	64	48	n/a	n/a	n/a	n/a	n/a	n/a
47	±1%	0.7	39	21	65.18	46	48	n/a	n/a	n/a	n/a	n/a	n/a
82	±1%	0.7	17	10	148.400	24	48	n/a	n/a	n/a	n/a	n/a	n/a

Accu-P[®] 01005 Typical SRF vs Capacitance



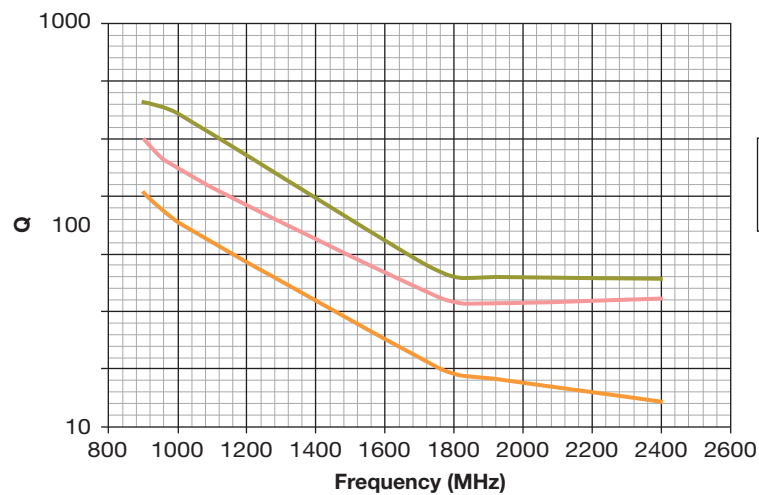
Measured on HP8720ES

Accu-P[®] 01005 Typical ESR vs Frequency



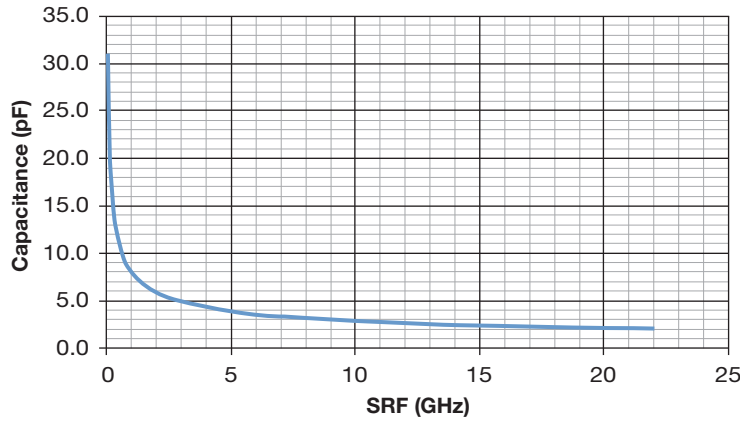
Measured on Agilent 4278A/4991A

Accu-P[®] 01005 Typical Q vs Frequency



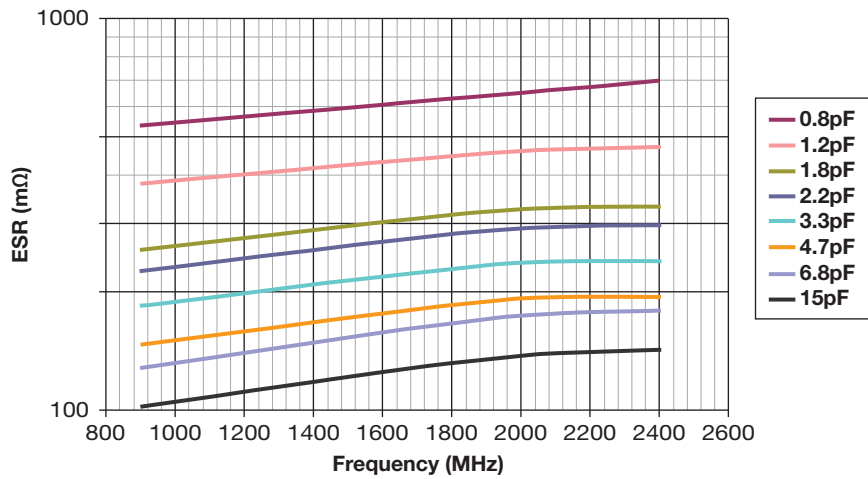
Measured on Agilent 4278A/4991A

Accu-P® 0201 Typical SRF vs Capacitance



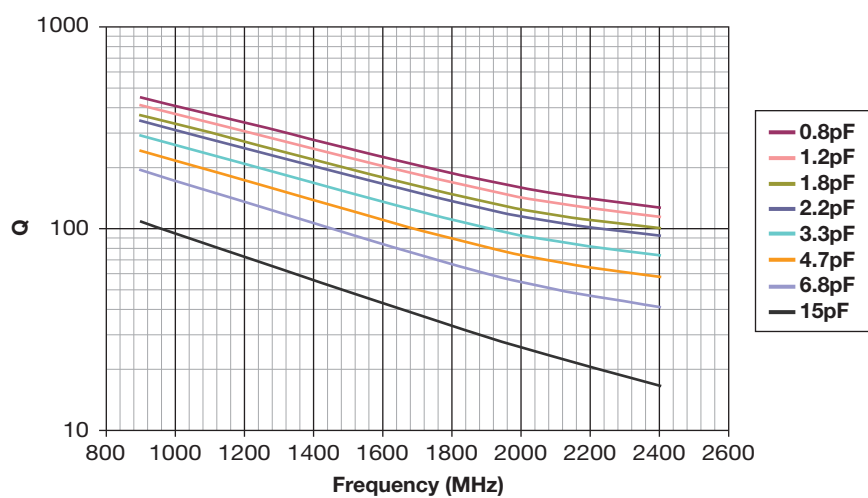
Measured on HP8720ES

Accu-P® 0201 Typical ESR vs Frequency



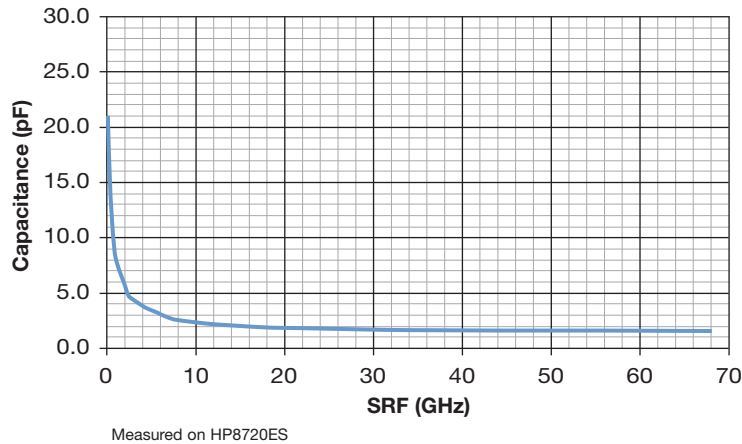
Measured on Agilent 4278A/4991A

Accu-P® 0201 Typical Q vs Frequency

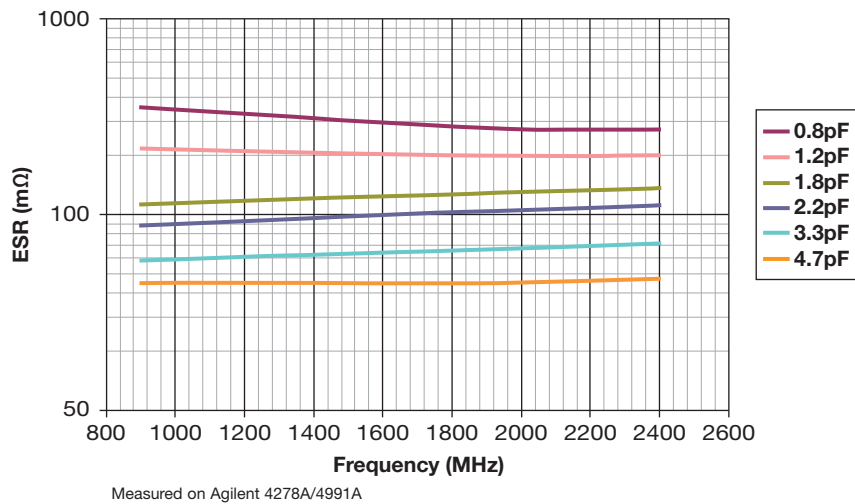


Measured on Agilent 4278A/4991A

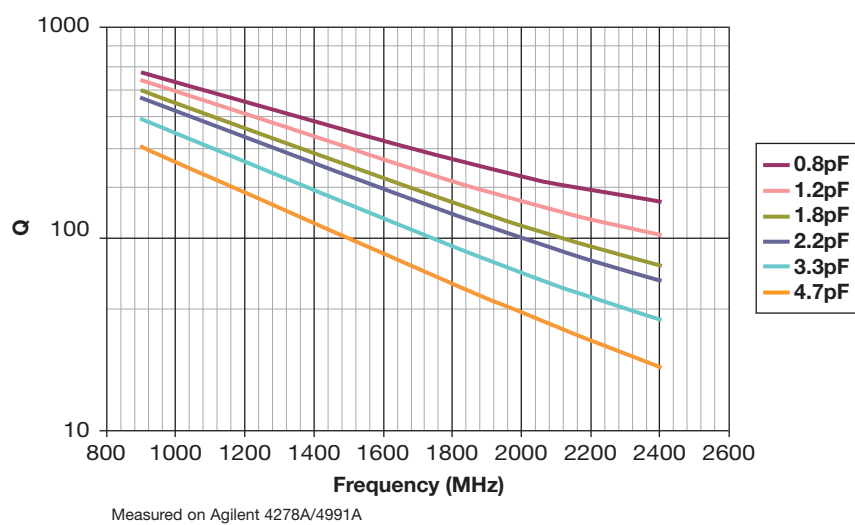
Accu-P[®] 0402 Typical SRF vs Capacitance



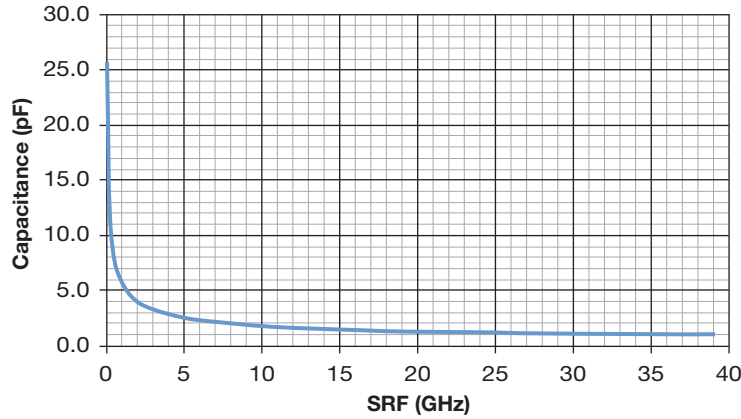
Accu-P[®] 0402 Typical ESR vs Frequency



Accu-P[®] 0402 Typical Q vs Frequency

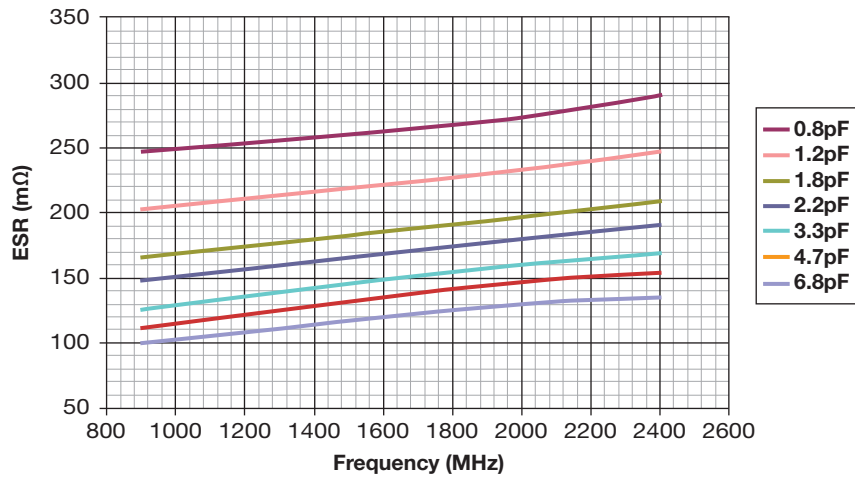


Accu-P[®] 0603 Typical SRF vs Capacitance



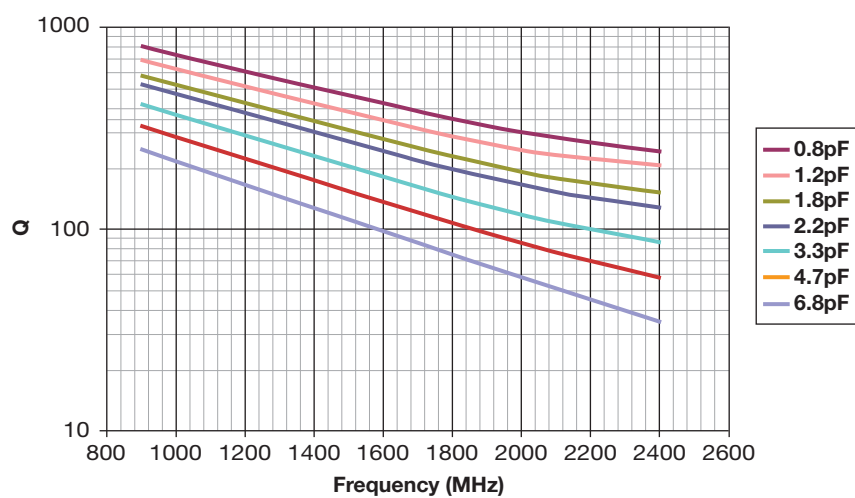
Measured on HP8720ES

Accu-P[®] 0603 Typical ESR vs Frequency



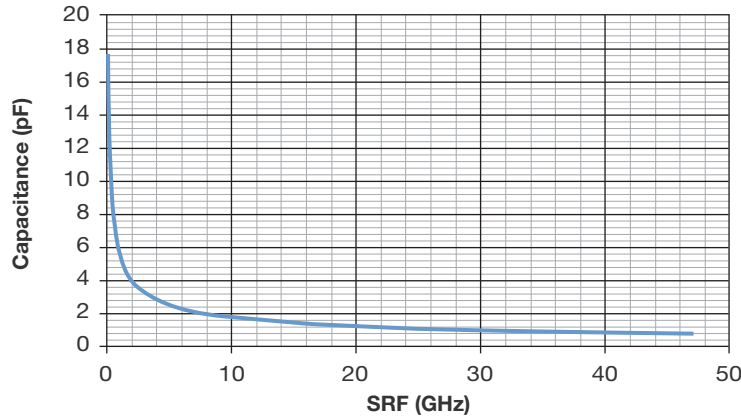
Measured on Agilent 4278A/4991A

Accu-P[®] 0603 Typical Q vs Frequency



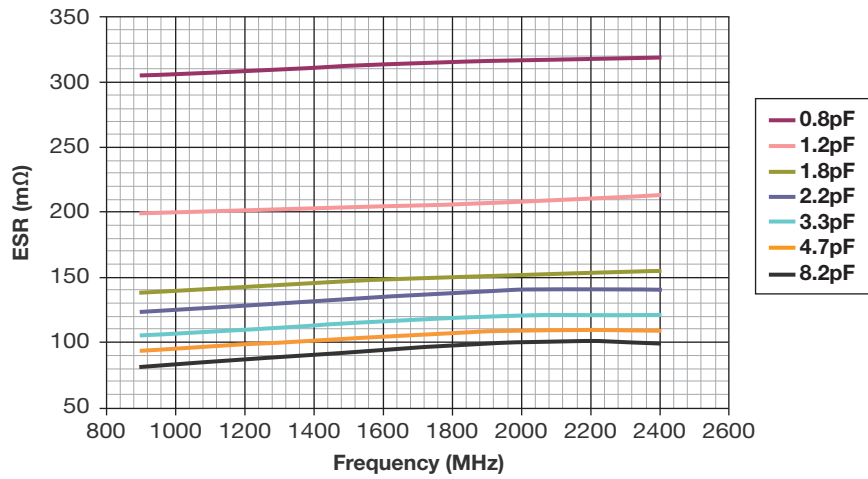
Measured on Agilent 4278A/4991A

Accu-P[®] 0805 Typical SRF vs Capacitance



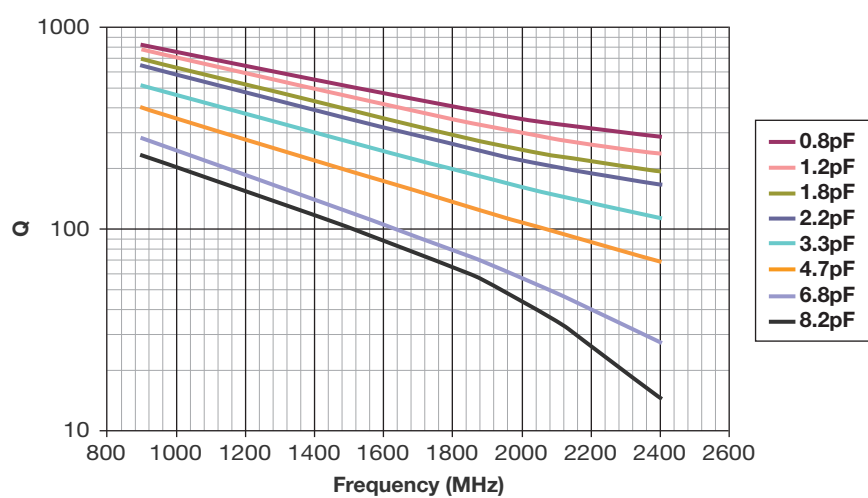
Measured on HP8720ES

Accu-P[®] 0805 Typical ESR vs Frequency



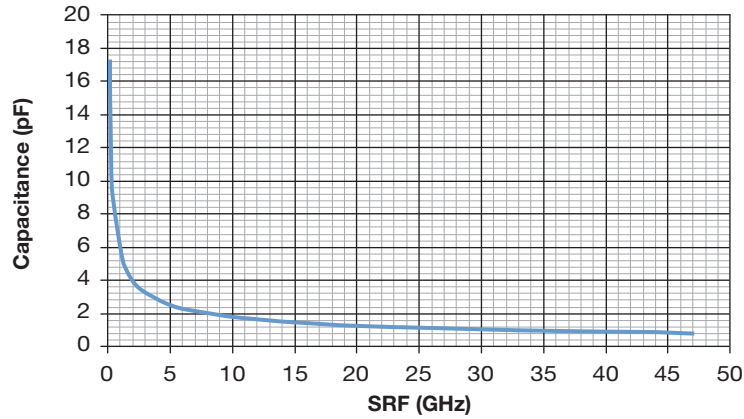
Measured on Agilent 4278A/4991A

Accu-P[®] 0805 Typical Q vs Frequency



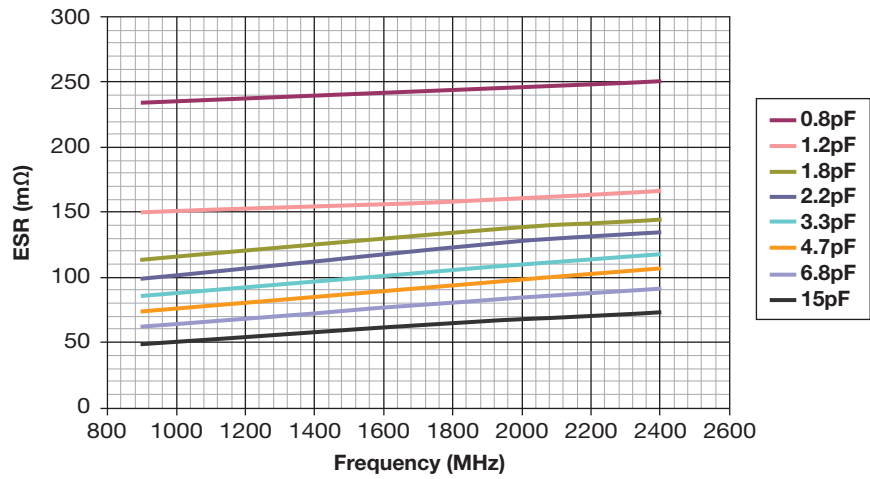
Measured on Agilent 4278A/4991A

Accu-P[®] 1210 Typical SRF vs Capacitance



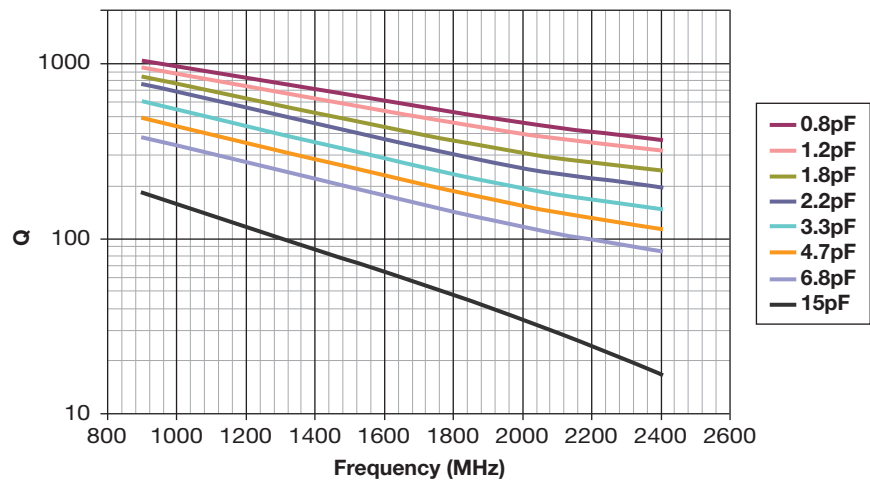
Measured on HP8720ES

Accu-P[®] 1210 Typical ESR vs Frequency



Measured on Agilent 4278A/4991A

Accu-P[®] 1210 Typical Q vs Frequency

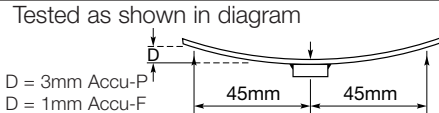


Measured on Agilent 4278A/4991A

ENVIRONMENTAL CHARACTERISTICS

TEST	CONDITIONS	REQUIREMENT
Life (Endurance) MIL-STD-202F Method 108A	125°C, 2U _R , 1000 hours	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Accelerated Damp Heat Steady State MIL-STD-202F Method 103B	85°C, 85% RH, U _R , 1000 hours	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Temperature Cycling MIL-STD-202F Method 107E MIL-STD-883D Method 1010.7	-55°C to +125°C, 15 cycles – Accu-P®	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Resistance to Solder Heat IEC-68-2-58	260°C ± 5°C for 10 secs	C remains within initial limits

MECHANICAL CHARACTERISTICS

TEST	CONDITIONS	REQUIREMENT
Solderability IEC-68-2-58	Components completely immersed in a solder bath at 235°C for 2 secs.	Terminations to be well tinned, minimum 95% coverage
Leach Resistance IEC-68-2-58	Components completely immersed in a solder bath at 260±5°C for 60 secs.	Dissolution of termination faces ≤15% of area Dissolution of termination edges ≤25% of length
Adhesion MIL-STD-202F Method 211A	A force of 5N applied for 10 secs.	No visible damage
Termination Bond Strength IEC-68-2-21 Amend. 2	Tested as shown in diagram 	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Robustness of Termination IEC-68-2-21 Amend. 2	A force of 5N applied for 10 secs.	No visible damage
High Frequency Vibration MIL-STD-202F Method 201A, 204D (Accu-P® only)	55Hz to 2000Hz, 20G	No visible damage
Storage	12 months minimum with components stored in “as received” packaging	Good solderability

QUALITY & RELIABILITY

Accu-P® is based on well established thin-film technology and materials.

• ON-LINE PROCESS CONTROL

This program forms an integral part of the production cycle and acts as a feedback system to regulate and control production processes. The test procedures, which are integrated into the production process, were developed after long research work and are based on the highly developed semiconductor industry test procedures and equipment. These measures help AVX to produce a consistent and high yield line of products.

• FINAL QUALITY INSPECTION

Finished parts are tested for standard electrical parameters and visual/mechanical characteristics. Each production lot is 100% evaluated for: capacitance and proof voltage at 2.5 U_R. In addition, production is periodically evaluated for:

Average capacitance with histogram printout for capacitance distribution;
IR and Breakdown Voltage distribution;
Temperature Coefficient;
Solderability;
Dimensional, mechanical and temperature stability.

QUALITY ASSURANCE

The reliability of these thin-film chip capacitors has been studied intensively for several years. Various measures have been taken to obtain the high reliability required today by the industry. Quality assurance policy is based on well established international industry standards. The reliability of the capacitors is determined by accelerated testing under the following conditions:

Life (Endurance)	125°C, 2U _R , 1000 hours
Accelerated Damp Heat Steady State	85°C, 85% RH, U _R , 1000 hours.

RF POWER APPLICATIONS

In RF power applications capacitor losses generate heat. Two factors of particular importance to designers are:

- Minimizing the generation of heat.
- Dissipating heat as efficiently as possible.

CAPACITOR HEATING

- The major source of heat generation in a capacitor in RF power applications is a function of RF current (I) and ESR, from the relationship:

$$\text{Power dissipation} = I_{\text{RMS}}^2 \times \text{ESR}$$

- Accu-P® capacitors are specially designed to minimize

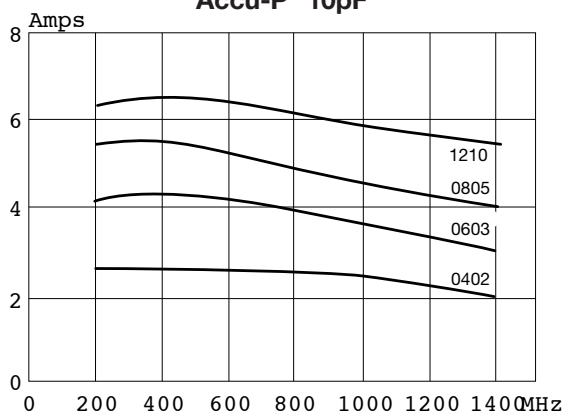
ESR and therefore RF heating. Values of ESR for Accu-P® capacitors are significantly less than those of ceramic MLC components currently available.

HEAT DISSIPATION

- Heat is dissipated from a capacitor through a variety of paths, but the key factor in the removal of heat is the thermal conductivity of the capacitor material.
- The higher the thermal conductivity of the capacitor, the more rapidly heat will be dissipated.
- The table below illustrates the importance of thermal conductivity to the performance of Accu-P® in power applications.

PRODUCT	MATERIAL	THERMAL CONDUCTIVITY W/mK
Accu-P® Microwave MLC	Alumina Magnesium Titanate	18.9 6.0

**Power Handling
Accu-P® 10pF**



Data used in calculating the graph:

Thermal impedance of capacitors:

0402	17°C/W
0603	12°C/W
0805	6.5°C/W
1210	5°C/W

Thermal impedance measured using RF generator, amplifier and strip-line transformer.

ESR of capacitors measured on Boonton 34A

THERMAL IMPEDANCE

Thermal impedance of Accu-P® chips is shown below compared with the thermal impedance of Microwave MLC's.

The thermal impedance expresses the temperature difference in °C between chip center and termination caused by a power dissipation of 1 watt in the chip. It is expressed in °C/W.

CAPACITOR TYPE	CHIP SIZE	THERMAL IMPEDANCE (°C/W)
Accu-P®	0805	6.5
	1210	5
Microwave MLC	0505	12
	1210	7.5

ADVANTAGES OF ACCU-P® IN RF POWER CIRCUITS

The optimized design of Accu-P® offers the designer of RF power circuits the following advantages:

- Reduced power losses due to the inherently low ESR of Accu-P®.
- Increased power dissipation due to the high thermal conductivity of Accu-P®.

• THE ONLY TRUE TEST OF A CAPACITOR IN ANY PARTICULAR APPLICATION IS ITS PERFORMANCE UNDER OPERATING CONDITIONS IN THE ACTUAL CIRCUIT.

PRACTICAL APPLICATION IN RF POWER CIRCUITS

- There is a wide variety of different experimental methods for measuring the power handling performance of a capacitor in RF power circuits. Each method has its own problems and few of them exactly reproduce the conditions present in "real" circuit applications.
- Similarly, there is a very wide range of different circuit applications, all with their unique characteristics and operating conditions which cannot possibly be covered by such "theoretical" testing.

GENERAL

Accu-P® SMD capacitors are designed for soldering to printed circuit boards or other substrates. The construction of the components is such that they will withstand the time/temperature profiles used in both wave and reflow soldering methods.

CIRCUIT BOARD TYPE

The circuit board types which may be used with Accu-P® are as follows:

All flexible types of circuit boards
(eg. FR-4, G-10) and also alumina.

For other circuit board materials, please consult factory.

HANDLING

SMD capacitors should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of plastic tipped tweezers or vacuum pick-ups is strongly recommended for individual components. Bulk handling should ensure that abrasion and mechanical shock are minimized. For automatic equipment, taped and reeled product gives the ideal medium for direct presentation to the placement machine.

COMPONENT PAD DESIGN

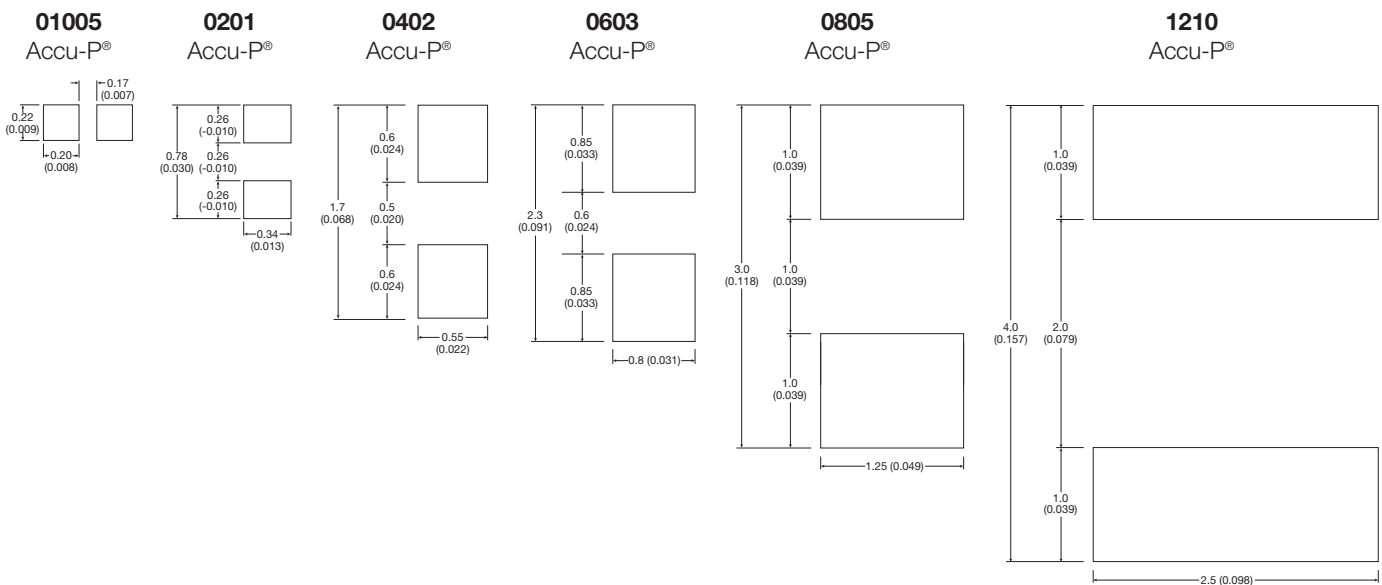
Component pads must be designed to achieve good joints and minimize component movement during reflow soldering. Pad designs are given below for both wave and reflow soldering.

The basis of these designs is:

- Pad width equal to component width. It is permissible to decrease this to as low as 85% of component width but it is not advisable to go below this.
- Pad overlap 0.5mm beneath large components. Pad overlap about 0.3mm beneath small components.
- Pad extension of 0.5mm for reflow of large components and pad extension about 0.3mm for reflow of small components. Pad extension about 1.0mm for wave soldering.

REFLOW SOLDERING

PAD DIMENSIONS: millimeters (inches)



PREHEAT & SOLDERING

The rate of preheat in production should not exceed 4°C/second and a recommended maximum is about 2°C/second. Temperature differential from preheat to soldering should not exceed 100°C.

For further specific application or process advice, please consult AVX.

COOLING

After soldering, the assembly should preferably be allowed to cool naturally. In the event of assisted cooling, similar conditions to those recommended for preheating should be used.

HAND SOLDERING & REWORK

Hand soldering is permissible. Preheat of the PCB to 150°C is required. The most preferable technique is to use hot air soldering tools. Where a soldering iron is used, a temperature controlled model not exceeding 30 watts should be used and set to not more than 260°C.

CLEANING RECOMMENDATIONS

Care should be taken to ensure that the devices are thoroughly cleaned of flux residues, especially the space beneath the device. Such residues may otherwise become conductive and effectively offer a lossy bypass to the device. Various recommended cleaning conditions (which must be optimized for the flux system being used) are as follows:

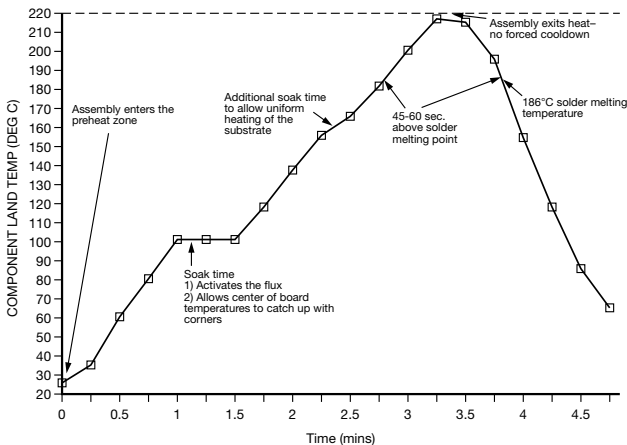
- Cleaning liquids. i-propanol, ethanol, acetylacetone, water and other standard PCB cleaning liquids.
- Ultrasonic conditions . . . power-20w/liter max. frequency-20kHz to 45kHz.
- Temperature 80°C maximum (if not otherwise limited by chosen solvent system).
- Time 5 minutes max.

STORAGE CONDITIONS

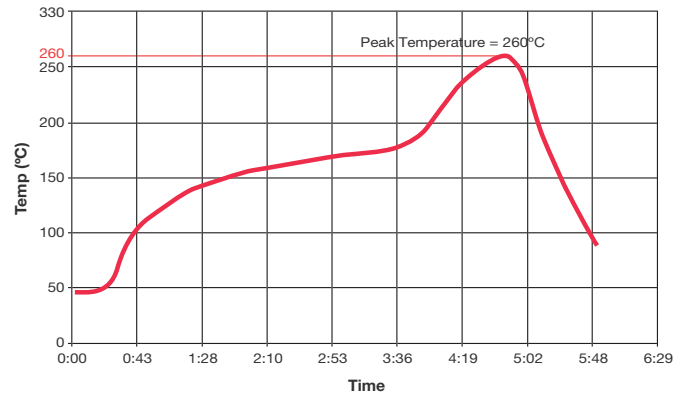
Recommended storage conditions for Accu-P® prior to use are as follows:

- Temperature 15°C to 35°C
- Humidity ≤65%
- Air Pressure 860mbar to 1060mbar

RECOMMENDED REFLOW SOLDERING PROFILE COMPONENTS WITH SnPb TERMINATIONS



RECOMMENDED REFLOW SOLDERING PROFILE COMPONENTS WITH LEAD FREE Sn100 TERMINATIONS



TAPE & REEL

All tape and reel specifications are in compliance with EIA 481-1-A.
(equivalent to IEC 286 part 3).

- 8mm carrier
- Reeled quantities: Reels of 3,000 per 7" reel or 10,000 pieces per 13" reel
01005, 0201 and 0402 = 5,000 pieces per 7" reel and 20,000 pieces per 13" reel

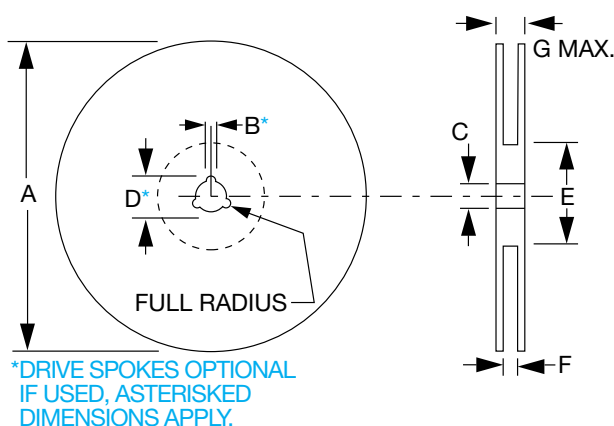
REEL

DIMENSIONS: millimeters (inches)

A ⁽¹⁾	B	C	D	E	F	G
180±1.0 (7.087±0.039)	1.5 min. (0.059 min.)	13±0.2 (0.512 ± 0.008)	20.2 min. (0.795 min.)	50 min. (1.969 min.)	9.6±1.5 (0.370 ± 0.050)	14.4 max. (0.567 max.)

Metric dimensions will govern.
Inch measurements rounded and for reference only.

(1) 330mm (13 inch) reels are available.

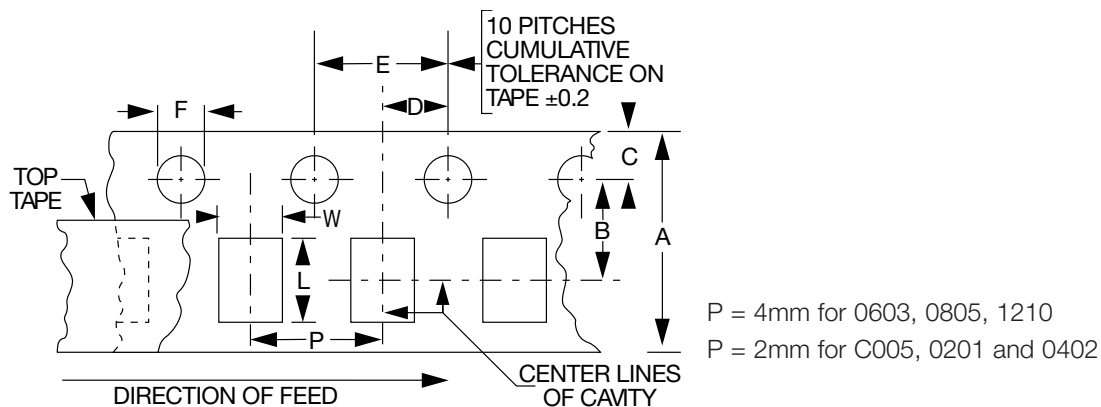


CARRIER

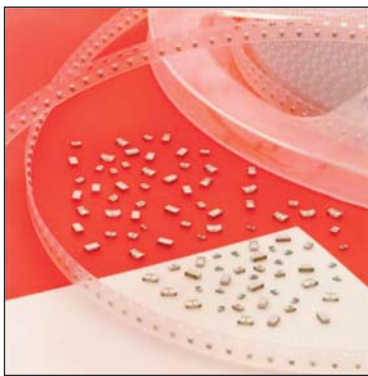
DIMENSIONS: millimeters (inches)

A	B	C	D	E	F
8.0 ± 0.3 (0.315 ± 0.012)	3.5 ± 0.05 (0.138 ± 0.002)	1.75±0.1 (0.069 ± 0.004)	2.0 ± 0.05 (0.079 ± 0.002)	4.0 ± 0.1 (0.157 ± 0.004)	1.5 ^{+0.1} _{-0.0} (0.059 ^{+0.004} _{-0.000})

The nominal dimensions of the component compartment (W,L) are derived from the component size.



AVX reserves the right to change the information published herein without notice.



These ranges of surface mount Thin Film RF capacitors provide DLA approved parts in 0402, 0603, 0805, and 1210 case sizes.

- DLA 09024 covers 0402 case sizes
- DLA 09025 covers 0603 case sizes
- DLA 09026 covers 0805 case sizes
- DLA 09027 covers 1210 case sizes

HOW TO ORDER

09024	BP	100	B	J	U	-
Case Size 09024 = 0402 09025 = 0603 09026 = 0805 09027 = 1210	Voltage Temperature Limits BP = 0 ± 30ppm/°C with rated Voltage from: -55°C to +125°C BH = 0 ± 60ppm/°C with rated Voltage from: -55°C to +125°C	Capacitance EIA Capacitance Code in pF First Two Digits = significant figures or "R" for decimal place. Third Digit = number of zeros or after "R" significant figures	Rated Voltage X = 10V Y = 16V Z = 25V A = 50V B = 100V	Capacitance Tolerance A = ±0.05pF B = ±0.1pF C = ±0.25pF D = ±0.5pF F = ±1% G = ±2% J = ±5% P = ±0.02pF Q = ±0.03pF X = ±0.015pF Z = ±0.01pF	Termination Finish U = Solder Coated Tin/Lead Alloy (4% Lead min) T = Solder Coated Tin/Silver Alloy (4% Silver min)	Options C = Full Group C L = 2000 Hour Life M = 1000 Hour Life H = Low Voltage Humidity N/A = No Group C Testing

Not RoHS Compliant

DLA 09024 RF CAPACITOR 0402 CASE SIZE

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC	Termination Finish
DLA 09024	BP	0.05 - 1.0	A,B,C,P,Q,X,Z	10 to 100	U
DLA 09024	BP	1.1 - 1.5	A,B,C,P,Q,X	10 to 100	U
DLA 09024	BP	1.6 - 1.8	A,B,C,P,Q	10 to 100	U
DLA 09024	BP	1.9 - 2.0	A,B,C,P,Q	10 to 50	U
DLA 09024	BP	2.1 - 3.0	A,B,C,Q	10 to 50	U
DLA 09024	BP	3.1 - 5.6	A,B,C	10 to 50	U
DLA 09024	BP	6.2 - 8.2	B,C,D	10 to 50	U
DLA 09024	BP	9.1	B,C,D	10 to 25	U
DLA 09024	BP	10 - 12	F,G,J	10 to 25	U
DLA 09024	BH	13 - 21	F,G,J	10 to 25	U
DLA 09024	BH	22 - 33	F,G,J	10 to 16	U
DLA 09024	BH	39 - 68	F,G,J	10	U

DLA 09026 RF CAPACITOR 0805 CASE SIZE

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC	Termination Finish
DLA 09026	BP	0.1 - 1.0	A,B,C,P,Q,X,Z	10 to 100	T
DLA 09026	BP	1.2 - 1.5	A,B,C,P,Q,X	10 to 100	T
DLA 09026	BP	1.8	A,B,C,P,Q	10 to 100	T
DLA 09026	BP	2.2 - 3.0	A,B,C,Q	10 to 100	T
DLA 09026	BP	3.3 - 5.6	A,B,C	10 to 100	T
DLA 09026	BP	6.8 - 9.1	B,C,D	10 to 100	T
DLA 09026	BP	10	F,G,J	10 to 100	T
DLA 09026	BP	11 - 33	F,G,J	10 to 50	T
DLA 09026	BH	39 - 56	F,G,J	10 to 50	T
DLA 09026	BH	68 - 100	F,G,J	10 to 25	T

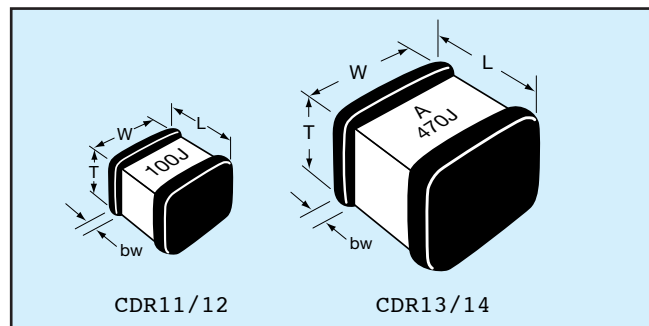
DLA 09025 RF CAPACITOR 0603 CASE SIZE

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC	Termination Finish
DLA 09025	BP	0.05 - 1.0	A,B,C,P,Q,X,Z	10 to 100	U
DLA 09025	BP	1.1 - 1.5	A,B,C,P,Q,X	10 to 100	U
DLA 09025	BP	1.6 - 2.0	A,B,C,P,Q	10 to 100	U
DLA 09025	BP	2.2 - 3.0	A,B,C,Q	10 to 100	U
DLA 09025	BP	3.3 - 4.3	A,B,C	10 to 100	U
DLA 09025	BP	4.7 - 5.6	A,B,C	10 to 50	U
DLA 09025	BP	6.2 - 9.1	B,C,D	10 to 50	U
DLA 09025	BP	10 - 18	F,G,J	10 to 50	U
DLA 09025	BP	22 - 24	F,G,J	10 to 25	U
DLA 09025	BH	27 - 47	F,G,J	10 to 25	U
DLA 09025	BH	56 - 68	F,G,J	10 to 16	U

DLA 09027 RF CAPACITOR 1210 CASE SIZE

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC	Termination Finish
DLA 09027	BP	0.1 - 1.0	A,B,C,P,Q,X,Z	10 to 100	T
DLA 09027	BP	1.2 - 1.5	A,B,C,P,Q,X	10 to 100	T
DLA 09027	BP	1.8	A,B,C,P,Q	10 to 100	T
DLA 09027	BP	2.2 - 3.0	A,B,C,Q	10 to 100	T
DLA 09027	BP	3.3 - 5.6	A,B,C	10 to 100	T
DLA 09027	BP	6.8 - 9.1	B,C,D	10 to 100	T
DLA 09027	BP	10 - 11	F,G,J	10 to 100	T
DLA 09027	BH	12 - 15	F,G,J	10 to 100	T
DLA 09027	BP	18 - 30	F,G,J	10 to 100	T
DLA 09027	BH	33 - 47	F,G,J	10 to 100	T
DLA 09027	BH	56 - 100	F,G,J	10 to 50	T

MILITARY DESIGNATION PER MIL-PRF-55681



CROSS REFERENCE: AVX/MIL-PRF-55681

Per MIL-C-55681	AVX Style	Length (L)	Width (W)	Thickness (T)		Termination Band (bw)	
				Max	Min	Max	Min
CDR11	AQ11	.055±.015 (1.40±.381)	.055±.015 (1.40±.381)	.057 (1.45)	.020 (.508)	.020 (.508)	.005 (.127)
CDR12	AQ12	.055±.025 (1.40±.635)	.055±.015 (1.40±.381)	.057 (1.45)	.020 (.508)	.020 (.508)	.005 (.127)
CDR13	AQ13	.110±.020 (2.79±.508)	.110±.020 (2.79±.508)	.102 (2.59)	.030 (.762)	.025 (.635)	.005 (.127)
CDR14	AQ14	.110 +.035 -0.020 (2.79 +.889 -.508)	.110±.020 (2.79±.508)	.102 (2.59)	.030 (.762)	.025 (.635)	.005 (.127)

HOW TO ORDER

<p>CDR12</p> <hr style="width: 20px; margin: 0 auto;"/> <p>MIL Style CDR11, CDR12, CDR13, CDR14</p>	<p>BG</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Voltage Temperature Limits BG = +90±20 ppm/°C with and without rated voltage from -55°C to +125°C BP = 0±30ppm/°C with and without rated voltage from -55°C to +125°C</p>	<p>101</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Capacitance EIA Capacitance Code in pF. First two digits = significant figures or "R" for decimal place. Third digit = number of zeros or after "R" significant figures.</p>	<p>A</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Rated Voltage Code A = 50V B = 100V C = 200V D = 300V E = 500V</p>	<p>K</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Capacitance Tolerance Code B = ±.1 pF C = ±.25 pF D = ±.5 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%</p>	<p>U</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Termination Finish (Military Designations) Code M = Palladium silver N = Silver-nickel-gold S = Solder coated final with a minimum of 4 percent lead T = Silver U = Base metallization-barrier metal-solder coated (tin/lead alloy, with a minimum of 4 percent lead) W = Base metallization-barrier metal-tinned (tin or tin/lead alloy) Y = Base metallization-barrier metal-tin (100 percent) Z = Base metallization-barrier metal-tinned (tin/lead alloy, with a minimum of 4 percent lead) *See MIL-PRF-55681 Specification for more details</p>	<p>S</p> <hr style="width: 20px; margin: 0 auto;"/> <p>Failure Rate Level M = 1.0% P = .1% R = .01% S = .001%</p>
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PACKAGING

Standard Packaging Quantity
CDR11-12 = 100 pcs per waffle pack
CDR13-14 = 80 pcs per waffle pack

TAPE & REEL: All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

Sizes SQCA through SQCB, CDR11/12 through 13/14.
—8mm carrier
—7" reel: ≤0.040" thickness = 2000 pcs
 ≤0.075" thickness = 2000 pcs
—13" reel: ≤0.075" thickness = 10,000 pcs

Not RoHS Compliant



For RoHS compliant products, please select correct termination style.

TABLE I: STYLES CDR11 AND CDR12 CAPACITOR CHARACTERISTICS

Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and V/Temperature	WVDC
CDR1 -B-0R1AB--	0.1	B	BG, BP	50
CDR1 -B-0R2AB--	0.2	B	BG, BP	50
CDR1 -B-0R3A---	0.3	B, C	BG, BP	50
CDR1 -B-0R4A---	0.4	B, C	BG, BP	50
CDR1 -B-0R5A---	0.5	B, C, D	BG, BP	50
CDR1 -B-0R6A---	0.6	B, C, D	BG, BP	50
CDR1 -B-0R7A---	0.7	B, C, D	BG, BP	50
CDR1 -B-0R8A---	0.8	B, C, D	BG, BP	50
CDR1 -B-0R9A---	0.9	B, C, D	BG, BP	50
CDR1 -B-1R0A---	1.0	B, C, D	BG, BP	50
CDR1 -B-1R1A---	1.1	B, C, D	BG, BP	50
CDR1 -B-1R2A---	1.2	B, C, D	BG, BP	50
CDR1 -B-1R3A---	1.3	B, C, D	BG, BP	50
CDR1 -B-1R4A---	1.4	B, C, D	BG, BP	50
CDR1 -B-1R5A---	1.5	B, C, D	BG, BP	50
CDR1 -B-1R6A---	1.6	B, C, D	BG, BP	50
CDR1 -B-1R7A---	1.7	B, C, D	BG, BP	50
CDR1 -B-1R8A---	1.8	B, C, D	BG, BP	50
CDR1 -B-1R9A---	1.9	B, C, D	BG, BP	50
CDR1 -B-2R0A---	2.0	B, C, D	BG, BP	50
CDR1 -B-2R1A---	2.1	B, C, D	BG, BP	50
CDR1 -B-2R2A---	2.2	B, C, D	BG, BP	50
CDR1 -B-2R4A---	2.4	B, C, D	BG, BP	50
CDR1 -B-2R7A---	2.7	B, C, D	BG, BP	50
CDR1 -B-3R0A---	3.0	B, C, D	BG, BP	50
CDR1 -B-3R3A---	3.3	B, C, D	BG, BP	50
CDR1 -B-3R6A---	3.6	B, C, D	BG, BP	50
CDR1 -B-3R9A---	3.9	B, C, D	BG, BP	50
CDR1 -B-4R3A---	4.3	B, C, D	BG, BP	50
CDR1 -B-4R7A---	4.7	B, C, D	BG, BP	50
CDR1 -B-5R1A---	5.1	B, C, D	BG, BP	50
CDR1 -B-5R6A---	5.6	B, C, D	BG, BP	50
CDR1 -B-6R2A---	6.2	B, C, D	BG, BP	50
CDR1 -B-6R8A---	6.8	B, C, J, K, M	BG, BP	50
CDR1 -B-7R5A---	7.5	B, C, J, K, M	BG, BP	50
CDR1 -B-8R2A---	8.2	B, C, J, K, M	BG, BP	50
CDR1 -B-9R1A---	9.1	B, C, J, K, M	BG, BP	50
CDR1 -B-100A---	10	F, G, J, K, M	BG, BP	50
CDR1 -B-110A---	11	F, G, J, K, M	BG, BP	50
CDR1 -B-120A---	12	F, G, J, K, M	BG, BP	50
CDR1 -B-130A---	13	F, G, J, K, M	BG, BP	50
CDR1 -B-150A---	15	F, G, J, K, M	BG, BP	50
CDR1 -B-160A---	16	F, G, J, K, M	BG, BP	50
CDR1 -B-180A---	18	F, G, J, K, M	BG, BP	50
CDR1 -B-200A---	20	F, G, J, K, M	BG, BP	50
CDR1 -B-220A---	22	F, G, J, K, M	BG, BP	50
CDR1 -B-240A---	24	F, G, J, K, M	BG, BP	50
CDR1 -B-270A---	27	F, G, J, K, M	BG, BP	50

Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and V/Temperature	WVDC
CDR1 -B-300A---	30	F, G, J, K, M	BG, BP	50
CDR1 -B-330A---	33	F, G, J, K, M	BG, BP	50
CDR1 -B-360A---	36	F, G, J, K, M	BG, BP	50
CDR1 -B-390A---	39	F, G, J, K, M	BG, BP	50
CDR1 -B-430A---	43	F, G, J, K, M	BG, BP	50
CDR1 -B-470A---	47	F, G, J, K, M	BG, BP	50
CDR1 -B-510A---	51	F, G, J, K, M	BG, BP	50
CDR1 -B-560A---	56	F, G, J, K, M	BG, BP	50
CDR1 -B-620A---	62	F, G, J, K, M	BG, BP	50
CDR1 -B-680A---	68	F, G, J, K, M	BG, BP	50
CDR1 -B-750A---	75	F, G, J, K, M	BG, BP	50
CDR1 -B-820A---	82	F, G, J, K, M	BG, BP	50
CDR1 -B-910A---	91	F, G, J, K, M	BG, BP	50
CDR1 -B-101A---	100	F, G, J, K, M	BG, BP	50
CDR1 -B-111A---	110	F, G, J, K, M	BP	50
CDR1 -B-121A---	120	F, G, J, K, M	BP	50
CDR1 -B-131A---	130	F, G, J, K, M	BP	50
CDR1 -B-151A---	150	F, G, J, K, M	BP	50
CDR1 -B-161A---	160	F, G, J, K, M	BP	50
CDR1 -B-181A---	180	F, G, J, K, M	BP	50
CDR1 -B-201A---	200	F, G, J, K, M	BP	50
CDR1 -B-221A---	220	F, G, J, K, M	BP	50
CDR1 -B-241A---	240	F, G, J, K, M	BP	50
CDR1 -B-271A---	270	F, G, J, K, M	BP	50
CDR1 -B-301A---	300	F, G, J, K, M	BP	50
CDR1 -B-331A---	330	F, G, J, K, M	BP	50
CDR1 -B-361A---	360	F, G, J, K, M	BP	50
CDR1 -B-391A---	390	F, G, J, K, M	BP	50
CDR1 -B-431A---	430	F, G, J, K, M	BP	50
CDR1 -B-471A---	470	F, G, J, K, M	BP	50
CDR1 -B-511A---	510	F, G, J, K, M	BP	50
CDR1 -B-561A---	560	F, G, J, K, M	BP	50
CDR1 -B-621A---	620	F, G, J, K, M	BP	50
CDR1 -B-681A---	680	F, G, J, K, M	BP	50
CDR1 -B-751A---	750	F, G, J, K, M	BP	50
CDR1 -B-821A---	820	F, G, J, K, M	BP	50
CDR1 -B-911A---	910	F, G, J, K, M	BP	50
CDR1 -B-102A---	1000	F, G, J, K, M	BP	50

1/Complete type designation will include additional symbols to indicate style, voltage-temperature limits, capacitance tolerance (where applicable), termination finish ("M" or "N" for style CDR11, and "S", "U", "W", "Y" or "Z" for style CDR12) and failure rate level.

TABLE II: STYLES CDR13 AND CDR14 CAPACITOR CHARACTERISTICS

Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and V/Temperature	WVDC
CDR1 -B-0R1*B--	0.1	B	BG, BP	200/500
CDR1 -B-0R2*B--	0.2	B	BG, BP	200/500
CDR1 -B-0R3*---	0.3	B, C	BG, BP	200/500
CDR1 -B-0R4*---	0.4	B, C	BG, BP	200/500
CDR1 -B-0R5*---	0.5	B, C, D	BG, BP	200/500
CDR1 -B-0R6*---	0.6	B, C, D	BG, BP	200/500
CDR1 -B-0R7*---	0.7	B, C, D	BG, BP	200/500
CDR1 -B-0R8*---	0.8	B, C, D	BG, BP	200/500
CDR1 -B-0R9*---	0.9	B, C, D	BG, BP	200/500
CDR1 -B-1R0*---	1.0	B, C, D	BG, BP	200/500
CDR1 -B-1R1*---	1.1	B, C, D	BG, BP	200/500
CDR1 -B-1R2*---	1.2	B, C, D	BG, BP	200/500
CDR1 -B-1R3*---	1.3	B, C, D	BG, BP	200/500
CDR1 -B-1R4*---	1.4	B, C, D	BG, BP	200/500
CDR1 -B-1R5*---	1.5	B, C, D	BG, BP	200/500
CDR1 -B-1R6*---	1.6	B, C, D	BG, BP	200/500
CDR1 -B-1R7*---	1.7	B, C, D	BG, BP	200/500
CDR1 -B-1R8*---	1.8	B, C, D	BG, BP	200/500
CDR1 -B-1R9*---	1.9	B, C, D	BG, BP	200/500
CDR1 -B-2R0*---	2.0	B, C, D	BG, BP	200/500
CDR1 -B-2R1*---	2.1	B, C, D	BG, BP	200/500
CDR1 -B-2R2*---	2.2	B, C, D	BG, BP	200/500
CDR1 -B-2R4*---	2.4	B, C, D	BG, BP	200/500
CDR1 -B-2R7*---	2.7	B, C, D	BG, BP	200/500
CDR1 -B-3R0*---	3.0	B, C, D	BG, BP	200/500
CDR1 -B-3R3*---	3.3	B, C, D	BG, BP	200/500
CDR1 -B-3R6*---	3.6	B, C, D	BG, BP	200/500
CDR1 -B-3R9*---	3.9	B, C, D	BG, BP	200/500
CDR1 -B-4R3*---	4.3	B, C, D	BG, BP	200/500
CDR1 -B-4R7*---	4.7	B, C, D	BG, BP	200/500
CDR1 -B-5R1*---	5.1	B, C, D	BG, BP	200/500
CDR1 -B-5R6*---	5.6	B, C, D	BG, BP	200/500
CDR1 -B-6R2*---	6.2	B, C, D	BG, BP	200/500
CDR1 -B-6R8*---	6.8	B, C, J, K, M	BG, BP	200/500
CDR1 -B-7R5*---	7.5	B, C, J, K, M	BG, BP	200/500
CDR1 -B-8R2*---	8.2	B, C, J, K, M	BG, BP	200/500
CDR1 -B-9R1*---	9.1	B, C, J, K, M	BG, BP	200/500
CDR1 -B-100*---	10	F, G, J, K, M	BG, BP	200/500
CDR1 -B-110*---	11	F, G, J, K, M	BG, BP	200/500
CDR1 -B-120*---	12	F, G, J, K, M	BG, BP	200/500
CDR1 -B-130*---	13	F, G, J, K, M	BG, BP	200/500
CDR1 -B-150*---	15	F, G, J, K, M	BG, BP	200/500
CDR1 -B-160*---	16	F, G, J, K, M	BG, BP	200/500
CDR1 -B-180*---	18	F, G, J, K, M	BG, BP	200/500
CDR1 -B-200*---	20	F, G, J, K, M	BG, BP	200/500
CDR1 -B-220*---	22	F, G, J, K, M	BG, BP	200/500
CDR1 -B-240*---	24	F, G, J, K, M	BG, BP	200/500
CDR1 -B-270*---	27	F, G, J, K, M	BG, BP	200/500
CDR1 -B-300*---	30	F, G, J, K, M	BG, BP	200/500
CDR1 -B-330*---	33	F, G, J, K, M	BG, BP	200/500
CDR1 -B-360*---	36	F, G, J, K, M	BG, BP	200/500
CDR1 -B-390*---	39	F, G, J, K, M	BG, BP	200/500
CDR1 -B-430*---	43	F, G, J, K, M	BG, BP	200/500
CDR1 -B-470*---	47	F, G, J, K, M	BG, BP	200/500
CDR1 -B-510*---	51	F, G, J, K, M	BG, BP	200/500

Type Designation 1/	Capacitance in pF	Capacitance tolerance	Rated temperature and V/Temperature	WVDC
CDR1 -B-560*---	56	F, G, J, K, M	BG, BP	200/500
CDR1 -B-620*---	62	F, G, J, K, M	BG, BP	200/500
CDR1 -B-680*---	68	F, G, J, K, M	BG, BP	200/500
CDR1 -B-750*---	75	F, G, J, K, M	BG, BP	200/500
CDR1 -B-820*---	82	F, G, J, K, M	BG, BP	200/500
CDR1 -B-910*---	91	F, G, J, K, M	BG, BP	200/500
CDR1 -B-101*---	100	F, G, J, K, M	BG, BP	200/500
CDR1 -B-111*---	110	F, G, J, K, M	BG, BP	200/300
CDR1 -B-121*---	120	F, G, J, K, M	BG, BP	200/300
CDR1 -B-131*---	130	F, G, J, K, M	BG, BP	200/300
CDR1 -B-151*---	150	F, G, J, K, M	BG, BP	200/300
CDR1 -B-161*---	160	F, G, J, K, M	BG, BP	200/300
CDR1 -B-181*---	180	F, G, J, K, M	BG, BP	200/300
CDR1 -B-201*---	200	F, G, J, K, M	BG, BP	200/300
CDR1 -B-221C---	220	F, G, J, K, M	BG, BP	200
CDR1 -B-241C---	240	F, G, J, K, M	BG, BP	200
CDR1 -B-271C---	270	F, G, J, K, M	BG, BP	200
CDR1 -B-301C---	300	F, G, J, K, M	BG, BP	200
CDR1 -B-331C---	330	F, G, J, K, M	BG, BP	200
CDR1 -B-361C---	360	F, G, J, K, M	BG, BP	200
CDR1 -B-391C---	390	F, G, J, K, M	BG, BP	200
CDR1 -B-431C---	430	F, G, J, K, M	BG, BP	200
CDR1 -B-471C---	470	F, G, J, K, M	BG, BP	200
CDR1 -B-511B---	510	F, G, J, K, M	BG, BP	100
CDR1 -B-561B---	560	F, G, J, K, M	BG, BP	100
CDR1 -B-621B---	620	F, G, J, K, M	BG, BP	100
CDR1 -B-681A---	680	F, G, J, K, M	BG, BP	50
CDR1 -B-751A---	750	F, G, J, K, M	BG, BP	50
CDR1 -B-821A---	820	F, G, J, K, M	BG, BP	50
CDR1 -B-911A---	910	F, G, J, K, M	BG, BP	50
CDR1 -B-102A---	1000	F, G, J, K, M	BG, BP	50
CDR1 -B-112A---	1100	F, G, J, K, M	BP	50
CDR1 -B-122A---	1200	F, G, J, K, M	BP	50
CDR1 -B-132A---	1300	F, G, J, K, M	BP	50
CDR1 -B-152A---	1500	F, G, J, K, M	BP	50
CDR1 -B-162A---	1600	F, G, J, K, M	BP	50
CDR1 -B-182A---	1800	F, G, J, K, M	BP	50
CDR1 -B-202A---	2000	F, G, J, K, M	BP	50
CDR1 -B-222A---	2200	F, G, J, K, M	BP	50
CDR1 -B-242A---	2400	F, G, J, K, M	BP	50
CDR1 -B-272A---	2700	F, G, J, K, M	BP	50
CDR1 -B-302A---	3000	F, G, J, K, M	BP	50
CDR1 -B-332A---	3300	F, G, J, K, M	BP	50
CDR1 -B-362A---	3600	F, G, J, K, M	BP	50
CDR1 -B-392A---	3900	F, G, J, K, M	BP	50
CDR1 -B-432A---	4300	F, G, J, K, M	BP	50
CDR1 -B-472A---	4700	F, G, J, K, M	BP	50
CDR1 -B-502A---	5000	F, G, J, K, M	BP	50
CDR1 -B-512A---	5100	F, G, J, K, M	BP	50

1/Complete type designation will include additional symbols to indicate style, voltage-temperature limits, capacitance tolerance (where applicable), termination finish ("M" or "N" for style CDR13, and "S", "U", "W", "Y" or "Z" for style CDR14) and failure rate level.

*C=200V; E=500V.

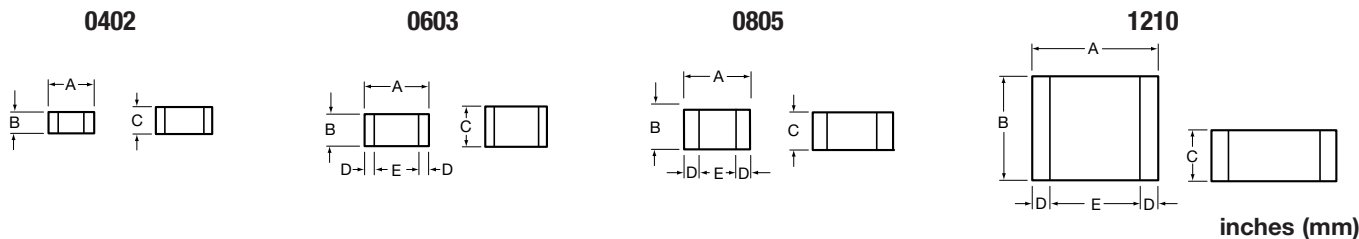
±C=200V; D=300V.

GENERAL INFORMATION

"U" Series capacitors are COG (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance

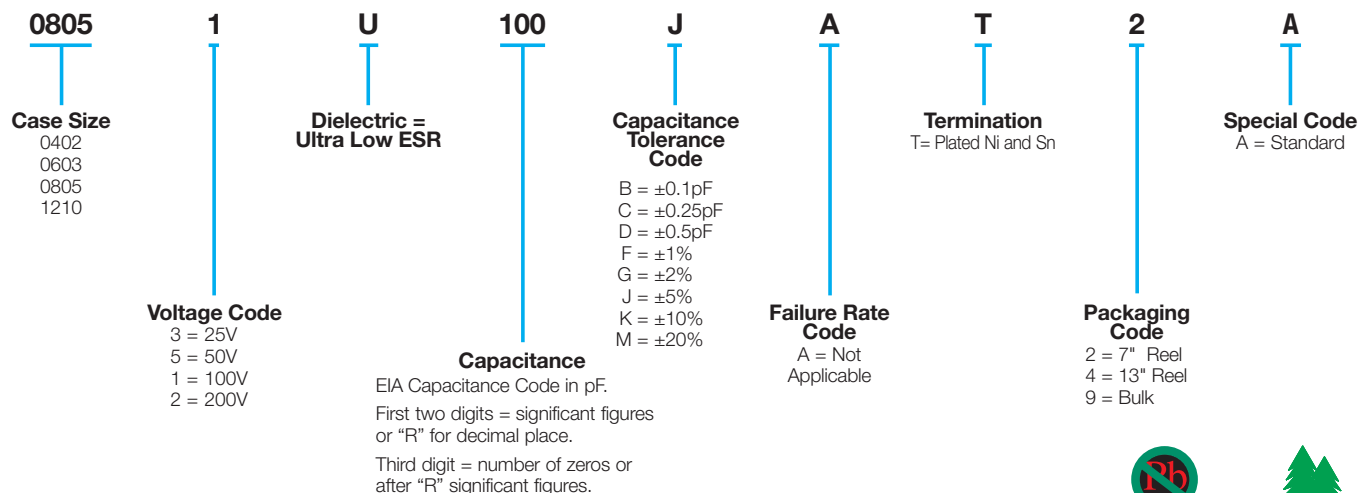
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

DIMENSIONS: inches (millimeters)



Size	A	B	C	D	E
0402	0.039±0.004 (1.00±0.1)	0.020±0.004 (0.50±0.1)	0.024 (0.6) max	N/A	N/A
0603	0.060±0.010 (1.52±0.25)	0.030±0.010 (0.76±0.25)	0.036 (0.91) max	0.010±0.005 (0.25±0.13)	0.030 (0.76) min
0805	0.079±0.008 (2.01±0.2)	0.049±0.008 (1.25±0.2)	0.040±0.005 (1.02±0.127)	0.020±0.010 (0.51±0.254)	0.020 (0.51) min
1210	0.126±0.008 (3.2±0.2)	0.098±0.008 (2.49±0.2)	0.050±0.005 (1.27±0.127)	0.025±0.015 (0.635±0.381)	0.040 (1.02) min

HOW TO ORDER



ELECTRICAL CHARACTERISTICS

Capacitance Values and Tolerances:

- Size 0402 - 0.2 pF to 22 pF @ 1 MHz
- Size 0603 - 1.0 pF to 100 pF @ 1 MHz
- Size 0805 - 1.6 pF to 160 pF @ 1 MHz
- Size 1210 - 2.4 pF to 1000 pF @ 1 MHz

Temperature Coefficient of Capacitance (TC):

0±30 ppm/°C (-55° to +125°C)

Insulation Resistance (IR):

- 10¹² Ω min. @ 25°C and rated WVDC
- 10¹¹ Ω min. @ 125°C and rated WVDC

Working Voltage (WVDC):

- Size Working Voltage
- 0402 - 50, 25 WVDC
- 0603 - 200, 100, 50 WVDC
- 0805 - 200, 100 WVDC
- 1210 - 200, 100 WVDC

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

- 0402 - See Performance Curve, page 231
- 0603 - See Performance Curve, page 231
- 0805 - See Performance Curve, page 231
- 1210 - See Performance Curve, page 231

Marking: Laser marking EIA J marking standard (except 0603) (capacitance code and tolerance upon request).

MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681



CAPACITANCE RANGE

Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
0.2	B,C	50V	N/A	N/A	N/A
0.3	↓	↓	↓	↓	↓
0.4	B,C	↓	↓	↓	↓
0.5	B,C,D	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓
0.7	↓	↓	↓	↓	↓
0.8	B,C,D	↓	↓	↓	↓
0.9	B,C,D	↓	↓	↓	↓

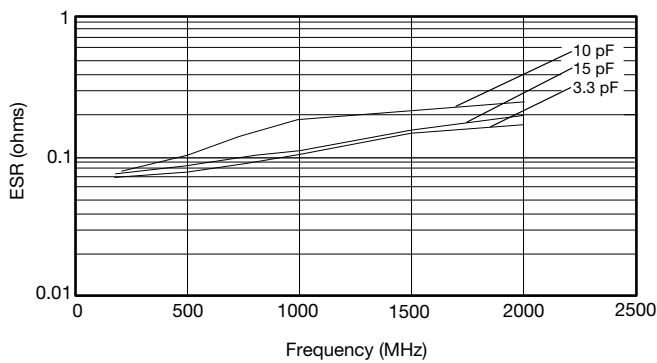
Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
1.0	B,C,D	50V	200V	200V	200V
1.1	↓	↓	↓	↓	↓
1.2	↓	↓	↓	↓	↓
1.3	↓	↓	↓	↓	↓
1.4	↓	↓	↓	↓	↓
1.5	↓	↓	↓	↓	↓
1.6	↓	↓	↓	↓	↓
1.7	↓	↓	↓	↓	↓
1.8	↓	↓	↓	↓	↓
1.9	↓	↓	↓	↓	↓
2.0	↓	↓	↓	↓	↓
2.1	↓	↓	↓	↓	↓
2.2	↓	↓	↓	↓	↓
2.4	↓	↓	↓	↓	↓
2.7	↓	↓	↓	↓	↓
3.0	↓	↓	↓	↓	↓
3.3	↓	↓	↓	↓	↓
3.6	↓	↓	↓	↓	↓
3.9	↓	↓	↓	↓	↓
4.3	↓	↓	↓	↓	↓
4.7	↓	↓	↓	↓	↓
5.1	↓	↓	↓	↓	↓
5.6	B,C,D	↓	↓	↓	↓
6.2	B,C,J,K,M	↓	↓	↓	↓
6.8	B,C,J,K,M	↓	↓	↓	↓

Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
7.5	B,C,J,K,M	50V	200V	200V	200V
8.2	↓	↓	↓	↓	↓
9.1	B,C,J,K,M	↓	↓	↓	↓
10	F,G,J,K,M	↓	↓	↓	↓
11	↓	↓	↓	↓	↓
12	↓	↓	↓	↓	↓
13	↓	↓	↓	↓	↓
15	↓	↓	↓	↓	↓
18	↓	↓	↓	↓	↓
20	↓	↓	↓	↓	↓
22	↓	↓	↓	↓	↓
24	↓	↓	↓	↓	↓
27	↓	↓	↓	↓	↓
30	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓
36	↓	↓	↓	↓	↓
39	↓	↓	↓	↓	↓
43	↓	↓	↓	↓	↓
47	↓	↓	↓	↓	↓
51	↓	↓	↓	↓	↓
56	↓	↓	↓	↓	↓
68	↓	↓	↓	↓	↓
75	↓	↓	↓	↓	↓
82	↓	↓	↓	↓	↓
91	↓	↓	↓	↓	↓

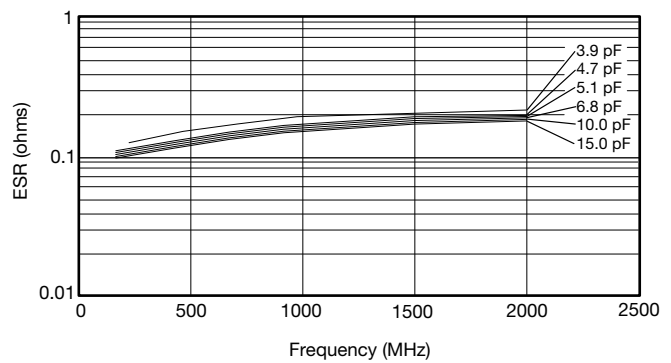
Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓	↓	↓	↓	↓
120	↓	↓	↓	↓	↓
130	↓	↓	↓	↓	↓
140	↓	↓	↓	↓	↓
150	↓	↓	↓	↓	↓
160	↓	↓	↓	↓	↓
180	↓	↓	↓	↓	↓
200	↓	↓	↓	↓	↓
220	↓	↓	↓	↓	↓
270	↓	↓	↓	↓	↓
300	↓	↓	↓	↓	↓
330	↓	↓	↓	↓	↓
360	↓	↓	↓	↓	↓
390	↓	↓	↓	↓	↓
430	↓	↓	↓	↓	↓
470	↓	↓	↓	↓	↓
510	↓	↓	↓	↓	↓
560	↓	↓	↓	↓	↓
620	↓	↓	↓	↓	↓
680	↓	↓	↓	↓	↓
750	↓	↓	↓	↓	↓
820	↓	↓	↓	↓	↓
910	↓	↓	↓	↓	↓
1000	F,G,J,K,M	↓	↓	↓	↓

ULTRA LOW ESR, "U" SERIES

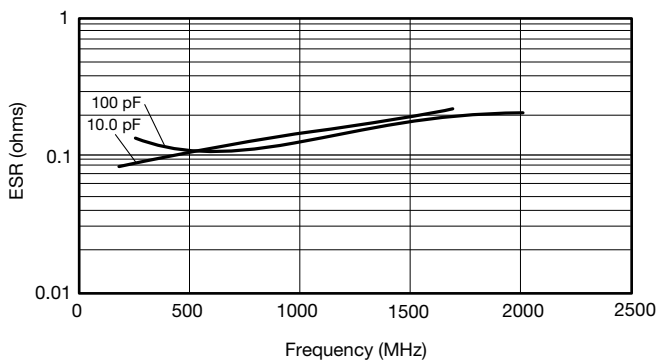
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



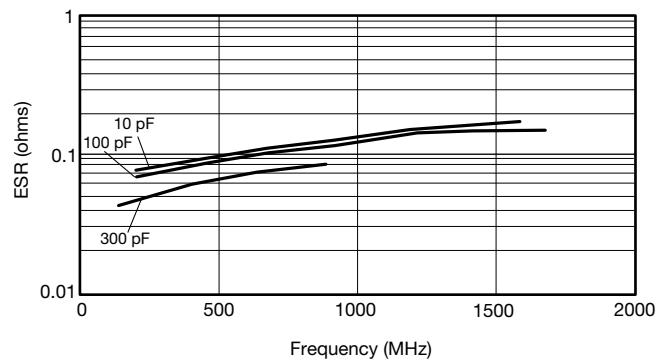
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



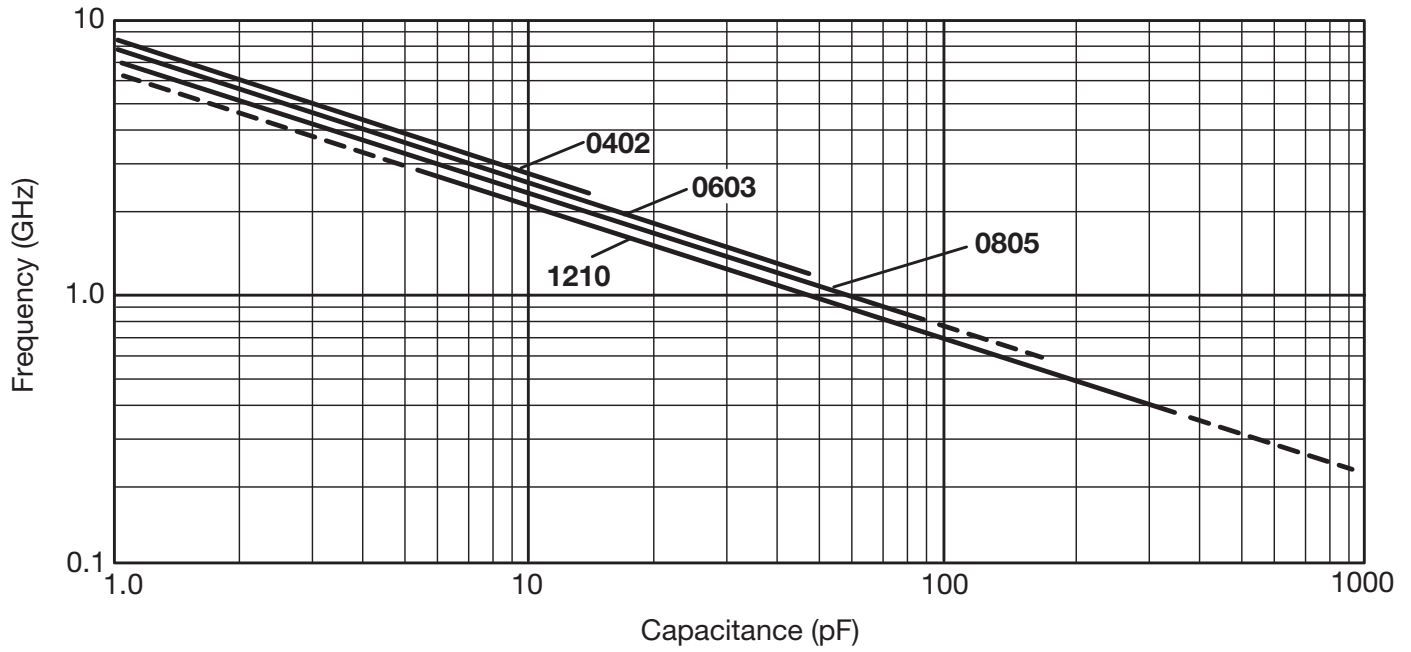
TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



**TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP**

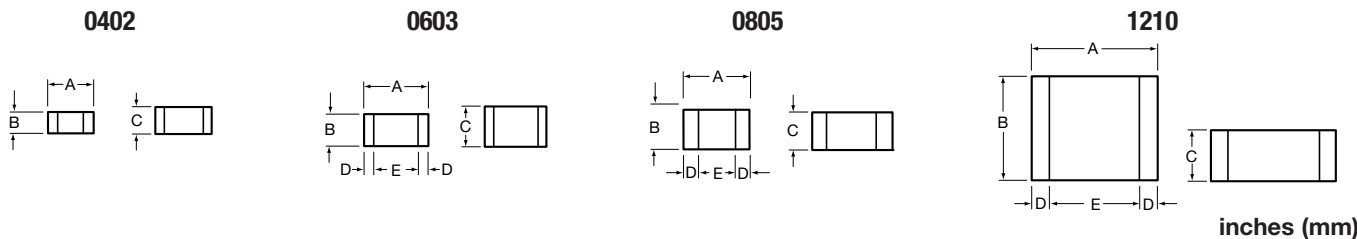


GENERAL INFORMATION

"U" Series capacitors are COG (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance

are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

DIMENSIONS: inches (millimeters)



Size	A	B	C	D	E
0402	0.039±0.004 (1.00±0.1)	0.020±0.004 (0.50±0.1)	0.024 (0.6) max	N/A	N/A
0603	0.060±0.010 (1.52±0.25)	0.030±0.010 (0.76±0.25)	0.036 (0.91) max	0.010±0.005 (0.25±0.13)	0.030 (0.76) min
0805	0.079±0.008 (2.01±0.2)	0.049±0.008 (1.25±0.2)	0.040±0.005 (1.02±0.127)	0.020±0.010 (0.51±0.254)	0.020 (0.51) min
1210	0.126±0.008 (3.2±0.2)	0.098±0.008 (2.49±0.2)	0.050±0.005 (1.27±0.127)	0.025±0.015 (0.635±0.381)	0.040 (1.02) min

HOW TO ORDER

LD05 | **1** | **U** | **100** | **J** | **A** | **B** | **2** | **A**

- Case Size**
LD02 = 0402
LD03 = 0603
LD05 = 0805
LD10 = 1210
- Voltage Code**
3 = 25V
5 = 50V
1 = 100V
2 = 200V
- Dielectric = Ultra Low ESR**
- Capacitance**
EIA Capacitance Code in pF.
First two digits = significant figures or "R" for decimal place.
Third digit = number of zeros or after "R" significant figures.
- Capacitance Tolerance Code**
B = ±0.1pF
C = ±0.25pF
D = ±0.5pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%
M = ±20%
- Failure Rate Code**
A = Not Applicable
- Termination**
B = 5% min lead
- Packaging Code**
2 = 7" Reel
4 = 13" Reel
9 = Bulk
- Special Code**
A = Standard

Not RoHS Compliant

ELECTRICAL CHARACTERISTICS

Capacitance Values and Tolerances:

- Size 0402 - 0.2 pF to 22 pF @ 1 MHz
- Size 0603 - 1.0 pF to 100 pF @ 1 MHz
- Size 0805 - 1.6 pF to 160 pF @ 1 MHz
- Size 1210 - 2.4 pF to 1000 pF @ 1 MHz

Temperature Coefficient of Capacitance (TC):

0±30 ppm/°C (-55° to +125°C)

Insulation Resistance (IR):

- 10¹² Ω min. @ 25°C and rated WVDC
- 10¹¹ Ω min. @ 125°C and rated WVDC

Working Voltage (WVDC):

- Size Working Voltage
- 0402 - 50, 25 WVDC
- 0603 - 200, 100, 50 WVDC
- 0805 - 200, 100 WVDC
- 1210 - 200, 100 WVDC

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

- 0402 - See Performance Curve, page 237
- 0603 - See Performance Curve, page 237
- 0805 - See Performance Curve, page 237
- 1210 - See Performance Curve, page 237

Marking: Laser marking EIA J marking standard

(except 0603) (capacitance code and tolerance upon request).

MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681

Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
0.2	B,C	50V	N/A	N/A	N/A
0.3	↓ B,C	↓	↓	↓	↓
0.4		↓	↓	↓	↓
0.5	B,C	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓
0.7	↓ B,C,D	↓	↓	↓	↓
0.8		↓	↓	↓	↓
0.9	B,C,D	↓	↓	↓	↓

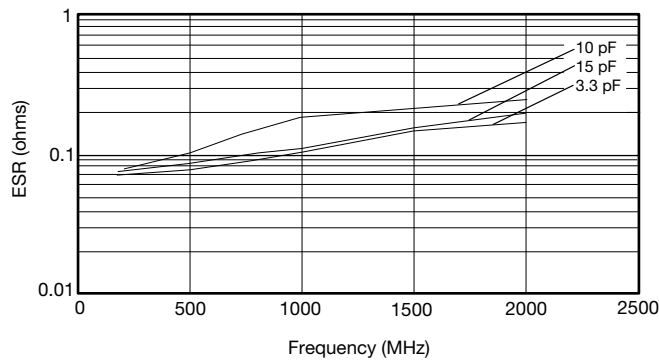
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1	↓	↓	↓	↓	↓
1.2		↓	↓	↓	↓
1.3	↓	↓	↓	↓	↓
1.4		↓	↓	↓	↓
1.5	↓	↓	↓	↓	↓
1.6		↓	↓	↓	↓
1.7	↓	↓	↓	↓	↓
1.8		↓	↓	↓	↓
1.9	↓	↓	↓	↓	↓
2.0		↓	↓	↓	↓
2.1	↓	↓	↓	↓	↓
2.2		↓	↓	↓	↓
2.4	↓	↓	↓	↓	↓
2.7		↓	↓	↓	↓
3.0	↓	↓	↓	↓	↓
3.3		↓	↓	↓	↓
3.6	↓	↓	↓	↓	↓
3.9		↓	↓	↓	↓
4.3	↓	↓	↓	↓	↓
4.7		↓	↓	↓	↓
5.1	↓	↓	↓	↓	↓
5.6		↓	↓	↓	↓
6.2	B,C,D	↓	↓	↓	↓
6.8	B,C,J,K,M	↓	↓	↓	↓

Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
7.5	B,C,J,K,M	50V	200V	200V	200V
8.2	↓	↓	↓	↓	↓
9.1		↓	↓	↓	↓
10	B,C,J,K,M	↓	↓	↓	↓
11	F,G,J,K,M	↓	↓	↓	↓
12	↓	↓	↓	↓	↓
13		↓	↓	↓	↓
15	↓	↓	↓	↓	↓
18		↓	↓	↓	↓
20	↓	↓	↓	↓	↓
22		↓	↓	↓	↓
24	↓	↓	↓	↓	↓
27		↓	↓	↓	↓
30	↓	↓	↓	↓	↓
33		↓	↓	↓	↓
36	↓	↓	↓	↓	↓
39		↓	↓	↓	↓
43	↓	↓	↓	↓	↓
47		↓	↓	↓	↓
51	↓	↓	↓	↓	↓
56		↓	↓	↓	↓
68	↓	↓	↓	↓	↓
75		↓	↓	↓	↓
82	↓	↓	↓	↓	↓
91		↓	↓	↓	↓

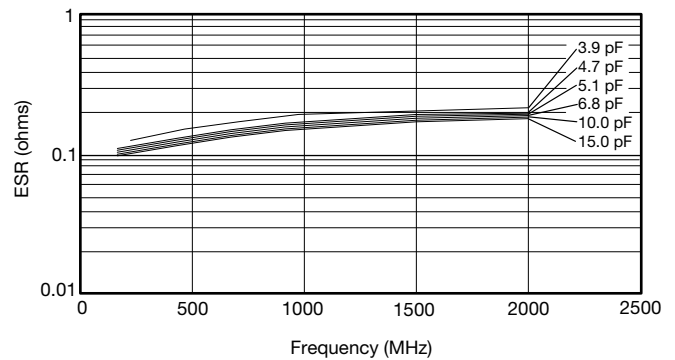
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓	↓	↓	↓	↓
120		↓	↓	↓	↓
130	↓	↓	↓	↓	↓
140		↓	↓	↓	↓
150	↓	↓	↓	↓	↓
160		↓	↓	↓	↓
180	↓	↓	↓	↓	↓
200		↓	↓	↓	↓
220	↓	↓	↓	↓	↓
270		↓	↓	↓	↓
300	↓	↓	↓	↓	↓
330		↓	↓	↓	↓
360	↓	↓	↓	↓	↓
390		↓	↓	↓	↓
430	↓	↓	↓	↓	↓
470		↓	↓	↓	↓
510	↓	↓	↓	↓	↓
560		↓	↓	↓	↓
620	↓	↓	↓	↓	↓
680		↓	↓	↓	↓
750	↓	↓	↓	↓	↓
820		↓	↓	↓	↓
910	↓	↓	↓	↓	↓
1000		F,G,J,K,M	↓	↓	↓

ULTRA LOW ESR, "U" SERIES

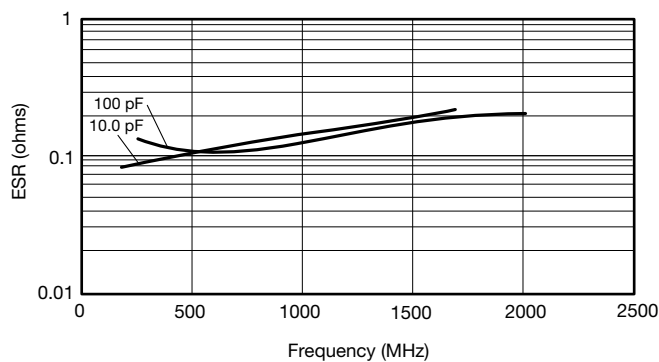
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



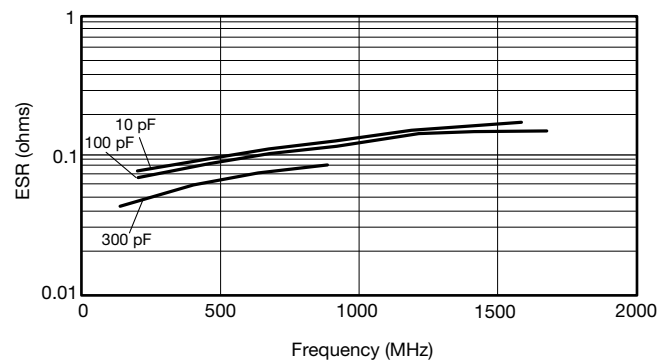
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



"U" SERIES

0402

Kit 5000 UZ			
Cap. Value pF	Tolerance	Cap. Value pF	Tolerance
0.5	B (± 0.1 pF)	4.7	B (± 0.1 pF)
1.0		5.6	
1.5		6.8	
1.8		8.2	
2.2		10.0	
2.4	J ($\pm 5\%$)	12.0	J ($\pm 5\%$)
3.0		15.0	
3.6			

***25 each of 15 values

0603

Kit 4000 UZ				
Cap. Value pF	Tolerance	Cap. Value pF	Tolerance	
1.0	B (± 0.1 pF)	6.8	B (± 0.1 pF)	
1.2		7.5		
1.5		8.2		
1.8		J ($\pm 5\%$)	10.0	J ($\pm 5\%$)
2.0			12.0	
2.4			15.0	
2.7			18.0	
3.0			22.0	
3.3			27.0	
3.9			33.0	
4.7			39.0	
5.6			47.0	

***25 each of 24 values

0805

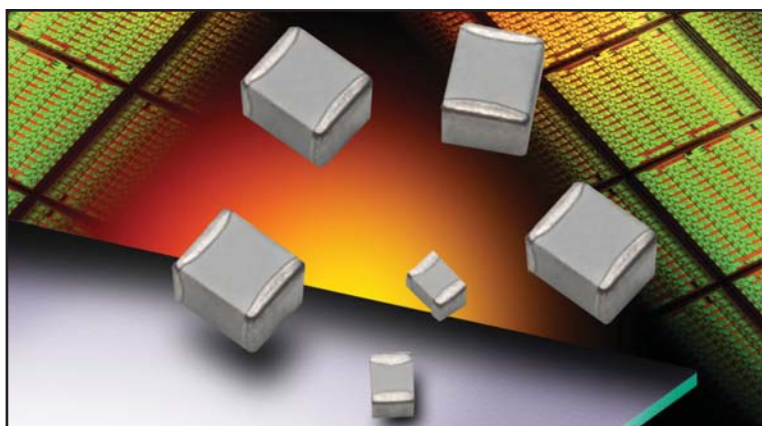
Kit 3000 UZ					
Cap. Value pF	Tolerance	Cap. Value pF	Tolerance		
1.0	B (± 0.1 pF)	15.0	J ($\pm 5\%$)		
1.5		18.0			
2.2		22.0			
2.4		24.0			
2.7		27.0			
3.0		33.0			
3.3		36.0			
3.9		39.0			
4.7		47.0			
5.6		56.0			
7.5		68.0			
8.2		82.0			
9.1		100.0			
10.0		J ($\pm 5\%$)		130.0	J ($\pm 5\%$)
12.0				160.0	

***25 each of 30 values

1210

Kit 3500 UZ			
Cap. Value pF	Tolerance	Cap. Value pF	Tolerance
2.2	B (± 0.1 pF)	36.0	J ($\pm 5\%$)
2.7		39.0	
4.7		47.0	
5.1		51.0	
6.8		56.0	
8.2		68.0	
9.1		82.0	
10.0	J ($\pm 5\%$)	100.0	J ($\pm 5\%$)
13.0		120.0	
15.0		130.0	
18.0		240.0	
20.0		300.0	
24.0		390.0	
27.0		470.0	
30.0		680.0	

***25 each of 30 values



FEATURES:

- Low ESR
- High Q
- High Self Resonance
- Capacitance Range 0.1 pF to 5100 pF
- 175°C Capability SQCB

APPLICATIONS:

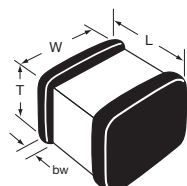
- RF Power Amplifiers
- Low Noise Amplifiers
- Filter Networks
- MRI Systems

HOW TO ORDER

<p>SQ</p> <p>AVX Style</p>	<p>CA</p> <p>Case Size CA = 0605 CB = 1210</p> <p>See mechanical dimensions below</p>	<p>7</p> <p>Voltage Code</p> <p>5 = 50V 1 = 100V E = 150V 2 = 200V V = 250V 9 = 300V 7 = 500V</p>	<p>M</p> <p>Temperature Coefficient Code</p> <p>M = +90±20ppm/°C A = 0±30ppm/°C C = 15% ("J" Termination only)</p>	<p>100</p> <p>Capacitance</p> <p>EIA Capacitance Code in pF. First two digits = significant figures or "R" for decimal place. Third digit = number of zeros or after "R" significant figures.</p>	<p>J</p> <p>Capacitance Tolerance Code</p> <p>B = ±.1 pF C = ±.25 pF D = ±.5 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20% N = ±30%</p>	<p>A</p> <p>Failure Rate Code</p> <p>A = Not Applicable</p>	<p>T</p> <p>Termination Style Code</p> <p>**1 = Pd/Ag **7 = Ag/Ni/Au J = Nickel Barrier Sn/Pb (60/40) **T = 100% Tin H = Cu/Sn (Non-Magnetic)</p>	<p>1A</p> <p>Packaging Code</p> <p>1A = 7" Reel Unmarked 6A = Waffle Pack Unmarked ME = 7" Reel Marked WE = Waffle Pack Marked</p> <p>* Vertical T&R available</p>
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****RoHS compliant**

MECHANICAL DIMENSIONS: inches (millimeters)



Case	Length (L)	Width (W)	Thickness (T)	Band Width (bw)
SQCA*	.055 + .015 - .010 (1.40+ .381 - .254)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 + .010 - .005 (.254 +.254 -.127)
SQCB*	.110 + .020 - .010 (2.79 +.508 -.254)	.110±.010 (2.79±.254)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)

TAPE & REEL: All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

- 8mm carrier
- 7" reel: SQCA/SQCB = 1000 pcs

WAFFLE PACK

SQCA 100 pcs
SQCB 100 pcs

Not RoHS Compliant



For RoHS compliant products, please select correct termination style.

ELECTRICAL SPECIFICATIONS

		M & A	C
Temperature Coefficient (TCC)		(M) +90 ± 20 PPM/°C (-55°C to +125°C) (M) +90 ± 30 PPM/°C (+125°C to +175°C)* (A) 0 ± 30 PPM/°C	±15% (-55°C to 125°C)
Capacitance Range		(M) 0.1 pF to 1000 pF (A) 0.1 pF to 5100 pF	0.001µF to 0.1µF
Operating Temperature		0.1 pF to 330 pF: from -55°C to +175°C* 360 pF to 5100 pF: from -55°C to +125°C	-55°C to +125°C
Quality Factor (Q)	M Dielectric A & B Case	Greater than 10,000 at 1 MHz	2.5% @ 1kHz
	A Dielectric B Case	Greater than 10,000 at 1 MHz Greater than 2,000 at 1 MHz Greater than 2,000 at 1 KHz	0.1 - 200 pF 220 - 1000 pF 1100 - 5100 pF
	A Dielectric A Case	Greater than 10,000 at 1 MHz Greater than 2,000 at 1 MHz	0.1 - 100 pF 110 - 1000 pF
Insulation Resistance (IR)		0.2 pF to 470 pF 10 ⁶ Megohms min. @ 25°C at rated WVDC 10 ⁵ Megohms min. @ 125°C at rated WVDC 510 pF to 5100 pF 10 ⁵ Megohms min. @ 25°C at rated WVDC 10 ⁴ Megohms min. @ 125°C at rated WVDC	10 ⁴ Megohms min. @ 25°C at rated WVDC 10 ³ Megohms min. @ 125°C at rated WVDC
Working Voltage (WVDC)		See Capacitance Values table	See Capacitance Values table
Dielectric Withstanding Voltage (DWW)		250% of rated WVDC for 5 secs (for 500V rated 150% of rated voltage)	250% of rated WVDC for 5 secs
Aging Effects		None	<3% per decade hour
Piezoelectric Effects		None	None
Capacitance Drift		± (0.02% or 0.02 pF), whichever is greater	Not Applicable

* 175 SQCB & SQLB only

ENVIRONMENTAL CHARACTERISTICS

AVX SQ will meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123

Thermal Shock	Mil-STD-202, Method 107, Condition A
Moisture Resistance	Mil-STD-202, Method 106
Low Voltage Humidity	Mil-STD-202, Method 103, condition A, with 1.5 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours
Life Test	Mil-STD-202, Method 108, for 2000 hours at 125°C
Shock	Mil-STD-202, Method 213, Condition J
Vibration	Mil-STD-202, Method 204, Condition B
Immersion	Mil-STD-202, Method 104, Condition B
Salt Spray	Mil-STD-202, Method 101, Condition B
Solderability	Mil-STD-202, Method 208
Terminal Strength	Mil-STD-202, Method 211
Temperature Cycling	Mil-STD-202, Method 102, Condition C
Barometric Pressure	Mil-STD-202, Method 105, Condition B
Resistance to Solder Heat	Mil-STD-202, Method 210, Condition C

Case Size A

TABLE I: TC: M (+90±20PPM/°C)

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	150, 250	1.7	B, C, D	150, 250	6.2	B, C, D	150, 250	27	F, G, J, K	150, 250
0.2	B	150, 250	1.8	B, C, D	150, 250	6.8	B, C, J, K	150, 250	30	F, G, J, K	150, 250
0.3	B,C	150, 250	1.9	B, C, D	150, 250	7.5	B, C, J, K	150, 250	33	F, G, J, K	150, 250
0.4	B,C	150, 250	2.0	B, C, D	150, 250	8.2	B, C, J, K	150, 250	36	F, G, J, K	150, 250
0.5	B, C, D	150, 250	2.2	B, C, D	150, 250	9.1	B, C, J, K	150, 250	39	F, G, J, K	150, 250
0.6	B, C, D	150, 250	2.4	B, C, D	150, 250	10	F, G, J, K	150, 250	43	F, G, J, K	150, 250
0.7	B, C, D	150, 250	2.7	B, C, D	150, 250	11	F, G, J, K	150, 250	47	F, G, J, K	150, 250
0.8	B, C, D	150, 250	3.0	B, C, D	150, 250	12	F, G, J, K	150, 250	51	F, G, J, K	150, 250
0.9	B, C, D	150, 250	3.3	B, C, D	150, 250	13	F, G, J, K	150, 250	56	F, G, J, K	150, 250
1.0	B, C, D	150, 250	3.6	B, C, D	150, 250	15	F, G, J, K	150, 250	62	F, G, J, K	150, 250
1.1	B, C, D	150, 250	3.9	B, C, D	150, 250	16	F, G, J, K	150, 250	68	F, G, J, K	150, 250
1.2	B, C, D	150, 250	4.3	B, C, D	150, 250	18	F, G, J, K	150, 250	75	F, G, J, K	150, 250
1.3	B, C, D	150, 250	4.7	B, C, D	150, 250	20	F, G, J, K	150, 250	82	F, G, J, K	150, 250
1.4	B, C, D	150, 250	5.1	B, C, D	150, 250	22	F, G, J, K	150, 250	91	F, G, J, K	150, 250
1.5	B, C, D	150, 250	5.6	B, C, D	150, 250	24	F, G, J, K	150, 250	100	F, G, J, K	150, 250
1.6	B, C, D	150, 250									

TABLE II: TC: A (0±30PPM/°C)

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	150, 250	2.7	B, C, D	150, 250	20	F, G, J, K	150, 250	150	F, G, J, K	150
0.2	B	150, 250	3.0	B, C, D	150, 250	22	F, G, J, K	150, 250	160	F, G, J, K	150
0.3	B,C	150, 250	3.3	B, C, D	150, 250	24	F, G, J, K	150, 250	180	F, G, J, K	150
0.4	B,C	150, 250	3.6	B, C, D	150, 250	27	F, G, J, K	150, 250	200	F, G, J, K	150
0.5	B, C, D	150, 250	3.9	B, C, D	150, 250	30	F, G, J, K	150, 250	220	F, G, J, K	150
0.6	B, C, D	150, 250	4.3	B, C, D	150, 250	33	F, G, J, K	150, 250	240	F, G, J, K	150
0.7	B, C, D	150, 250	4.7	B, C, D	150, 250	36	F, G, J, K	150, 250	270	F, G, J, K	150
0.8	B, C, D	150, 250	5.1	B, C, D	150, 250	39	F, G, J, K	150, 250	300	F, G, J, K	150
0.9	B, C, D	150, 250	5.6	B, C, D	150, 250	43	F, G, J, K	150, 250	330	F, G, J, K	150
1.0	B, C, D	150, 250	6.2	B, C, D	150, 250	47	F, G, J, K	150, 250	360	F, G, J, K	150
1.1	B, C, D	150, 250	6.8	B, C, J, K	150, 250	51	F, G, J, K	150, 250	390	F, G, J, K	150
1.2	B, C, D	150, 250	7.5	B, C, J, K	150, 250	56	F, G, J, K	150, 250	430	F, G, J, K	150
1.3	B, C, D	150, 250	8.2	B, C, J, K	150, 250	62	F, G, J, K	150, 200	470	F, G, J, K	150
1.4	B, C, D	150, 250	9.1	B, C, J, K	150, 250	68	F, G, J, K	150, 200	510	F, G, J, K	150
1.5	B, C, D	150, 250	10	F, G, J, K	150, 250	75	F, G, J, K	150, 200	560	F, G, J, K	150
1.6	B, C, D	150, 250	11	F, G, J, K	150, 250	82	F, G, J, K	150, 200	620	F, G, J, K	150
1.7	B, C, D	150, 250	12	F, G, J, K	150, 250	91	F, G, J, K	150, 200	680	F, G, J, K	50
1.8	B, C, D	150, 250	13	F, G, J, K	150, 250	100	F, G, J, K	150	750	F, G, J, K	50
1.9	B, C, D	150, 250	15	F, G, J, K	150, 250	110	F, G, J, K	150	820	F, G, J, K	50
2.0	B, C, D	150, 250	16	F, G, J, K	150, 250	120	F, G, J, K	150	910	F, G, J, K	50
2.2	B, C, D	150, 250	18	F, G, J, K	150, 250	130	F, G, J, K	150	1000	F, G, J, K	50
2.4	B, C, D	150, 250									

TABLE III: TC: C (±15%)

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
1000	K, M, N	50	2200	K, M, N	50	5100	K, M, N	50
1200	K, M, N	50	2700	K, M, N	50	5600	K, M, N	50
1500	K, M, N	50	3300	K, M, N	50	6800	K, M, N	50
1800	K, M, N	50	3900	K, M, N	50	8200	K, M, N	50
2000	K, M, N	50	4700	K, M, N	50	10000	K, M, N	50

Case Size B

TABLE IV: TC: M (+90±20PPM/°C)

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	500	2.7	B, C, D	500	20	F, G, J, K	500	150	F, G, J, K	300
0.2	B	500	3.0	B, C, D	500	22	F, G, J, K	500	160	F, G, J, K	300
0.3	B,C	500	3.3	B, C, D	500	24	F, G, J, K	500	180	F, G, J, K	300
0.4	B,C	500	3.6	B, C, D	500	27	F, G, J, K	500	200	F, G, J, K	300
0.5	B, C, D	500	3.9	B, C, D	500	30	F, G, J, K	500	220	F, G, J, K	200
0.6	B, C, D	500	4.3	B, C, D	500	33	F, G, J, K	500	240	F, G, J, K	200
0.7	B, C, D	500	4.7	B, C, D	500	36	F, G, J, K	500	270	F, G, J, K	200
0.8	B, C, D	500	5.1	B, C, D	500	39	F, G, J, K	500	300	F, G, J, K	200
0.9	B, C, D	500	5.6	B, C, D	500	43	F, G, J, K	500	330	F, G, J, K	200
1.0	B, C, D	500	6.2	B, C, D	500	47	F, G, J, K	500	360	F, G, J, K	200
1.1	B, C, D	500	6.8	B, C, J, K	500	51	F, G, J, K	500	390	F, G, J, K	200
1.2	B, C, D	500	7.5	B, C, J, K	500	56	F, G, J, K	500	430	F, G, J, K	200
1.3	B, C, D	500	8.2	B, C, J, K	500	62	F, G, J, K	500	470	F, G, J, K	200
1.4	B, C, D	500	9.1	B, C, J, K	500	68	F, G, J, K	500	510	F, G, J, K	150
1.5	B, C, D	500	10	F, G, J, K	500	75	F, G, J, K	500	560	F, G, J, K	150
1.6	B, C, D	500	11	F, G, J, K	500	82	F, G, J, K	500	620	F, G, J, K	150
1.7	B, C, D	500	12	F, G, J, K	500	91	F, G, J, K	500	680	F, G, J, K	150
1.8	B, C, D	500	13	F, G, J, K	500	100	F, G, J, K	500	750	F, G, J, K	150
1.9	B, C, D	500	15	F, G, J, K	500	110	F, G, J, K	300	820	F, G, J, K	150
2.0	B, C, D	500	16	F, G, J, K	500	120	F, G, J, K	300	910	F, G, J, K	150
2.2	B, C, D	500	18	F, G, J, K	500	130	F, G, J, K	300	1000	F, G, J, K	150
2.4	B, C, D	500									

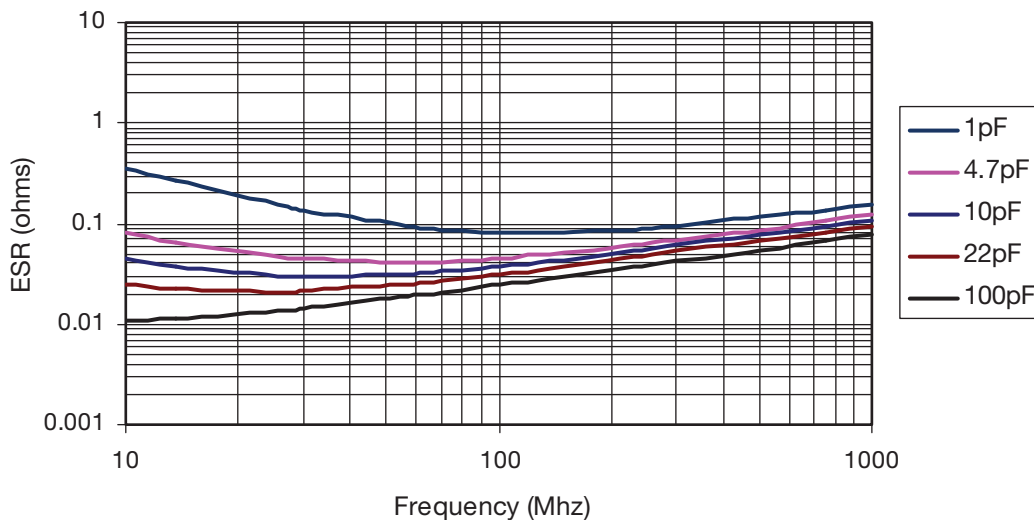
TABLE V: TC: A (0±30PPM/°C)

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	500	3.9	B, C, D	500	47	F, G, J, K	500	560	F, G, J, K	150
0.2	B	500	4.3	B, C, D	500	51	F, G, J, K	500	620	F, G, J, K	150
0.3	B,C	500	4.7	B, C, D	500	56	F, G, J, K	500	680	F, G, J, K	150
0.4	B,C	500	5.1	B, C, D	500	62	F, G, J, K	500	750	F, G, J, K	150
0.5	B, C, D	500	5.6	B, C, D	500	68	F, G, J, K	500	820	F, G, J, K	150
0.6	B, C, D	500	6.2	B, C, D	500	75	F, G, J, K	500	910	F, G, J, K	150
0.7	B, C, D	500	6.8	B, C, J, K	500	82	F, G, J, K	500	1000	F, G, J, K	150
0.8	B, C, D	500	7.5	B, C, J, K	500	91	F, G, J, K	500	1100	F, G, J, K	50
0.9	B, C, D	500	8.2	B, C, J, K	500	100	F, G, J, K	500	1200	F, G, J, K	50
1.0	B, C, D	500	9.1	B, C, J, K	500	110	F, G, J, K	300	1300	F, G, J, K	50
1.1	B, C, D	500	10	F, G, J, K	500	120	F, G, J, K	300	1500	F, G, J, K	50
1.2	B, C, D	500	11	F, G, J, K	500	130	F, G, J, K	300	1600	F, G, J, K	50
1.3	B, C, D	500	12	F, G, J, K	500	150	F, G, J, K	300	1800	F, G, J, K	50
1.4	B, C, D	500	13	F, G, J, K	500	160	F, G, J, K	300	2000	F, G, J, K	50
1.5	B, C, D	500	15	F, G, J, K	500	180	F, G, J, K	300	2200	F, G, J, K	50
1.6	B, C, D	500	16	F, G, J, K	500	200	F, G, J, K	300	2400	F, G, J, K	50
1.7	B, C, D	500	18	F, G, J, K	500	220	F, G, J, K	200	2700	F, G, J, K	50
1.8	B, C, D	500	20	F, G, J, K	500	240	F, G, J, K	200	3000	F, G, J, K	50
1.9	B, C, D	500	22	F, G, J, K	500	270	F, G, J, K	200	3300	F, G, J, K	50
2.0	B, C, D	500	24	F, G, J, K	500	300	F, G, J, K	200	3600	F, G, J, K	50
2.2	B, C, D	500	27	F, G, J, K	500	330	F, G, J, K	200	3900	F, G, J, K	50
2.4	B, C, D	500	30	F, G, J, K	500	360	F, G, J, K	200	4300	F, G, J, K	50
2.7	B, C, D	500	33	F, G, J, K	500	390	F, G, J, K	200	4700	F, G, J, K	50
3.0	B, C, D	500	36	F, G, J, K	500	430	F, G, J, K	200	5000	F, G, J, K	50
3.3	B, C, D	500	39	F, G, J, K	500	470	F, G, J, K	200	5100	F, G, J, K	50
3.6	B, C, D	500	43	F, G, J, K	500	510	F, G, J, K	150			

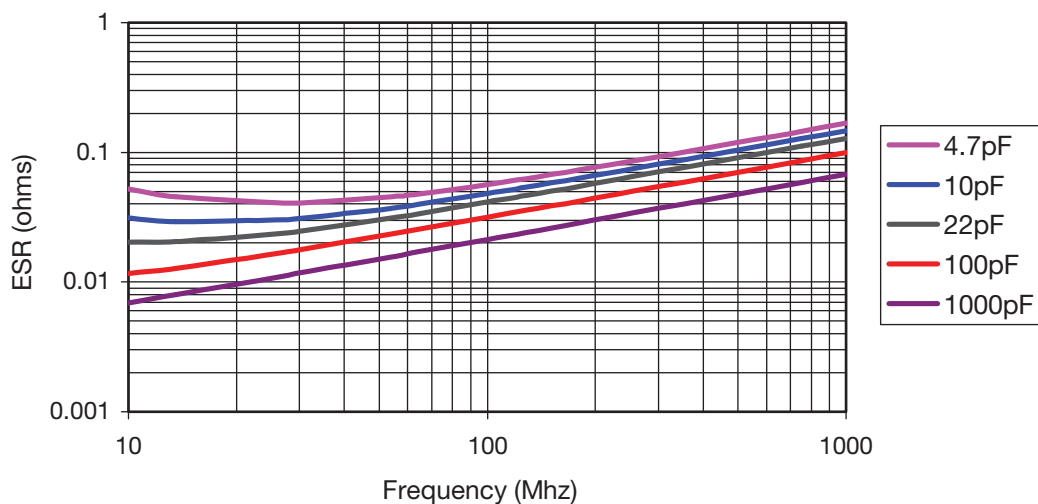
TABLE VI: TC: C (±15%)

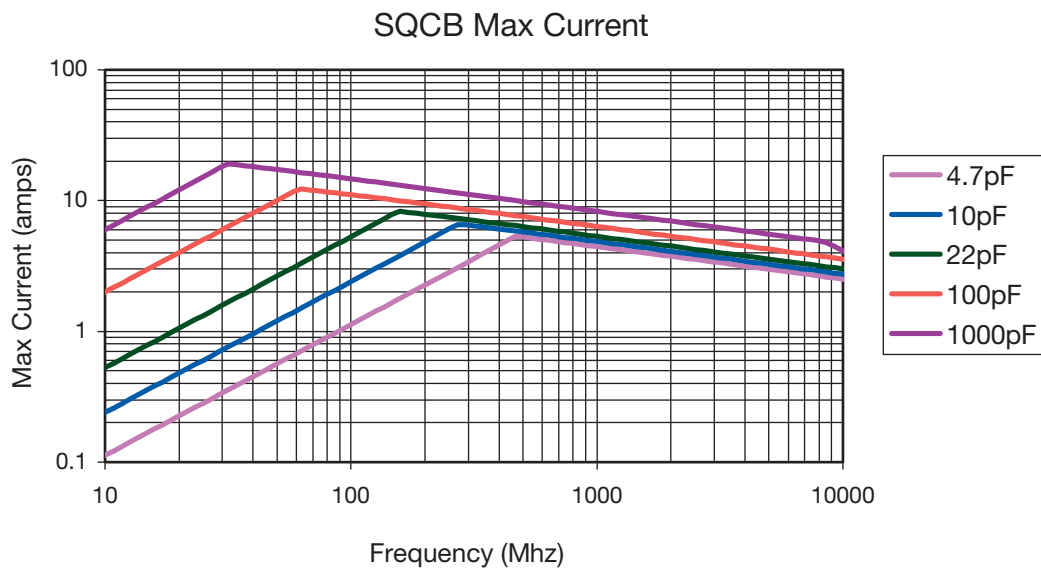
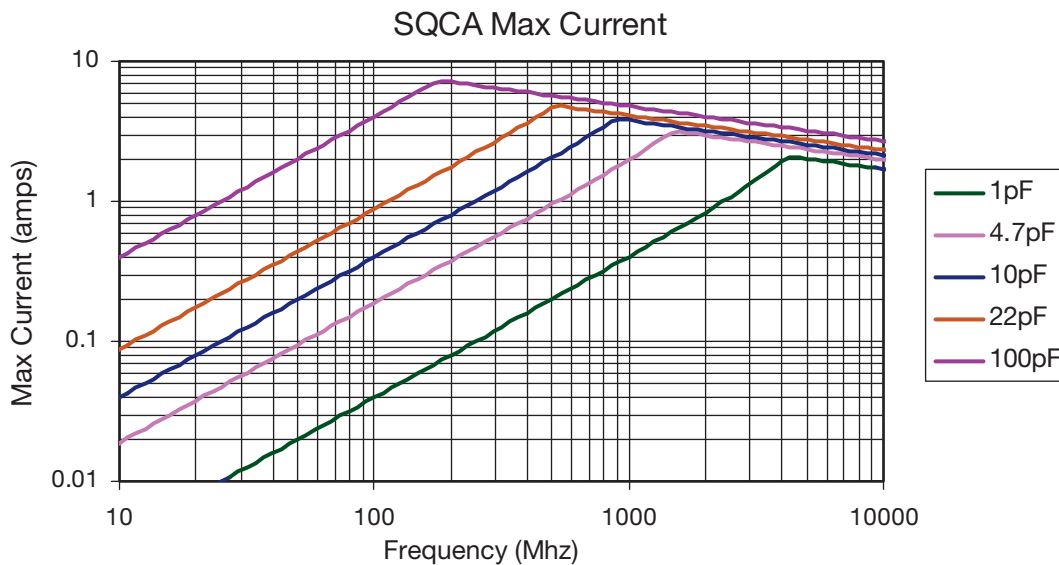
Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
5000	K, M, N	50	15000	K, M, N	50	47000	K, M, N	50
6800	K, M, N	50	18000	K, M, N	50	68000	K, M, N	50
8200	K, M, N	50	27000	K, M, N	50	82000	K, M, N	50
10000	K, M, N	50	33000	K, M, N	50	100000	K, M, N	50
12000	K, M, N	50	39000	K, M, N	50			

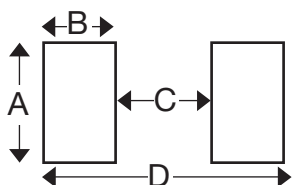
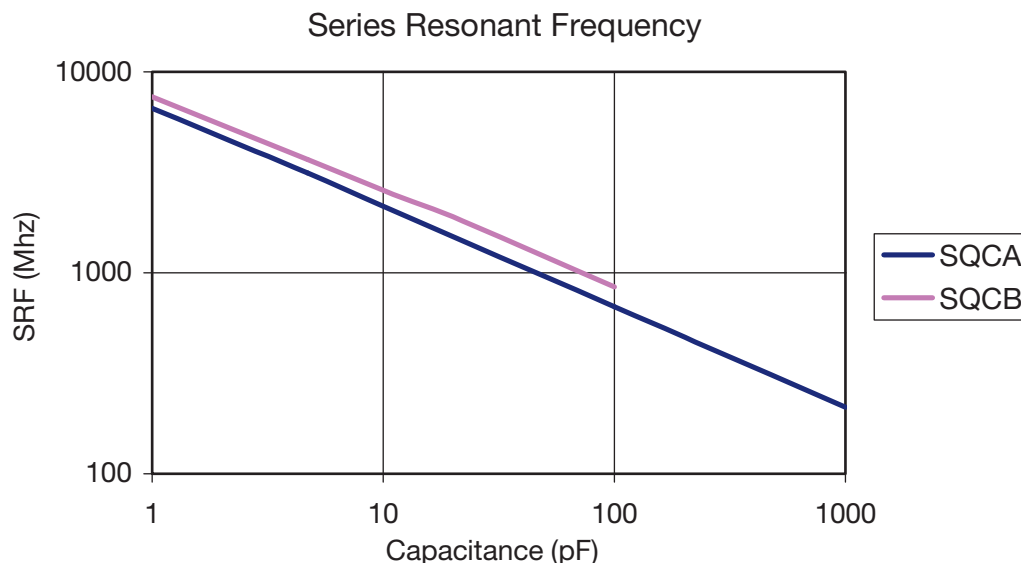
Typical ESR SQCA



Typical ESR SQCB





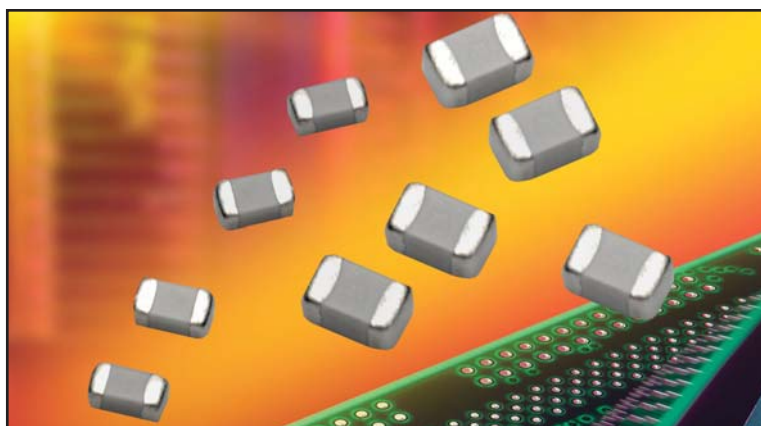


MOUNTING PAD DIMENSIONS: inches (millimeters)

Case	A min	B min	C min	D min
SQCA	0.082 (2.083)	0.051 (1.295)	0.032 (0.813)	0.130 (3.302)
SQCB	0.131 (3.327)	0.051 (1.295)	0.074 (1.880)	0.177 (4.496)
SQCS	0.038 (0.965)	0.043 (1.092)	0.025 (0.635)	0.112 (2.845)
SQCF	0.059 (1.499)	0.051 (1.295)	0.024 (0.610)	0.125 (3.175)

SQCA & SQCB DESIGN KITS

PN	Series	Diel	Term	Range	Different Values	# per value
KITSQ100LF	SQCA	P90	100% Tin RoHS	.1 to 2pF	16	15
KITSQ400LF		C0G				
KITSQ200LF	SQCA	P90	100% Tin RoHS	1 to 10pF	16	15
KITSQ500LF		C0G				
KITSQ300LF	SQCA	P90	100% Tin RoHS	10 to 100pF	16	15
KITSQ600LF		C0G				
KITSQ700LF	SQCA	C0G	100% Tin RoHS	100 to 1000pF	16	15
KITSQ800LF	SQCB	P90	100% Tin RoHS	1 to 10pF	16	15
KITSQ1100LF		C0G				
KITSQ900LF	SQCB	P90	100% Tin RoHS	10 to 100pF	16	15
KITSQ1200LF		C0G				
KITSQ1000LF	SQCB	P90	100% Tin RoHS	100 to 1000pF	16	15
KITSQ1300LF		C0G				
KITSQ1400LF	SQCB	C0G	100% Tin RoHS	1000 to 5100 pF	11	15



FEATURES:

- Low ESR
- High Q
- High Self Resonance
- Capacitance Range 0.1 pF to 240 pF
- EIA Size

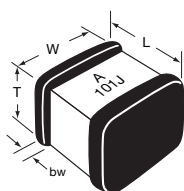
APPLICATIONS:

- RF Power Amplifiers
- Low Noise Amplifiers
- Filter Networks
- Point to Point Radios

HOW TO ORDER

<p>SQ</p> <p>AVX Style</p>	<p>CS</p> <p>Case Size CS = 0603 CF = 0805</p>	<p>V</p> <p>Voltage Code V = 250V</p>	<p>A</p> <p>Temperature Coefficient Code A = 0±30ppm/°C</p>	<p>100</p> <p>Capacitance EIA Capacitance Code in pF. First two digits = significant figures or "R" for decimal place. Third digit = number of zeros or after "R" significant figures.</p>	<p>J</p> <p>Capacitance Tolerance Code A = ±.05 pF B = ±.1 pF C = ±.25 pF D = ±.5 pF F = ±1% G = ±2% J = ±5%</p>	<p>A</p> <p>Failure Rate Code A = Not Applicable</p>	<p>T</p> <p>Termination Style Code **1 = Pd/Ag **7 = Ag/Ni/Au J = Nickel Barrier Sn/Pb (60/40) **T = 100% Tin (Standard)</p>	<p>1A</p> <p>Packaging Code 1A = 7" Reel Unmarked ME = 7" Reel Marked</p> <p>* Vertical T&R available * 500 piece reels available</p>
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****RoHS compliant**



MECHANICAL DIMENSIONS: inches (millimeters)

Case	Length (L)	Width (W)	Thickness (T)	Band Width (bw)
SQCS	.063±.006 (1.60±.152)	.032±.006 (.813±.152)	.030 Max. (.762)	.014±.006 (.357±.152)
SQCF	.079±.008 (2.01±.200)	.049±.008 (1.24±.200)	.045 Max. (1.14)	.014±.006 (.357±.152)

TAPE & REEL: All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

- 8mm carrier
- 7" reel = 4000 pcs (500 piece options)

Not RoHS Compliant



For RoHS compliant products, please select correct termination style.

ELECTRICAL SPECIFICATIONS

Temperature Coefficient (TCC)	(A) 0 ± 30 PPM/°C
Operating Temperature	-55°C to +125°C
Quality Factor (Q)	Greater than 10,000 at 1 MHz
Insulation Resistance (IR)	0.1 pF to 240 pF 10 ⁵ Megohms min. @ 25°C at rated WVDC 10 ⁴ Megohms min. @ 125°C at rated WVDC
Working Voltage (WVDC)	See Capacitance Values table
Dielectric Withstanding Voltage (DWW)	250% of rated WVDC for 5 secs
Aging Effects	None
Piezoelectric Effects	None
Capacitance Drift	± (0.02% or 0.02 pF), whichever is greater

ENVIRONMENTAL CHARACTERISTICS

AVX SQ will meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123

Thermal Shock	Mil-STD-202, Method 107, Condition A
Moisture Resistance	Mil-STD-202, Method 106
Low Voltage Humidity	Mil-STD-202, Method 103, condition A, with 1.5 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours
Life Test	Mil-STD-202, Method 108, for 2000 hours at 125°C
Shock	Mil-STD-202, Method 213, Condition J
Vibration	Mil-STD-202, Method 204, Condition B
Immersion	Mil-STD-202, Method 104, Condition B
Salt Spray	Mil-STD-202, Method 101, Condition B
Solderability	Mil-STD-202, Method 208
Terminal Strength	Mil-STD-202, Method 211
Temperature Cycling	Mil-STD-202, Method 102, Condition C
Barometric Pressure	Mil-STD-202, Method 105, Condition B
Resistance to Solder Heat	Mil-STD-202, Method 210, Condition C

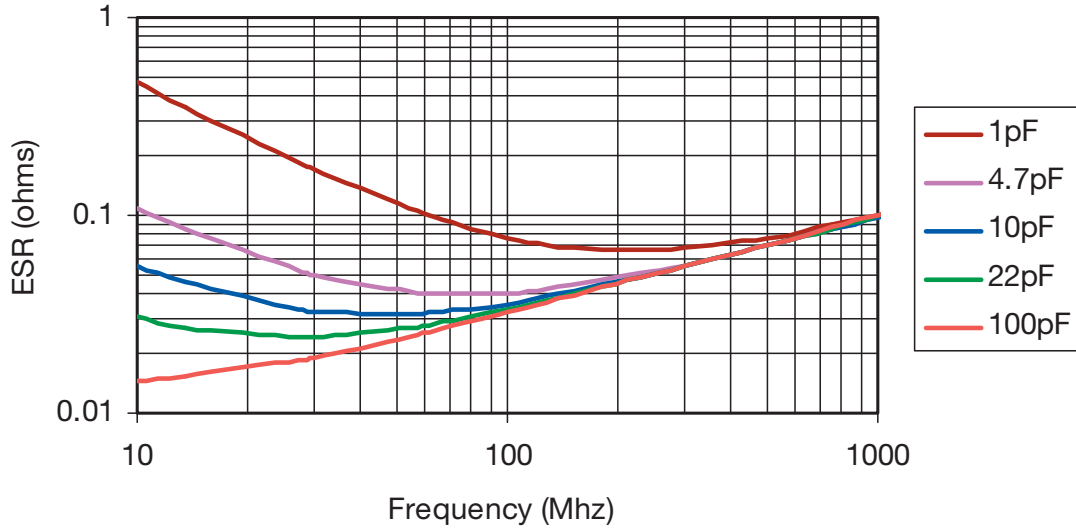
TABLE I: TC: A (0±30PPM/°C) CASE SIZE S

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	A, B	250	2.4	A, B, C	250	18	F, G, J	250
0.2	A, B	250	2.7	A, B, C	250	20	F, G, J	250
0.3	A, B	250	3.0	A, B, C	250	22	F, G, J	250
0.4	A, B	250	3.3	A, B, C	250	24	F, G, J	250
0.5	A, B, C	250	3.6	A, B, C	250	27	F, G, J	250
0.6	A, B, C	250	3.9	A, B, C	250	30	F, G, J	250
0.7	A, B, C	250	4.3	A, B, C	250	33	F, G, J	250
0.8	A, B, C	250	4.7	A, B, C	250	36	F, G, J	250
0.9	A, B, C	250	5.1	A, B, C	250	39	F, G, J	250
1.0	A, B, C	250	5.6	A, B, C	250	43	F, G, J	250
1.1	A, B, C	250	6.2	A, B, C	250	47	F, G, J	250
1.2	A, B, C	250	6.8	B, C, D	250	51	F, G, J	250
1.3	A, B, C	250	7.5	B, C, D	250	56	F, G, J	250
1.4	A, B, C	250	8.2	B, C, D	250	62	F, G, J	250
1.5	A, B, C	250	9.1	B, C, D	250	68	F, G, J	250
1.6	A, B, C	250	10	F, G, J	250	75	F, G, J	250
1.7	A, B, C	250	11	F, G, J	250	82	F, G, J	250
1.8	A, B, C	250	12	F, G, J	250	91	F, G, J	250
1.9	A, B, C	250	13	F, G, J	250	100	F, G, J	250
2.0	A, B, C	250	15	F, G, J	250			
2.2	A, B, C	250	16	F, G, J	250			

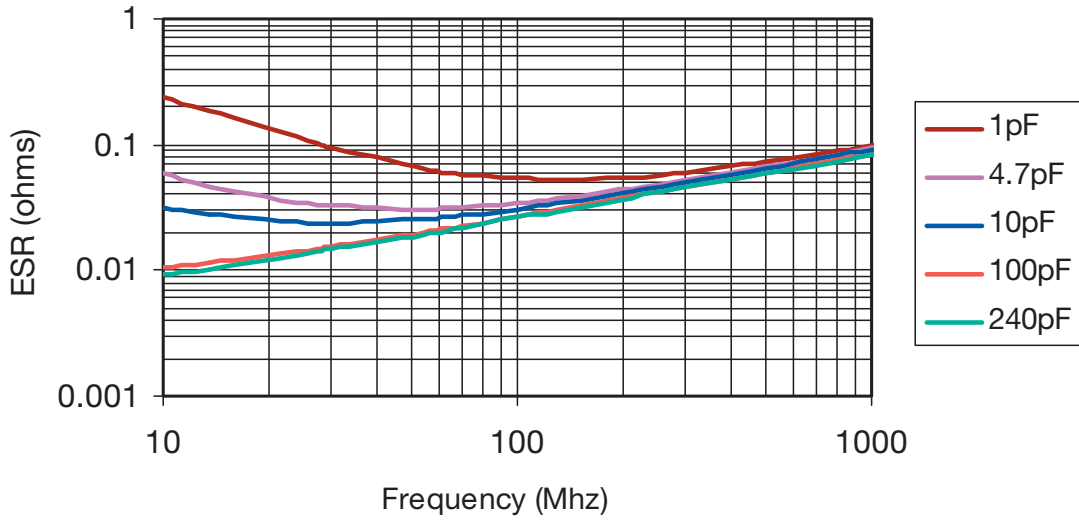
TABLE II: TC: A (0±30PPM/°C) CASE SIZE F

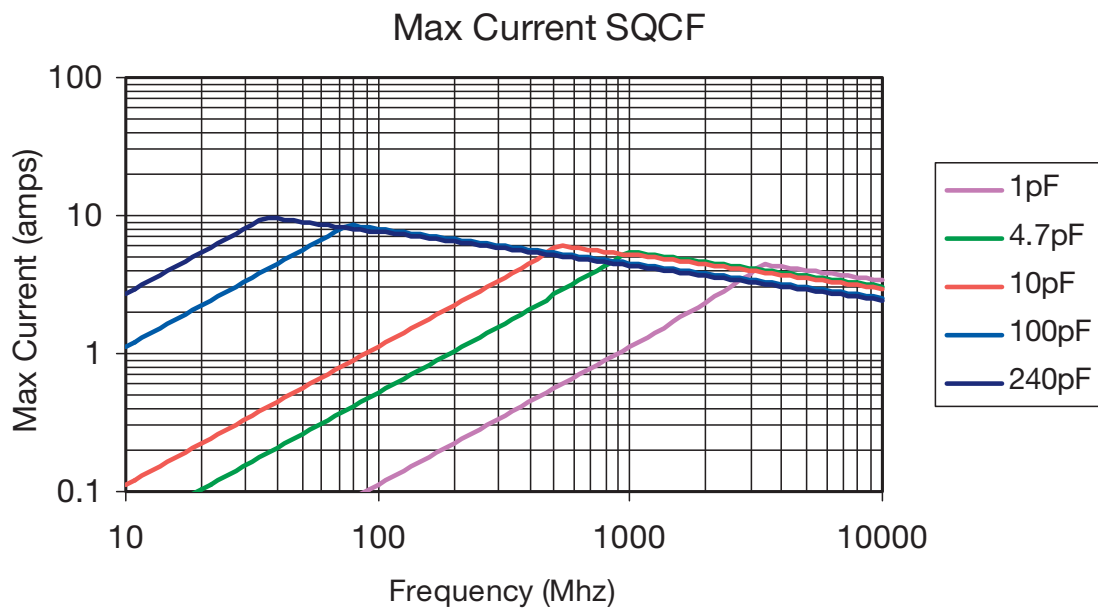
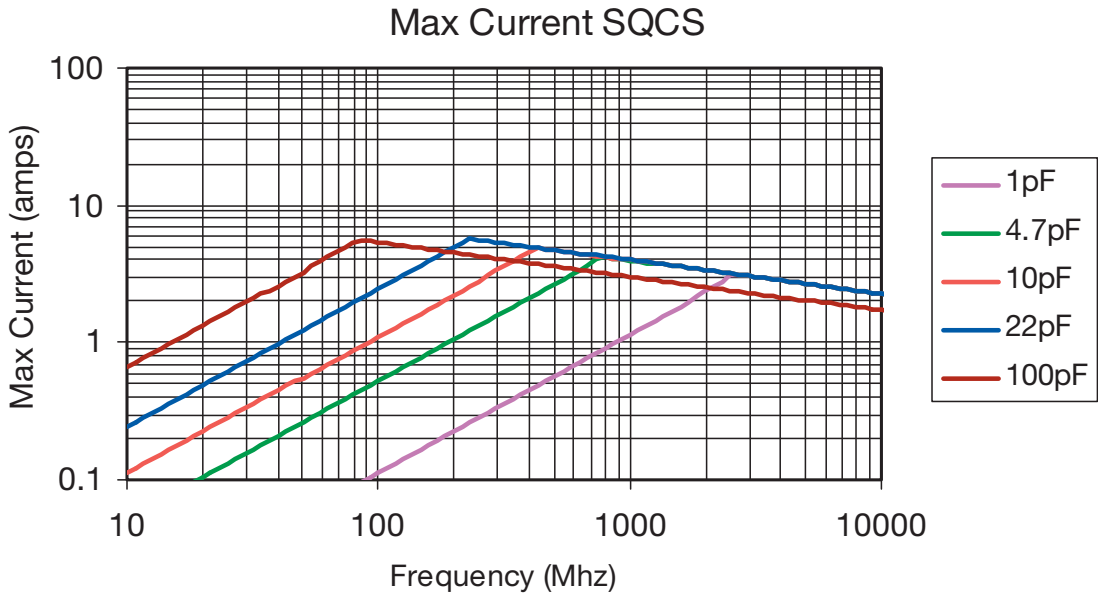
Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	A, B	250	2.4	A, B, C	250	18	F, G, J	250	150	F, G, J	250
0.2	A, B	250	2.7	A, B, C	250	20	F, G, J	250	180	F, G, J	250
0.3	A, B	250	3.0	A, B, C	250	22	F, G, J	250	200	F, G, J	250
0.4	A, B	250	3.3	A, B, C	250	24	F, G, J	250	220	F, G, J	250
0.5	A, B, C	250	3.6	A, B, C	250	27	F, G, J	250	240	F, G, J	250
0.6	A, B, C	250	3.9	A, B, C	250	30	F, G, J	250			
0.7	A, B, C	250	4.3	A, B, C	250	33	F, G, J	250			
0.8	A, B, C	250	4.7	A, B, C	250	36	F, G, J	250			
0.9	A, B, C	250	5.1	A, B, C	250	39	F, G, J	250			
1.0	A, B, C	250	5.6	A, B, C	250	43	F, G, J	250			
1.1	A, B, C	250	6.2	A, B, C	250	47	F, G, J	250			
1.2	A, B, C	250	6.8	B, C, D	250	51	F, G, J	250			
1.3	A, B, C	250	7.5	B, C, D	250	56	F, G, J	250			
1.4	A, B, C	250	8.2	B, C, D	250	62	F, G, J	250			
1.5	A, B, C	250	9.1	B, C, D	250	68	F, G, J	250			
1.6	A, B, C	250	10	F, G, J	250	75	F, G, J	250			
1.7	A, B, C	250	11	F, G, J	250	82	F, G, J	250			
1.8	A, B, C	250	12	F, G, J	250	91	F, G, J	250			
1.9	A, B, C	250	13	F, G, J	250	100	F, G, J	250			
2.0	A, B, C	250	15	F, G, J	250	110	F, G, J	250			
2.2	A, B, C	250	16	F, G, J	250	120	F, G, J	250			

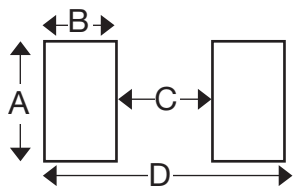
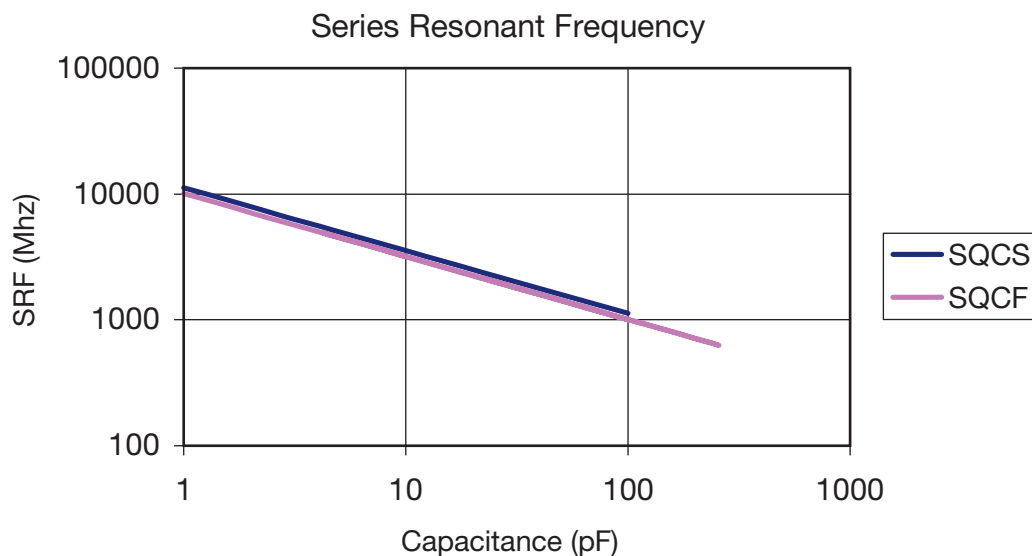
Typical ESR SQCS



Typical ESR SQCF







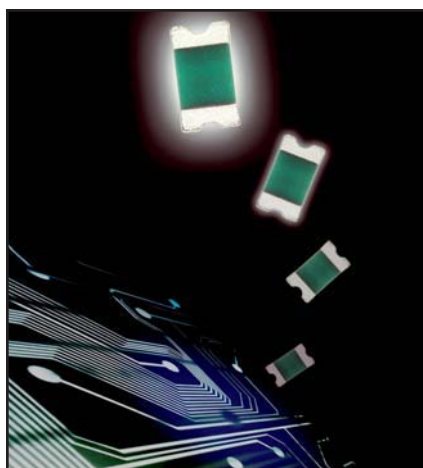
MOUNTING PAD DIMENSIONS: inches (millimeters)

Case	A min	B min	C min	D min
SQCA	0.082 (2.083)	0.051 (1.295)	0.032 (0.813)	0.130 (3.302)
SQCB	0.131 (3.327)	0.051 (1.295)	0.074 (1.880)	0.177 (4.496)
SQCS	0.038 (0.965)	0.043 (1.092)	0.025 (0.635)	0.112 (2.845)
SQCF	0.059 (1.499)	0.051 (1.295)	0.024 (0.610)	0.125 (3.175)

SQCS & SQCF ENGINEERING KITS

PN	Series	Diel	Term	Range	Different Values	# per value
Kit SQ1800LF	SQCF	C0G	100% Tin	.1 to 10pF	27	15
Kit SQ1900LF			RoHS	10 to 240pF	22	
Kit SQ1500LF	SQCS	C0G	100%Tin	.1 to 10pF	27	15
Kit SQ1600LF			RoHS	10 to 100pF	16	

Tolerance per PF:	
B from .1 to 3.3	J from 10 to 240
C from 3.9 to 8.2	



Based on its patented multilayer low loss organic (MLO™) technology. These new capacitors represent a paradigm shift from traditional ceramic and thin film passive SMD components. Multilayer Organic Capacitors (MLOC) are polymer based capacitors that use high conductivity copper interconnects in a multilayer fashion. The ability to fabricate these components on large area substrates and state of the art laser direct imaging allow for improved cost benefits and tolerance control. The end result is a state of the art low ESR and high SRF low profile RF capacitor that can support frequencies well above one GHz. Additionally MLOCs are expansion matched to printed circuit boards to allow for improved reliability.

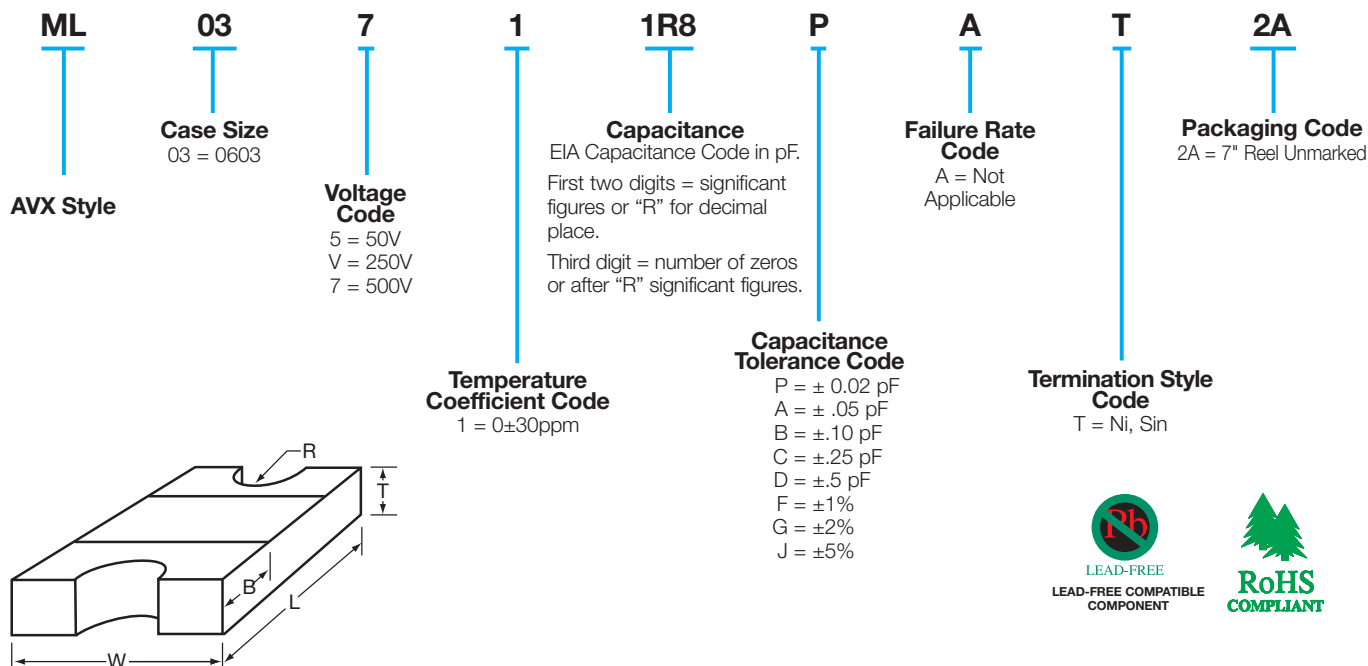
FEATURES

- Low ESR
- Hi-Q®
- High Self Resonance
- Tight Tolerance
- Low Dielectric Absorption (0.0015%)

APPLICATIONS

- RF Power Amplifiers
- Low Noise Amplifiers
- Filter Networks
- Instrumentation

HOW TO ORDER



MECHANICAL DIMENSIONS: inches (millimeters)

Case	Length (L)	Width (W)	Thickness (T)	Band Width (B)	Castellation Radius (R)
0603	0.063 ± 0.004 (1.600 ± 0.102)	0.033 ± 0.004 (0.838 ± 0.102)	0.025 ± 0.004 (0.635 ± 0.102)	0.015 ± 0.005 (0.381 ± 0.127)	0.008 ± 0.002 (0.203 ± 0.051)

TAPE & REEL: All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

- 8mm carrier
- 7" reel, 3,000 pcs per reel

ENVIRONMENTAL CHARACTERISTICS

TEST	CONDITIONS	REQUIREMENT
Life (Endurance) MIL-STD-202F Method 108A	125°C, 2U _R , 1000 hours	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C/C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Accelerated Damp Heat Steady State MIL-STD-202F Method 103B	85°C, 85% RH, U _R , 1000 hours	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C/C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Temperature Cycling MIL-STD-202F Method 107E MIL-STD-883D Method 1010.7	-55°C to +125°C, 15 cycles – MLO™	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C/C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Resistance to Solder Heat IEC-68-2-58	260°C ± 5°C for 10 secs.	C remains within initial limits

MECHANICAL SPECIFICATIONS

TEST	CONDITIONS	REQUIREMENT
Solderability IEC-68-2-58	Components completely immersed in a solder bath at 235°C for 2 secs.	Terminations to be well tinned, minimum 95% coverage
Leach Resistance IEC-68-2-58	Components completely immersed in a solder bath at 260±5°C for 60 secs.	Dissolution of termination faces $\leq 15\%$ of area Dissolution of termination edges $\leq 25\%$ of length
Adhesion MIL-STD-202F Method 211A	A force of 5N applied for 10 secs.	No visible damage
Termination Bond Strength IEC-68-2-21 Amend. 2	Tested as shown in diagram	No visible damage $\Delta C/C \leq 2\%$ for $C \geq 5\text{pF}$ $\Delta C/C \leq 0.25\text{pF}$ for $C < 5\text{pF}$
Robustness of Termination IEC-68-2-21 Amend. 2	A force of 5N applied for 10 secs.	No visible damage
Storage	12 months minimum with components stored in “as received” packaging	Good solderability

QUALITY & RELIABILITY

MLO™ capacitors utilize high density interconnect wiring technology on well established low loss organic materials.

- Solderability;
- Dimensional, mechanical and temperature stability.

FINAL QUALITY INSPECTION

Finished parts are tested for standard electrical parameters and visual/mechanical characteristics. Each production lot is 100% evaluated for: capacitance and proof voltage at 2.5 U_R. In addition, production is periodically evaluated for:

- Average capacitance with histogram printout for capacitance distribution;
- IR and Breakdown Voltage distribution;
- Temperature Coefficient;

QUALITY ASSURANCE

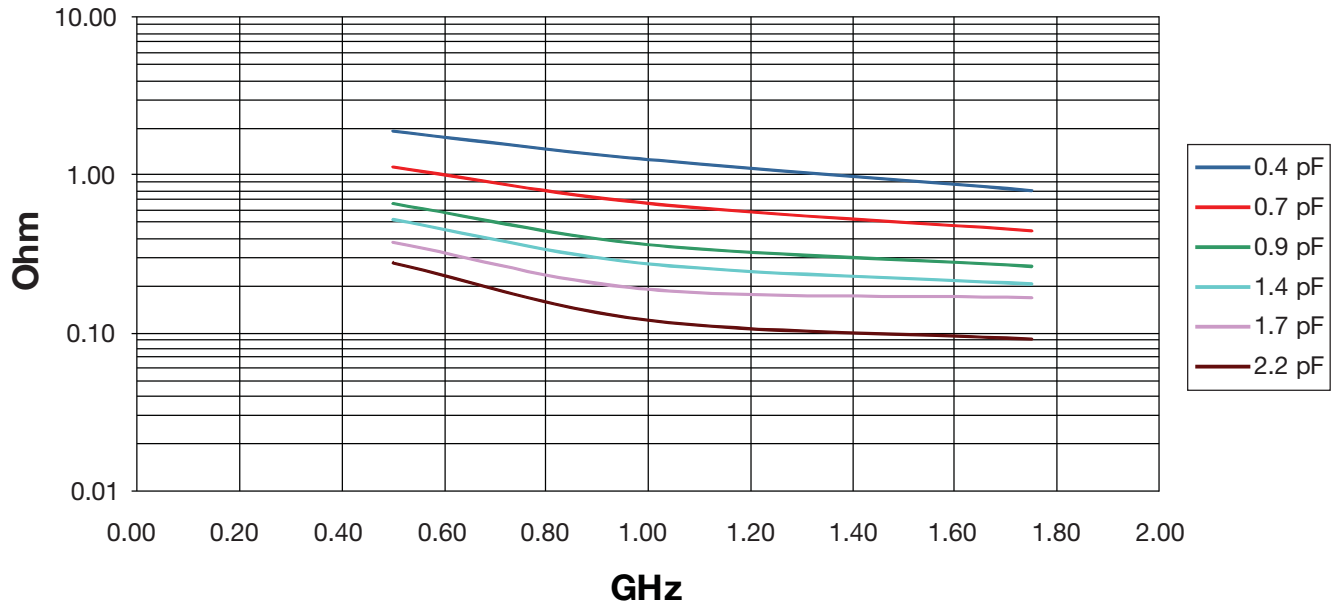
The reliability of these multilayer organic capacitors has been extensively studied. Various methods and standards have been used to ensure a high quality component including JEDEC, Mil Spec and IPC testing. AVX's quality assurance policy is based on well established international industry standards. The reliability of the capacitors is determined by accelerated testing under the following conditions:

Life (Endurance)	125°C, 2U _R , 1000 hours
Accelerated Damp Heat Steady State	85°C, 85% RH, U _R , 1000 hours.

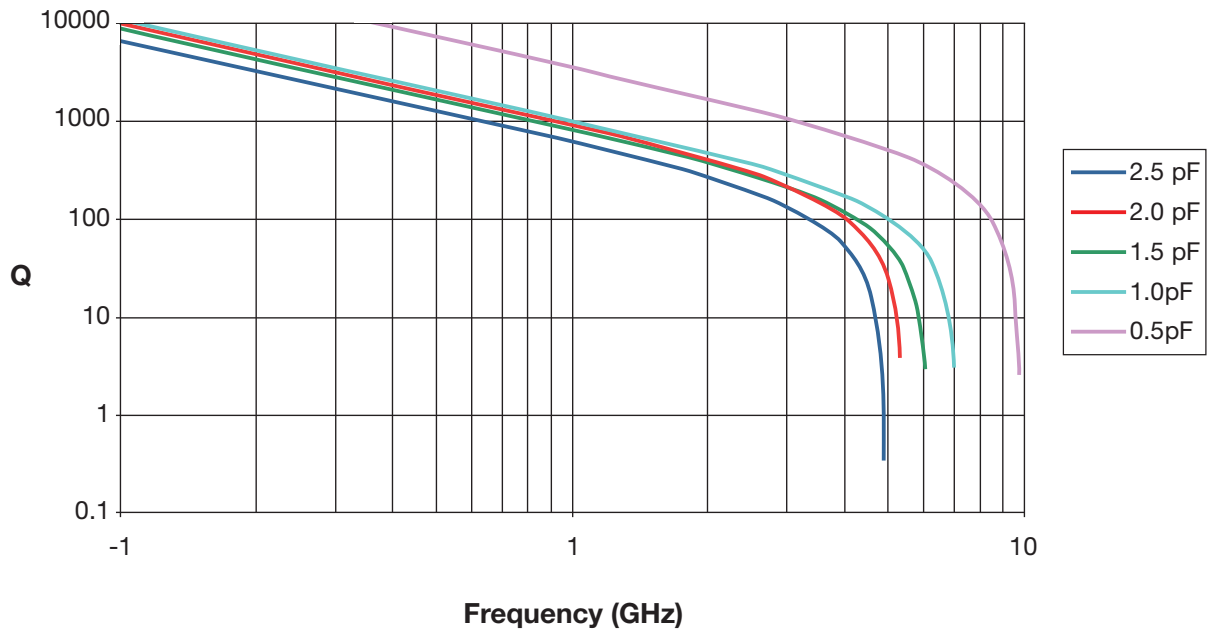
TABLE I: CASE SIZE ML03

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	P, A, B	50, 250, 500	1.3	P, A, B, C	50, 250, 500	3.0	P, A, B, C	50, 250
0.2	P, A, B	50, 250, 500	1.4	P, A, B, C	50, 250, 500	3.3	P, A, B, C	50, 250
0.3	P, A, B	50, 250, 500	1.5	P, A, B, C	50, 250, 500	3.6	P, A, B, C	50, 250
0.4	P, A, B	50, 250, 500	1.6	P, A, B, C	50, 250, 500	3.9	P, A, B, C	50, 250
0.5	P, A, B, C	50, 250, 500	1.7	P, A, B, C	50, 250, 500			
0.6	P, A, B, C	50, 250, 500	1.8	P, A, B, C	50, 250, 500			
0.7	P, A, B, C	50, 250, 500	1.9	P, A, B, C	50, 250, 500			
0.8	P, A, B, C	50, 250, 500	2.0	P, A, B, C	50, 250, 500			
0.9	P, A, B, C	50, 250, 500	2.2	P, A, B, C	50, 250, 500			
1.0	P, A, B, C	50, 250, 500	2.4	P, A, B, C	50, 250, 500			
1.1	P, A, B, C	50, 250, 500	2.5	P, A, B, C	50, 250, 500			
1.2	P, A, B, C	50, 250, 500	2.7	P, A, B, C	50, 250			

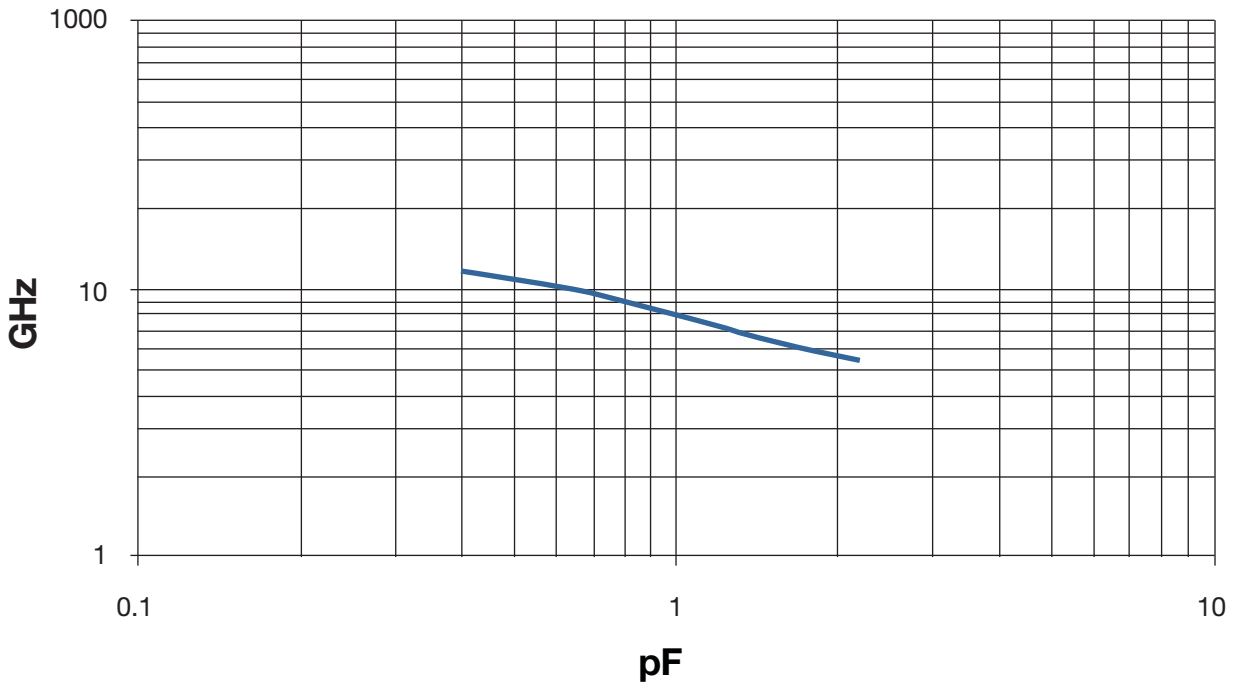
Typical ESR vs. Frequency MLO™ 0603

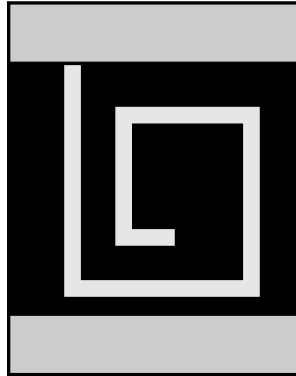


Typical Q vs. Frequency MLO™ 0603



Typical Self Resonant Frequency vs Capacitance OPC 0603





10 nH Inductor (Top View)

ACCU-L® TECHNOLOGY

The Accu-L® SMD Inductor is based on thin-film multilayer technology. This technology provides a level of control on the electrical and physical characteristics of the component which gives consistent characteristics within a lot and lot-to-lot.

The original design provides small size, excellent high-frequency performance and rugged construction for reliable automatic assembly.

The Accu-L® inductor is particularly suited for the telecommunications industry where there is a continuing trend towards miniaturization and increasing frequencies. The Accu-L® inductor meets both the performance and tolerance requirements of present cellular frequencies 450MHz and 900MHz and of future frequencies, such as 1700MHz, 1900MHz and 2400MHz.

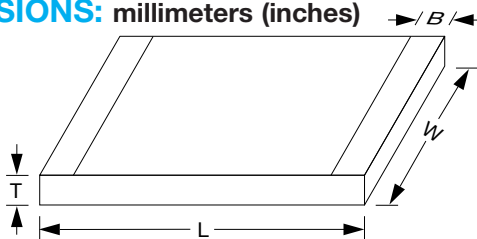
FEATURES

- High Q
- RF Power Capability
- High SRF
- Low DC Resistance
- Ultra-Tight Tolerance on Inductance
- Standard 0603 and 0805 Chip Size
- Low Profile
- Rugged Construction
- Taped and Reeled

APPLICATIONS

- Mobile Communications
- Satellite TV Receivers
- GPS
- Vehicle Locations Systems
- Filters
- Matching Networks

DIMENSIONS: millimeters (inches)



	0603	0805
L	1.6±0.10 (0.063±0.004)	2.11±0.10 (0.083±0.004)
W	0.81±0.10 (0.032±0.004)	1.5±0.10 (0.059±0.004)
T	0.61±0.10 (0.024±0.004)	0.91±0.13 (0.036±0.005)
B	top: 0.0 +0.3/-0.0 (0.0+0.012) bottom: 0.35±0.20 (0.014±0.008)	0.25±0.15 (0.010±0.006)

Operating/Storage
Temp. Range:
-55°C to +125°C

HOW TO ORDER

L	0805	4R7	D	E	S	TR
Product Inductor	Size 0603 0805	Inductance Expressed in nH (2 significant digits + number of zeros) for values <10nH, letter R denotes decimal point. Example: 22nH = 220 4.7nH = 4R7	Tolerance for L ≤ 4.7nH, B = ±0.1nH C = ±0.2nH D = ±0.5nH 4.7nH < L < 10nH, C = ±0.2nH D = ±0.5nH L ≥ 10nH, G = ±2% J = ±5%	Specification Code E = Accu-L® 0805 technology G = Accu-L® 0603 technology	Termination Code W = Nickel/ solder coated (Sn 63, Pb 37) **S = Nickel/ Lead Free Solder coated (Sn100)	Packaging Code TR = Tape and Reel (3,000/reel)

Not RoHS Compliant



LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



RoHS
COMPLIANT

****RoHS compliant**

For RoHS compliant products,
please select correct termination style.

ELECTRICAL SPECIFICATIONS TABLE FOR ACCU-L® 0603

Inductance L (nH)	450 MHz Test Frequency		900 MHz Test Frequency		1900 MHz Test Frequency		2400 MHz Test Frequency		SRF min (MHz)	R _{DC} max (Ω)	I _{DC} max (mA)
	Available Inductance Tolerance	Q Typical	L (nH)	Q Typical	L (nH)	Q Typical	L (nH)	Q Typical			
1.2	±0.1, ±0.2nH	49	1.2	70	1.2	134	1.2	170	10000	0.04	1000
1.5	±0.1, ±0.2nH	26	1.54	39	1.52	63	1.52	76	10000	0.06	1000
1.8	±0.1, ±0.2nH	20	1.74	30	1.73	50	1.72	59	10000	0.07	1000
2.2	±0.1, ±0.2nH	20	2.2	30	2.24	49	2.24	56	10000	0.08	1000
2.7	±0.1, ±0.2nH	21	2.7	30	2.75	48	2.79	54	9000	0.08	750
3.3	±0.1, ±0.2, ±0.5nH	24	3.33	35	3.39	56	3.47	64	8400	0.08	750
3.9	±0.1, ±0.2, ±0.5nH	25	3.9	57	4.06	60	4.21	69	6500	0.12	500
4.7	±0.1, ±0.2, ±0.5nH	23	4.68	32	4.92	46	5.2	49	5500	0.15	500
5.6	±0.2, ±0.5nH	26	5.65	36	5.94	54	6.23	60	5000	0.25	300
6.8	±0.2, ±0.5nH	23	6.9	33	7.3	47	8.1	39	4500	0.30	300
8.2	±0.2, ±0.5nH	23	8.4	31	10	35	12.1	31	3800	0.35	300
10.0	±2%, ±5%	28	10	39	11.8	47	14.1	41	3500	0.45	300
12.0	±2%, ±5%	28	13.2	38	14.1	30	17.2	20	3000	0.50	300
15.0	±2%, ±5%	28	16.2	38	25.9	30	49.8	15	2500	0.60	300

(1) I_{DC} measured for 15°C rise at 25°C ambient temperature when soldered to FR-4 board. Inductance and Q measured on Agilent 4291B / 4287 using the 16196A test fixture.

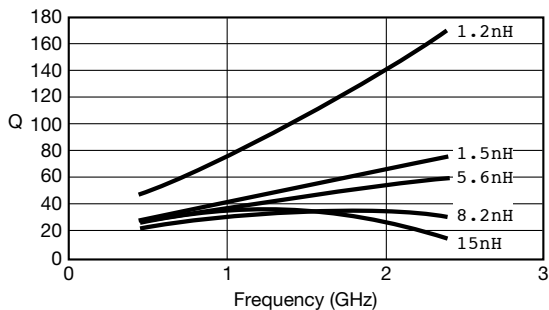
ELECTRICAL SPECIFICATIONS TABLE FOR ACCU-L® 0805

Inductance L (nH)	450 MHz Test Frequency		900 MHz Test Frequency		1700 MHz Test Frequency		2400 MHz Test Frequency		SRF min (MHz)	R _{DC} max (Ω)	I _{DC} max (mA)	
	Available Inductance Tolerance	Q Typical	L (nH)	Q Typical	L (nH)	Q Typical	L (nH)	Q Typical			ΔT = 15°C (1)	ΔT = 70°C (2)
1.2	±0.1nH, ±0.2nH, ±0.5nH	60	1.2	92	1.2	122	1.2	92	10000	0.05	1000	2000
1.5	±0.1nH, ±0.2nH, ±0.5nH	50	1.5	74	1.5	102	1.5	84	10000	0.05	1000	2000
1.8	±0.1nH, ±0.2nH, ±0.5nH	50	1.8	72	1.8	88	1.9	73	10000	0.06	1000	2000
2.2	±0.1nH, ±0.2nH, ±0.5nH	42	2.2	62	2.2	82	2.3	72	10000	0.07	1000	2000
2.7	±0.1nH, ±0.2nH, ±0.5nH	42	2.7	62	2.8	80	2.9	70	10000	0.08	1000	2000
3.3	±0.1nH, ±0.2nH, ±0.5nH	38	3.3	46	3.4	48	3.5	57	10000	0.11	750	1500
3.9	±0.1nH, ±0.2nH, ±0.5nH	27	3.9	36	4.0	38	4.1	42	10000	0.20	750	1500
4.7	±0.1nH, ±0.2nH, ±0.5nH	43	4.8	62	5.3	76	5.8	60	5500	0.10	750	1500
5.6	±0.5nH	50	5.7	68	6.3	73	7.6	62	4600	0.10	750	1500
6.8	±0.5nH	43	7.0	62	7.7	71	9.4	50	4500	0.11	750	1500
8.2	±0.5nH	43	8.5	56	10.0	55	15.2	32	3500	0.12	750	1500
10	±2%, ±5%	46	10.6	60	13.4	52	-	-	2500	0.13	750	1500
12	±2%, ±5%	40	12.9	50	17.3	40	-	-	2400	0.20	750	1500
15	±2%, ±5%	36	16.7	46	27	23	-	-	2200	0.20	750	1000
18	±2%, ±5%	30	21.9	27	-	-	-	-	1700	0.35	500	1000
22	±2%, ±5%	36	27.5	33	-	-	-	-	1400	0.40	500	1000

(1) I_{DC} measured for 15°C rise at 25°C ambient temperature. (2) I_{DC} measured for 70°C rise at 25°C ambient temperature. L, Q, SRF measured on HP 4291A, Boonton 34A and Wiltron 360 Vector Analyzer, R_{DC} measured on Keithley 580 micro-ohmmeter.

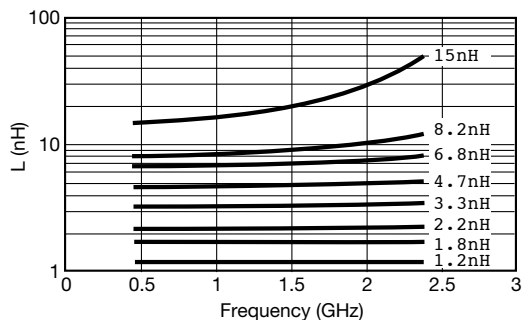
L0603

**Typical Q vs. Frequency
L0603**



Measured on AGILENT 4291B/4287 using the 16196A test fixture

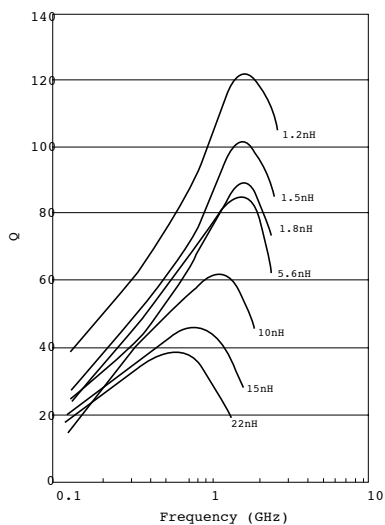
**Typical Inductance vs. Frequency
L0603**



Measured on AGILENT 4291B/4287 using the 16196A test fixture

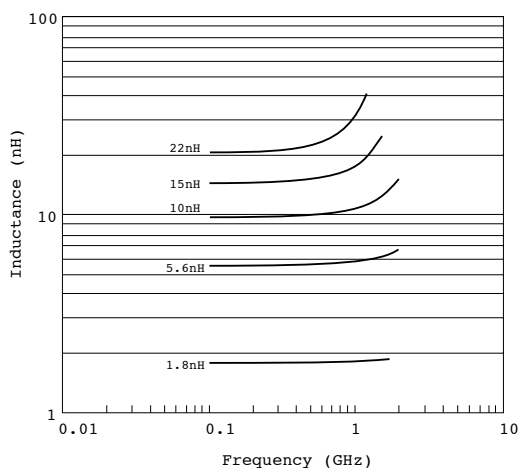
L0805

**Typical Q vs. Frequency
L0805**



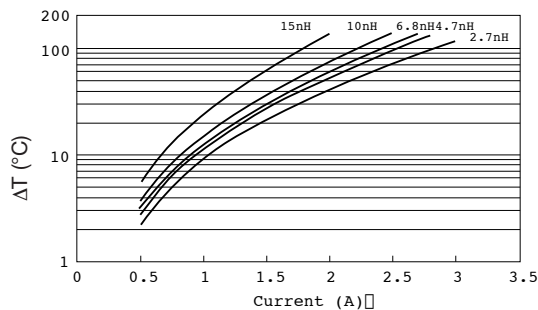
Measured on HP4291A and Boonton 34A Coaxial Line

**Typical Inductance vs. Frequency
L0805**



Measured on HP4291A and Wiltron 360 Vector Analyzer

**Maximum Temperature Rise
at 25°C ambient temperature (on FR-4)
L0805**



Temperature rise will typically be no higher than shown by the graph

GENERAL DESCRIPTION ITF TECHNOLOGY

The L0402 LGA Inductor is based on thin-film multilayer technology. The technology provides a miniature part with excellent high frequency performance and rugged construction for reliable automatic assembly.

APPLICATIONS

- Mobile Communications
- Satellite TV Receivers
- GPS
- Vehicle Location Systems
- Wireless LAN's
- Filters
- Matching Networks

LAND GRID ARRAY ADVANTAGES

- Inherent Low Profile
- Self Alignment during Reflow
- Excellent Solderability
- Low Parasitics
- Better Heat Dissipation

HOW TO ORDER



P/N Example: **L04023R3BHNT**

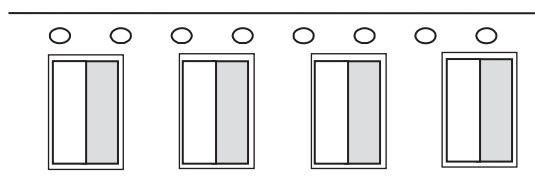
QUALITY INSPECTION

Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:

- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C, I_r , 4 hours

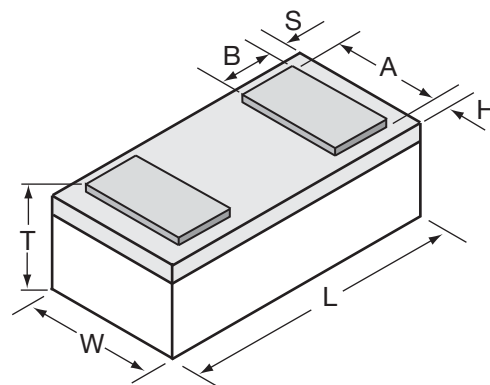
MAKING AND ORIENTATION IN TAPE

(Top View)



DIMENSIONS: (Bottom View)

millimeters (inches)



L	1.00±0.10 (0.039±0.004)
W	0.58±0.07 (0.023±0.003)
T	0.35±0.10 (0.014±0.004)

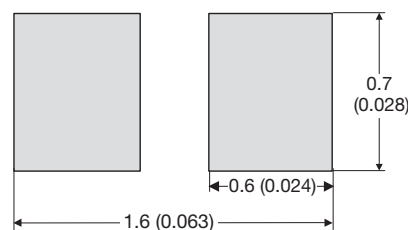
A	0.48±0.05 (0.019±0.002)
B	0.17±0.05 (0.007±0.002)
S, H	0.064±0.05 (0.003±0.002)



TERMINATION

Nickel/Lead Free solder coating compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

Recommended Pad Layout Dimensions mm (inches)



ELECTRICAL SPECIFICATIONS

L(nH)	450MHz			900MHz	1900MHz	2400MHz	SRF min. (MHz)	R _{dc} max. (Ω)	I _{dc} max. (mA)
	Tolerance A=±0.05nH, B=±0.1nH, C=±0.2nH, D=±0.5nH	Q (min)	Q (Typ)	Q (Typ)	Q (Typ)	Q (Typ)			
0.56	± 0.05nH, ± 0.1nH	35	45	55	65	75	20000	0.02	1000
0.68	± 0.05nH, ± 0.1nH	30	40	50	60	70	20000	0.04	750
0.82	± 0.05nH, ± 0.1nH	25	40	50	60	70	20000	0.06	500
1.0	± 0.05nH, ± 0.1nH	20	30	35	40	50	20000	0.15	500
1.2	± 0.05nH, ± 0.1nH, ± 0.2nH	20	30	30	40	45	20000	0.20	400
1.5	± 0.05nH, ± 0.1nH, ± 0.2nH	20	25	30	40	40	18000	0.20	400
1.8	± 0.05nH, ± 0.1nH, ± 0.2nH	18	20	30	35	40	16000	0.20	400
2.2	± 0.05nH, ± 0.1nH, ± 0.2nH	15	20	25	35	40	15000	0.20	400
2.7	± 0.05nH, ± 0.1nH, ± 0.2nH	15	20	25	35	40	9500	0.25	250
3.3	± 0.1nH, ± 0.2nH, ± 0.5nH	15	20	25	35	40	8500	0.40	250
3.9	± 0.1nH, ± 0.2nH, ± 0.5nH	13	20	20	30	30	8000	0.45	250
4.7	± 0.1nH, ± 0.2nH, ± 0.5nH	13	20	20	30	30	7500	0.45	250
5.6	± 0.1nH, ± 0.2nH, ± 0.5nH	13	20	20	30	30	7000	0.65	200
6.8	± 0.1nH, ± 0.2nH, ± 0.5nH	12	15	20	25	30	6500	0.90	200

Please contact factory for intermediate inductance values within the indicated range.



ACCU-L[®] TECHNOLOGY

The L0201 SMD Tuning Inductor is based on thin-film multilayer technology. The technology provides a miniature part with excellent high frequency performance and rugged construction for reliable automatic assembly.

APPLICATIONS

- Mobile Communications
- Satellite TV Receivers
- GPS
- Vehicle Location Systems
- Wireless LAN's
- Filters
- Matching Networks

HOW TO ORDER

L0201	XXX	X	H	S	TR	
	Inductance (nH)	Tolerance	Series	Lead Free Termination	Taped & Reeled	

P/N Example: **L02013R3BHSTR**

QUALITY INSPECTION

Finished parts are 100% tested for electrical parameters and visual characteristics. Each production lot is evaluated on a sample basis for:

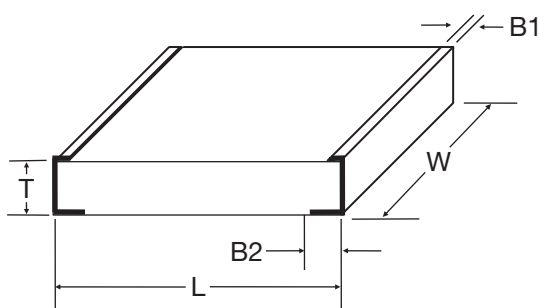
- Static Humidity: 85°C, 85% RH, 160 hours
- Endurance: 125°C, I_R , 4 hours

TERMINATION

Nickel/Lead Free solder coating compatible with automatic soldering technologies: reflow, wave soldering, vapor phase and manual.

DIMENSIONS: (TOP View)

millimeters (inches)

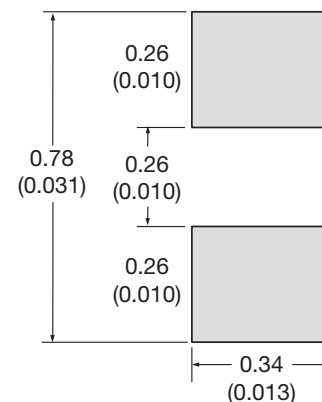


L	0.600±0.050 (0.024±0.002)
W	0.325±0.050 (0.013±0.002)
T	0.225±0.050 (0.009±0.002)

B1	0.100±0.100 (0.004±0.004)
B2	0.150±0.050 (0.006±0.002)

Recommended Pad Layout Dimensions

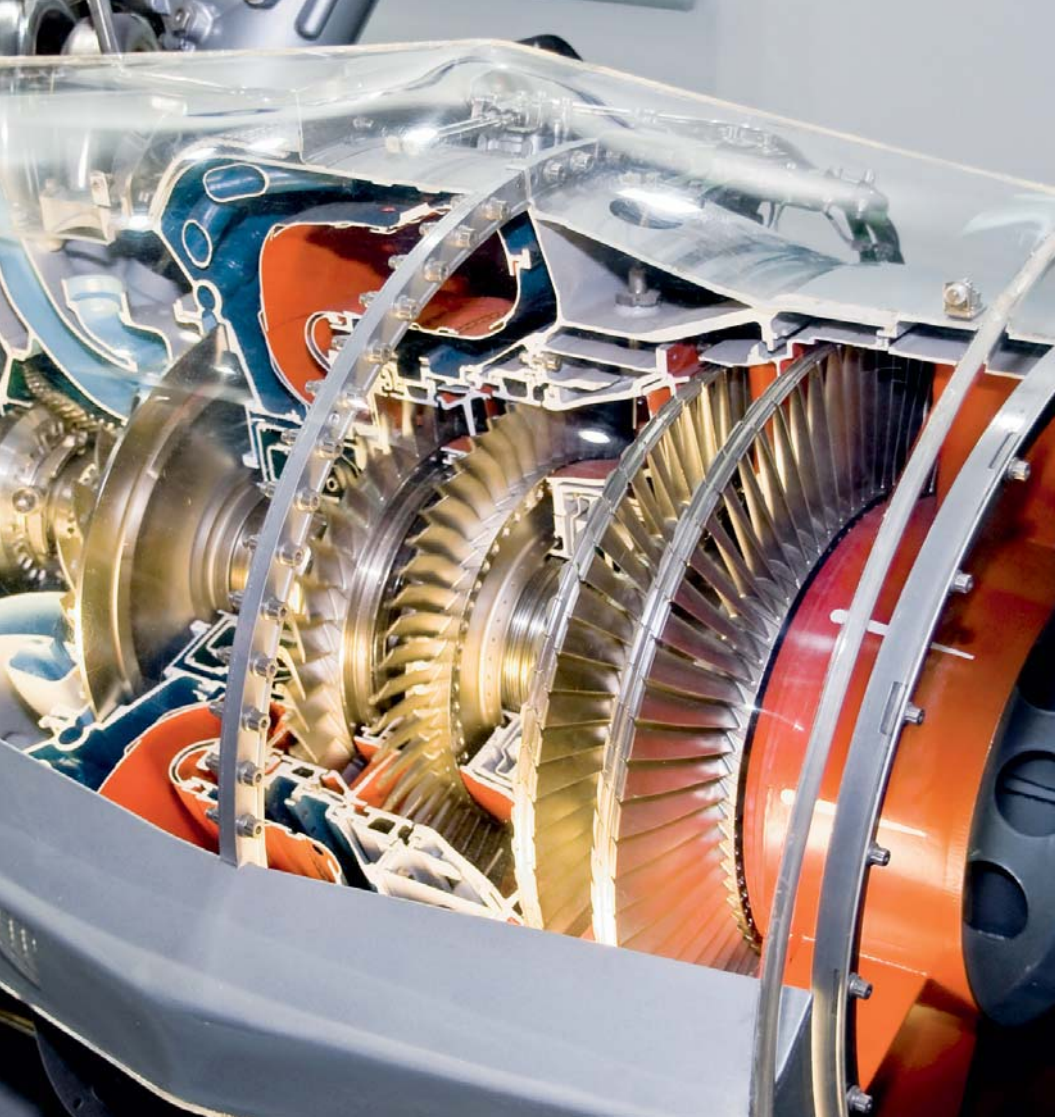
mm (inches)



ELECTRICAL SPECIFICATIONS

L(nH)	450MHz		900MHz	1900MHz	2400MHz	SRF min. (GHz)	R _{DC} max. (Ω)	I _{DC} max. (mA)
	Tolerance A=±0.05nH, B=±0.1nH, C=±0.2nH, D=±0.5nH	Q (min)	Q (Typ)	Q (Typ)	Q (Typ)			
0.33	±0.05nH, ± 0.1nH, ± 0.2nH	13	24	36	39	35	0.1	550
0.39	±0.05nH, ± 0.1nH, ± 0.2nH	11	23	34	38	33	0.1	550
0.47	±0.05nH, ± 0.1nH, ± 0.2nH	10	18	26	30	32	0.1	550
0.56	±0.05nH, ± 0.1nH, ± 0.2nH	9	16	24	27	31	0.1	500
0.68	±0.05nH, ± 0.1nH, ± 0.2nH	8	19	28	32	30	0.2	500
0.82	±0.05nH, ± 0.1nH, ± 0.2nH	8	19	28	32	28	0.2	400
1.0	±0.05nH, ± 0.1nH, ± 0.2nH	7	16	26	30	26	0.2	400
1.2	±0.05nH, ± 0.1nH, ± 0.2nH	7	16	26	30	24	0.3	300
1.5	± 0.1nH, ± 0.2nH, ± 0.5nH	7	16	26	30	23	0.5	250
1.8	± 0.1nH, ± 0.2nH, ± 0.5nH	7	15	25	29	20	0.5	250
2.2	± 0.1nH, ± 0.2nH, ± 0.5nH	7	15	22	24	18	0.6	200
2.7	± 0.1nH, ± 0.2nH, ± 0.5nH	7	15	22	24	14	0.7	180
3.3	± 0.1nH, ± 0.2nH, ± 0.5nH	7	15	22	24	13	1.0	150

All intermediate Inductance values within the indicated range are available.



SIGNAL INTEGRITY PRODUCTS

AVX has provided a wide range of signal integrity products, filter capacitors, and low inductance ceramic capacitors. These provide excellent options for decoupling and low-pass filtering.

Feedthru Filters

Surface mount ceramic feedthru capacitors, excellent for EMI suppression and line filtering

LICC

Low inductance capacitors, commonly referred to as having "reverse geometry"

IDC

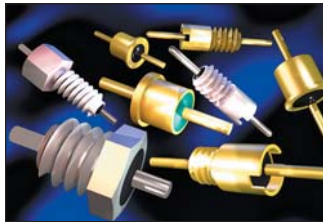
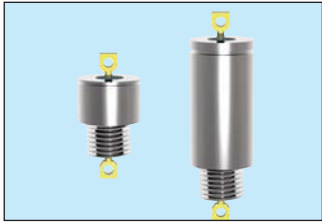
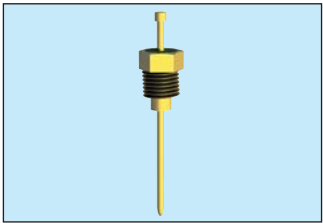
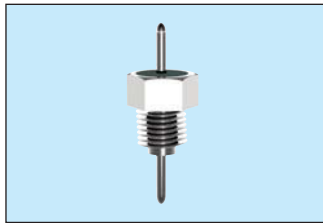
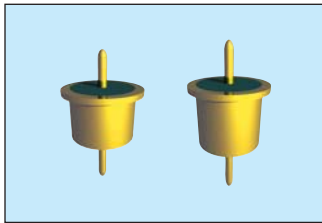
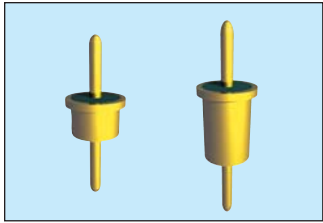
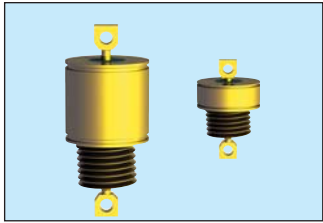
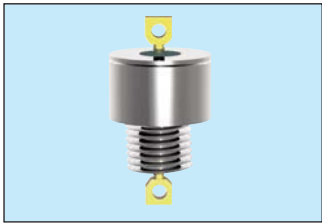
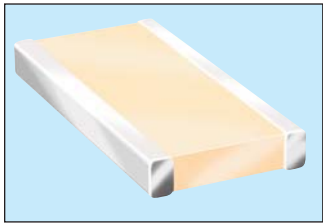
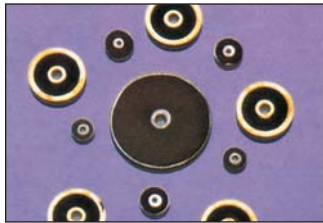
InterDigitated capacitors allowing for reduced inductance, beyond the capability of LICC

LGA

Very low inductance capacitors, allowing for dramatically reduced inductance compared to traditional MLCC.

EMI Filters

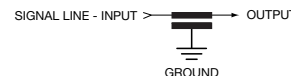
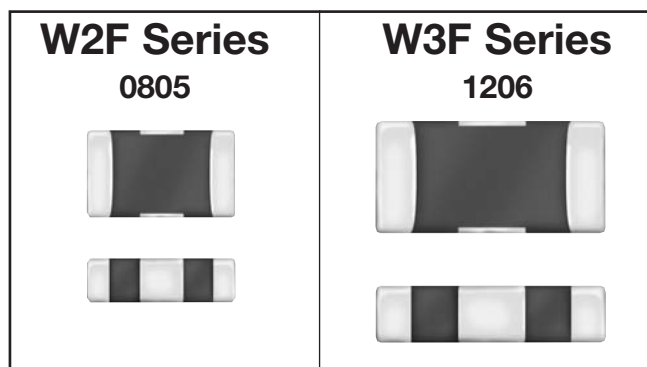
Bolt-in, Solder-in, or Cylindrical EMI filters, in a variety of styles and sizes



A KYOCERA GROUP COMPANY

GENERAL DESCRIPTION

Available in both a standard 0805 and 1206 size, AVX's line of feedthru capacitors are ideal choices for EMI suppression, broadband I/O filtering, or Vcc power line conditioning. The unique construction of a feedthru capacitor provides low parallel inductance and offers excellent decoupling capability for all high di/dt environments and provides significant noise reduction in digital circuits to <5 GHz. A large range of capacitor values are available in either NP0 or X7R ceramic dielectrics. AVX FeedThru filters are AEC Q200 qualified. High reliability screening options are available for spacecraft designs.



CAPACITOR VALUES

Part Number	Size	Voltage	Dielectric	Capacitance
W2F11A 220 8ATxx	0805	100V	NP0	22pF
W2F11A 470 8ATxx	0805	100V	NP0	47pF
W2F11A 101 8ATxx	0805	100V	NP0	100pF
W2F11A 221 8ATxx	0805	100V	NP0	220pF
W2F11A 471 8ATxx	0805	100V	NP0	470pF
W2F15C 102 8ATxx	0805	50V	X7R	1000pF
W2F15C 222 8ATxx	0805	50V	X7R	2200pF
W2F15C 472 8ATxx	0805	50V	X7R	4700pF
W2F15C 103 8ATxx	0805	50V	X7R	10000pF
W2F15C 223 8ATxx	0805	50V	X7R	22000pF
W2F15C 473 8ATxx	0805	50V	X7R	47000pF
W3F11A 220 8ATxx	1206	100V	NP0	22pF
W3F11A 470 8ATxx	1206	100V	NP0	47pF
W3F11A 101 8ATxx	1206	100V	NP0	100pF
W3F11A 221 8ATxx	1206	100V	NP0	220pF
W3F11A 471 8ATxx	1206	100V	NP0	470pF
W3F15C 102 8ATxx	1206	50V	X7R	1000pF
W3F15C 222 8ATxx	1206	50V	X7R	2200pF
W3F15C 472 8ATxx	1206	50V	X7R	4700pF
W3F15C 103 8ATxx	1206	50V	X7R	10000pF
W3F15C 223 8ATxx*	1206	50V	X7R	22000pF
W3F15C 473 8ATxx	1206	50V	X7R	47000pF

PERFORMANCE CHARACTERISTICS

	NP0	X7R
Capacitance Tolerance	+50%, -20%	+50%, -20%
Voltage Rating	100V	50V
Current Rating	300mA	300mA
Insulation Resistance	1000MΩ	1000MΩ
DC Resistance	<0.6Ω	<0.6Ω
Operating Temperature Range	-55 to +125°C	

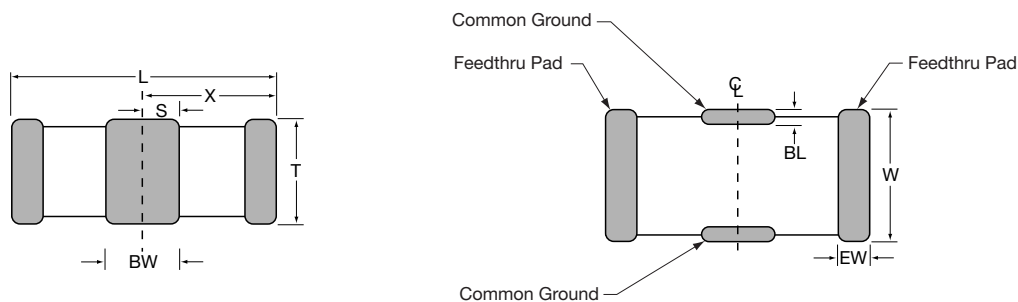


HOW TO ORDER

W	3	F	1	5	C	223	8	A	T	3	A
Style	Size	Feedthru	Number of Elements	Voltage**	Dielectric	Capacitance Code	Capacitance Tolerance	Failure Rate	Termination	Packaging Code (Reel Size)	Quantity Code (Pcs./Reel)
W = Plated Ni & Sn L = Plated SnPb	2 = 0805 3 = 1206			1 = 100V 5 = 50V	A = NP0 C = X7R		8 = +50/-20%	A = Not Applicable 4 = AUTOMOTIVE	T = Plated Ni & Sn B = Plated SnPb	1 & 2 = 7" Reel Embossed Tape 3 & 4 = 13" Reel Embossed Tape	F = 1,000 A = 2,000, 4,000 or 10,000

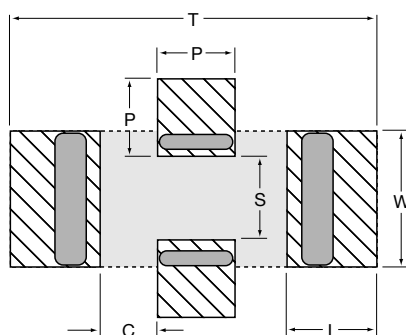
*AECQ-200 Qualified. Contact factory for other values.

**Note: NP0 available in 100V only and X7R available in 50V only.



DIMENSIONS

	L	W	T	BW	BL	EW	X	S
0805 MM (in.)	2.01 ± 0.20 (0.079 ± 0.008)	1.25 ± 0.20 (0.049 ± 0.008)	1.14 Max. (0.045 Max.)	0.46 ± 0.10 (0.018 ± 0.004)	0.18 + 0.25 - 0.08 (0.007 + 0.010 - 0.003)	0.25 ± 0.13 (0.010 ± 0.005)	1.02 ± 0.10 (0.040 ± 0.004)	0.23 ± 0.15 (0.009 ± 0.006)
1206 MM (in.)	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	1.27 Max. (0.050 Max.)	0.89 ± 0.10 (0.035 ± 0.004)	0.18 + 0.25 - 0.08 (0.007 + 0.010 - 0.003)	0.38 ± 0.18 (0.015 ± 0.007)	1.60 ± 0.10 (0.063 ± 0.004)	0.46 ± 0.15 (0.018 ± 0.006)

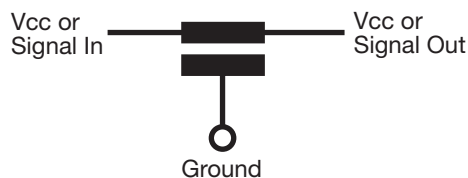


RECOMMENDED SOLDER PAD LAYOUT (TYPICAL DIMENSIONS)

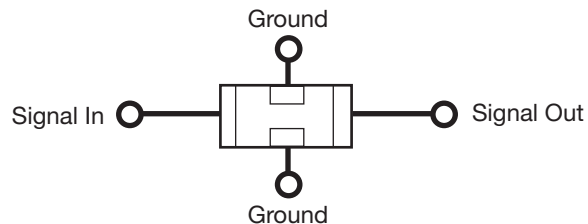
	T	P	S	W	L	C
0805 MM (in.)	3.45 (0.136)	0.51 (0.020)	0.76 (0.030)	1.27 (0.050)	1.02 (0.040)	0.46 (0.018)
1206 MM (in.)	4.54 (0.179)	0.94 (0.037)	1.02 (0.040)	1.65 (0.065)	1.09 (0.043)	0.71 (0.028)

TYPICAL FEEDTHRU CHIP CAP CONNECTION

Feedthru Chip Component Model

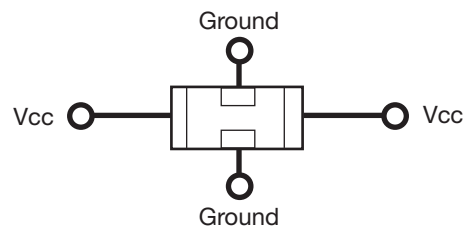


Physical Layout - A



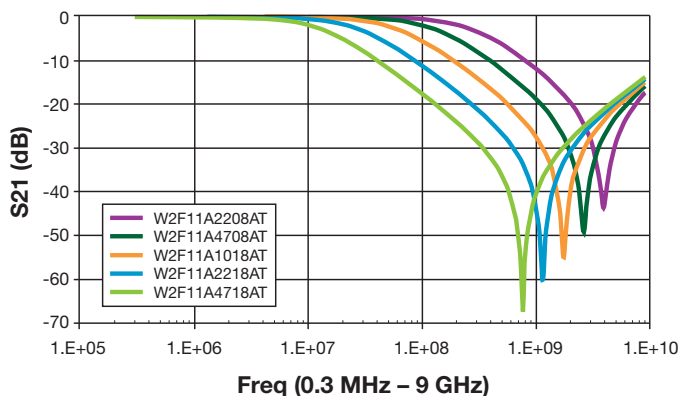
The terminals are connected internally side to side. Left side and right side are connected and front and back are connected internally. For Decoupling, the chip is usually surrounded by four vias, two for Vcc and two for GND. For Signal Filtering, the in and out lines need to be separated on the circuit board.

Physical Layout - B

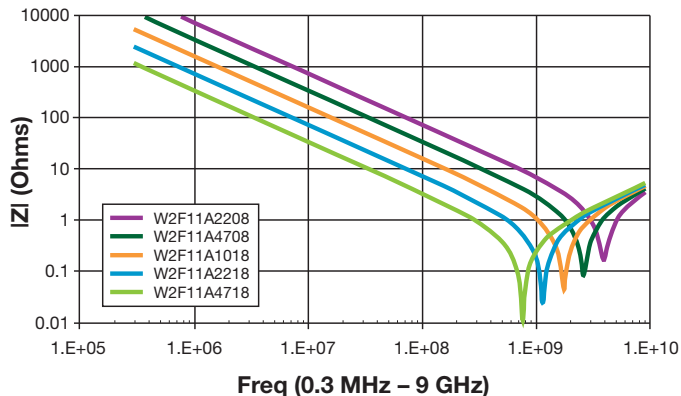


PERFORMANCE CHARACTERISTICS

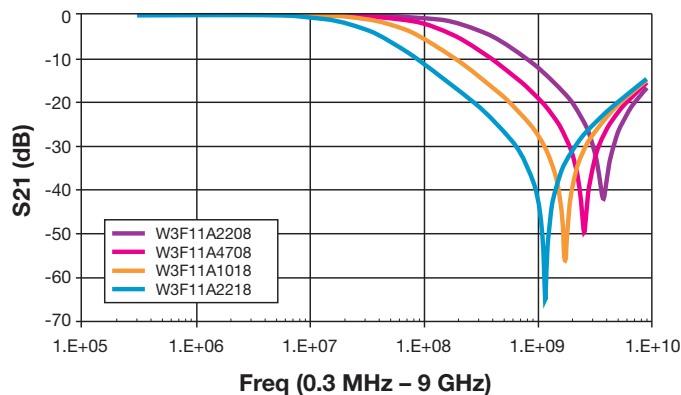
S21 0805 – 100V



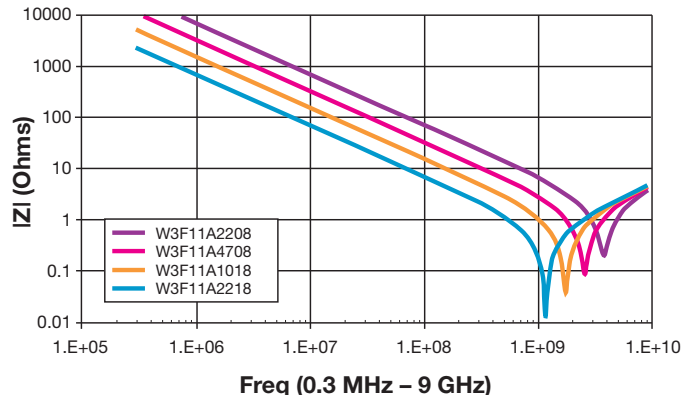
IMPEDANCE 0805 – 100V



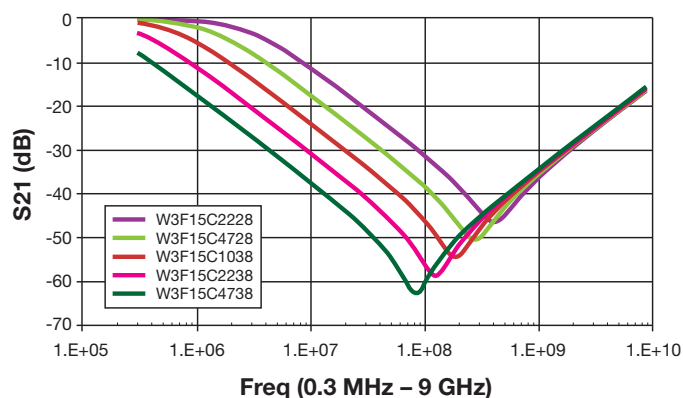
S21 1206 – 100V



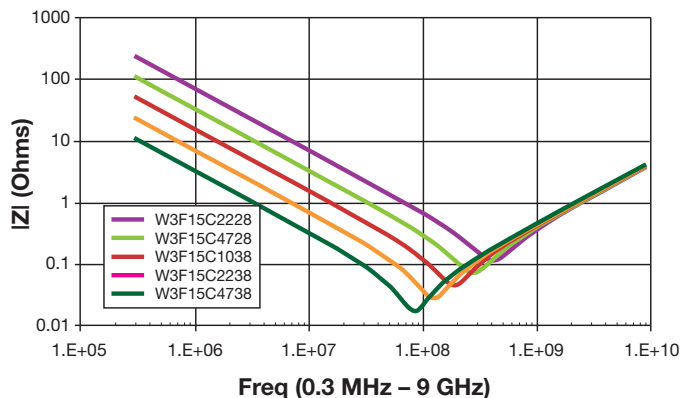
IMPEDANCE 1206 – 100V



S21 1206 – 50V

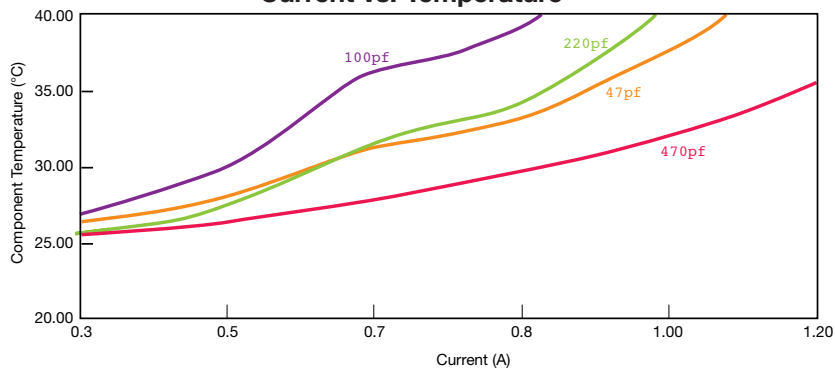


IMPEDANCE 1206 – 50V

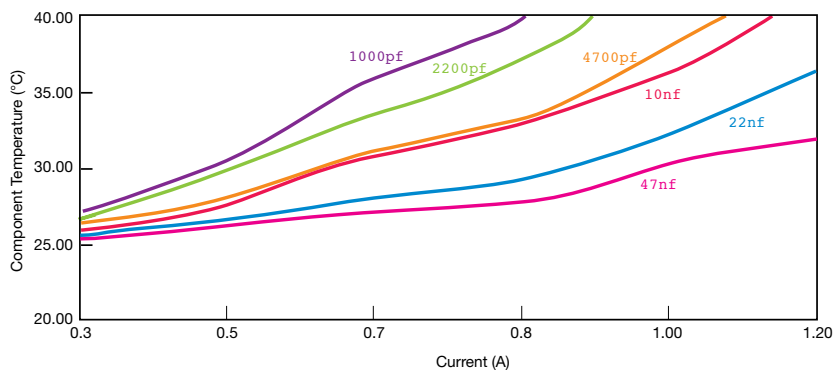


PERFORMANCE CHARACTERISTICS

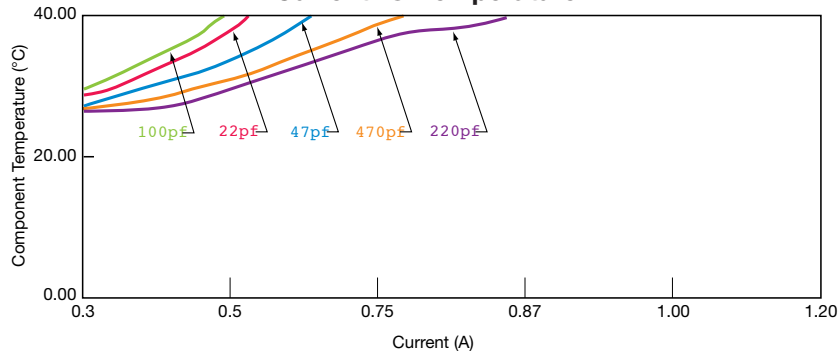
0805 NPO
Current vs. Temperature



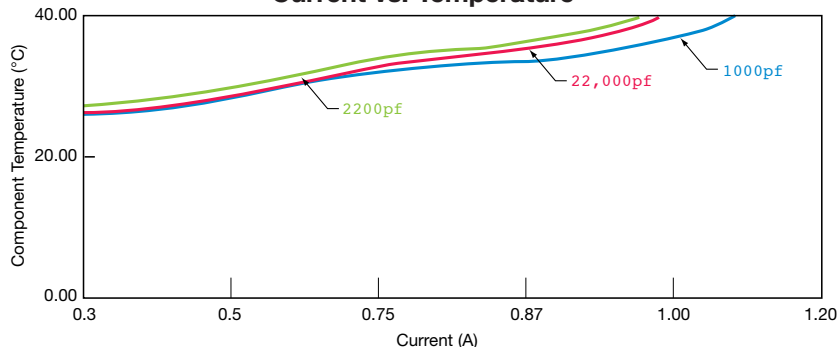
0805 X7R
Current vs. Temperature



1206 NPO
Current vs. Temperature



1206 X7R
Current vs. Temperature



The signal integrity characteristics of a Power Delivery Network (PDN) are becoming critical aspects of board level and semiconductor package designs due to higher operating frequencies, larger power demands, and the ever shrinking lower and upper voltage limits around low operating voltages. These power system challenges are coming from mainstream designs with operating frequencies of 300MHz or greater, modest ICs with power demand of 15 watts or more, and operating voltages below 3 volts.

The classic PDN topology is comprised of a series of capacitor stages. Figure 1 is an example of this architecture with multiple capacitor stages.

An ideal capacitor can transfer all its stored energy to a load instantly. A real capacitor has parasitics that prevent instantaneous transfer of a capacitor's stored energy. The true nature of a capacitor can be modeled as an RLC equivalent circuit. For most simulation purposes, it is possible to model the characteristics of a real capacitor with one

capacitor, one resistor, and one inductor. The RLC values in this model are commonly referred to as equivalent series capacitance (ESC), equivalent series resistance (ESR), and equivalent series inductance (ESL).

The ESL of a capacitor determines the speed of energy transfer to a load. The lower the ESL of a capacitor, the faster that energy can be transferred to a load. Historically, there has been a tradeoff between energy storage (capacitance) and inductance (speed of energy delivery). Low ESL devices typically have low capacitance. Likewise, higher capacitance devices typically have higher ESLs. This tradeoff between ESL (speed of energy delivery) and capacitance (energy storage) drives the PDN design topology that places the fastest low ESL capacitors as close to the load as possible. Low Inductance MLCCs are found on semiconductor packages and on boards as close as possible to the load.

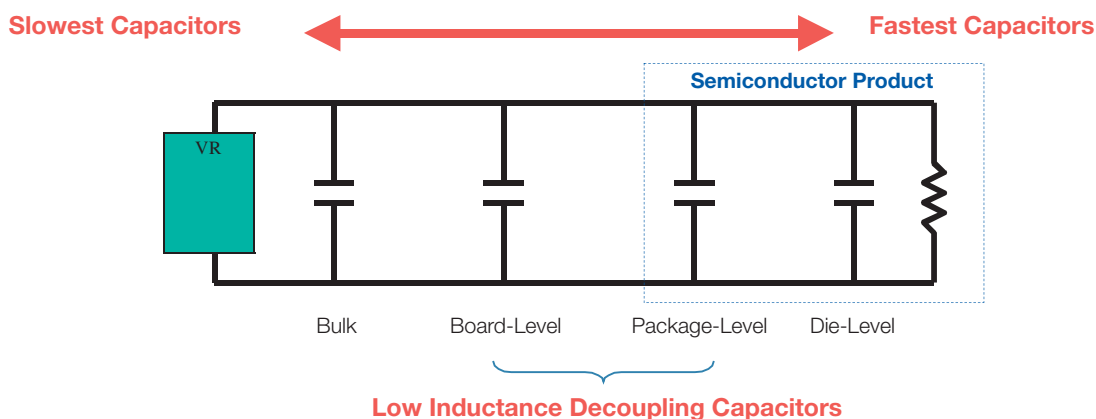


Figure 1 Classic Power Delivery Network (PDN) Architecture

LOW INDUCTANCE CHIP CAPACITORS

The key physical characteristic determining equivalent series inductance (ESL) of a capacitor is the size of the current loop it creates. The smaller the current loop, the lower the ESL. A standard surface mount MLCC is rectangular in shape with electrical terminations on its shorter sides. A Low Inductance Chip Capacitor (LICC) sometimes referred to as Reverse Geometry Capacitor (RGC) has its terminations on the longer side of its rectangular shape.

When the distance between terminations is reduced, the size of the current loop is reduced. Since the size of the current loop is the primary driver of inductance, an 0306 with a smaller current loop has significantly lower ESL than an 0603. The reduction in ESL varies by EIA size, however, ESL is typically reduced 60% or more with an LICC versus a standard MLCC.

INTERDIGITATED CAPACITORS

The size of a current loop has the greatest impact on the ESL characteristics of a surface mount capacitor. There is a secondary method for decreasing the ESL of a capacitor. This secondary method uses adjacent opposing current loops to reduce ESL. The InterDigitated Capacitor (IDC) utilizes both primary and secondary methods of reducing inductance. The IDC architecture shrinks the distance between terminations to minimize the current loop size, then further reduces inductance by creating adjacent opposing current loops.

An IDC is one single capacitor with an internal structure that has been optimized for low ESL. Similar to standard MLCC versus LICCs, the reduction in ESL varies by EIA case size. Typically, for the same EIA size, an IDC delivers an ESL that is at least 80% lower than an MLCC.

LAND GRID ARRAY (LGA) CAPACITORS

Land Grid Array (LGA) capacitors are based on the first Low ESL MLCC technology created to specifically address the design needs of current day Power Delivery Networks (PDNs). This is the 3rd low inductance capacitor technology developed by AVX. LGA technology provides engineers with new options. The LGA internal structure and manufacturing technology eliminates the historic need for a device to be physically small to create small current loops to minimize inductance.

The first family of LGA products are 2 terminal devices. A 2 terminal 0306 LGA delivers ESL performance that is equal to or better than an 0306 8 terminal IDC. The 2 terminal 0805 LGA delivers ESL performance that approaches the 0508 8 terminal IDC. New designs that would have used 8 terminal IDCs are moving to 2 terminal LGAs because the layout is easier for a 2 terminal device and manufacturing yield is better for a 2 terminal LGA versus an 8 terminal IDC.

LGA technology is also used in a 4 terminal family of products that AVX is sampling and will formerly introduce in 2008. Beyond 2008, there are new multi-terminal LGA product families that will provide even more attractive options for PDN designers.

LOW INDUCTANCE CHIP ARRAYS (LICA®)

The LICA® product family is the result of a joint development effort between AVX and IBM to develop a high performance MLCC family of decoupling capacitors. LICA was introduced in the 1980s and remains the leading choice of designers in high performance semiconductor packages and high reliability board level decoupling applications.

LICA® products are used in 99.999% uptime semiconductor package applications on both ceramic and organic substrates. The C4 solder ball termination option is the perfect compliment to flip-chip packaging technology. Mainframe class CPUs, ultimate performance multi-chip modules, and communications systems that must have the reliability of 5 9's use LICA®.

LICA® products with either Sn/Pb or Pb-free solder balls are used for decoupling in high reliability military and aerospace applications. These LICA® devices are used for decoupling of large pin count FPGAs, ASICs, CPUs, and other high power ICs with low operating voltages.

When high reliability decoupling applications require the very lowest ESL capacitors, LICA® products are the best option.

470 nF 0306 Impedance Comparison

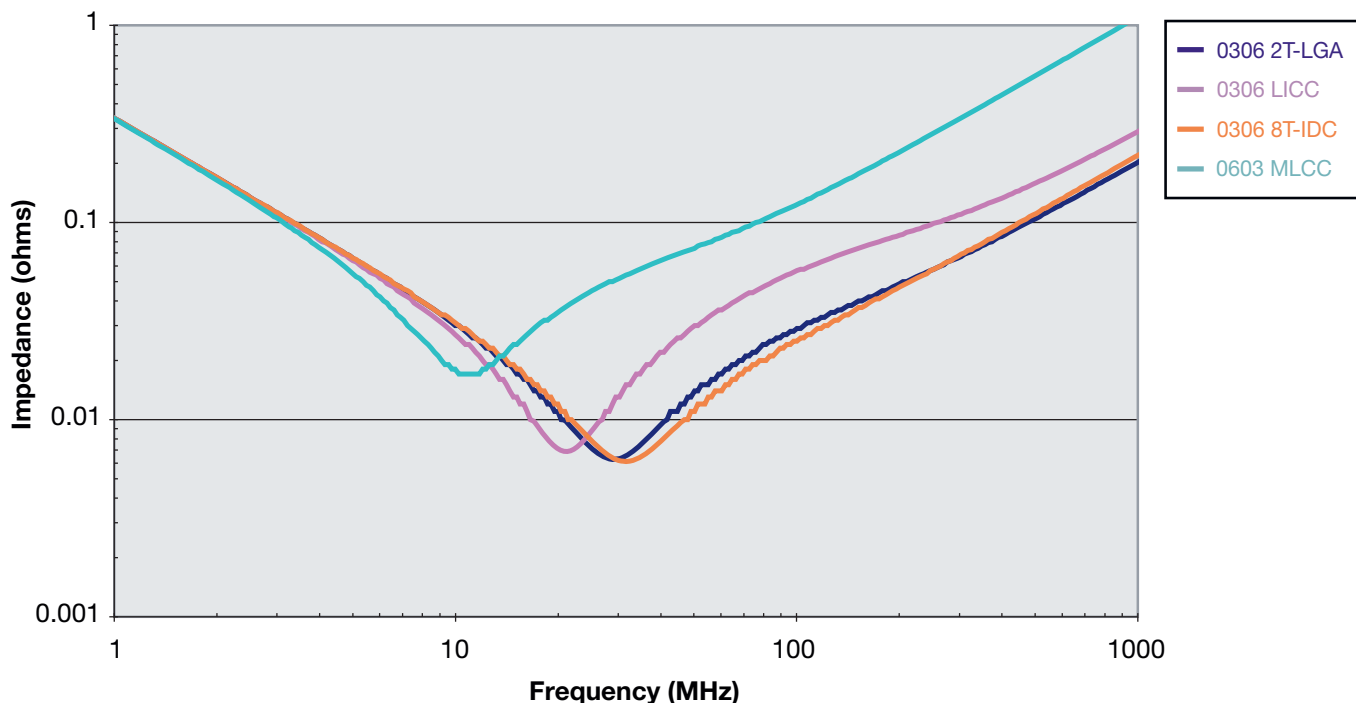


Figure 2 MLCC, LICC, IDC, and LGA technologies deliver different levels of equivalent series inductance (ESL).

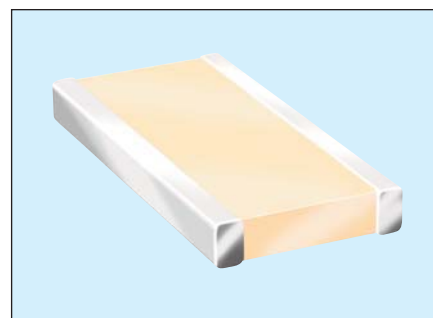
GENERAL DESCRIPTION

The key physical characteristic determining equivalent series inductance (ESL) of a capacitor is the size of the current loop it creates. The smaller the current loop, the lower the ESL.

A standard surface mount MLCC is rectangular in shape with electrical terminations on its shorter sides. A Low Inductance Chip Capacitor (LICC) sometimes referred to as Reverse Geometry Capacitor (RGC) has its terminations on the longer sides of its rectangular shape. The image on the right shows the termination differences between an MLCC and an LICC.

When the distance between terminations is reduced, the size of the current loop is reduced. Since the size of the current loop is the primary driver of inductance, an 0306 with a smaller current loop has significantly lower ESL than an 0603. The reduction in ESL varies by EIA size, however, ESL is typically reduced 60% or more with an LICC versus a standard MLCC.

AVX LICC products are available with a lead-free finish of plated Nickel/Tin.



PERFORMANCE CHARACTERISTICS

Capacitance Tolerances	K = $\pm 10\%$; M = $\pm 20\%$
Operation Temperature Range	X7R = -55°C to $+125^{\circ}\text{C}$ X5R = -55°C to $+85^{\circ}\text{C}$ X7S = -55°C to $+125^{\circ}\text{C}$
Temperature Coefficient	X7R, X5R = $\pm 15\%$; X7S = $\pm 22\%$
Voltage Ratings	4, 6.3, 10, 16, 25 VDC
Dissipation Factor	4V, 6.3V = 6.5% max; 10V = 5.0% max; 16V = 3.5% max; 25V = 3.0% max
Insulation Resistance (@+25°C, RVDC)	100,000M Ω min, or 1,000M Ω per μF min., whichever is less

HOW TO ORDER

0612

Size
0204
0306
0508
0612

Z

Voltage
4 = 4V
6 = 6.3V
Z = 10V
Y = 16V
3 = 25V
5 = 50V

D

Dielectric
C = X7R
D = X5R
W = X6S
Z = X7S

105

Capacitance Code (In pF)
2 Sig. Digits +
Number of Zeros

M

Capacitance Tolerance
K = $\pm 10\%$
M = $\pm 20\%$

A

Failure Rate
A = N/A

T

Terminations
T = Plated Ni
and Sn

2

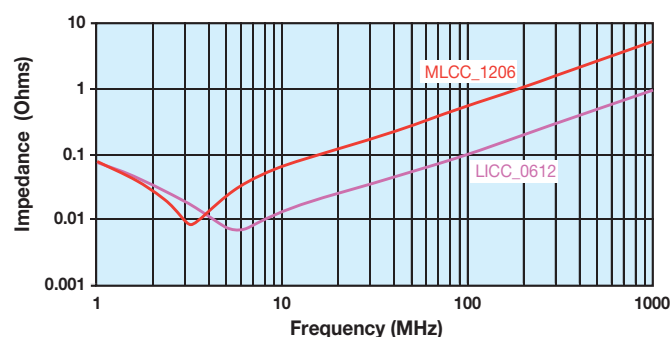
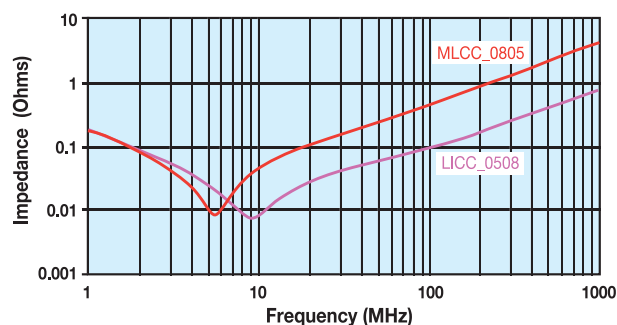
Packaging Available
2 = 7" Reel
4 = 13" Reel

A*

Thickness
Thickness
mm (in)
0.35 (0.014)
0.56 (0.022)
0.61 (0.024)
0.76 (0.030)
1.02 (0.040)
1.27 (0.050)

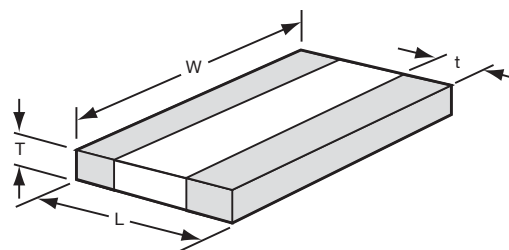
NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

TYPICAL IMPEDANCE CHARACTERISTICS



SIZE		0204				0306				0508				0612						
Packaging		Embossed				Embossed				Embossed				Embossed						
Length	mm (in.)	0.50 ± 0.05 (0.020 ± 0.002)				0.81 ± 0.15 (0.032 ± 0.006)				1.27 ± 0.25 (0.050 ± 0.010)				1.60 ± 0.25 (0.063 ± 0.010)						
Width	mm (in.)	1.00 ± 0.05 (0.040 ± 0.002)				1.60 ± 0.15 (0.063 ± 0.006)				2.00 ± 0.25 (0.080 ± 0.010)				3.20 ± 0.25 (0.126 ± 0.010)						
Cap Code	WVDC	4	6.3	10	16	4	6.3	10	16	25	6.3	10	16	25	50	6.3	10	16	25	50
102	Cap 0.001					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
222	(µF) 0.0022					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
332	0.0033					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
472	0.0047					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
682	0.0068					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
103	0.01					A	A	A	A	S	S	S	S	V	S	S	S	S	V	
153	0.015					A	A	A	A	S	S	S	S	V	S	S	S	S	W	
223	0.022					A	A	A	A	S	S	S	S	V	S	S	S	S	W	
333	0.033					A	A	A		S	S	S	V	V	S	S	S	S	W	
473	0.047					A	A	A		S	S	S	V	A	S	S	S	S	W	
683	0.068					A	A	A		S	S	S	A	A	S	S	S	V	W	
104	0.1					A	A			S	S	V	A	A	S	S	S	V	W	
154	0.15					A	A			S	S	V			S	S	S	W	W	
224	0.22					A	A			S	S	A			S	S	V	W		
334	0.33									V	V	A			S	S	V			
474	0.47									V	V				S	S	V			
684	0.68									A	A				V	V	W			
105	1									A	A				V	V	A			
155	1.5														W	W				
225	2.2														A	A				
335	3.3																			
475	4.7																			
685	6.8																			
106	10																			

PHYSICAL DIMENSIONS AND PAD LAYOUT



PHYSICAL CHIP DIMENSIONS

	mm (in)		
	L	W	t
0612	1.60 ± 0.25 (0.063 ± 0.010)	3.20 ± 0.25 (0.126 ± 0.010)	0.13 min. (0.005 min.)
0508	1.27 ± 0.25 (0.050 ± 0.010)	2.00 ± 0.25 (0.080 ± 0.010)	0.13 min. (0.005 min.)
0306	0.81 ± 0.15 (0.032 ± 0.006)	1.60 ± 0.15 (0.063 ± 0.006)	0.13 min. (0.005 min.)
0204	0.50 ± 0.05 (0.020 ± 0.002)	1.00 ± 0.05 (0.040 ± 0.002)	0.18 ± 0.08 (0.007 ± 0.003)

T - See Range Chart for Thickness and Codes

PAD LAYOUT DIMENSIONS

	mm (in)		
	A	B	C
0612	0.76 (0.030)	3.05 (0.120)	0.635 (0.025)
0508	0.51 (0.020)	2.03 (0.080)	0.76 (0.030)
0306	0.31 (0.012)	1.52 (0.060)	0.51 (0.020)
0204	0.15 (0.006)	0.75 (0.030)	1.20 (0.047)

Solid = X7R

= X5R

= X7S

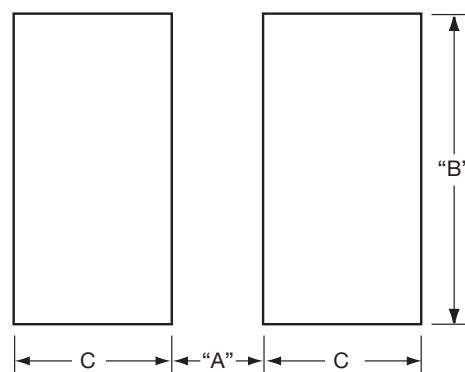
= X6S

mm (in.)	
0204	
Code	Thickness
C	0.35 (0.014)

mm (in.)	
0306	
Code	Thickness
A	0.56 (0.022)

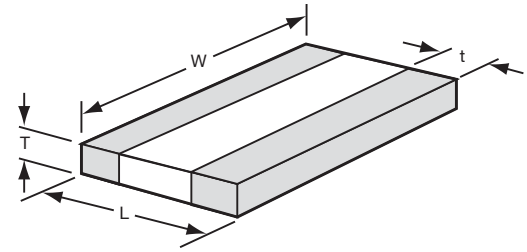
mm (in.)	
0508	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
A	1.02 (0.040)

mm (in.)	
0612	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
W	1.02 (0.040)
A	1.27 (0.050)



SIZE		0306				0508					0612				
Packaging		Embossed				Embossed					Embossed				
Length	mm	0.81 ± 0.15				1.27 ± 0.25					1.60 ± 0.25				
	(in.)	(0.032 ± 0.006)				(0.050 ± 0.010)					(0.063 ± 0.010)				
Width	mm	1.60 ± 0.15				2.00 ± 0.25					3.20 ± 0.25				
	(in.)	(0.063 ± 0.006)				(0.080 ± 0.010)					(0.126 ± 0.010)				
Cap Code	WVDC	6	10	16	25	6	10	16	25	50	6	10	16	25	50
102	Cap 0.001	A	A	A	A	S	S	S	S	V	S	S	S	S	V
222	(µF) 0.0022	A	A	A	A	S	S	S	S	V	S	S	S	S	V
332	0.0033	A	A	A	A	S	S	S	S	V	S	S	S	S	V
472	0.0047	A	A	A	A	S	S	S	S	V	S	S	S	S	V
682	0.0068	A	A	A	A	S	S	S	S	V	S	S	S	S	V
103	0.01	A	A	A	A	S	S	S	S	V	S	S	S	S	V
153	0.015	A	A	A	A	S	S	S	S	V	S	S	S	S	W
223	0.022	A	A	A	A	S	S	S	S	V	S	S	S	S	W
333	0.033	A	A	A		S	S	S	V	V	S	S	S	S	W
473	0.047	A	A	A		S	S	S	V	A	S	S	S	S	W
683	0.068	A	A	A		S	S	S	A	A	S	S	S	V	W
104	0.1					S	S	V	A	A	S	S	S	V	W
154	0.15					S	S				S	S	S	W	W
224	0.22					S	S				S	S	V	W	
334	0.33					V	V				S	S			
474	0.47					V	V				S	S			
684	0.68					A	A				V	V			
105	1					A	A				V	V			
155	1.5										W	W			
225	2.2										A	A			
335	3.3														
475	4.7														
685	6.8														
106	10														

PHYSICAL DIMENSIONS AND PAD LAYOUT



PHYSICAL CHIP DIMENSIONS

	mm (in)		
	L	W	t
0612	1.60 ± 0.25 (0.063 ± 0.010)	3.20 ± 0.25 (0.126 ± 0.010)	0.13 min. (0.005 min.)
0508	1.27 ± 0.25 (0.050 ± 0.010)	2.00 ± 0.25 (0.080 ± 0.010)	0.13 min. (0.005 min.)
0306	0.81 ± 0.15 (0.032 ± 0.006)	1.60 ± 0.15 (0.063 ± 0.006)	0.13 min. (0.005 min.)

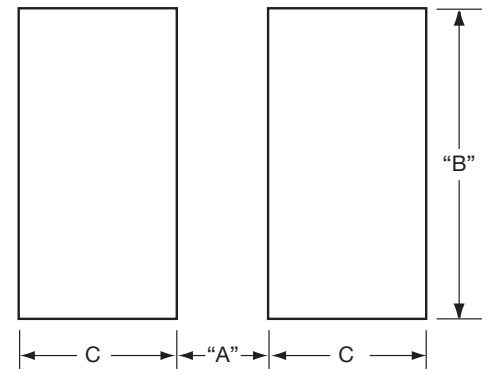
PAD LAYOUT DIMENSIONS

	mm (in)		
	A	B	C
0612	0.76 (0.030)	3.05 (0.120)	0.635 (0.025)
0508	0.51 (0.020)	2.03 (0.080)	0.76 (0.030)
0306	0.31 (0.012)	1.52 (0.060)	0.51 (0.020)

mm (in.)	
0306	
Code	Thickness
A	0.56 (0.022)

mm (in.)	
0508	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
A	1.02 (0.040)

mm (in.)	
0612	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
W	1.02 (0.040)
A	1.27 (0.050)



GENERAL DESCRIPTION

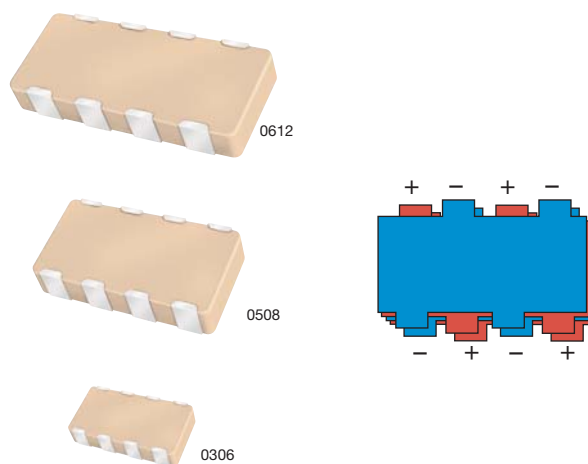
Inter-Digitated Capacitors (IDCs) are used for both semiconductor package and board level decoupling. The equivalent series inductance (ESL) of a single capacitor or an array of capacitors in parallel determines the response time of a Power Delivery Network (PDN). The lower the ESL of a PDN, the faster the response time. A designer can use many standard MLCCs in parallel to reduce ESL or a low ESL Inter-Digitated Capacitor (IDC) device. These IDC devices are available in versions with a maximum height of 0.95mm or 0.55mm.

IDCs are typically used on packages of semiconductor products with power levels of 15 watts or greater. Inter-Digitated Capacitors are used on CPU, GPU, ASIC, and ASSP devices produced on 0.13μ, 90nm, 65nm, and 45nm processes. IDC devices are used on both ceramic and organic package substrates. These low ESL surface mount capacitors can be placed on the bottom side or the top side of a package substrate. The low profile 0.55mm maximum height IDCs can easily be used on the bottom side of BGA packages or on the die side of packages under a heat spreader.

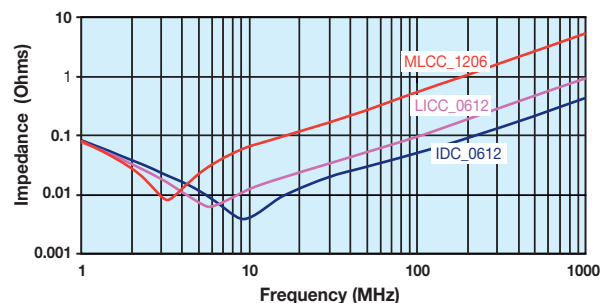
IDCs are used for board level decoupling of systems with speeds of 300MHz or greater. Low ESL IDCs free up valuable board space by reducing the number of capacitors required versus standard MLCCs. There are additional benefits to reducing the number of capacitors beyond saving board space including higher reliability from a reduction in the number of components and lower placement costs based on the need for fewer capacitors.

The Inter-Digitated Capacitor (IDC) technology was developed by AVX. This is the second family of Low Inductance MLCC products created by AVX. IDCs are a cost effective alternative to AVX's first generation low ESL family for high-reliability applications known as LICA (Low Inductance Chip Array).

AVX IDC products are available with a lead-free finish of plated Nickel/Tin.



TYPICAL IMPEDANCE



HOW TO ORDER

W	3	L	1	6	D	225	M	A	T	3	A
Style	IDC Case Size	Low Inductance	Number of Terminals	Voltage	Dielectric	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	Termination	Packaging	Thickness
	2 = 0508 3 = 0612 4 = 0306		1 = 8 Terminals	4 = 4V 6 = 6.3V Z = 10V Y = 16V 3 = 25V	C = X7R D = X5R Z = X7S	2 Sig. Digits + Number of Zeros	M = ±20%	A = N/A	T = Plated Ni and Sn	Available 1=7" Reel 3=13" Reel	Max. Thickness mm (in.) A=Standard S=0.55 (0.022)

NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

PERFORMANCE CHARACTERISTICS

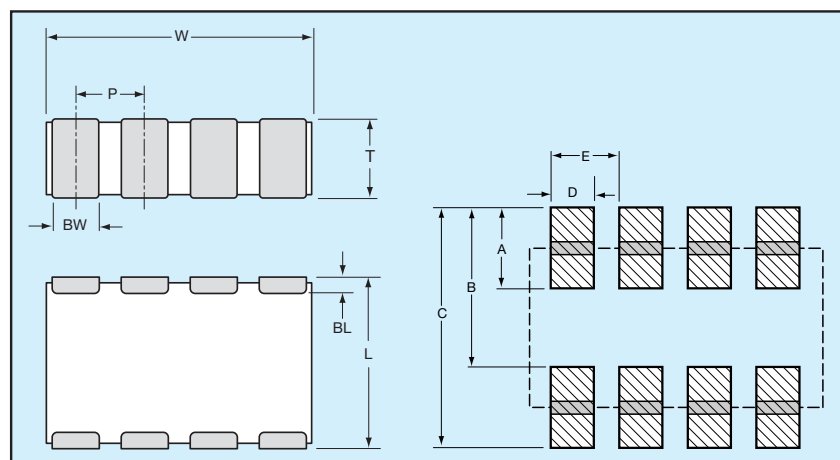
Capacitance Tolerance	±20% Preferred
Operation Temperature Range	X7R = -55°C to +125°C X5R = -55°C to +85°C X7S = -55°C to +125°C
Temperature Coefficient	±15% (0VDC), ±22% (X7S)
Voltage Ratings	4, 6.3, 10, 16, 25 VDC
Dissipation Factor	≤ 6.3V = 6.5% max; 10V = 5.0% max; ≥ 16V = 3.5% max
Insulation Resistance (@+25°C, RVDC)	100,000MΩ min, or 1,000MΩ per μF min., whichever is less

Dielectric Strength	No problems observed after 2.5 x RVDC for 5 seconds at 50mA max current
CTE (ppm/C)	12.0
Thermal Conductivity	4-5W/M K
Terminations Available	Plated Nickel and Solder

SIZE	W4 = 0306		W2 = Thin 0508					W2 = 0508					W3= Thin 0612				W3 = 0612					W3 = THICK 0612							
Max. Thickness	0.55 (0.022)		0.55 (0.022)					0.95 (0.037)					0.55 (0.022)				0.95 (0.037)					1.22 (0.048)							
WVDC	4	6.3	4	6.3	10	16	25	4	6.3	10	16	25	4	6.3	10	16	4	6.3	10	16	25	4	6.3	10	16	4	6.3	10	16
Cap (µF)	[Grid showing availability for various capacitor values across different sizes and WVDC ratings]																												

PHYSICAL DIMENSIONS AND PAD LAYOUT

Consult factory for additional requirements



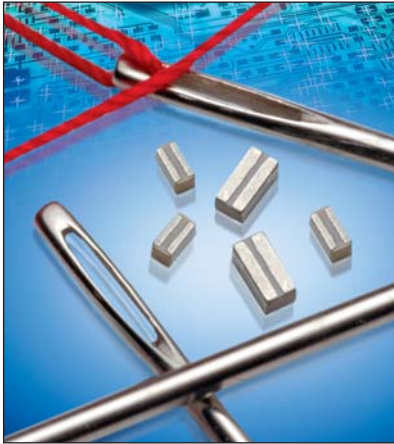
- = X7R
- = X5R
- = X7S

PHYSICAL CHIP DIMENSIONS millimeters (inches)

SIZE	W	L	BW	BL	P
0306	1.60 ± 0.20 (0.063 ± 0.008)	0.82 ± 0.10 (0.032 ± 0.006)	0.25 ± 0.10 (0.010 ± 0.004)	0.20 ± 0.10 (0.008 ± 0.004)	0.40 ± 0.05 (0.015 ± 0.002)
0508	2.03 ± 0.20 (0.080 ± 0.008)	1.27 ± 0.20 (0.050 ± 0.008)	0.30 ± 0.10 (0.012 ± 0.004)	0.25 ± 0.15 (0.010 ± 0.006)	0.50 ± 0.05 (0.020 ± 0.002)
0612	3.20 ± 0.20 (0.126 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	0.50 ± 0.10 (0.020 ± 0.004)	0.25 ± 0.15 (0.010 ± 0.006)	0.80 ± 0.10 (0.031 ± 0.004)

PAD LAYOUT DIMENSIONS

SIZE	A	B	C	D	E
0306	0.38 (0.015)	0.89 (0.035)	1.27 (0.050)	0.20 (0.008)	0.40 (0.015)
0508	0.64 (0.025)	1.27 (0.050)	1.91 (0.075)	0.28 (0.011)	0.50 (0.020)
0612	0.89 (0.035)	1.65 (0.065)	2.54 (0.101)	0.45 (0.018)	0.80 (0.031)



Land Grid Array (LGA) capacitors are the latest family of low inductance MLCCs from AVX. These new LGA products are the third low inductance family developed by AVX. The innovative LGA technology sets a new standard for low inductance MLCC performance.

Our initial 2 terminal versions of LGA technology deliver the performance of an 8 terminal IDC low inductance MLCC with a number of advantages including:

- Simplified layout of 2 large solder pads compared to 8 small pads for IDCs
- Opportunity to reduce PCB or substrate contribution to system ESL by using multiple parallel vias in solder pads
- Advanced FCT manufacturing process used to create uniformly flat terminations on the capacitor that resist “tombstoning”
- Better solder joint reliability

APPLICATIONS

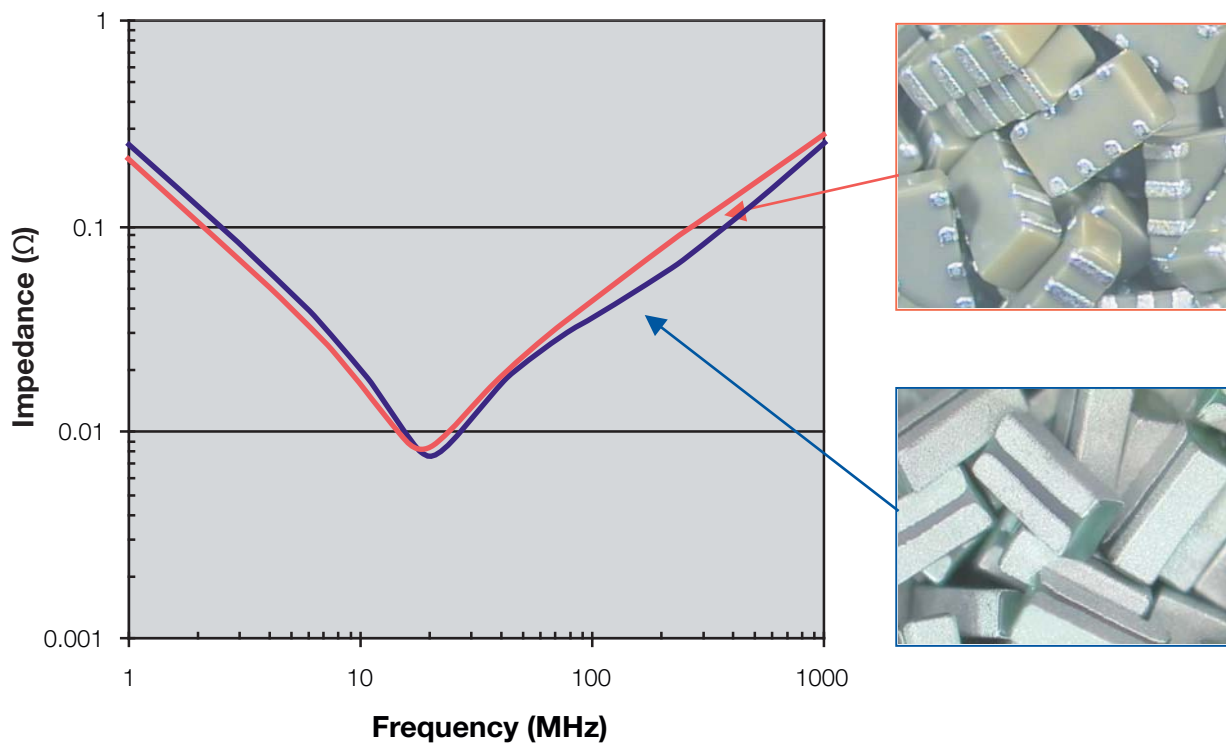
Semiconductor Packages

- Microprocessors/CPUs
- Graphics Processors/GPUs
- Chipsets
- FPGAs
- ASICs

Board Level Device Decoupling

- Frequencies of 300 MHz or more
- ICs drawing 15W or more
- Low voltages
- High speed buses

0306 2 TERMINAL LGA COMPARISON WITH 0306 8 TERMINAL IDC

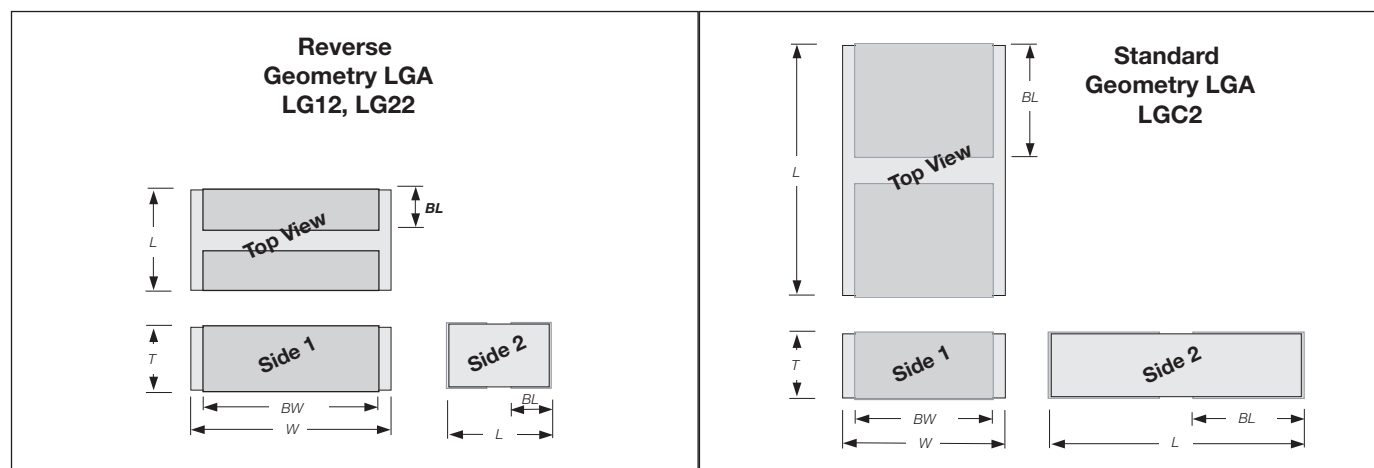


SIZE	LG12 (0204)						LG22 (0306)						LGC2 (0805)											
Length mm (in.)	0.50 (0.020)						0.76 (0.030)						2.06 (0.081)											
Width mm (in.)	1.00 (0.039)						1.60 (0.063)						1.32 (0.052)											
Temp. Char.	X5R (D)		X7S (Z)		X6S (W)		X7R (C)		X5R (D)		X7S (Z)		X6S (W)		X7R (C)		X5R (D)		X7S (Z)		X6S (W)			
Working Voltage	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	10 (Z)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	6.3 (6)	4 (4)	
Cap (µF)	0.010 (103)		0.022 (223)		0.047 (473)		0.100 (104)		0.220 (224)		0.330 (334)		0.470 (474)		1.000 (105)		2.200 (225)							

= X7R
 = X5R
 = X7S
 = X6S

HOW TO ORDER

LG	1	2	6	Z	104	M	A	T	2	S	1
Style	Case Size	Number of Terminals	Working Voltage	Temperature Characteristic	Coded Cap	Cap Tolerance	Termination Style	Termination 100% Sn*	Packaging Tape & Reel	Thickness S = 0.55mm max	Number of Capacitors
	1 = 0204 2 = 0306 C = 0805	2	4 = 4V 6 = 6.3V Z = 10V	C = X7R D = X5R Z = X7S W = X6S		M = 20%	A = "U" Land	*Contact factory for other termination finishes	2 = 7" Reel 4 = 13" Reel		



PART DIMENSIONS

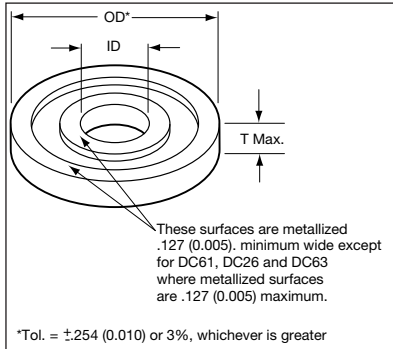
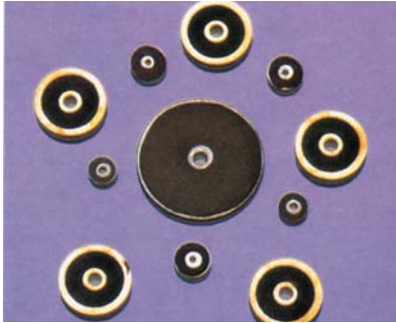
Series	L	W	T	BW	BL
LG12 (0204)	0.5 ± 0.05 (0.020 ± 0.002)	1.00 ± 0.10 (0.039 ± 0.004)	0.50 ± 0.05 (0.020 ± 0.002)	0.8 ± 0.10 (0.031 ± 0.004)	0.13 ± 0.08 (0.005 ± 0.003)
LG22 (0306)	0.76 ± 0.10 (0.030 ± 0.004)	1.60 ± 0.10 (0.063 ± 0.004)	0.50 ± 0.05 (0.020 ± 0.002)	1.50 ± 0.10 (0.059 ± 0.004)	0.28 ± 0.08 (0.011 ± 0.003)
LGC2 (0805)	2.06 ± 0.10 (0.081 ± 0.004)	1.32 ± 0.10 (0.052 ± 0.004)	0.50 ± 0.05 (0.020 ± 0.002)	1.14 ± 0.10 (0.045 ± 0.004)	0.90 ± 0.08 (0.035 ± 0.003)



RECOMMENDED SOLDER PAD DIMENSIONS

Series	PL	PW1	G
LG12 (0204)	0.50 (0.020)	1.00 (0.039)	0.20 (0.008)
LG22 (0306)	0.65 (0.026)	1.50 (0.059)	0.20 (0.008)
LGC2 (0805)	1.25 (0.049)	1.40 (0.055)	0.20 (0.008)

APPLICATION INFORMATION ON DISCOIDAL



LOWEST CAPACITANCE IMPEDANCES TO GROUND

A discoidal MLC capacitor has very low impedance associated with its ground path since the signal is presented with a multi-directional path. These electrode paths, which can be as many as 100, allow for low ESR and ESL which are the major elements in impedance at high frequencies.

The assembled discoidal element or feed-thru allows signal to be fed in through a chassis or bulkhead, conditioned as it passes through the discoidal, and isolated by the chassis and discoidal from the original signal. An example of this application would be in an AFT circuit where the AC noise signal would be required to be stripped from the DC control signal. Other applications include single line EMI/RFI suppression, L-C filter construction, and coaxial shield bypass filtering.

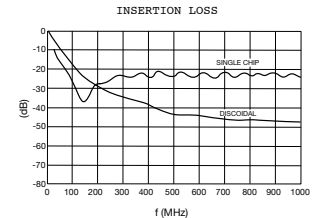
The shape of the discoidal lends itself to filter construction. The short length allows compact construction where L-C construction is desired. The size freedom associated with this element allows almost any inside/outside diameter combination. By allowing the inside diameter to equal the center insulator diameter of a coaxial signal line and special termination techniques, this device will allow bypass filtering of a floating shield to ground.

* Discoidal capacitors are available in two (2) temperature coefficients (COG, X7R) and a variety of shapes and sizes, the most standard of which appear on pages 142 and 143.

* Custom designed capacitor arrays are available in an unlimited number of configuration with a wide range of rating voltages (50–2000) and temperature coefficients (NPO, BX, BR, X7R) please see page 140.

For additional information please contact AVX.

AVX's DC Series 50V, 100V, 200V, COG and X7R parts are capable of meeting the requirements of MIL-PRF-31033.



ELECTRICAL SPECIFICATIONS

Temperature Coefficient

COG: A Temperature Coefficient - 0 ±30 ppm/°C, -55° +125°C

X7R: C Temperature Coefficient - ±15%, -55° to +125°C

Capacitance Test (MIL-STD-202 Method 305)

COG: 25°C, 1.0±0.2 Vrms at 1KHz, for ≤100 pF use 1 MHz

X7R: 25°C, 1.0±0.2 Vrms at 1KHz

Dissipation Factor 25°C

COG: 0.15% Max @ 25°C, 1.0±0.2 Vrms at 1KHz, for ≤100 pF use 1 MHz

X7R: 2.5% Max @ 25°C, 1.0±0.2 Vrms at 1KHz

Insulation Resistance 25°C (MIL-STD-202 Method 302)

COG and X7R: 100K MΩ or 1000 MΩ-μF, whichever is less.

Insulation Resistance 125°C (MIL-STD-202 Method 302)

COG and X7R: 10K MΩ or 100 MΩ-μF, whichever is less.

Dielectric Withstanding Voltage 25°C (Flash Test)*

COG and X7R: 250% rated voltage for 5 seconds with 50 mA max charging current. 500V rated units will be tested at 750 VDC

Life Test (1000 hrs)

COG and X7R: 200% rated voltage at +125°C (500 Volt units @ 600 VDC)

Moisture Resistance (MIL-STD-202 Method 106)

COG, X7R: Ten cycles with no voltage applied.

Thermal Shock (MIL-STD-202 Method 107, Condition A)

Immersion Cycling (MIL-STD-202 Method 104, Condition B)

HOW TO ORDER

DC61	5	A	561	K	A	5	1	06
AVX Style	Voltage	Temperature Coefficient	Capacitance Code (2 significant digits + no. of zeros) Examples: 100 = 10 pF 101 = 100 pF 102 = 1,000 pF 223 = 22,000 pF 224 = 220,000 pF	Capacitance Tolerance COG: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20%	Test Level A = Standard	Termination 5 = Silver (AVX Standard) A = Untermated 7 = Ti/W/Ni w/Au Sputter (100μ inches)	Inside Diameter	Maximum Thickness 04 = 1.02 (0.040) 06 = 1.52 (0.060) 10 = 2.54 (0.100)

Not RoHS Compliant

For dimensions, voltages or values not specified, please consult factory.

SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: millimeters (inches)

EIA Characteristic	COG																
AVX Style	DC50	DC08	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72
Outside Diameter (OD)*	1.27 (0.050)	2.03 (0.080)	2.54 (0.100)	3.43 (0.135)	3.81 (0.150)	4.83 (0.190)	5.33 (0.210)	5.97 (0.235)	6.73 (0.265)	8.13 (0.320)	8.51 (0.335)	8.89 (0.350)	9.40 (0.370)	9.78 (0.385)	12.70 (0.500)	15.24 (0.600)	16.26 (0.640)
Thickness Maximum (T)	1.02 (0.040)	1.02 (0.040)	1.52 (0.060)	1.52 (0.060)	1.52 (0.060)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)
Inside Diameter No. (ID)	1	1,2	1,2	1,2,3	1,2,3,4	1,2,3	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4
Termination	Sputter	All															
Voltage	50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50	500 200 100 50
cap. in pF	10 12 15																
	18 22 27																
	33 39 47																
	56 68 82																
	100 120 150																
	180 220 270																
	330 390 470																
	560 680 820																
	1000 1200 1500																
	1800 2200 2700																
	3300 3900 4700																
	5600 6800 8200																
	10,000 12,000 15,000																
	18,000 22,000 27,000																
	33,000 39,000 47,000																
	56,000 68,000 82,000																
	100,000 120,000 150,000																
	180,000 220,000 270,000																
	330,000 390,000 470,000																
	560,000 680,000																

DC50 termination can only be sputter Au

***Outside Diameter:**
Tolerance is ±0.254 (0.010) or 3%
whichever is greater

Inside Diameter:		
1 = .635 ^{+.127} _{-.051} (.025 ^{+.005} _{-.002})	3 = .914 ^{+.127} _{-.051} (.036 ^{+.005} _{-.002})	5 = 1.27±.127 (0.050±.005)
2 = .762 ^{+.127} _{-.051} (.030 ^{+.005} _{-.002})	4 = 1.07 ^{+.127} _{-.051} (.042 ^{+.005} _{-.002})	6 = 1.52±.127 (0.060±.005)
		7 = 1.73±.127 (0.068±.005)

SIZE AND CAPACITANCE SPECIFICATIONS

Dimensions: millimeters (inches)

EIA Characteristic	X7R																
AVX Style	DC50	DC08	DC61	DC26	DC63	DC04	DC65	DC66	DC67	DC69	DC32	DC70	DC02	DC71	DC05	DC73	DC72
Outside Diameter (OD)*	1.27 (0.050)	2.03 (0.080)	2.54 (0.100)	3.43 (0.135)	3.81 (0.150)	4.83 (0.190)	5.33 (0.210)	5.97 (0.235)	6.73 (0.265)	8.13 (0.320)	8.51 (0.335)	8.89 (0.350)	9.40 (0.370)	9.78 (0.385)	12.70 (0.500)	15.24 (0.600)	16.26 (0.640)
Thickness Maximum (T)	1.02 (0.040)	1.02 (0.040)	1.52 (0.060)	1.52 (0.060)	1.52 (0.060)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)	2.54 (0.100)
Inside Diameter No. (ID)	1	1,2	1,2	1,2,3	1,2,3,4	1,2,3	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4	5,6,7 1,2,3,4
Termination	Sputter	All															
Voltage	50	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60	500 200 100 60
cap. in pF	56																
	68																
	82																
	100																
	120																
	150																
	180																
	220																
	270																
	330																
	390																
	470																
	560																
	680																
	820																
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	560,000																
	680,000																
	820,000																
	1.0 μF																
	1.2 μF																
	1.5 μF																
	1.8 μF																
	2.2 μF																
	2.7 μF																
	3.3 μF																
	3.9 μF																
	6.8 μF																

DC50 termination can only be sputter Au

***Outside Diameter:**
Tolerance is ±0.254 (0.010) or 3%
whichever is greater

Inside Diameter:		
1 = .635 ^{+.127} _{-.051} (.025 ^{+.005} _{-.002})	3 = .914 ^{+.127} _{-.051} (.036 ^{+.005} _{-.002})	5 = 1.27±.127 (0.050±.005)
2 = .762 ^{+.127} _{-.051} (.030 ^{+.005} _{-.002})	4 = 1.07 ^{+.127} _{-.051} (.042 ^{+.005} _{-.002})	6 = 1.52±.127 (0.060±.005)
		7 = 1.73±.127 (0.068±.005)

There have been many questions raised regarding the differences between MIL-F-15733 and MIL-F-28861. To clarify these differences we have incorporated the following

Analysis Chart which compares the differences between these two military specifications.

ANALYSIS MIL-F-15733 vs. MIL-F-28861			
	MIL-F-15733	MIL-F-28861	
Characteristics	Filter Design/Construction	Filter Design/Construction	
		Class B	Class S
CASE	Standard	Standard	Standard
CAPACITOR (Discoidal) • Dielectrics • K • VTL • Cap Range	Standard X7R, Z5U 2200-10K N/A Max Cap/Case Size	Special Design BR 2K max +15%, -40% Limited Cap/Case Size Conservation Design	Special Design BX 2K max +15%, -25% (when design permits) Limited Cap/Case Size & MIL-C-123 Req'ts Conservative Design
	Testing	Testing	
GROUP A • Test • PDA (parts defective allowed)	MIL-STD-105, 1.0% AQL None	100% Test 10%	100% Test Thermal Shock, Burn-in*, IR & DWV-2% each test Cap, Volt. Drop, Insertion Loss <u>-3% max</u> combined Total 10% max
X-RAY	None	MIL-STD-202 Method 209	MIL-STD-202 Method 209
LEAK TEST	Condition "A" Gross Leak	Condition "A" Gross Leak PDA 10% max	Condition "A" Gross Leak Condition "C" Fine Leak PDA 10% max
BURN-IN	None generally. A few slash sheets require 1.4 x rated voltage	160 Hrs. @ 2 x rated voltage — Resistor protected	168 Hrs. (250 Hrs. max) @ 2 x rated voltage - Fuse protected *PDA .2% max lasts 50 Hrs.
INSERTION LOSS	1.0% AQL	100%	100%
SOLDERABILITY	None	MIL-STD-202 Method 208 5 Samples	MIL-STD-202 Method 208 5 Samples

Cylindrical Style EMI Filters

BK Series – 0.375/0.410 Dia. – Button Hermetically Sealed, Circuits Available – C & L



APPLICATIONS

The BK series offers effective filtering from 500 KHz to 10 GHz. Glass sealed for hermeticity, this low profile series is impervious to high moisture, solvents, or other severe environmental conditions commonly encountered in military applications. It is designed for bulkhead mounting in a slotted hole with nut and lockwasher supplied. This series is ideal for low to medium impedance circuits where large amounts of capacitance to

ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead configurations or special capacitance values may be ordered.

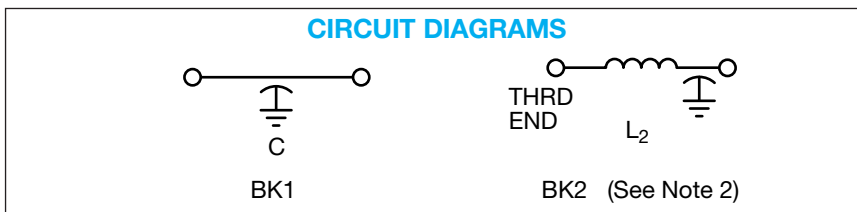
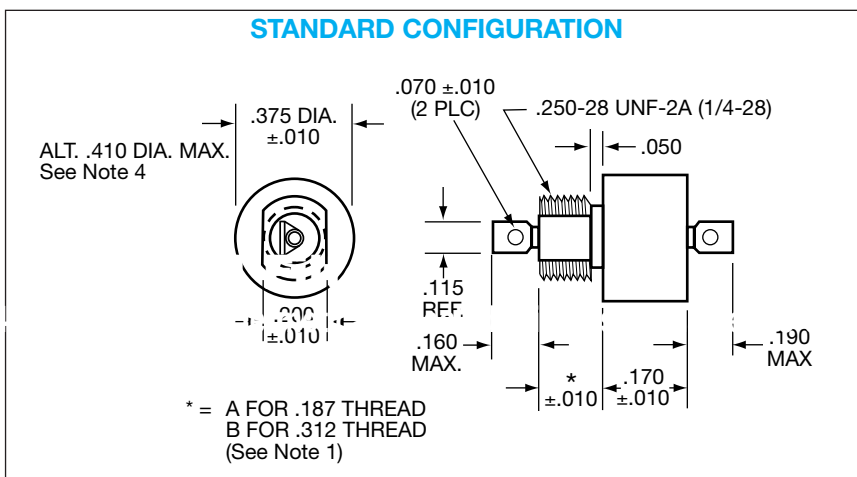
Custom packages or filter arrays utilizing the BK series can be furnished.

CHARACTERISTICS

- .410 Dia. version (AK) meets or exceeds the applicable requirements of MIL-F-28861/1. See QPL listings.
- Glass hermetic seal on both ends.
- Internal ferrite bead provides inductance for the L-section version.
- High DC current rating: 15 Amps

SPECIFICATIONS

- Case/Terminal Plating:
Electro-tin standard – Silver or gold available
- Material:
Case: Brass standard – Steel available
End Seal: Mild steel
Terminals: Nickel-iron alloy
- Operating Temperature Range:
-55°C to +125°C
- Electrical Characteristics:
 - Rated Voltage: See chart
 - Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 50,000 megohms, whichever is less, at the rated DC voltage
At 125°C: 100 megohm-microfarad min., or 5,000 megohms, whichever is less
 - Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
 - Capacitance: Values listed in chart are “guaranteed minimum value” (GMV)
- Marking:
Standard Marking: AVX, AVX part number, lot code
BK2 only: Letter “L” denotes ferrite bead inductor at threaded end
See Reliability Codes section for definition of Reliability Level marking. See How to Order section for part number construction.
- Installation:
 - Mounting Torque:
44 oz-in. ± 4 oz-in.
 - Refer to “Installation, Handling, Hardware Options” section of the catalog.



millimeters (inches)	
.25 (.010)	4.75 (.187)
1.27 (.050)	4.83 (.190)
1.78 (.070)	5.08 (.200)
2.92 (.115)	7.93 (.312)
3.81 (.150)	9.53 (.375)
4.32 (.170)	—

(See Note 3)
(See Note 1)

Notes:

- Thread length option. Standard part numbers shown (e.g., BK1CA-103) are .187" thread length. Optional .312 length available. (e.g., BK1CB-103).
- Ferrite bead inductor at threaded end (BK2 only).
- Metric equivalent dimensions given for information only.
- .410 Dia. (identified as AK) is required for all hi-rel tested parts (e.g., MIL-F-28861/1 series).

SPECIFICATIONS

AVX P/N	CKT	CAP (µF)	DC Voltage	Insertion Loss ¹ Per MIL-STD-220, +25°C						
				30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
BK1CA-125	C	1.200	50	15	28	33	40	40	70	70
BK1CB-125	C	1.200	50	15	28	33	40	40	70	70
BK2CA-125	L2	1.200	50	15	28	33	40	40	70	70
BK2CB-125	L2	1.200	50	15	28	33	40	40	70	70
BK1NA-704	C	0.700	70	10	24	30	40	40	64	70
BK1NB-704	C	0.700	70	10	24	30	40	40	64	70
BK2NA-704	L2	0.700	70	10	24	30	40	40	64	70
BK2NB-704	L2	0.700	70	10	24	30	40	40	64	70
BK1AA-103	C	0.010	100	–	–	–	2	20	40	55
BK1AA-454	C	0.450	100	6	19	25	36	40	60	70
BK1AB-454	C	0.450	100	6	19	25	36	40	60	70
BK1AA-754	C	0.750	100	11	24	30	40	40	64	70
BK1AA-105	C	1.000	100	12	24	30	40	40	65	70
BK2AA-454	L2	0.450	100	6	19	25	36	40	60	70
BK2AB-454	L2	0.450	100	6	19	25	36	40	60	70
BK2AA-754	L2	0.750	100	11	24	30	40	40	64	70
BK2AA-105	L2	1.000	100	12	24	30	40	40	65	70
BK1HA-254	C	0.250	150	–	14	20	31	40	56	70
BK1HB-254	C	0.250	150	–	14	20	31	40	56	70
BK2HA-254	L2	0.250	150	–	14	20	31	40	56	70
BK2HB-254	L2	0.250	150	–	14	20	31	40	56	70
BK1LA-753	C	0.075	200*	–	–	7	18	37	46	70
BK1LA-154	C	0.150	200*	–	10	16	26	40	52	70
BK1LB-154	C	0.150	200*	–	10	16	26	40	52	70
BK2BA-203	L2	0.020	200*	–	–	–	7	25	40	60
BK2LA-753	L2	0.075	200*	–	–	7	18	37	51	70
BK2LA-154	L2	0.150	200*	–	10	16	26	40	52	70
BK2LB-154	L2	0.150	200*	–	10	16	26	40	52	70

* Also rated 125 VAC/400 Hz

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

Cylindrical Style EMI Filters

CK Series – 0.375 Dia. – Button Hermetically Sealed, Circuits Available – C & L



APPLICATIONS

The CK series offers effective filtering from 100 KHz to 10 GHz. Glass sealed for hermeticity, this medium profile series is impervious to high moisture, solvents, or other severe environmental conditions commonly encountered in military applications. It is designed for bulkhead mounting in a slotted hole with nut and lockwasher supplied. This series is ideal for low to medium impedance circuits where large amounts of capacitance to

ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead configurations or special capacitance values may be ordered.

Custom packages or filter arrays utilizing the CK series can be furnished.

CHARACTERISTICS

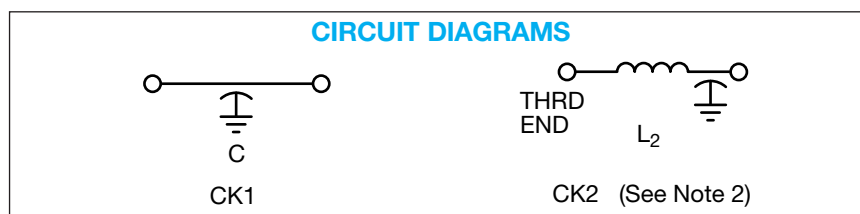
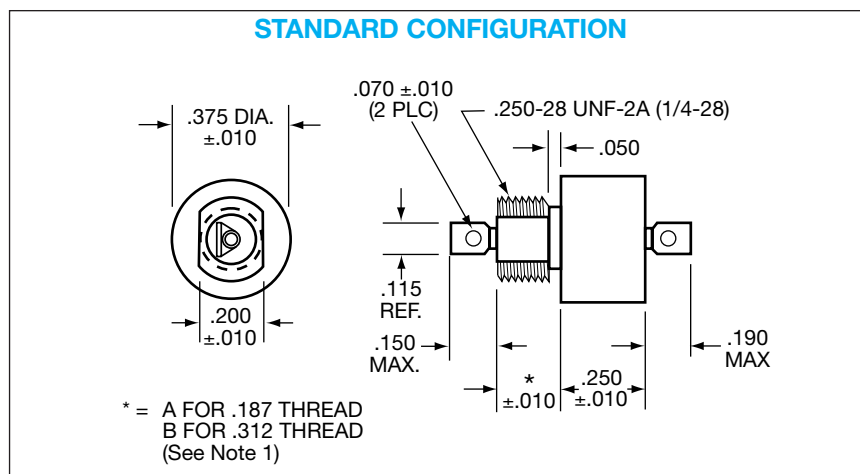
- Meets or exceeds the applicable requirements of MIL-F-15733, and the environmental/test requirements of MIL-F-28861.
- Glass hermetic seal on both ends.
- Internal ferrite bead provides inductance

for the L-section version.

- High DC current rating: 15 Amps.
- High capacitance values available.
- Conservatively rated for 125 VAC/400 Hz in certain values.

SPECIFICATIONS

- Case/Terminal Plating:
Electro-tin standard –
Silver or gold available
 - Material:
Case: Brass standard – Steel available
End Seal: Mild steel
Terminals: Nickel-iron alloy
 - Operating Temperature Range:
-55°C to +125°C
 - Electrical Characteristics:
 - Rated Voltage: See chart
 - Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min.,
or 50,000 megohms min.,
whichever is less, at the rated DC voltage
At 125°C: 100 megohm-microfarad min.,
or 5,000 megohms min.,
whichever is less
 - Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
 - Capacitance: Values listed in chart are
“guaranteed minimum value” (GMV)
- Marking:
Standard Marking: AVX, AVX part number,
rated current, voltage, lot code
B. CK2 only: Letter “L” to denote ferrite bead
inductor at threaded end
C. See Reliability Codes section for definition
of Reliability Level marking. See How to
Order section for part number construc-
tion.
 - Installation:
 - Mounting Torque: 44 oz-in. ± 4 oz-in.
 - Refer to “Installation, Handling, Hardware
Options” section of the catalog.



millimeters (inches)

0.25 (.010)	4.83 (.190)
1.27 (.050)	5.08 (.200)
1.78 (.070)	6.35 (.250)
2.92 (.115)	7.93 (.312)
3.81 (.150)	9.53 (.375)
4.75 (.187)	—

(See Note 3)

Notes:

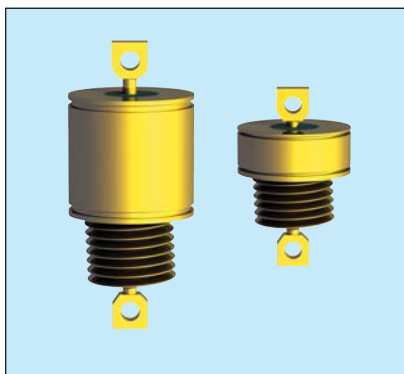
- Thread length option.
EXAMPLE: CK1CA-103
(.187 thrd. L)
CK1CB-103
(.312 thrd. L).
- All CK2 L-Section Filters
have inductor (bead) at
threaded end.
- Metric equivalent dimen-
sions given for informa-
tion only.

SPECIFICATIONS

AVX P/N	Current (A)	CKT	CAP (µF)	DC Voltage	Insertion Loss ¹ Per MIL-STD-220, +25°C						
					30 KHz	150 KHz	500 KHz	1 MHz	10 MHz	100 MHz	1 GHz
CK1CA-754	15	C	0.750	50	11	24	30	40	40	64	70
CK1CA-105	15	C	1.000	50	12	24	30	40	40	65	70
CK1CA-145	15	C	1.400	50	15	28	33	40	40	70	70
CK1CA-205	15	C	2.000	50	16	30	35	43	45	70	70
CK2CA-754	15	L2	0.750	50	11	24	30	40	40	64	70
CK2CA-105	15	L2	1.000	50	12	24	30	40	40	65	70
CK2CA-145	15	L2	1.400	50	15	28	33	40	40	70	70
CK2CA-205	15	L2	2.000	50	16	30	35	43	45	70	70
CK1AA-504	15	C	0.500	100	–	16	26	34	42	58	70
CK1AA-754	15	C	0.750	100	11	24	30	40	40	64	70
CK1AA-105	15	C	1.000	100	12	24	30	40	40	65	70
CK1AA-185	15	C	1.800	100	15	28	33	41	45	70	70
CK2AA-504	15	L2	0.500	100	–	16	26	36	44	60	70
CK2AA-754	15	L2	0.750	100	11	24	30	40	40	64	70
CK2AA-105	15	L2	1.000	100	12	24	30	40	40	65	70
CK2AA-185	15	L2	1.800	100	15	28	33	41	45	70	70
CK1BA-103	15	C	0.010	200	–	–	–	2	20	40	55
CK1LA-753	15	C	0.075	200*	–	–	7	18	37	46	70
CK1BA-104	15	C	0.100	200	–	–	14	24	38	50	70
CK1LA-154	15	C	0.150	200*	–	10	16	26	40	52	70
CK1BA-304	15	C	0.300	200	–	15	23	32	40	56	70
CK1BA-504	15	C	0.500	200	6	19	25	36	40	58	70
CK2BA-103	15	L2	0.010	200	–	–	–	2	20	40	55
CK2LA-753	15	L2	0.075	200*	–	–	7	18	37	51	70
CK2BA-104	15	L2	0.100	200	–	–	14	24	38	50	70
CK2LA-154	15	L2	0.150	200*	–	10	16	26	40	52	70
CK2BA-304	15	L2	0.300	200	–	15	23	32	40	56	70
CK2BA-504	15	L2	0.500	200	6	19	25	36	40	60	70

* Also rated 125 VAC/400 Hz

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.



APPLICATIONS

The JD series offers effective filtering from 14 KHz to 10 GHz. The large diameter, increased length, restricted capacitance values and conservative dielectrics of the JD series are particularly important design features for 400 Hz AC applications where high reactive currents and the resultant heat dissipation must be controlled. Glass sealed on both ends for hermeticity, this series is impervious to high moisture, solvents, or other severe environmental conditions commonly encountered in military applications. It is designed for bulkhead mounting in a slotted hole with nut and lockwasher supplied.

The 230 VAC “T” section style is uniquely capable of handling very high pulse inrush currents or overvoltage conditions typical of EMP.

In addition, transient voltage suppression devices can be added to any of the JD circuit designs to provide complete circuit protection against EMP, lightning, or voltage spikes such as MIL-STD-704. These devices when combined with high frequency attenuation characteristics of the discoidal capacitor and toroidal

inductors offer significant performance advantages by suppressing and absorbing the EMP pulse over a very broad spectral range. Very high pulse currents will occur within the EMI filter, however, reradiation to sensitive electronic circuits is prevented by the fully shielded case design. In some cases a slight increase in the case length of the filter is required to provide space for the transient suppression device.

The “L”, and the “T” designs are designed to provide effective attenuation over a wide range of circuit impedances. For current ratings under 15 Amps toroidal wound inductor elements offer increased filter performance and protection against circuit transients. Data showing the actual inductance versus various levels of DC or AC bias current are available as well as the attenuation in any combination of source and load impedance.

Alternate lead configurations or special capacitance/inductance values may be ordered.

Custom packages or filter arrays utilizing the JD series can be furnished.

CHARACTERISTICS

- Designed to meet the requirements of DESC drawings 84083, 84084 and MIL-F-28861/16 and /17.
- Glass hermetic seal on both ends.
- Wound toroidal inductor used in designs up to 10 Amps. 15 Amp designs incorporate ferrite bead inductor.
- Superior heat dissipation for both 125 VAC and 230 VAC designs.

SPECIFICATIONS

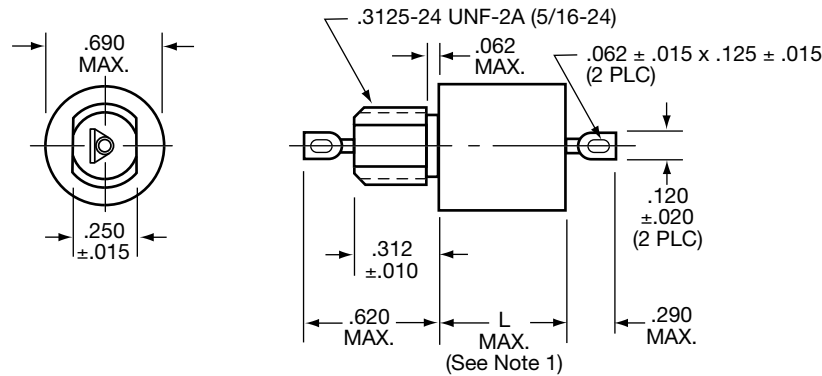
1. Case/Terminal Plating:
Electro-tin standard –
Silver or gold available
2. Material:
Case: Brass standard – Steel available
End Seal: Mild steel
Terminals: Nickel-iron alloy
3. Operating Temperature Range:
-55°C to +125°C
4. Electrical Characteristics:
 - A. Rated Voltage:
300 VDC/125 VAC, 400 Hz or
400 VDC/230 VAC, 400 Hz
 - B. Current Rating - see chart
 - C. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad
min., or 50,000 megohms
min., whichever is less, at
the rated DC voltage
At 125°C: 100 megohm-microfarad
min., or 5,000 megohms
min., whichever is less
 - D. Dielectric Withstanding Voltage
(DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
3. Capacitance: Total capacitance listed in
chart for each filter type is “guaranteed
minimum value” (GMV)
5. Marking:
Standard Marking: AVX, AVX part
number, rated voltage, current, lot
number, schematic
NOTE: Schematic to indicate location of
inductor (standard or reverse) for
JD2 L-Section Filters.
See Reliability Codes section for
definition of Reliability Level marking.
See How to Order section for part
number construction.
6. Installation:
 - A. Mounting Torque: 60 oz-in. \pm 4 oz-in.
 - B. Refer to “Installation and Handling”
section of Filter Design Guide

Cylindrical Style EMI Filters

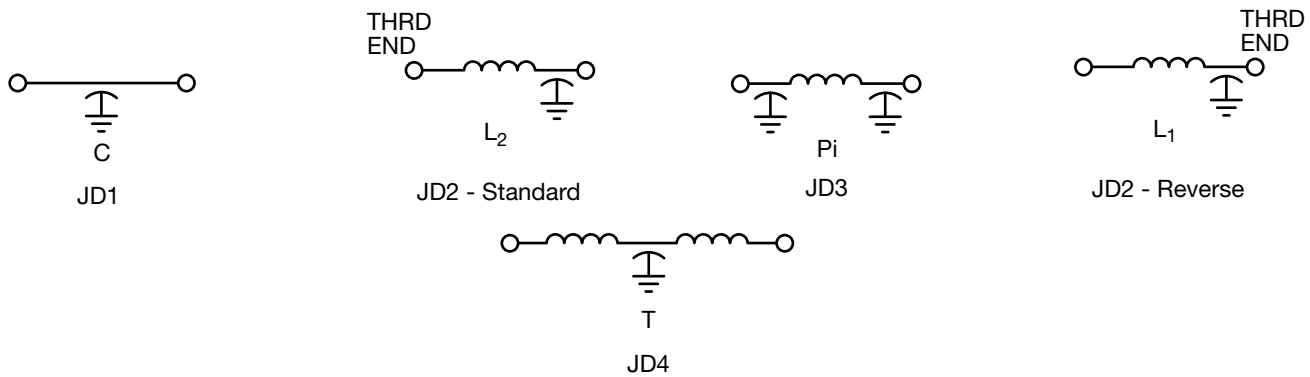
JD Series - 0.690 Dia. - Button Hermetically Sealed, Circuits Available - C, L, π , T



STANDARD CONFIGURATION



CIRCUIT DIAGRAMS



millimeters (inches)

0.08 (.003)	6.35 (.250)
0.13 (.005)	7.37 (.290)
0.18 (.007)	7.92 (.312)
0.25 (.010)	9.53 (.375)
0.38 (.015)	10.67 (.420)
0.51 (.020)	11.18 (.440)
0.56 (.022)	15.75 (.620)
1.14 (.045)	17.27 (.680)
1.57 (.062)	17.78 (.700)
2.36 (.093)	26.92 (1.060)
3.05 (.120)	30.61 (1.205)
3.18 (.125)	33.02 (1.300)

(See Note 2)

MIL-F-28861/17 (See P/N Table)

Dash No.	L Dimension Max.	Weight (grams) Max.
001	.700	18.0
002	1.060	20.0
003	1.060	20.0
004	1.060	20.0
005	1.060	20.0
006	1.060	20.0
007	1.060	20.0
008	1.060	20.0
009	1.060	20.0
010	1.060	20.0
011	1.060	20.0
012	1.205	29.0
013	1.205	29.0
014	1.205	29.0
015	1.205	29.0
016	1.205	29.0
017	1.300	29.0
018	1.300	29.0
019	1.300	29.0

MIL-F-28861/16 (See P/N Table)

Dash No.	L Dimension Max.
001	.700
002 through 011	1.060
012 through 016	1.205
017 through 019	1.300

Notes:

1. Refer to Part Number Table for L-Max for specific filter.
2. Metric equivalent dimensions given for information only.
3. All dimensions for JD series filters established per MIL-F-28861/16 and /17, and DESC 84083 and 84084 requirements.

Cylindrical Style EMI Filters

JD Series – 0.690 Dia. – Button Hermetically Sealed, Circuits Available – C, L, π , T



SPECIFICATIONS

AVX P/N	Current (A)	CKT	CAP (μ F)	DC Voltage	DCR (Ω)	L. dim	Insertion Loss ¹ Per MIL-STD-220, +25°C						
							50 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
100 VDC, 1.2–2.8 μF													
JD1AB-125	15.0	C	1.200	100	0.008	0.700	16	27	34	43	60	60	60
JD1AB-704	15.0	C	1.2000	100	0.008	0.700	10	19	28	40	50	60	60
JD2AB-S07	0.50	L2	1.400	100	0.300	1.060	21	40	58	70	70	70	70
JD2AB-S08	1.00	L2	1.400	100	0.210	1.060	19	37	55	70	70	70	70
JD2AB-S10	3.00	L2	1.400	100	0.030	1.060	16	26	37	55	70	70	70
JD2AB-S11	5.00	L2	1.400	100	0.007	1.060	15	25	34	46	70	70	70
JD2AB-S12	10.0	L2	1.400	100	0.006	1.060	15	24	34	44	70	70	70
JD3AB-P07	0.50	π	2.800	100	0.300	1.205	40	70	80	80	80	80	80
JD3AB-P08	1.00	π	2.800	100	0.210	1.205	35	68	80	80	80	80	80
JD3AB-P10	3.00	π	2.800	100	0.030	1.205	13	43	73	80	80	80	80
JD3AB-P11	5.00	π	2.800	100	0.007	1.205	–	26	63	80	80	80	80
JD3AB-P12	10.0	π	2.800	100	0.006	1.205	20	30	40	70	70	80	80
JD4AB-T08	1.00	T	1.400	100	0.500	1.400	21	48	70	70	70	70	70
JD4AB-T09	2.00	T	1.400	100	0.090	1.400	15	26	44	70	70	70	70
JD4AB-T16	4.00	T	1.400	100	0.030	1.400	15	24	35	50	70	70	70
JD4AB-T12	10.0	T	1.400	100	0.005	1.400	14	24	34	44	60	70	70
200 VDC, .45–.9 μF													
JD1BB-904	15.0	C	0.900	200	0.006	0.700	12	21	30	40	53	60	60
JD1BB-454	15.0	C	0.450	200	0.006	0.700	6	16	24	34	51	60	60
JD2BB-S07	0.50	L2	0.450	200	0.300	1.060	10	30	48	65	70	70	70
JD2BB-S08	1.00	L2	0.450	200	0.210	1.060	8	28	45	65	70	70	70
JD2BB-S10	3.00	L2	0.450	200	0.030	1.060	6	16	28	45	60	70	70
JD2BB-S11	5.00	L2	0.450	200	0.007	1.060	6	14	24	36	52	70	70
JD2BB-S12	10.0	L2	0.450	200	0.006	1.060	6	15	24	34	50	70	70
JD3BB-P07	0.50	π	0.900	200	0.300	1.205	15	50	70	80	80	80	80
JD3BB-P08	1.00	π	0.900	200	0.210	1.205	11	46	70	80	80	80	80
JD3BB-P10	3.00	π	0.900	200	0.030	1.205	–	18	50	80	80	80	80
JD3BB-P11	5.00	π	0.900	200	0.007	1.205	–	13	40	70	80	80	80
JD3BB-P12	10.0	π	0.900	200	0.006	1.205	9	20	30	40	55	80	80
JD4BB-T08	1.00	T	0.450	200	3.000	1.400	18	50	70	80	80	80	80
JD4BB-T09	2.00	T	0.450	200	0.210	1.400	12	48	70	80	80	80	80
JD4BB-T16	4.00	T	0.450	200	0.030	1.400	–	18	24	42	80	80	80
JD4BB-T12	10.0	T	0.450	200	0.006	1.400	–	12	22	34	70	80	80

¹ Insertion loss limits are based on theoretical values.
Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”.
Insertion loss and other parameters are identical.
Only the part number changes (e.g., L2 = GK2LA-S04,
L1 = GK2LA-R04).

Cylindrical Style EMI Filters

JD Series – 0.690 Dia. – Button Hermetically Sealed, Circuits Available – C, L, π , T



SPECIFICATIONS

AVX P/N	Current (A)	CKT	CAP (μ F)	DC Voltage	DCR (Ω)	L. dim	Insertion Loss ¹ Per MIL-STD-220, +25°C						
							50 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
300 VDC (125 VAC/400Hz*), .3–.36 μF													
JD1LB-304	15.0	C	0.300	300	0.008	0.700	7	16	22	32	46	58	70
JD2LB-S07	0.50	L2	0.300	300	0.330	1.060	13	28	40	60	60	70	70
JD2LB-S08	1.00	L2	0.300	300	0.150	1.060	6	24	37	56	60	70	70
JD2LB-S10	3.00	L2	0.300	300	0.026	1.060	7	17	24	42	70	70	70
JD2LB-S11	5.00	L2	0.300	300	0.013	1.060	7	16	22	34	68	70	70
JD2LB-S12	10.0	L2	0.300	300	0.008	1.060	7	16	20	30	56	70	70
JD3LB-P07	0.50	π	0.360	300	0.330	1.205	14	44	62	80	80	80	80
JD3LB-P08	1.00	π	0.360	300	0.150	1.205	–	37	56	80	80	80	80
JD3LB-P10	3.00	π	0.360	300	0.026	1.205	–	18	40	70	80	80	80
JD3LB-P11	5.00	π	0.360	300	0.013	1.205	–	–	25	60	80	80	80
JD3LB-P12	10.0	π	0.360	300	0.008	1.205	–	–	–	50	80	80	80
JD4LB-T08	1.00	T	0.300	300	0.070	1.400	6	18	28	58	70	70	70
JD4LB-T09	2.00	T	0.300	300	0.050	1.400	6	16	22	37	70	70	70
JD4LB-T16	4.00	T	0.300	300	0.030	1.400	6	16	20	34	70	70	70
JD4LB-T12	10.0	T	0.300	300	0.008	1.400	–	–	19	30	48	60	70
400 VDC (230 VAC/400Hz*), .15–.2 μF													
JD1EB-154	15.0	C	0.150	400	0.008	.700	–	10	16	26	40	52	70
JD2EB-S07	0.50	L2	0.150	400	0.330	1.060	5	24	32	50	60	70	70
JD2EB-S08	1.00	L2	0.150	400	0.150	1.060	–	19	30	46	60	70	70
JD2EB-S10	3.00	L2	0.150	400	0.026	1.060	–	11	19	36	60	70	70
JD2EB-S11	5.00	L2	0.150	400	0.013	1.060	–	10	16	28	54	70	70
JD2EB-S12	10.0	L2	0.150	400	0.008	1.060	–	10	16	25	48	70	70
JD3EB-P07	0.50	π	0.200	400	0.330	1.205	–	34	52	80	80	80	80
JD3EB-P08	1.00	π	0.200	400	0.150	1.205	–	27	46	74	80	80	80
JD3EB-P10	3.00	π	0.200	400	0.026	1.205	–	–	30	60	80	80	80
JD3EB-P11	5.00	π	0.200	400	0.013	1.205	–	–	12	50	80	80	80
JD3EB-P12	10.0	π	0.200	400	0.008	1.205	–	–	–	30	80	80	80
JD4EB-T08	1.00	T	0.150	400	0.070	1.300	–	12	25	48	70	70	70
JD4EB-T09	2.00	T	0.150	400	0.050	1.300	–	10	18	40	64	70	70
JD4EB-T16	4.00	T	0.150	400	0.030	1.300	–	10	16	31	58	70	70
JD4EB-T12	10.0	T	0.150	400	0.008	1.300	–	–	15	25	45	60	70

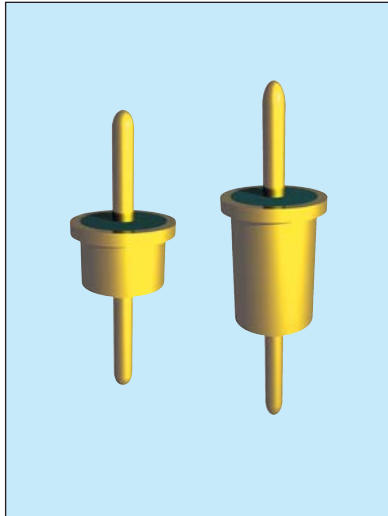
¹ Insertion loss limits are based on theoretical values.

* Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”.

Insertion loss and other parameters are identical.

Only the part number changes (e.g., L2 = GK2LA-S04, L1 = GK2LA-R04).



APPLICATIONS

The ZS series provides effective filtering in the MICROWAVE frequency spectrum from 10 MHz through 26 GHz. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for high impedance circuits where large capacitance values are not practical. In the “L” section version an internal ferrite bead element provides both induc-

tance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance. Alternate lead lengths or special capacitance values may be ordered.

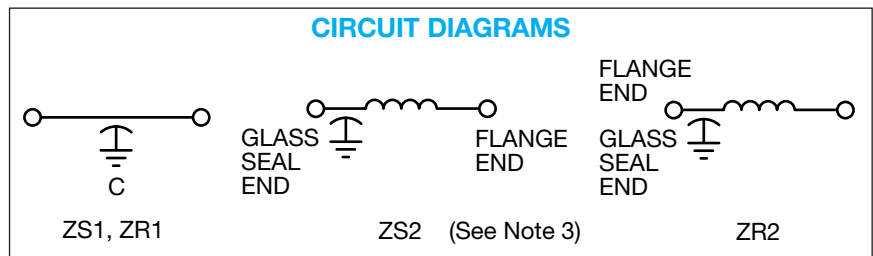
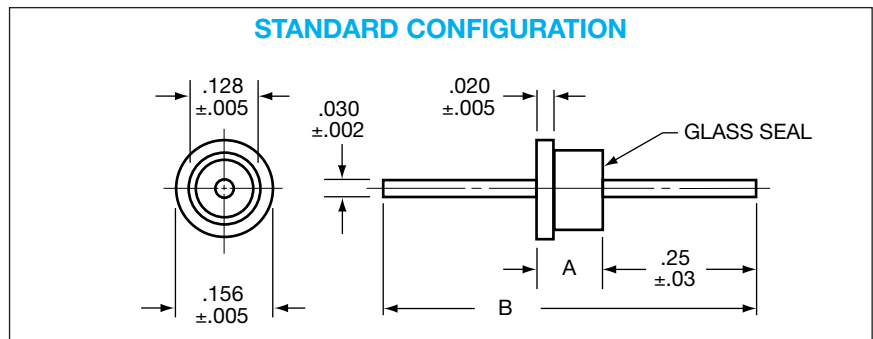
Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/12. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

SPECIFICATIONS

1. Plating: Gold standard –
Silver and solder coat available
2. Material:
Case: Cold rolled steel
Leads: Alloy 52 steel
3. Operating Temperature Range:
-55°C to +125°C
4. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature: 300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)

0.05 (.002)	3.25 (.128)
0.13 (.005)	3.96 (.156)
0.51 (.020)	5.08 (.200)
0.76 (.030)	6.4 (.25)
0.8 (.03)	15.88 (.625)
2.79 (.110)	18.16 (.715)

(See Note 4)

Circuit Diagram	Dimensions	
	A ±.005	B Nom.
L	.200	.715
C	.110	.625

Notes:

1. Outline drawing shows standard ZS configuration. Also available with glass seal at the opposite end, ZR reverse configuration.
2. MIL-F-28861/12 style FS70 equivalent to standard ZS configuration. Style FS71 is reverse ZR configuration.
3. For ZS2 or ZR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/12 (See Note 2)

Dash No.	Style
001 through 016, 033 and 034	FS70
017 through 032, 035 and 036	FS71

SPECIFICATIONS

AVX P/N	Current (A)	CKT	DC Voltage	CAP Min.	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					500 KHz	1 MHz	10 MHz	100 MHz	1000 MHz	10 GHz
ZS1C2-501H	5	C	50	500 pF	–	–	–	15	30	50
ZS1C2-102H	5	C	50	1000 pF	–	–	4	20	31	55
ZS1C2-122H	5	C	50	1200 pF	–	–	5	20	35	55
ZS1C2-272H	5	C	50	2700 pF	–	–	10	25	40	60
ZS1C2-502H	5	C	50	5000 pF	–	–	15	30	45	60
ZS1C2-103H	5	C	50	0.010 µF	–	4	20	35	48	60
ZS1C2-153H	5	C	50	0.015 µF	–	7	25	40	50	60
ZS2C2-501H	5	L	50	500 pF	–	–	–	15	30	50
ZS2C2-102H	5	L	50	1000 pF	–	–	4	20	33	55
ZS2C2-122H	5	L	50	1200 pF	–	–	5	20	37	55
ZS2C2-272H	5	L	50	2700 pF	–	–	10	25	40	60
ZS2C2-502H	5	L	50	5000 pF	–	–	15	30	45	60
ZS2C2-103H	5	L	50	0.010 µF	–	4	20	38	50	60
ZS2C2-153H	5	L	50	0.015 µF	–	7	25	42	50	60
ZS1A2-101H	5	C	100	100 pF	–	–	–	3	20	30
ZS1A2-501H	5	C	100	500 pF	–	–	–	15	30	50
ZS1A2-102H	5	C	100	1000 pF	–	–	4	20	31	55
ZS1A2-122H	5	C	100	1200 pF	–	–	5	20	35	55
ZS1A2-272H	5	C	100	2700 pF	–	–	10	25	40	60
ZS1A2-502H	5	C	100	5000 pF	–	–	15	30	45	60
ZS1A2-103H	5	C	100	0.010 µF	–	4	20	35	48	60
ZS1A2-153H	5	C	100	0.015 µF	–	7	25	40	50	60
ZS2A2-100H	5	L	100	10 pF	–	–	–	–	5	10
ZS2A2-250H	5	L	100	25 pF	–	–	–	–	10	15
ZS2A2-101H	5	L	100	100 pF	–	–	–	3	20	30
ZS2A2-501H	5	L	100	500 pF	–	–	–	15	30	50
ZS2A2-102H	5	L	100	1000 pF	–	–	4	20	33	55
ZS2A2-122H	5	L	100	1200 pF	–	–	5	20	37	55
ZS2A2-272H	5	L	100	2700 pF	–	–	10	25	40	60
ZS2A2-502H	5	L	100	5000 pF	–	–	15	30	45	60
ZS2A2-103H	5	L	100	0.010 µF	–	4	20	38	50	60
ZS2A2-153H	5	L	100	0.015 µF	–	7	25	42	50	60
ZS1B2-100H	5	C	200	10 pF	–	–	–	–	4	10
ZS1B2-250H	5	C	200	25 pF	–	–	–	–	10	15
ZS1B2-101H	5	C	200	100 pF	–	–	–	3	20	30
ZS1B2-501H	5	C	200	500 pF	–	–	–	15	30	50
ZS1B2-102H	5	C	200	1000 pF	–	–	4	20	31	55
ZS1B2-122H	5	C	200	1200 pF	–	–	5	20	35	55
ZS1B2-272H	5	C	200	2700 pF	–	–	10	25	40	60
ZS2B2-100H	5	L	200	10 pF	–	–	–	–	5	10
ZS2B2-250H	5	L	200	25 pF	–	–	–	–	10	15
ZS2B2-101H	5	L	200	100 pF	–	–	–	3	20	30
ZS2B2-501H	5	L	200	500 pF	–	–	–	15	30	50
ZS2B2-102H	5	L	200	1000 pF	–	–	4	20	33	55
ZS2B2-122H	5	L	200	1200 pF	–	–	5	20	37	55
ZS2B2-272H	5	L	200	2700 pF	–	–	10	25	40	60

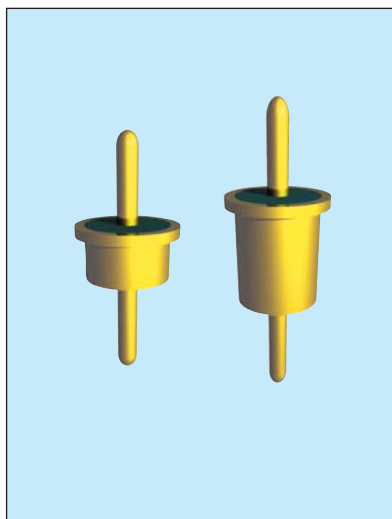
¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end.

All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical.

The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.



APPLICATIONS

The YS series provides increased filtering in the MICROWAVE frequency spectrum from 1 MHz through 10 GHz. Previously unavailable in the industry as a solder-in device, this unique design offers higher values of capacitance than were previously available. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for high impedance circuits where large capacitance values are not practical. In the “L”

section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

CHARACTERISTICS

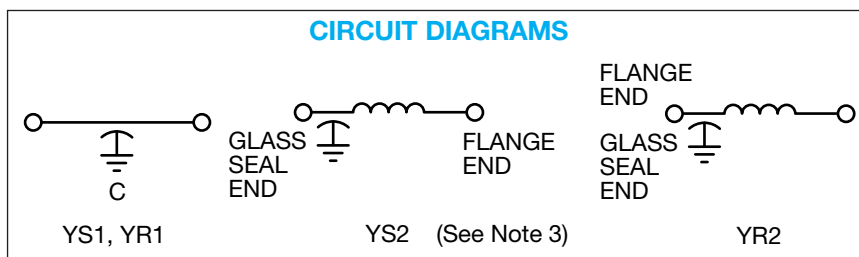
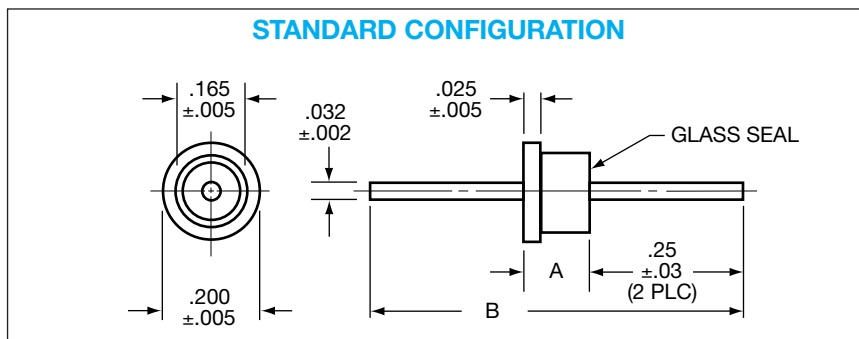
- Meets or exceeds the applicable portions of MIL-F-28861/15. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:
Case: Cold rolled steel
Leads: Alloy 52 steel
3. Operating Temperature Range:
-55°C to +125°C
4. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less

At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage

Class B, Class S designs:
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature: 300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)

0.05 (.002)	4.19 (.165)
0.13 (.005)	5.08 (.200)
0.64 (.025)	6.35 (.250)
0.8 (.03)	16.51 (.650)
0.81 (.032)	19.05 (.750)
3.81 (.150)	— —

(See Note 4)

Circuit Diagram	Dimensions	
	A ±.005	B Ref.
L	.250	.750
C	.150	.650

Notes:

1. Outline drawing shows standard YS configuration. Also available with glass seal at the opposite end, YR reverse configuration.
2. MIL-F-28861/15 style A equivalent to standard YS configuration. Style B is reverse YR configuration.
3. For YS2 or YR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/15 (See Note 2)

Dash No.	Config.
001 through 004	A
005 through 008	B

SPECIFICATIONS

AVX P/N	Current (A)	CKT	DC Voltage	CAP Min.	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					500 KHz	1 MHz	10 MHz	100 MHz	1000 MHz	10 GHz
YS1C2-152H	5	C	50	1500 pF	–	–	5	21	42	55
YS1C2-502H	5	C	50	5000 pF	–	–	15	34	50	60
YS1C2-103H	5	C	50	0.010 µF	–	4	20	35	53	60
YS1C2-153H	5	C	50	0.015 µF	–	7	25	40	55	60
YS1C2-203H	5	C	50	0.020 µF	–	8	27	41	60	65
YS1C2-273H	5	C	50	0.027 µF	4	10	30	42	65	70
YS1C2-503H	5	C	50	0.050 µF	9	15	35	44	70	70
YS1C2-753H	5	C	50	0.075 µF	12	18	37	46	70	70
YS1C2-104H	5	C	50	0.100 µF	14	20	38	48	70	70
YS2C2-152H	5	L	50	1500 pF	–	–	6	22	48	55
YS2C2-502H	5	L	50	5000 pF	–	–	15	35	55	60
YS2C2-103H	5	L	50	0.010 µF	–	4	20	36	57	60
YS2C2-153H	5	L	50	0.015 µF	–	7	25	45	60	60
YS2C2-203H	5	L	50	0.020 µF	–	8	27	46	62	65
YS2C2-273H	5	L	50	0.027 µF	4	10	30	48	65	70
YS2C2-503H	5	L	50	0.050 µF	9	15	36	50	70	70
YS2C2-753H	5	L	50	0.075 µF	12	18	37	51	70	70
YS2C2-104H	5	L	50	0.100 µF	14	20	39	52	70	70
YS1A2-152H	5	C	100	1500 pF	–	–	5	21	42	55
YS1A2-502H	5	C	100	5000 pF	–	–	15	34	50	60
YS1A2-103H	5	C	100	0.010 µF	–	4	20	35	53	60
YS1A2-153H	5	C	100	0.015 µF	–	7	25	40	55	60
YS1A2-203H	5	C	100	0.020 µF	–	8	27	41	60	65
YS1A2-273H	5	C	100	0.027 µF	–	10	30	42	65	70
YS1A2-503H	5	C	100	0.050 µF	9	15	35	44	70	70
YS1A2-753H	5	C	100	0.075 µF	12	18	37	46	70	70
YS2A2-152H	5	L	100	1500 pF	–	–	6	22	48	55
YS2A2-502H	5	L	100	5000 pF	–	–	15	35	55	60
YS2A2-103H	5	L	100	0.010 µF	–	4	20	36	57	60
YS2A2-153H	5	L	100	0.015 µF	–	7	25	45	60	60
YS2A2-203H	5	L	100	0.020 µF	–	8	27	46	62	65
YS2A2-273H	5	L	100	0.027 µF	–	10	30	48	65	70
YS2A2-503H	5	L	100	0.050 µF	9	15	36	50	70	70
YS2A2-753H	5	L	100	0.075 µF	12	18	37	51	70	70
YS1B2-152H	5	C	200	1500 pF	–	–	5	21	42	55
YS1B2-502H	5	C	200	5000 pF	–	–	15	34	50	60
YS1B2-103H	5	C	200	0.010 µF	–	4	20	35	53	60
YS1B2-153H	5	C	200	0.015 µF	–	7	25	40	55	60
YS1B2-203H	5	C	200	0.020 µF	–	8	27	41	60	65
YS1B2-273H	5	C	200	0.027 µF	4	10	30	42	65	70
YS2B2-152H	5	L	200	1500 pF	–	–	6	22	48	55
YS2B2-502H	5	L	200	5000 pF	–	–	15	35	55	60
YS2B2-103H	5	L	200	0.010 µF	–	4	20	36	57	60
YS2B2-153H	5	L	200	0.015 µF	–	7	25	45	60	60
YS2B2-203H	5	L	200	0.020 µF	–	8	27	46	62	65
YS2B2-273H	5	L	200	0.027 µF	4	10	30	48	65	70

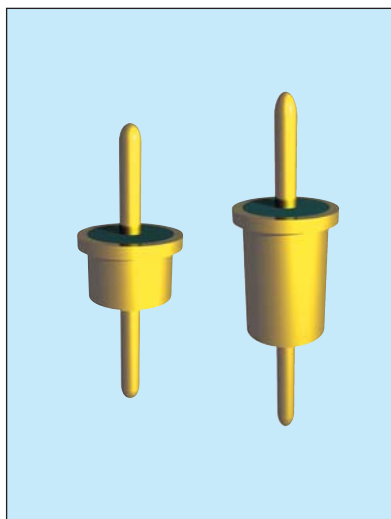
¹ Insertion loss limits are based on theoretical values Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end.

All parts are capable of the reverse configuration with the glass seal at the flange end.

All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.



APPLICATIONS

The XS series expands upon the YS offering by providing additional filtering in the HF through MICROWAVE frequency spectrum from 500 KHz up to 10 GHz. The larger diameter of the XS series means that even higher values of capacitance and a rated DC current of 10 Amps are available. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for medium to high impedance circuits where significant amounts of capacitance to

ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

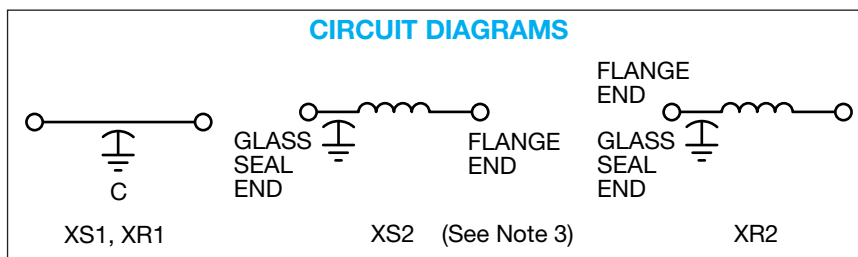
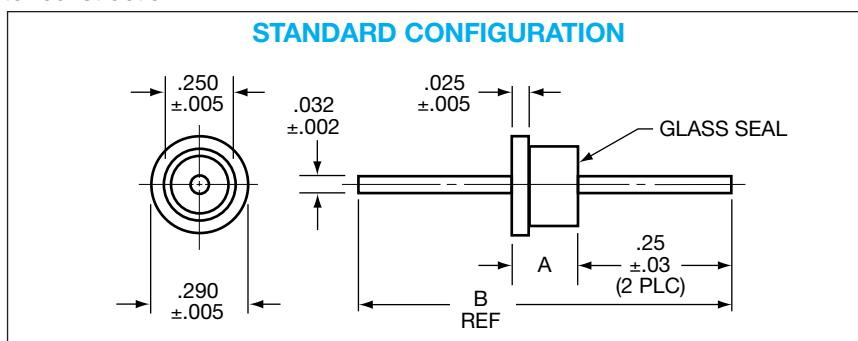
Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/14. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:
Case: Cold rolled steel
Leads: Alloy 52 steel
3. Operating Temperature Range:
-55°C to +125°C
4. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature:
300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)

0.05 (.002)	3.81 (.150)
0.13 (.005)	6.35 (.250)
0.64 (.025)	7.37 (.290)
0.8 (.03)	16.51 (.650)
0.81 (.032)	19.05 (.750)

(See Note 4)

Circuit Diagram	Dimensions	
	A ±.005	B Ref.
L	.250	.750
C	.150	.650

Notes:

1. Outline drawing shows standard XS configuration. Also available with glass seal at the opposite end, XR reverse configuration.
2. MIL-F-28861/14 configuration A is equivalent to standard XS configuration. B is reverse XR configuration.
3. For XS2 or XR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/14 (See Note 2)

Dash No.	Config.
001 through 006	A STD
007 through 012	B REV

SPECIFICATIONS

AVX P/N	Current (A)	CKT	DC Voltage	CAP Min.	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					500 KHz	1 MHz	10 MHz	100 MHz	1000 MHz	10 GHz
XS1C2-503H	5	C	50	0.050 μ F	9	15	35	44	70	70
XS1C2-753H	5	C	50	0.075 μ F	12	18	37	46	70	70
XS1C2-104H	5	C	50	0.100 μ F	14	20	38	48	70	70
XS1C2-154H	5	C	50	0.150 μ F	17	24	38	50	70	70
XS1C2-254H	5	C	50	0.250 μ F	21	31	40	55	70	70
XS2C2-503H	5	L	50	0.050 μ F	9	15	36	50	70	70
XS2C2-753H	5	L	50	0.075 μ F	12	18	37	51	70	70
XS2C2-104H	5	L	50	0.100 μ F	14	20	39	52	70	70
XS2C2-154H	5	L	50	0.150 μ F	17	26	40	53	70	70
XS2C2-254H	5	L	50	0.250 μ F	21	31	40	56	70	70
XS1A2-503H	5	C	100	0.050 μ F	9	15	35	44	70	70
XS1A2-753H	5	C	100	0.075 μ F	12	18	37	46	70	70
XS1A2-104H	5	C	100	0.100 μ F	14	20	38	48	70	70
XS2A2-503H	5	L	100	0.050 μ F	9	15	36	50	70	70
XS2A2-753H	5	L	100	0.075 μ F	12	18	37	51	70	70
XS2A2-104H	5	L	100	0.100 μ F	14	20	39	52	70	70
XS1B2-153H	5	C	200	0.015 μ F	–	5	25	40	55	60
XS1B2-223H	5	C	200	0.022 μ F	2	8	26	40	58	70
XS2B2-153H	5	L	200	0.015 μ F	–	5	25	45	60	60
XS2B2-223H	5	L	200	0.022 μ F	2	8	27	45	65	70
XS1L2-103H	5	C	300	0.010 μ F	–	3	20	35	52	60
XS2L2-103H	5	L	300	0.010 μ F	–	3	20	38	55	60

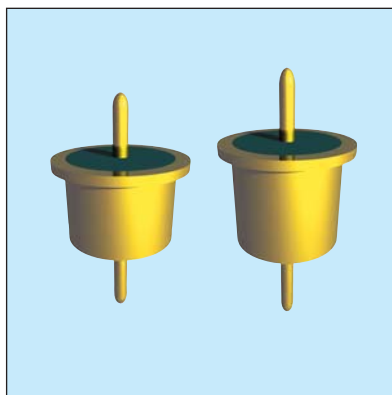
¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end.

All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical.

The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.



APPLICATIONS

The WS series expands greatly upon the XS and YS offerings by providing increased filtering in the HF through MICROWAVE frequency spectrum from 500 KHz up to 10 GHz. The larger diameter of the WS series means even higher values of capacitance, a rated DC current of 15 Amps, plus 125 VAC/400 Hz ratings are available. Designed to be soldered into a package, bracket or bulk-head (and maintain hermeticity), it is ideal for low to medium impedance circuits

where large amounts of capacitance to ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

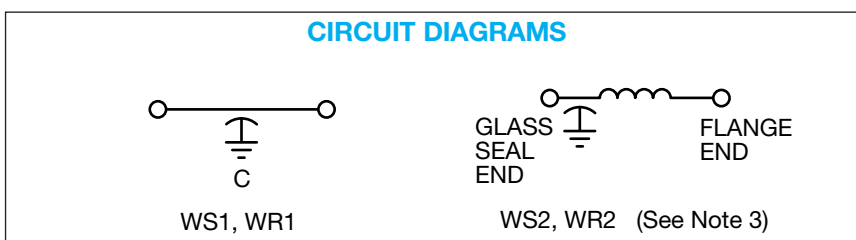
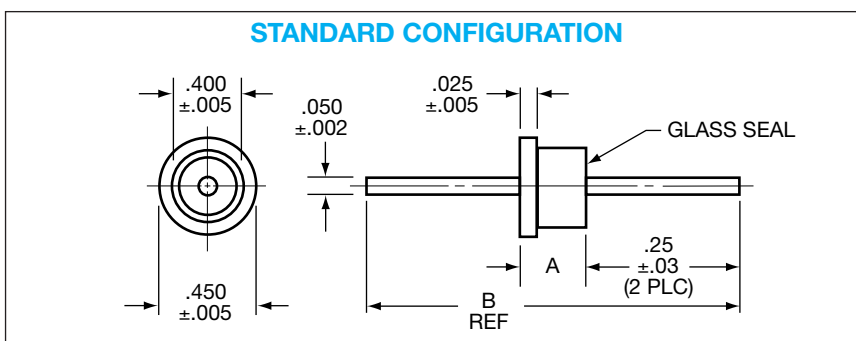
Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/13. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:
Case: Cold rolled steel
Leads: Alloy 52 steel
3. Operating Temperature Range:
-55°C to +125°C
4. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 15 Amps, maximum
9. Maximum Installation Temperature: 300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)

0.05 (.002)	6.35 (.250)
0.13 (.005)	7.62 (.300)
0.64 (.025)	10.16 (.400)
0.8 (.03)	11.43 (.450)
1.27 (.050)	17.78 (.700)
5.08 (.200)	20.32 (.800)

(See Note 4)

Circuit Diagram	Dimensions	
	A ±.005	B Ref.
L	.300	.800
C	.200	.700

Notes:

1. Outline drawing shows standard WS configuration. Also available with glass seal at the opposite end, WR reverse configuration.
2. MIL-F-28861/13 configuration “A” is equivalent to standard WS configuration. “B” is reverse WR configuration.
3. For WS2 or WR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/13 (See Note 2)

Dash No.	Config.
001 through 008	A
009 through 016	B

SPECIFICATIONS

AVX P/N	Current (A)	Circuit	DC Voltage	CAP Min.	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					500 KHz	1 MHz	10 MHz	100 MHz	1000 MHz	10 GHz
WS1C2-154H	15	C	50	0.150 µF	17	24	38	50	70	70
WS1C2-504H	15	C	50	0.500 µF	26	34	42	58	70	70
WS1C2-754H	15	C	50	0.750 µF	31	37	43	62	70	70
WS1C2-125H	15	C	50	1.200 µF	33	37	52	70	70	70
WS2C2-154H	15	L	50	0.150 µF	17	26	40	53	70	70
WS2C2-504H	15	L	50	0.500 µF	26	36	44	60	70	70
WS2C2-754H	15	L	50	0.750 µF	31	40	44	64	70	70
WS2C2-125H	15	L	50	1.200 µF	33	38	53	70	70	70
WS1N2-704H	15	C	70	0.700 µF	30	36	41	60	70	70
WS2N2-704H	15	L	70	0.700 µF	30	38	42	62	70	70
WS1A2-154H	15	C	100	0.150 µF	17	24	38	50	70	70
WS1A2-504H	15	C	100	0.500 µF	26	34	42	58	70	70
WS1A2-754H	15	C	100	0.750 µF	31	37	43	62	70	70
WS1A2-105H	15	C	100	1.000 µF	31	40	48	64	70	70
WS2A2-154H	15	L	100	0.150 µF	17	26	40	53	70	70
WS2A2-504H	15	L	100	0.500 µF	26	34	44	60	70	70
WS2A2-754H	15	L	100	0.750 µF	31	40	44	64	70	70
WS2A2-105H	15	L	100	1.000 µF	31	41	50	65	70	70
WS1L2-503H	15	C	200*	0.050 µF	7	15	34	42	70	70
WS1L2-154H	15	C	200*	0.150 µF	17	24	38	50	70	70
WS2L2-503H	15	L	200*	0.050 µF	7	15	34	44	70	70
WS2L2-154H	15	L	200*	0.150 µF	17	26	40	53	70	70
WS1E2-103H	15	C	400	0.010 µF	–	4	20	34	50	60
WS1E2-503H	15	C	400	0.050 µF	7	15	34	44	70	70
WS2E2-103H	15	L	400	0.010 µF	–	4	20	35	55	60
WS2E2-503H	15	L	400	0.050 µF	7	15	34	44	70	70

* Rated 200 VDC or 125 VAC/400 Hz.

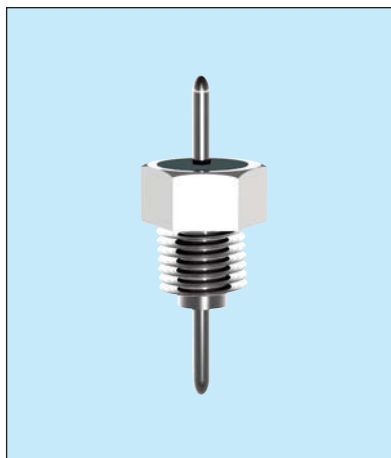
¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end.

All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical.

The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.



The SA series provides effective filtering in the RF and MICROWAVE frequency spectrums from 10 MHz through 26 GHz. Designed for mounting in a tapped bulkhead or with the standard nut and lockwasher provided, it is ideal for high impedance circuits where large capacitance values are not practical. In the “L” section version an internal ferrite bead

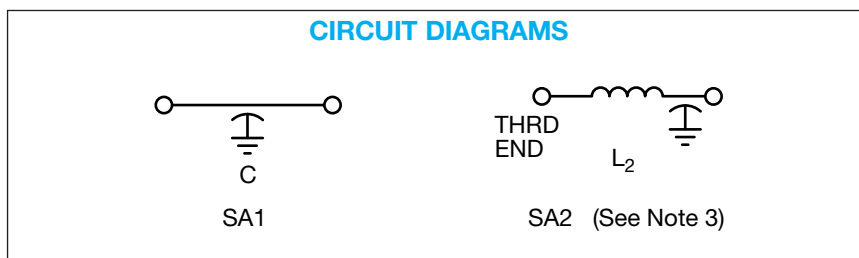
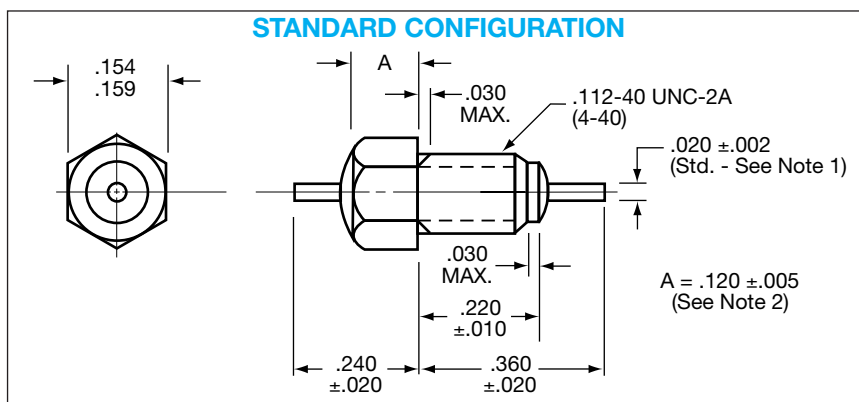
element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance. The SA series comes with a standard .020 diameter beryllium copper lead. Alternate lead lengths, diameters of .016 or .026 and alternate materials in steel or half-hard copper are available.

CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/6. See QPL listings.
- Smallest screwbody filter available.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
 - Case: Cold rolled steel
 - Leads: Beryllium copper (steel or half/hard copper leads available)
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
 - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
 - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
 - R-level designs: 2.0 times rated DC voltage
 - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .02 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Recommended Mounting Torque: 32 oz-in. ± 4 oz-in.
10. Supplied with mounting nut and lockwasher - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C” and “L” sections are equivalent due to the saturation characteristic of the ferrite bead element at rated current. At lower currents the “L” becomes much more effective.



millimeters (inches)

0.05 (.002)	3.05 (.120)
0.13 (.005)	3.68 (.145)
0.25 (.010)	3.91 (.154)
0.41 (.016)	4.04 (.159)
0.51 (.020)	5.59 (.220)
0.66 (.026)	6.10 (.240)
0.76 (.030)	9.14 (.360)
2.84 (.112)	—

(See Note 4)

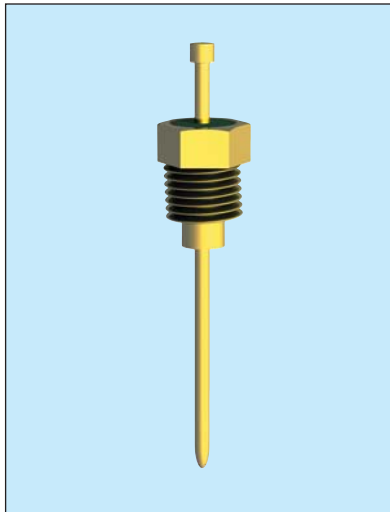
Notes:

1. Standard catalog designs have .020" dia. lead. MIL-F-28861/6 calls for .026" dia. .026" dia. will not be supplied unless specified.
2. "A" dimension of .120 ± .005 will satisfy M28861/6-003 requirement for .145 ± .030. All "SA" series are supplied A = .120 ± .005.
3. All SA2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.

SPECIFICATIONS

AVX P/N	CKT	CAP	DC Voltage	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SA1C1-102	C	1000 pF	50	0.020	–	4	20	25	25	55
SA1C1-502	C	5000 pF	50	0.020	–	15	34	41	42	55
SA1C1-103	C	0.010 μF	50	0.020	4	21	35	42	50	70
SA1C1-273	C	0.027 μF	50	0.020	10	30	39	43	65	70
SA1C1-503	C	0.050 μF	50	0.020	15	35	42	45	70	70
SA2C1-102	L2	1000 pF	50	0.020	–	4	20	27	30	60
SA2C1-502	L2	5000 pF	50	0.020	–	15	35	41	45	60
SA2C1-103	L2	0.010 μF	50	0.020	4	21	35	44	50	70
SA2C1-273	L2	0.027 μF	50	0.020	10	30	50	45	65	70
SA2C1-503	L2	0.050 μF	50	0.020	15	37	45	45	70	70
SA1A1-102	C	1000 pF	100	0.020	–	4	20	25	25	55
SA1A1-502	C	5000 pF	100	0.020	–	15	35	41	42	55
SA1A1-103	C	0.010 μF	100	0.020	4	21	35	42	50	70
SA1A1-273	C	0.027 μF	100	0.020	10	30	39	43	65	70
SA1A1-453	C	0.045 μF	100	0.020	14	35	42	45	70	70
SA2A1-102	L2	1000 pF	100	0.020	–	4	20	27	30	60
SA2A1-502	L2	5000 pF	100	0.020	–	15	35	41	45	60
SA2A1-103	L2	0.010 μF	100	0.020	4	21	35	44	50	70
SA2A1-273	L2	0.027 μF	100	0.020	10	30	50	45	70	70
SA2A1-453	L2	0.045 μF	100	0.020	14	37	45	45	70	70
SA1B1-102	C	1000 pF	200	0.020	–	4	20	25	25	55
SA1B1-502	C	5000 pF	200	0.020	–	15	34	41	42	55
SA1B1-103	C	0.010 μF	200	0.020	4	21	35	42	50	70
SA2B1-102	L2	1000 pF	200	0.020	–	4	20	27	30	60
SA2B1-502	L2	5000 pF	200	0.020	–	15	35	41	45	60
SA2B1-103	L2	0.010 μF	200	0.020	4	21	35	44	50	70

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.



APPLICATIONS

The SB series provides improved filtering in the HF through MICROWAVE frequency spectrums from 1 MHz through 10 GHz. Also designed for mounting in a tapped bulkhead or with the standard nut and lockwasher provided, it is ideal for medium to high impedance circuits where large

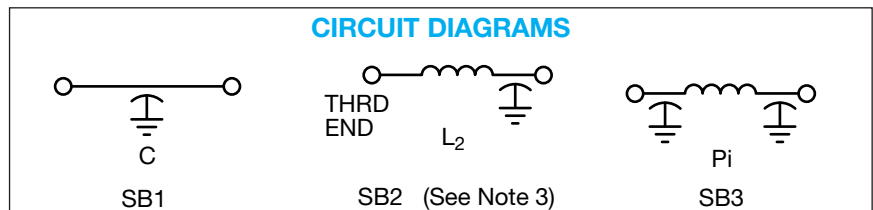
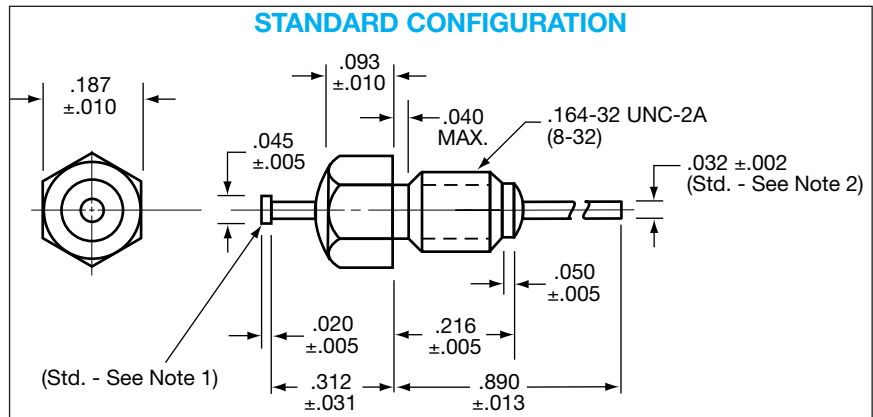
capacitance values are not practical. In the “L” and “ π ” section versions an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves the insertion loss rolloff to 40 dB and 60 dB per decade respectively.

CHARACTERISTICS

- Designed to meet or exceed the applicable portions of MIL-F-28861/7. See QPL listings.
- π design offers steeper insertion loss rolloff.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
Case: Cold rolled steel
Leads: Half/hard copper
3. Operating Temperature Range:
-55°C to +125°C
4. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
R-level designs:
2.0 times rated DC voltage
Class B, Class S designs:
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 10 Amps, maximum
9. Recommended Mounting Torque:
64 oz-in. \pm 4 oz-in.
10. Supplied with mounting nut and lockwasher - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C”, “L” and “ π ” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” and “ π ” become much more effective.



millimeters (inches)		
0.05 (.002)	1.14 (.045)	
0.13 (.005)	1.27 (.050)	
0.18 (.007)	1.85 (.073)	
0.25 (.010)	2.36 (.093)	
0.33 (.013)	4.17 (.164)	
0.38 (.015)	4.75 (.187)	
0.51 (.020)	5.49 (.216)	
0.64 (.025)	6.35 (.250)	
0.76 (.030)	7.11 (.280)	
0.79 (.031)	7.92 (.312)	
0.81 (.032)	22.61 (.890)	
1.02 (.040)	—	—

(See Note 4)

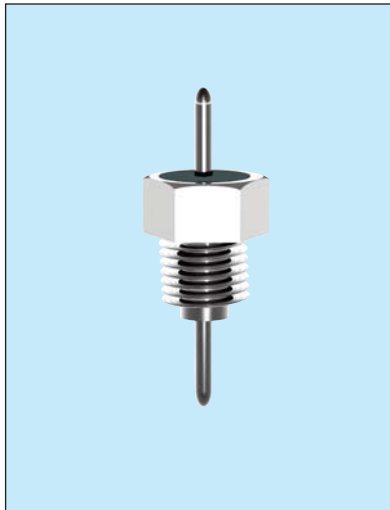
Notes:

1. Nailhead standard, straight lead available.
2. Lead diameters other than .032" available.
3. All SB2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.

SPECIFICATIONS

AVX P/N	CKT	CAP	DC Voltage	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SB1C1-102	C	1000 pF	50	0.010	–	4	20	25	40	50
SB1C1-502	C	5000 pF	50	0.010	–	15	34	41	50	55
SB1C1-103	C	0.010 μ F	50	0.010	4	21	35	40	55	60
SB1C1-273	C	0.027 μ F	50	0.010	10	30	39	45	65	70
SB1C1-503	C	0.050 μ F	50	0.010	15	35	42	50	70	70
SB2C1-273	L2	0.027 μ F	50	0.010	10	30	50	54	65	70
SB2C1-503	L2	0.050 μ F	50	0.010	15	36	54	60	70	70
SB3C1-323	π	0.032 μ F	50	0.010	12	30	60	70	70	70
SB1A1-102	C	1000 pF	100	0.010	–	4	20	25	40	50
SB1A1-502	C	5000 pF	100	0.010	–	15	34	41	50	55
SB1A1-103	C	0.010 μ F	100	0.010	4	21	35	40	55	60
SB1A1-273	C	0.027 μ F	100	0.010	10	30	39	45	65	70
SB1A1-503	C	0.050 μ F	100	0.010	15	35	42	50	70	70
SB2A1-103	L2	0.010 μ F	100	0.010	4	21	35	38	65	70
SB2A1-273	L2	0.027 μ F	100	0.010	10	30	50	54	70	70
SB3A1-152	π	1500 pF	100	0.010	–	8	20	45	70	70
SB3A1-123	π	0.012 μ F	100	0.010	–	12	60	70	70	70
SB3A1-153	π	0.015 μ F	100	0.010	–	17	37	43	70	70
SB1B1-102	C	1000 pF	200	0.010	–	4	20	25	40	50
SB1B1-502	C	5000 pF	200	0.010	–	15	34	41	50	55
SB2B1-102	L2	1000 pF	200	0.010	–	4	20	27	45	70
SB2B1-502	L2	5000 pF	200	0.010	–	15	35	41	55	70
SB3B1-202	π	2000 pF	200	0.010	–	8	42	58	70	70

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.



APPLICATIONS

The SP series provides increased filtering in the HF through MICROWAVE frequency spectrums from 100 KHz through 10 GHz. The larger hex size means that much higher values of capacitance are available and that a 125 VAC/400 Hz rating is available in certain values. Also designed for mounting in a tapped bulkhead or with the standard nut and lock-washer provided, it is optimum in medium

to low impedance circuits where significant amounts of capacitance to ground can be tolerated. In the “L” and “ π ” section versions an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves the insertion loss rolloff to 40 dB and 60 dB per decade respectively.

Alternate lead diameters or lengths are available both with and without a nailhead.

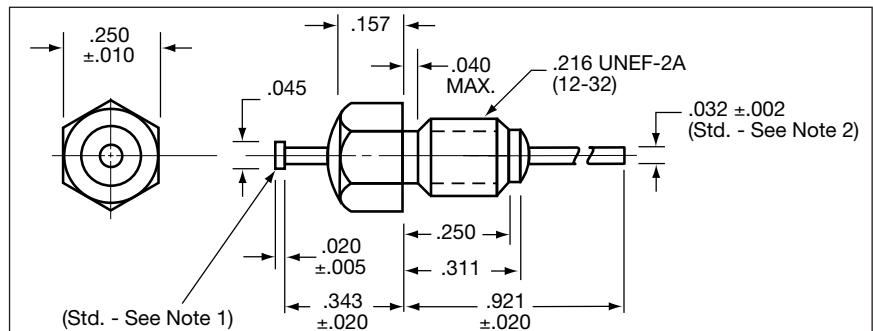
CHARACTERISTICS

- Designed to meet or exceed the applicable portions of MIL-F-28861/9. See QPL listing.
- Conservatively rated for 125 VAC/400 Hz in certain values.
- π design offers steeper insertion loss rolloff.
- Features rugged monolithic discoidal capacitor construction.
- Epoxy seal on both ends.

SPECIFICATIONS

1. Plating: Silver standard – Electro-tin or gold available
2. Material:
 - Case: Cold rolled steel standard, brass available
 - Leads: Half/hard copper
3. Operating Temperature Range: -55°C to +125°C
4. Insulation Resistance:
 - At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less
 - At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):
 - R-level designs: 2.0 times rated DC voltage
 - Class B, Class S designs: 2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 10 Amps, maximum
9. Recommended Mounting Torque: 64 oz-in. \pm 4 oz-in.
10. Supplied with mounting nut and lock-washer - See Filter Design Guide Screw and Locking Washer Table
11. Insertion Loss for the “C”, “L” and “ π ” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” and “ π ” become much more effective.

STANDARD CONFIGURATION

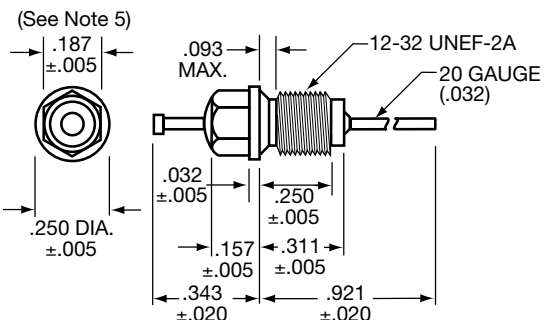


millimeters (inches)

0.05 (.002)	2.36 (.093)
0.13 (.005)	3.99 (.157)
0.18 (.007)	4.75 (.187)
0.25 (.010)	5.49 (.216)
0.51 (.020)	6.12 (.241)
0.58 (.023)	6.35 (.250)
0.79 (.031)	7.90 (.311)
0.81 (.032)	8.71 (.343)
1.02 (.040)	9.45 (.372)
1.14 (.045)	9.73 (.383)
1.60 (.063)	23.39 (.921)
1.85 (.073)	—

(See Note 4)

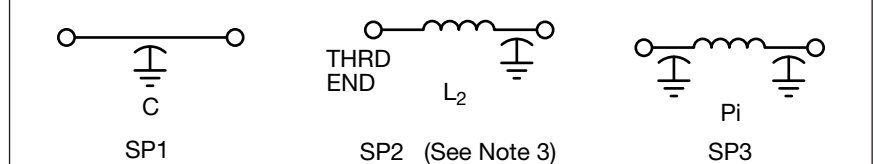
ALTERNATE CONFIGURATION (SC SERIES)



Notes:

1. Nailhead standard, straight lead available.
2. Lead diameters other than .032" available.
3. SP2 L-Section Filters have inductor (bead) at threaded end.
4. Metric equivalent dimensions given for information only.
5. Small-hex version may be specified for selected capacitance/voltage ratings. Contact AVX Filters Engineering for availability.

CIRCUIT DIAGRAMS



SPECIFICATIONS

AVX P/N	CKT	CAP	DC Voltage	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C					
					1 MHz	10 MHz	100 MHz	200 MHz	1 GHz	10 GHz
SP1C1-204	C	0.200 μ F	50	0.010	26	39	52	60	70	70
SP2C1-204	L2	0.200 μ F	50	0.010	26	38	65	70	70	70
SP3C1-124	π	0.120 μ F	50	0.010	20	38	70	70	70	70
SP1A1-503	C	0.050 μ F	100	0.010	15	35	38	50	70	70
SP1A1-104	C	0.100 μ F	100	0.010	20	38	48	53	70	70
SP2A1-503	L2	0.050 μ F	100	0.010	15	36	54	60	70	70
SP3A1-753	π	0.075 μ F	100	0.010	18	38	70	70	70	70
SP1L1-102	C	1000 pF	200*	0.010	–	4	20	25	40	50
SP1L1-502	C	5000 pF	200*	0.010	–	15	34	41	50	55
SP1L1-103	C	0.010 μ F	200*	0.010	4	21	35	40	55	60
SP1L1-253	C	0.025 μ F	200*	0.010	8	28	36	44	64	70
SP2L1-102	L2	1000 pF	200*	0.010	–	4	20	27	45	70
SP2L1-502	L2	5000 pF	200*	0.010	–	15	35	41	55	70
SP2L1-103	L2	0.010 μ F	200*	0.010	4	21	35	38	65	70
SP3B1-152	π	1500 pF	200	0.010	–	8	20	45	70	70
SP3B1-123	π	0.012 μ F	200	0.010	–	12	60	70	70	70

* Rated 200 VDC or 125 VAC/400 Hz

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

Cylindrical Style EMI Filters

GK Series – 0.375/0.410 Dia., Hermetically Sealed – Circuits Available – C, L, π , T



APPLICATIONS

The GK series offers effective filtering from 30 KHz to 10 GHz. Glass sealed for hermeticity, this series is impervious to high moisture, solvents, or other severe environmental conditions commonly encountered in military applications. It is designed for bulkhead mounting in a slotted hole with nut and lockwasher supplied.

The “L” and “T” configurations are designed to provide effective attenuation over a wide range of circuit impedances. For current ratings under 10 Amps toroidal wound

inductor elements offer increased filter performance and protection against circuit transients. Data showing the actual inductance versus various levels of DC or AC bias current are available as well as the attenuation in any combination of source and load impedances.

Alternate lead configurations or special capacitance/inductance values may be ordered.

Custom packages or filter arrays utilizing the GK series can be furnished.

CHARACTERISTICS

- .410 Dia. version (HK) meets or exceeds the applicable requirements of MIL-F-28861/2,/3,/4,/5. See QPL listing.
- Glass hermetic seal on both ends.
- Wound toroidal inductor used in current ratings up through 5 Amps. Ferrite bead inductor used in 10 and 15 Amp designs.
- High DC current rating: 15 Amps.
- High capacitance values available.

SPECIFICATIONS

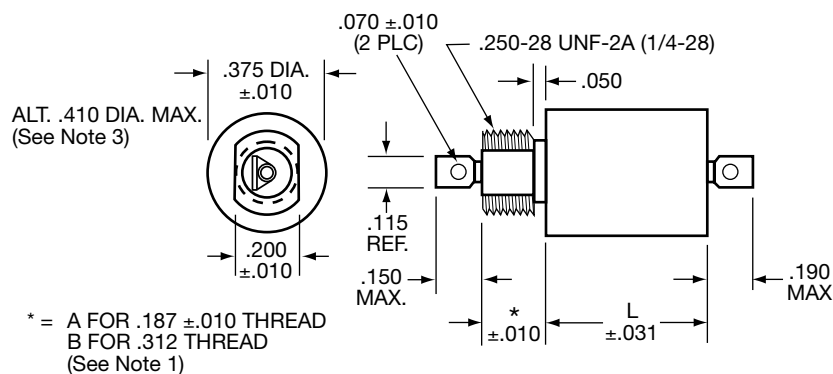
1. Case/Terminal Plating:
Electro-tin standard –
Silver or gold available
 2. Material:
Case: Brass standard – Steel available
End Seal: Mild steel
Terminals: Nickel-iron alloy
 3. Operating Temperature Range:
-55°C to +125°C
 4. Electrical Characteristics:
A. Rated Voltage and Current: See chart
B. Insulation Resistance:
At 25°C: 1,000 megohm-microfarad min., or 50,000 megohms min., whichever is less, at the rated DC voltage
At 125°C: 100 megohm-microfarad min., or 5,000 megohms min., whichever is less
 5. Marking:
Standard Marking: AVX, AVX part number, rated current, voltage, lot code, schematic
NOTE: Schematic to indicate location of inductor (standard or reverse) for GK2 L-Section Filters.
 6. Installation:
A. Mounting Torque: 44 oz-in. \pm 4 oz-in.
B. Refer to “Installation, Handling, Hardware Options” section of the catalog.
- See Reliability Codes section for definition of Reliability Level marking. See How to Order section for part number construction.

Cylindrical Style EMI Filters

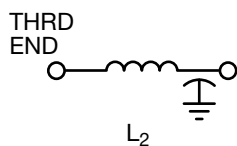
GK Series – 0.375/0.410 Dia., Hermetically Sealed – Circuits Available – C, L, π, T



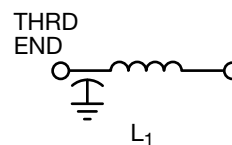
STANDARD CONFIGURATION



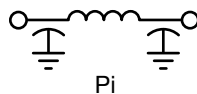
CIRCUIT DIAGRAMS



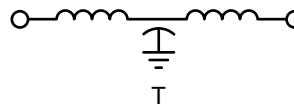
GK2 - Standard



GK2 - Reverse



GK3



GK4

millimeters (inches)

0.25 (.010)	4.75 (.187)
0.79 (.031)	4.83 (.190)
1.27 (.050)	5.08 (.200)
1.78 (.070)	7.93 (.312)
2.92 (.115)	9.53 (.375)
3.81 (.150)	13.72 (.540)

(See Note 2)

Notes:

1. Thread length option. Standard part numbers shown (e.g., GK2BA-S02) are .187" thread length. Optional .312" thread length available (e.g., GK2BB-S02).
2. Metric equivalent dimensions given for information only.

3. All QPL MIL-F-28861, and Hi-rel, will be supplied with .410 diameter (HK). See applicable slash sheet for mechanical dimensions.

* = A for .187 ±.010 Thread
B for .312 Thread
(See Note 1)

Cylindrical Style EMI Filters

GK Series – 0.375/0.410 Dia., Hermetically Sealed – Circuits Available – C, L, π, T



SPECIFICATIONS

AVX P/N	Current (A)	CKT	L. dim	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C							
					10 KHz	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
50 VDC, 1.4 μF												
GK2CA-S01	0.06	L2	0.540	12.00	16	44	70	70	70	70	70	70
GK2CA-S02	0.10	L2	0.540	10.00	15	34	62	70	70	70	70	70
GK2CA-S03	0.15	L2	0.540	4.000	7	24	52	64	70	70	70	70
GK2CA-S04	0.25	L2	0.540	4.000	6	25	53	65	70	70	70	70
GK2CA-S05	0.30	L2	0.540	0.500	5	16	35	45	66	70	70	70
GK2CA-S06	0.45	L2	0.540	0.300	5	15	33	44	65	70	70	70
GK2CA-S07	0.50	L2	0.540	1.000	5	16	41	54	70	70	70	70
GK2CA-S08	1.00	L2	0.540	0.250	5	15	31	42	63	70	70	70
GK2CA-S09	2.00	L2	0.540	0.063	5	15	28	35	51	70	70	70
GK2CA-S10	3.00	L2	0.540	0.027	5	15	28	34	45	70	70	70
GK2CA-S12	10.0	L2	0.540	0.008	5	15	28	34	44	52	65	65
GK3CA-P02	0.10	π	0.540	10.00	12	44	70	70	70	70	70	70
GK3CA-P04	0.25	π	0.540	4.000	8	36	70	70	70	70	70	70
GK3CA-P07	0.50	π	0.540	1.000	7	24	66	70	70	70	70	70
GK3CA-P08	1.00	π	0.540	0.250	5	15	54	70	70	70	70	70
GK3CA-P09	2.00	π	0.540	0.063	5	15	40	60	70	70	70	70
GK3CA-P10	3.00	π	0.540	0.027	5	15	30	50	70	70	70	70
GK3CA-P12	10.0	π	0.540	0.008	5	15	28	34	40	52	70	70
GK4CA-T08	1.00	T	1.020	0.500	5	16	34	56	70	70	70	70
GK4CA-T09	2.00	T	1.020	0.090	5	15	26	37	61	70	70	70
GK4CA-T16	4.00	T	1.020	0.030	5	15	26	34	47	70	70	70
GK4CA-T12	10.0	T	1.020	0.008	5	17	27	34	44	60	70	70

AVX P/N	Current (A)	CKT	L. dim	CAP (μF)	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C									
						15 KHz	30 KHz	50 KHz	100 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
70 VDC, .7–1.4 μF															
GK2NA-S02	0.10	L2	0.540	0.700	1.700	9	20	29	41	48	60	70	70	70	70
GK2NA-S05	0.30	L2	0.540	0.700	0.770	6	15	23	35	42	54	70	70	70	70
GK2NA-S07	0.50	L2	0.540	0.700	0.360	5	12	19	29	36	48	69	70	70	70
GK2NA-S08	1.00	L2	0.540	0.700	0.140	5	11	15	21	26	36	55	70	70	70
GK2NA-S10	3.00	L2	0.540	0.700	0.050	5	10	14	20	24	31	45	70	70	70
GK2NA-S11	5.00	L2	0.540	0.700	0.015	–	–	–	14	17	24	36	60	70	70
GK2NA-S12	10.0	L2	0.540	0.700	0.008	–	10	14	20	24	30	40	40	64	70
GK3NA-P02	0.10	π	0.540	1.400	1.700	15	36	50	69	79	80	80	80	80	80
GK3NA-P05	0.30	π	0.540	1.400	0.770	–	29	44	62	73	80	80	80	80	80
GK3NA-P07	0.50	π	0.540	1.400	0.360	–	21	37	56	67	80	80	80	80	80
GK3NA-P08	1.00	π	0.540	1.400	0.140	–	–	20	46	57	75	80	80	80	80
GK3NA-P10	3.00	π	0.540	1.400	0.050	–	–	–	17	36	51	80	80	80	80
GK3NA-P11	5.00	π	0.540	1.400	0.015	–	–	–	–	16	38	75	80	80	80
GK3NA-P12	10.0	π	0.540	1.400	0.008	5	15	20	24	28	34	40	52	80	80
GK4NA-T08	1.00	T	1.020	0.750	–	–	10	15	21	26	49	70	70	70	70
GK4NA-T09	2.00	T	1.020	0.750	–	–	10	13	17	20	32	55	70	70	70
GK4NA-T16	4.00	T	1.020	0.750	–	–	9	12	15	19	29	42	70	70	70
GK4NA-T12	10.0	T	1.020	0.750	–	–	9	12	15	19	28	38	55	70	70

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”. Insertion loss and other parameters are identical. Only the part number changes (e.g., L2 = GK2LA-S04, L1 = GK2LA-R04).

Cylindrical Style EMI Filters

GK Series – 0.375/0.410 Dia., Hermetically Sealed – Circuits Available – C, L, π , T



SPECIFICATIONS

AVX P/N	Current (A)	CKT	L. dim	CAP (μ F)	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C							
						10 KHz	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
100 VDC, .45–1.4 μF													
GK2AA-S01	0.06	L2	0.540	1.40	12.00	15	44	70	70	70	70	70	70
GK2AA-S02	0.10	L2	0.540	1.40	10.00	12	34	62	70	70	70	70	70
GK2AA-S03	0.15	L2	0.540	1.40	4.000	7	24	52	64	70	70	70	70
GK2AA-S05	0.30	L2	0.540	1.40	0.500	–	14	35	45	66	70	70	70
GK2AA-S06	0.45	L2	0.540	1.40	0.300	–	14	33	44	65	70	70	70
GK2AA-S07	0.50	L2	0.540	1.40	1.000	–	16	41	54	70	70	70	70
GK2AA-S09	2.00	L2	0.540	1.40	0.063	–	15	28	35	51	70	70	70
GK2AA-S12	10	L2	0.540	1.40	0.008	–	14	28	33	44	52	70	70
GK3AA-P02	0.10	π	0.540	1.00	10.00	12	40	70	70	70	70	70	70
GK3AA-P07	0.50	π	0.540	1.00	1.000	–	18	60	70	70	70	70	70
GK3AA-P09	2.00	π	0.540	1.00	0.063	–	9	36	53	70	70	70	70
GK3AA-P12	10.0	π	1.020	1.00	0.008	–	9	24	29	40	70	70	70
GK4AA-T08	1.00	T	1.020	0.75	0.500	–	10	25	49	70	70	70	70
GK4AA-T09	2.00	T	1.020	0.75	0.090	–	10	20	32	56	70	70	70
GK4AA-T16	4.00	T	1.020	0.75	0.030	–	10	19	29	42	70	70	70
GK4AA-T12	10.0	T	1.020	0.75	0.008	–	9	19	28	39	58	65	65
GK2AA-S04	0.25	L2	0.540	0.45	1.500	–	–	38	50	60	60	60	60
GK3AA-P04	0.25	π	0.540	0.90	1.500	–	–	64	80	80	80	80	80
GK2AA-S08	1.00	L2	0.540	0.45	0.250	–	–	23	34	55	60	60	60
GK3AA-P08	1.00	π	0.540	0.90	0.250	–	–	52	70	80	80	80	80
GK2AA-S10	3.00	L2	0.540	0.45	0.050	–	–	18	27	45	60	60	60
GK3AA-P10	3.00	π	0.540	0.90	0.050	–	–	25	51	80	80	80	80
GK2AA-S11	5.00	L2	0.540	0.45	0.015	–	–	17	24	36	60	60	60
GK3AA-P11	5.00	π	0.540	0.90	0.015	–	–	–	38	75	80	80	80

AVX P/N	Current (A)	CKT	L. dim	CAP (μ F)	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C						
						100 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
150 VDC, .25–.50 μF												
GK2HA-S02	0.10	L2	0.540	0.250	1.700	32	39	51	60	60	60	70
GK2HA-S05	0.30	L2	0.540	0.250	0.770	25	30	44	60	60	60	70
GK2HA-S07	0.50	L2	0.540	0.250	36.00	20	26	39	59	60	60	70
GK2HA-S08	1.00	L2	0.540	0.250	14.00	12	16	26	48	60	60	70
GK2HA-S10	3.00	L2	0.540	0.250	0.050	11	15	20	36	60	60	70
GK2HA-S11	5.00	L2	0.540	0.250	0.015	8	12	20	32	60	60	70
GK2HA-S12	10.0	L2	0.540	0.250	0.008	6	12	20	32	40	56	70
GK3HA-P02	0.10	π	0.540	0.500	1.700	49	60	70	80	80	80	80
GK3HA-P05	0.30	π	0.540	0.500	0.770	43	53	70	80	80	80	80
GK3HA-P07	0.50	π	0.540	0.500	0.360	37	48	66	80	80	80	80
GK3HA-P08	1.00	π	0.540	0.500	0.140	28	40	58	80	80	80	80
GK3HA-P10	3.00	π	0.540	0.500	0.050	–	–	38	70	80	80	80
GK3HA-P11	5.00	π	0.540	0.500	0.015	–	–	20	63	80	80	80
GK3HA-P12	10.0	π	0.540	0.500	0.008	–	–	15	35	60	80	80
GK4HA-T08	1.00	T	1.020	0.250	0.500	15	23	42	70	80	80	80
GK4HA-T09	2.00	T	1.020	0.250	0.090	9	13	32	50	70	80	80
GK4HA-T16	4.00	T	1.020	0.250	0.030	6	10	21	40	60	80	80
GK4HA-T12	10.0	T	1.020	0.250	0.006	–	9	21	28	44	60	80

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”. Insertion loss and other parameters are identical. Only the part number changes (e.g., L2 = GK2LA-S04, L1 = GK2LA-R04).

SPECIFICATIONS

AVX P/N	Current (A)	CKT	L. dim	CAP (μF)	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C							
						10 KHz	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
200 VDC, .15–.36 μF													
GK2BA-S02	0.10	L2	0.540	0.150	10.00	–	21	50	61	70	70	70	70
GK2BA-S04	0.25	L2	0.540	0.150	0.400	–	11	39	51	70	70	70	70
GK2BA-S07	0.50	L2	0.540	0.150	1.000	–	3	29	41	63	70	70	70
GK2BA-S08	1.00	L2	0.540	0.150	0.250	–	–	18	28	49	70	70	70
GK2BA-S09	2.00	L2	0.540	0.150	0.063	–	–	15	21	38	70	70	70
GK2BA-S10	3.00	L2	0.540	0.150	0.027	–	–	15	21	31	70	70	70
GK2BA-S12	10.0	L2	0.540	0.150	0.008	–	–	15	21	31	51	60	60
GK3BA-P02	0.10	π	0.540	0.360	10.00	–	21	61	70	70	70	70	70
GK3BA-P04	0.25	π	0.540	0.360	4.000	–	10	52	68	70	70	70	70
GK3BA-P07	0.50	π	0.540	0.360	1.000	–	–	44	63	70	70	70	70
GK3BA-P08	1.00	π	0.540	0.360	0.250	–	–	30	46	70	70	70	70
GK3BA-P09	2.00	π	0.540	0.360	0.063	–	–	16	33	63	70	70	70
GK3BA-P10	3.00	π	0.540	0.360	0.027	–	–	–	21	55	70	70	70
GK3BA-P12	10.0	π	0.540	0.360	0.008	–	–	–	20	30	60	70	70
GK4BA-T08	1.00	T	1.020	0.150	0.500	–	3	17	42	70	70	70	70
GK4BA-T09	2.00	T	1.020	0.150	0.090	–	–	12	24	48	70	70	70
GK4BA-T16	4.00	T	1.020	0.150	0.030	–	–	12	21	34	70	70	70
GK4BA-T12	10.0	T	1.020	0.150	0.008	–	3	12	21	31	50	60	60

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”. Insertion loss and other parameters are identical. Only the part number changes (e.g., L2 = GK2LA-S04, L1 = GK2LA-R04).

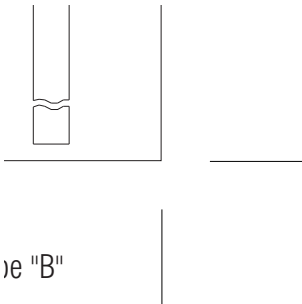
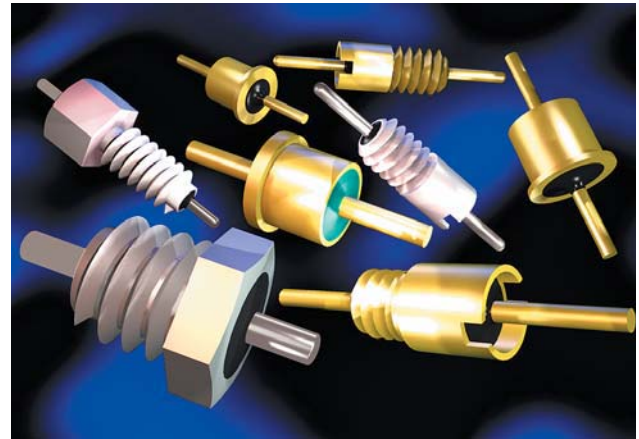
AVX P/N	Current (A)	CKT	L. dim	CAP (μF)	DCR (Ω)	Insertion Loss ¹ Per MIL-STD-220, +25°C							
						10 KHz	30 KHz	150 KHz	300 KHz	1 MHz	10 MHz	100 MHz	1 GHz
200 VDC (125 VAC/400 Hz) .15–.30 μF													
GK2LA-S02	0.10	L2	0.540	0.150	10.00	–	14	42	54	70	70	70	70
GK2LA-S07	0.50	L2	0.540	0.150	1.000	–	–	23	35	56	70	70	70
GK2LA-S09	2.00	L2	0.540	0.150	0.063	–	–	8	14	30	70	70	70
GK2LA-S12	10.0	L2	0.540	0.150	0.008	–	–	8	14	25	45	60	60
GK3LA-P02	0.10	π	0.540	0.300	10.00	–	21	60	70	70	70	70	70
GK3LA-P07	0.50	π	0.540	0.300	1.000	–	–	40	56	70	70	70	70
GK3LA-P10	3.00	π	0.540	0.300	0.027	–	–	–	25	54	70	70	70
GK3LA-P12	10.0	π	0.540	0.300	0.008	–	–	–	20	30	70	70	70
GK2LA-S04	0.25	L2	0.540	0.150	1.500	–	6	28	40	60	60	60	70
GK2LA-S08	1.00	L2	0.540	0.150	0.250	–	–	13	24	45	60	60	70
GK2LA-S10	3.00	L1	0.540	0.150	0.050	–	–	8	16	30	60	60	70
GK2LA-S11	5.00	L2	0.540	0.150	0.015	–	–	8	14	26	55	55	70
GK3LA-P04	0.25	π	0.540	0.300	1.500	–	8	44	62	80	80	80	80
GK3LA-P08	1.00	π	0.540	0.300	0.250	–	–	32	50	80	80	80	80
GK3LA-P10	3.00	π	0.540	0.300	0.050	–	–	–	19	59	80	80	80
GK3LA-P11	5.00	π	0.540	0.300	0.015	–	–	–	–	51	80	80	80
GK4LA-T08	1.00	T	1.020	0.150	0.500	–	–	10	36	66	70	70	70
GK4LA-T09	2.00	T	1.020	0.150	0.090	–	–	7	18	41	70	70	70
GK4LA-T16	4.00	T	1.020	0.150	0.030	–	–	8	15	27	70	70	70
GK4LA-T12	10.0	T	1.020	0.150	0.008	–	–	8	15	25	70	70	70

¹ Insertion loss limits are based on theoretical values. Actual measurements may vary due to internal capacitor resonances and other design constraints.

NOTE: All “L2” circuits are also available as “L1”. Insertion loss and other parameters are identical. Only the part number changes (e.g., L2 = GK2LA-S04, L1 = GK2LA-R04).

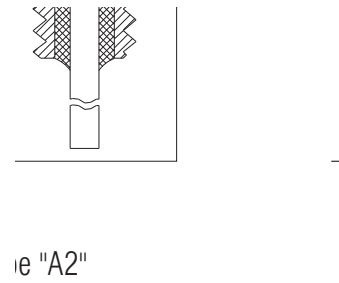
APPLICATIONS

AVX's Miniature filter line breaks the "small" size barrier. These ultraminiature products, available as solder-in or screw-in style, have case diameters as low as .073". Threaded filters will allow substitution, flexibility of placement and simple installation, while solder-in parts will provide hermeticity of your microcircuit packages. Now, with capacitance values of up to 50,000 pF, "C", "L" or "T" circuits, superior insertion loss over on-board filtering, variety of ultra small and lightweight sizes, you can meet all "mission critical" objectives. World's smallest and most complete miniature EMI filter line is especially well suited for microwave industry, medical electronics, avionics instrumentation, satellites or other applications where space is at premium.



FEATURES

- World's smallest filters, a "must" for avionics and space industry.
- Tiny size for miniaturization of microwave and telecom equipment.
- Hardware real-estate and weight reduction of up to 60%.
- Most complete product offering with solder-in or bolt installation.
- Discoidal capacitor design to meet cost/reliability goals.



- | | | |
|------------|----------------|---------------|
| ① - LEAD | ② - CASE | ③ - EPOXY |
| ④ - SOLDER | ⑤ - GLASS SEAL | ⑥ - CAPACITOR |



NOTE: Torque limiting tool with custom adapter available upon request.

SPECIFICATIONS

Mechanical

Material: Solder-In: Case and Leads:
Kovar per ASTM F-15

Screw-in: Case: CRS per ASTM-108
Leads: Copper clad steel
(1-64 & 2-56 Thd.)
Copper (4-40 & 8-36 Thd.)

Finish: Solder-in: Gold per Mil-G-45204
Screw-in: Gold per Mil-G-45204 (standard)
Silver optional (1-64 & 2-56 Thd.)
Silver per QQ-S-365 (standard)
Gold optional (4-40 & 8-36 Thd.)

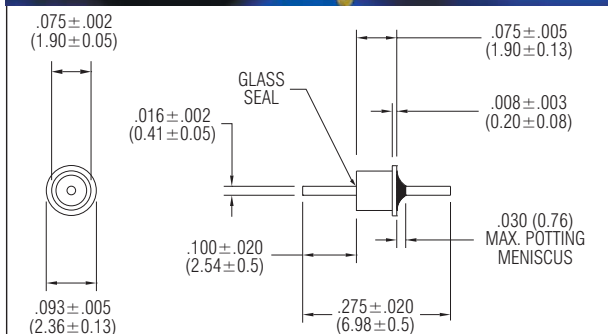
Electrical

Capacitance: measured @ 1KHz and .1 to 1 VRMS, 25°C
Dissipation factor: 3% max.
Insulation resistance: 10,000 Mohms min. @ 25°C, WVDC;
1000 Mohms min. @ 125°C, WVDC
DC resistance: .02 ohm max.
Dielectric withstanding voltage: 200% of WVDC min.

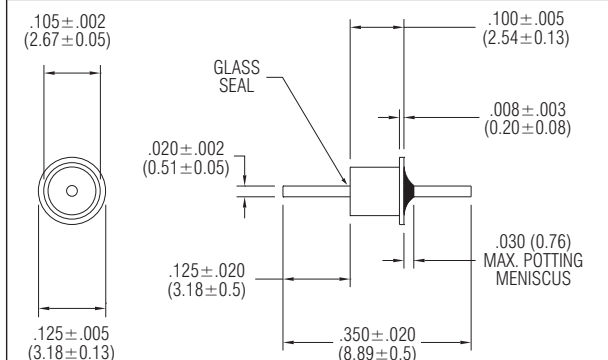
SOLDER-IN STYLE, C TYPE



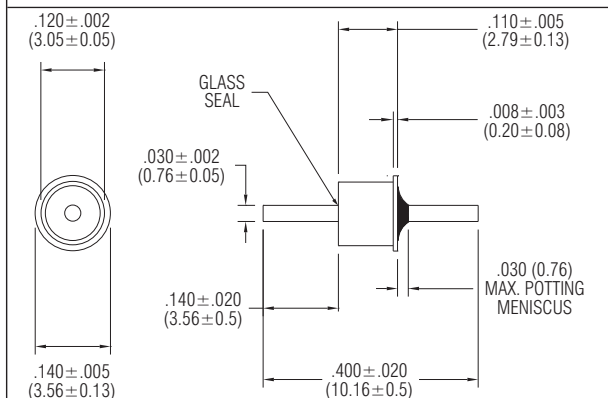
SPECIFICATIONS



AVX Part Number	Voltage Vdc (V)	Min. Cap (pF)	Current Idc (A)	MINIMUM NO LOAD INSERTION LOSS (db) @ 25°C PER MIL-STD-220					
				10 MHZ	30 MHZ	100 MHZ	300 MHZ	1 GHZ	10 GHZ
ZXS1C3-502	50	5000	1.5	15	22	35	45	55	60
ZXS1C3-272	50	2700	1.5	10	17	30	38	50	60
ZXS1A3-152	100	1500	1.5	5	12	25	33	45	55
ZXS1A3-102	100	1000	1.5	4	10	22	30	42	55
ZXS1A3-501	100	500	1.5	-	-	15	25	35	50
ZXS1A3-251	100	250	1.5	-	-	10	17	27	40
ZXS1B3-101	200	100	1.5	-	-	3	10	20	30
ZXS1B3-500	200	50	1.5	-	-	1	6	15	25
ZXS1B3-250	200	25	1.5	-	-	-	1	10	22
ZXS1B3-100	200	10	1.5	-	-	-	-	3	20
ZXS1B3-5R0	200	5	1.5	-	-	-	-	-	15
ZXS1B3-000	200	2 max.	1.5	-	-	-	-	-	-



ZYS1C3-273	50	27000	2.5	30	37	43	53	65	70
ZYS1C3-103	50	10000	2.5	20	27	37	47	60	65
ZYS1A3-502	100	5000	2.5	15	22	35	45	55	60
ZYS1A3-272	100	2700	2.5	10	17	30	38	50	60
ZYS1A3-152	100	1500	2.5	5	12	25	33	45	55
ZYS1B3-102	200	1000	2.5	4	10	22	30	42	55
ZYS1B3-501	200	500	2.5	-	-	15	25	35	50
ZYS1B3-251	200	250	2.5	-	-	10	17	27	40
ZYS1B3-101	200	100	2.5	-	-	3	10	20	30
ZYS1B3-500	200	50	2.5	-	-	1	6	15	25
ZYS1B3-250	200	25	2.5	-	-	-	1	10	22
ZYS1B3-100	200	10	2.5	-	-	-	-	3	20
ZYS1B3-5R0	200	5	2.5	-	-	-	-	-	15
ZYS1B3-000	200	2 max.	2.5	-	-	-	-	-	-



ZZS1C3-503	50	50000	5	35	40	45	55	70	70
ZZS1C3-273	50	27000	5	30	37	43	53	65	70
ZZS1A3-103	100	10000	5	20	27	37	47	60	65
ZZS1B3-502	200	5000	5	15	22	35	45	55	60
ZZS1B3-272	200	2700	5	10	17	30	38	50	60
ZZS1B3-152	200	1500	5	5	12	25	33	45	55
ZZS1B3-102	200	1000	5	4	10	22	30	42	55
ZZS1B3-501	200	500	5	-	-	15	25	35	50
ZZS1B3-251	200	250	5	-	-	10	17	27	40
ZZS1B3-101	200	100	5	-	-	3	10	20	30
ZZS1B3-500	200	50	5	-	-	1	6	15	25
ZZS1B3-250	200	25	5	-	-	-	1	10	22
ZZS1B3-100	200	10	5	-	-	-	-	3	20
ZZS1B3-5R0	200	5	5	-	-	-	-	-	15
ZZS1B3-000	200	2 max.	5	-	-	-	-	-	-

NOTE: Dimensions in inches (millimeters).

CONFIGURATION OPTIONS

Terminals

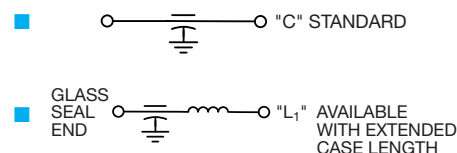


Flattened at Glass Seal End Only

Glass Seal

- Opposite Flange End – Standard
 - At Flange End – Reversed
- Change 3rd letter of part number from "S" to "R" for reversed configuration

Schematic



SCREW-IN STYLE, C TYPE ¹⁻⁶⁴/₂₋₅₆ THD.



SPECIFICATIONS

AVX Part Number	Voltage Vdc (V)	Min. Cap (pF)	Current Idc (A)	MINIMUM NO LOAD INSERTION LOSS (db) @ 25°C PER MIL-STD-220					
				10 MHZ	30 MHZ	100 MHZ	300 MHZ	1 GHZ	10 GHZ
SXD1C3-502	50	5000	3	15	22	35	45	55	60
SXD1C3-272	50	2700	3	10	17	30	38	50	60
SXD1A3-152	100	1500	3	5	12	25	33	45	55
SXD1A3-102	100	1000	3	4	10	22	30	42	55
SXD1A3-501	100	500	3	-	-	15	25	35	50
SXD1A3-251	100	250	3	-	-	10	17	27	40
SXD1B3-101	200	100	3	-	-	3	10	20	30
SXD1B3-500	200	50	3	-	-	1	6	15	25
SXD1B3-250	200	25	3	-	-	-	1	10	22
SXD1B3-100	200	10	3	-	-	-	-	3	20
SXD1B3-5R0	200	5	3	-	-	-	-	-	15

AVX Part Number	Voltage Vdc (V)	Min. Cap (pF)	Current Idc (A)	MINIMUM NO LOAD INSERTION LOSS (db) @ 25°C PER MIL-STD-220					
				10 MHZ	30 MHZ	100 MHZ	300 MHZ	1 GHZ	10 GHZ
SYD1C3-502	50	5000	3	15	22	35	45	55	60
SYD1C3-272	50	2700	3	10	17	30	38	50	60
SYD1A3-152	100	1500	3	5	12	25	33	45	55
SYD1A3-102	100	1000	3	4	10	22	30	42	55
SYD1A3-501	100	500	3	-	-	15	25	35	50
SYD1A3-251	100	250	3	-	-	10	17	27	40
SYD1B3-101	200	100	3	-	-	3	10	20	30
SYD1B3-500	200	50	3	-	-	1	6	15	25
SYD1B3-250	200	25	3	-	-	-	1	10	22
SYD1B3-100	200	10	3	-	-	-	-	3	20
SYD1B3-5R0	200	5	3	-	-	-	-	-	15

AVX Part Number	Voltage Vdc (V)	Min. Cap (pF)	Current Idc (A)	MINIMUM NO LOAD INSERTION LOSS (db) @ 25°C PER MIL-STD-220					
				10 MHZ	30 MHZ	100 MHZ	300 MHZ	1 GHZ	10 GHZ
SZD1C3-273	50	27000	5	30	37	43	53	65	70
SZD1C3-103	50	10000	5	20	27	37	47	60	65
SZD1A3-502	100	5000	5	15	22	35	45	55	60
SZD1A3-272	100	2700	5	10	17	30	38	50	60
SZD1A3-152	100	1500	5	5	12	25	33	45	55
SZD1B3-102	200	1000	5	4	10	22	30	42	55
SZD1B3-501	200	500	5	-	-	15	25	35	50
SZD1B3-251	200	250	5	-	-	10	17	27	40
SZD1B3-101	200	100	5	-	-	3	10	20	30
SZD1B3-500	200	50	5	-	-	1	6	15	25
SZD1B3-250	200	25	5	-	-	-	1	10	22
SZD1B3-100	200	10	5	-	-	-	-	3	20
SZD1B3-5R0	200	5	5	-	-	-	-	-	15

NOTE: Dimensions in inches (millimeters). Torque limiting tool with custom adapter required for proper installation (see page 2)

CONFIGURATION OPTIONS

Terminals

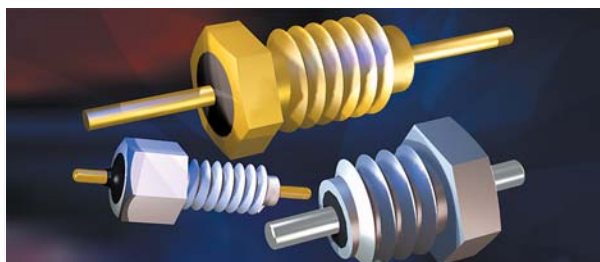
"SZD" and "SYD" Parts Only
Slotted terminal available on one or both sides

Mounting

- .090 Thd. Length Standard, intended for tapped hole feed through mounting
- .140 Thd. Length available for through hole mounting with hex nut

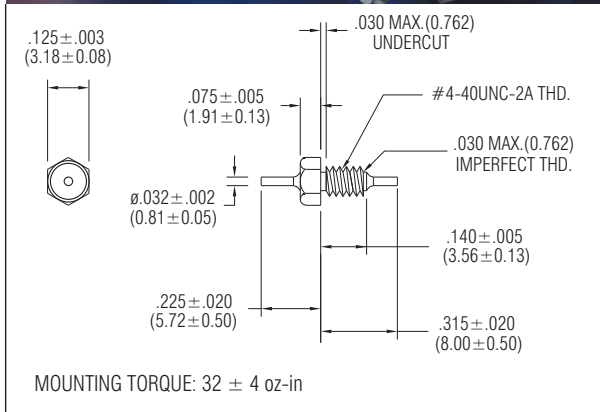
Schematic

- "C" STANDARD
- "L1" AVAILABLE WITH EXTENDED CASE LENGTH
- "T"

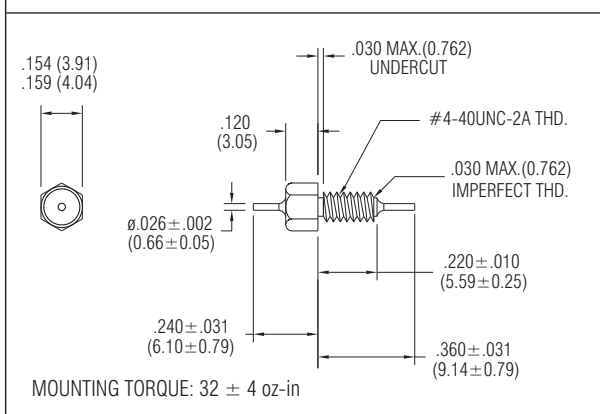


SCREW-IN STYLE, C TYPE ⁴⁻⁴⁰/₈₋₃₆ THD.

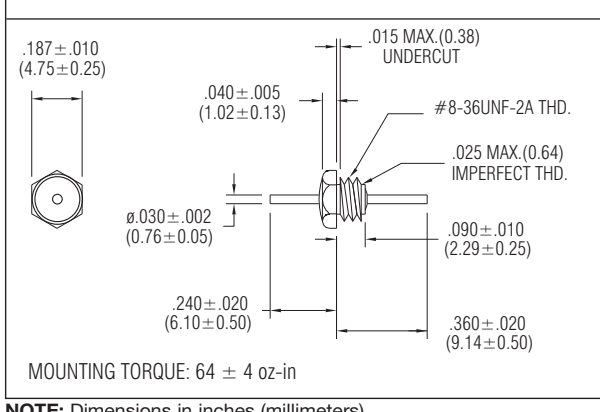
SPECIFICATIONS



AVX Part Number	Voltage Vdc (V)	Min. Cap (pF)	Current Idc (A)	MINIMUM NO LOAD INSERTION LOSS (db) @ 25°C PER MIL-STD-220					
				1 MHZ	10 MHZ	100 MHZ	300 MHZ	1 GHZ	10 GHZ
SA1C3-503	50	50000	10	15	35	45	55	70	70
SA1A3-273	100	27000	10	10	30	43	53	65	70
SA1A3-103	100	10000	10	4	20	37	47	60	65
SA1B3-502	200	5000	10	-	15	35	45	55	60
SA1B3-272	200	2700	10	-	10	30	38	50	60
SA1B3-152	200	1500	10	-	5	25	33	45	55
SA1B3-102	200	1000	10	-	4	22	30	42	55
SA1B3-501	200	500	10	-	-	15	25	35	50
SA1B3-251	200	250	10	-	-	10	17	27	40
SA1B3-101	200	100	10	-	-	3	10	20	30
SA1B3-500	200	50	10	-	-	1	6	15	25
SA1B3-250	200	25	10	-	-	-	1	10	22
SA1B3-100	200	10	10	-	-	-	-	3	20
SA1B3-5R0	200	5	10	-	-	-	-	-	15



SA1C1-104	50	100000	10	20	40	50	60	70	70
SA1A1-503	100	50000	10	15	35	45	55	70	70
SA1A1-273	100	27000	10	10	30	43	53	65	70
SA1B1-103	200	10000	10	4	20	37	47	60	65
SA1B1-502	200	5000	10	-	15	35	45	55	60
SA1B1-272	200	2700	10	-	10	30	38	50	60
SA1B1-102	200	1000	10	-	4	22	30	42	55
SA1B1-501	200	500	10	-	-	15	25	35	50
SA1B1-251	200	250	10	-	-	10	17	27	40
SA1B1-101	200	100	10	-	-	3	10	20	30
SA1B1-500	200	50	10	-	-	1	6	15	25
SA1B1-250	200	25	10	-	-	-	1	10	22
SA1B1-100	200	10	10	-	-	-	-	3	20
SA1B1-5R0	200	5	10	-	-	-	-	-	15



SZ1C1-503	50	50000	10	15	35	45	55	70	70
SZ1A1-273	100	27000	10	10	30	43	53	65	70
SZ1A1-103	100	10000	10	4	20	37	47	60	65
SZ1B1-502	200	5000	10	-	15	35	45	55	60
SZ1B1-272	200	2700	10	-	10	30	38	50	60
SZ1B1-152	200	1500	10	-	5	25	33	45	55
SZ1B1-102	200	1000	10	-	4	22	30	42	55
SZ1B1-501	200	500	10	-	-	15	25	35	50
SZ1B1-251	200	250	10	-	-	10	17	27	40
SZ1B1-101	200	100	10	-	-	3	10	20	30
SZ1B1-500	200	50	10	-	-	1	6	15	25
SZ1B1-250	200	25	10	-	-	-	1	10	22
SZ1B1-100	200	10	10	-	-	-	-	3	20
SZ1B1-5R0	200	5	10	-	-	-	-	-	15

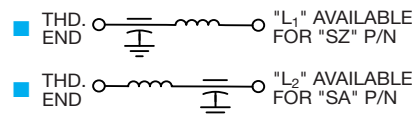
NOTE: Dimensions in inches (millimeters).

Leads

- Custom lead lengths and materials available
- Chamfered or rounded lead tips for mating with connectors

CONFIGURATION OPTIONS

Schematic





GENERAL DESCRIPTION

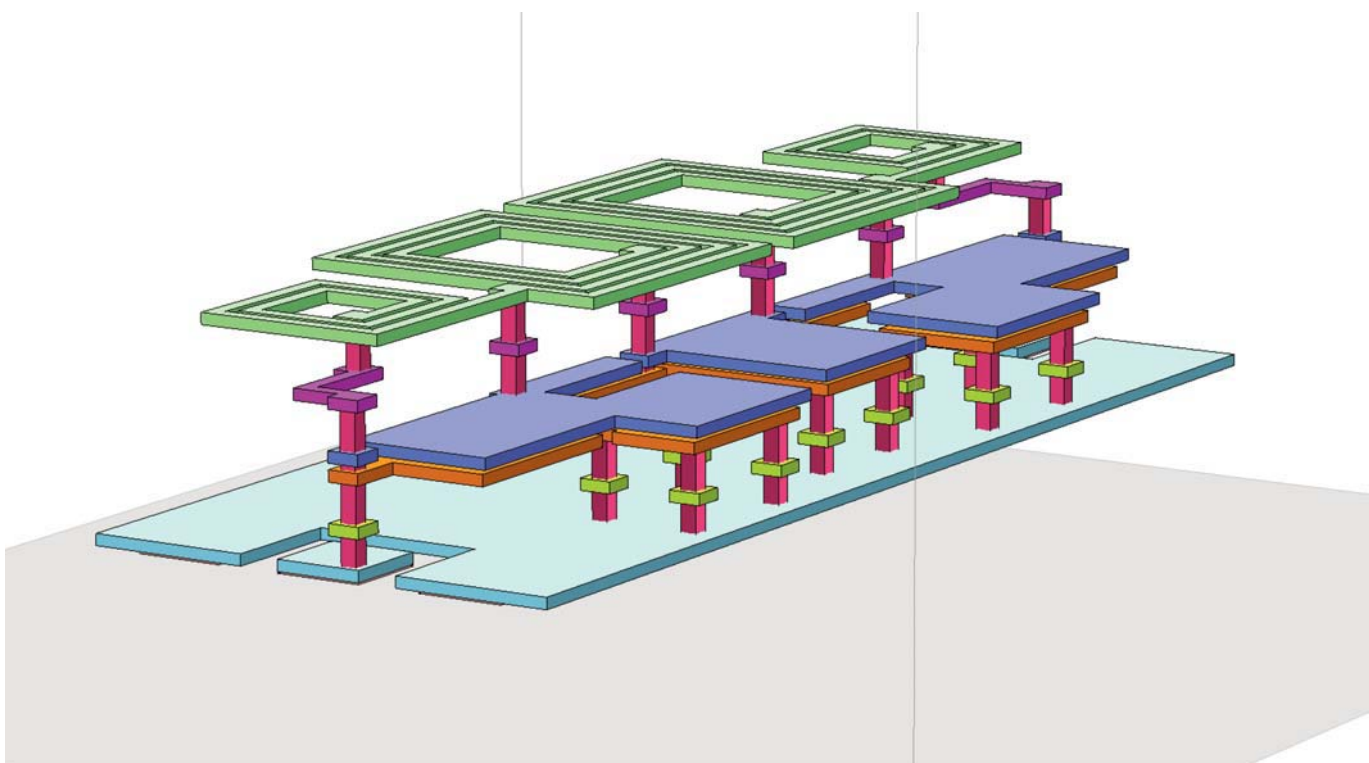
AVX offers the ability to build custom MLO filters with performance characteristics set by customer requirements. These build-to-Print filters offer long-term strategic solutions for leading-edge passive demands in military, commercial, industrial, and consumer products.

These filters are based on AVX's patented multilayer organic high density interconnect technology. Our custom MLO filters use high dielectric constant and low loss materials to realize high Q printed passive elements, such as inductors and capacitors, in a multilayer stack-up.

For more information on these filters, please contact your local AVX sales office.

FEATURES

- Discrete Components with Excellent Performance and Price
- Integrated Components for Enhanced Performance and Miniaturization
- Embedded Designs in PWB Structures





APPLICATIONS GUIDE

Through the creation of a wide variety of Aerospace and Avionics appropriate components, AVX has opened the door for our products' use in many applications. In this section, we aim to provide a selection of commonly encountered electrical systems in Aerospace and Avionics, and provide guides on which of our parts would be appropriate for each application. Some of these applications are:

AC/DC power supplies

Airplane Cabin Management

UAV Low Level Electrical

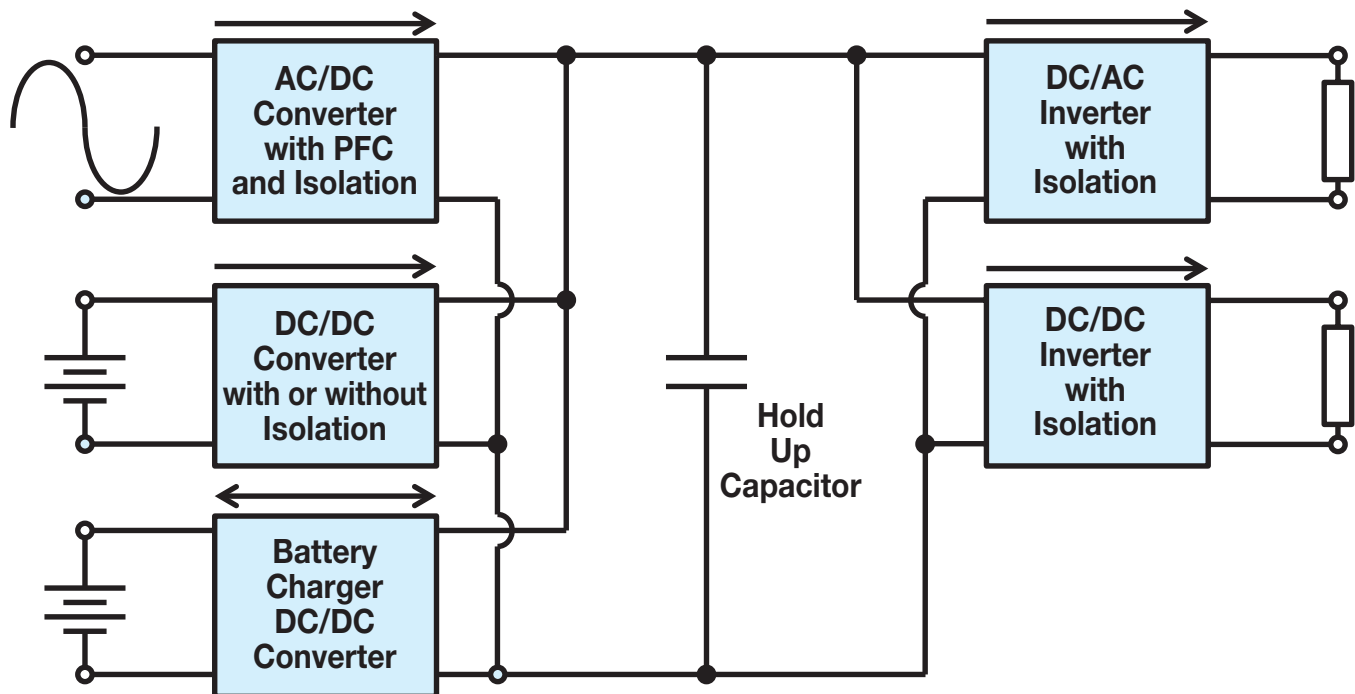
Spacecraft Applications

- Electrical Power
- Thermal Control System
- Propulsion Systems
- Payload Communications
- Attitude Control
- Primary CPU
- RF Deck

AC/DC POWER SUPPLIES

As is the case with the automotive industry, the aerospace and avionics industry is becoming increasingly more reliant on electronics to ensure the comfort of passengers and the safety of cargo and crew. To this end, AVX supplies the aerospace industry with a variety of products intended to ensure the reliable operation of electronics devices involved in airplane cabin electronics.

NOTE: some of the following listed products are not included in this catalog. More information on each product line can be found on AVX.com.



AC/DC Converter w/ PFC And Isolation

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

Battery Charger/ DC/DC Converter

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

DC/DC Converter w/ Isolation

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

DC/DC Converter w/ or w/out Isolation

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

DC/AC Inverter w/ Isolation

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

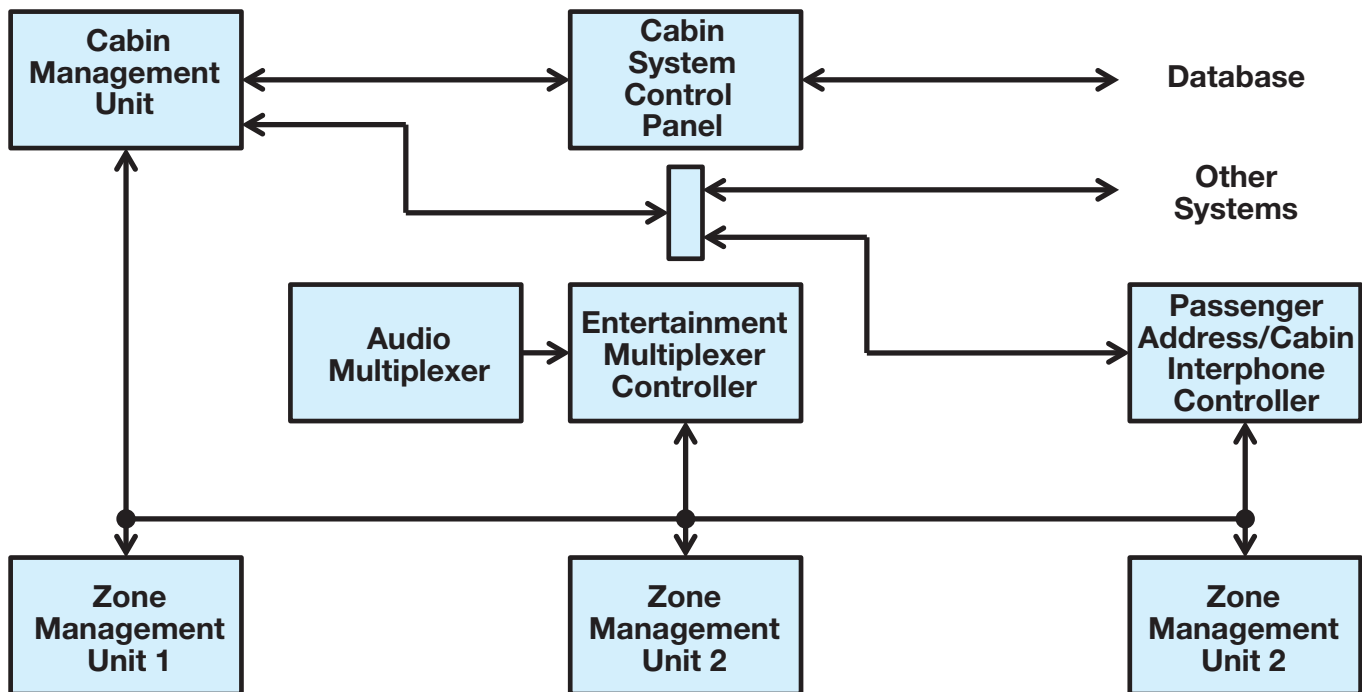
Hold Up Capacitor

- TWM
- TCP
- NBS
- TWA
- TBM
- TRM
- TCH
- RMM/SMM

AIRPLANE CABIN MANAGEMENT

As is the case with the automotive industry, the aerospace and avionics industry is becoming increasingly more reliant on electronics to ensure the comfort of passengers and the safety of cargo and crew. To this end, AVX supplies the aerospace industry with a variety of products intended to ensure the reliable operation of electronics devices involved in airplane cabin electronics.

NOTE: some of the following listed products are not included in this catalog. More information on each product line can be found on AVX.com.



Cabin Systems Management Unit

- High Voltage MLCC
- CapGuard
- NBS
- NBM

Audio Multiplexer

- MH Series
- All Tantalum

Passenger Address/Cabin Interphone

- SQ/HQ
- TransGuard

Signal/Power Connections and Lines

- FFVE
- Feedthrough
- EMI Filters
- TransGuard

Cabin System Control Panel

- High Voltage MLCC
- CapGuard
- NBS
- NBM
- Feedthrough
- TransGuard

Entertainment Multiplexer Controller

- SQ/HQ
- TransGuard

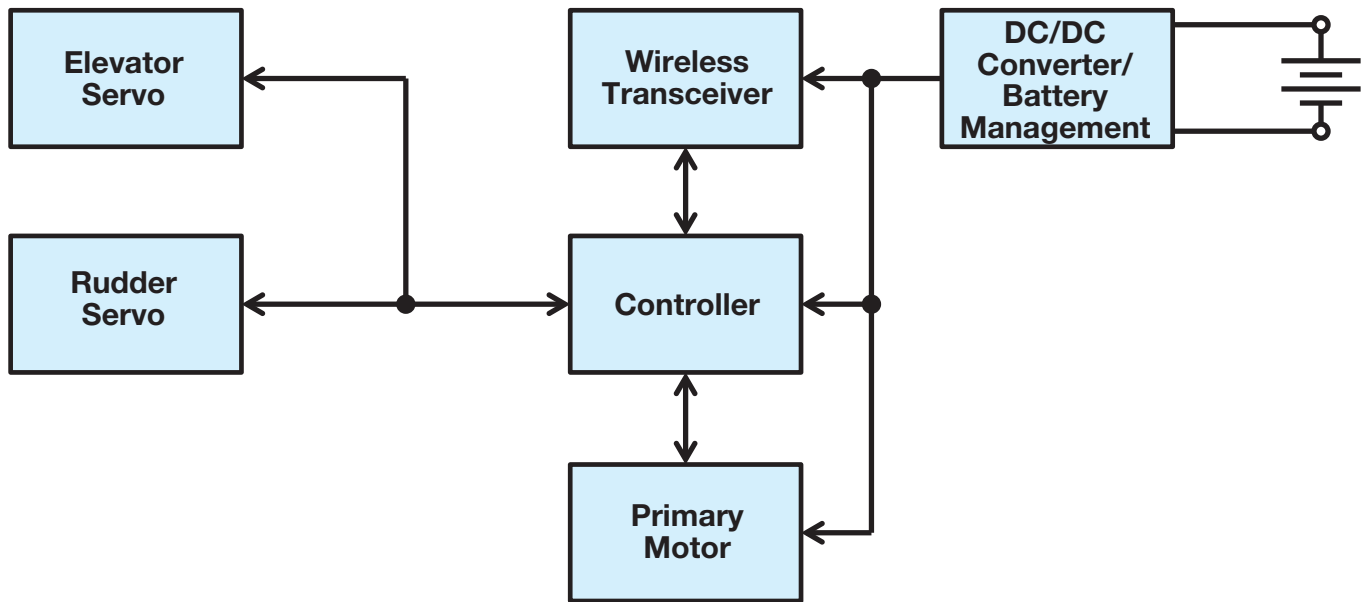
Zone Management Units

- TAW
- NTC Thermistors

UAV LOW LEVEL ELECTRICAL

UAVs have become a standard in many military or commercial applications. Drones can serve to replace humans in potentially dangerous environments, perform reconnaissance, or simply replace cranes or dollies when shooting video. AVX provides passive component solutions for the systems which are intended to improve a UAV's battery life, altitude range, speed, signal reception, and total flight distance.

NOTE: some of the following listed products are not included in this catalog. More information on each product line can be found on AVX.com.



Elevator Servo

- TransGuard
- All Leaded Ceramics
- All Stacked Ceramics

Rudder Servo

- TransGuard
- All Leaded Ceramics
- All Stacked Ceramics

Primary Motor

- TransGuard
- All Leaded Ceramics
- All Stacked Ceramics

Signal/Power Connections and Lines

- BestCap
- FlexiSafe
- All Tantalum
- EMI Filters

Wireless Transceiver

- SQ/HQ
- Accu-P
- Accu-L
- SLC

Controller

- Feedthrough
- LICC/IDC/LGA
- NBS
- NBM

DC/DC Converter/Battery Management

- APS Series
- MH Series
- SMX Series
- ESCC Qual SMPS Caps
- TCR
- THH
- NBS
- TWA

SPACECRAFT APPLICATIONS

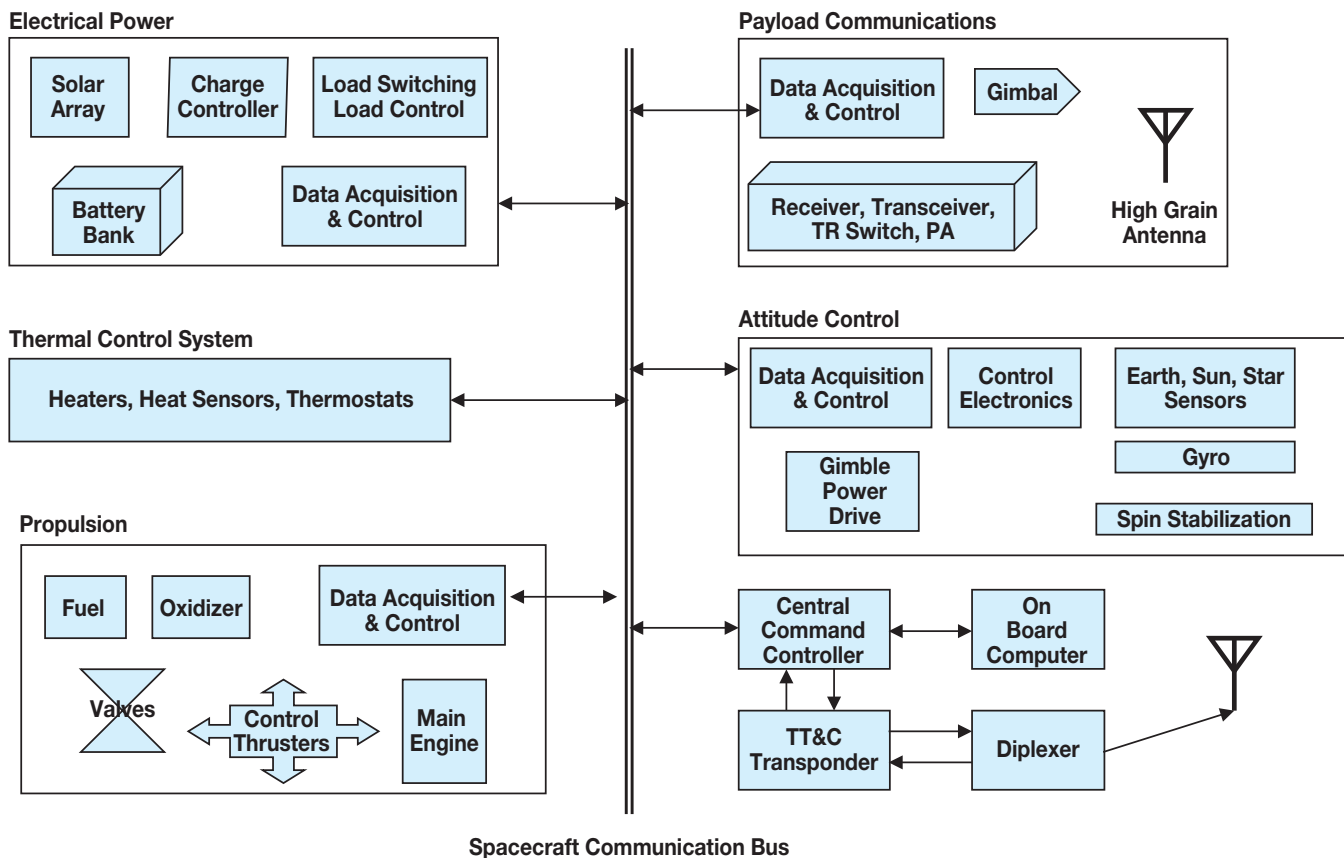
As the availability of information grows, the means of delivery for that information must also expand. Practically all devices today rely on some form of wireless communication, and many of those devices receive said wireless communication through satellite communications (albeit with some potential degrees of separation). These satellites, and other spacecraft, must have their electrical systems designed in such a way to ensure long life, continuous service, and display the need for minimal maintenance.

AVX Provides a wide variety of components which can positively impact spacecraft performance

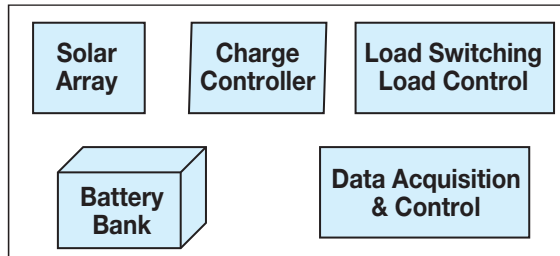
- Radiation resistant glass capacitors can be used as stable reference capacitors
- Radiation resistant transient voltage suppressors save space and weight by operating as EMI filters in the off state, and as bi-directional TVS diodes in the on state
- Miniature SMT LCT filters save space and weight by offering broad EMI filtering
- Miniature bolt in/ solder in filters improve system to system signal to noise ratios
- Tight tolerance RF capacitors help reduce noise and RF circuits through impedance matching
- Low inductance decoupling capacitors save space, weight, and reduce component count in digital controllers, improving system reliability.
- SMO capacitors save space, weight, and improve power conversion efficiency
- Miniature tantalum capacitors save space and weight on Vcc ripple sensitive circuits
- IPD array components offer extremely tight matching in differential circuitry.
- Thick film array components are ideal for EMI reduction and time base improvements

The following pages of notes hope to show some sample spacecraft electrical system which could benefit from the inclusion of AVX's high quality components.

NOTE: some of the following listed products are not included in this catalog. More information on each product line can be found on AVX.com.



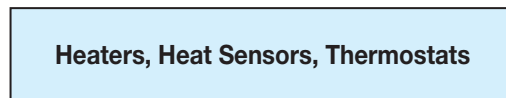
Electrical Power



The most common parts seen in spacecraft power systems revolve around reduction of noise from radiation, reduction of EMI, DC/DC converters for distribution, and hold up capacitors to maintain power during possible primary source outages. The recommended AVX solutions for these issues are:

- Glass Capacitors
- SMO
- High Voltage Ceramic Capacitors
- Tantalum Capacitors
- Bolt-in EMI filters
- Solder-in EMI filters

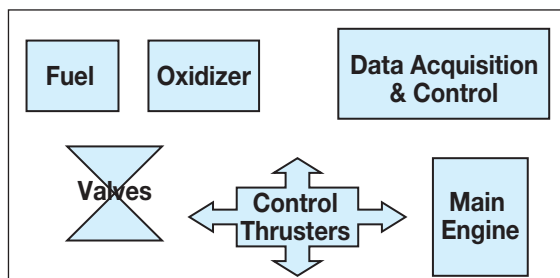
Thermal Control Systems



The continuous function of thermal control systems relies on electrical components which can reject high frequency noise, EMI, and the effects of regular temperature cycling. AVX can supply a plethora of parts to meet the needs of any thermal system design, even if very high temperatures (>150°C) are required:

- Glass Capacitors
- TransGuard Multilayer Varistors
- MLCC Capacitors
- SMT Feedthrough Filters
- NTC Thermistors
- Bolt-in EMI Filters
- Solder-in EMI Filters
- Capacitor Arrays
- Integrated Passive Component Bridges

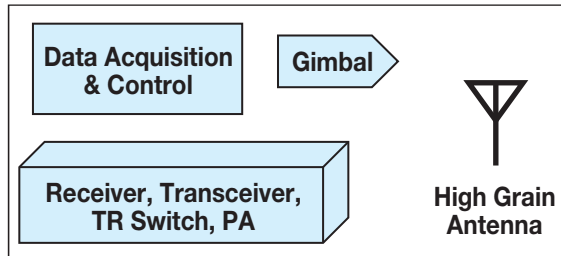
Propulsion Systems



The electrical systems seen in the propulsion systems of satellites and spacecraft tend to revolve around the control systems and sensing for fuel delivery, temperature, engine performance, and direction sense. These control systems experience the same limitations that many control systems face, in that they must reject radiation and EMI, have protection in place for transient voltage events, and have hold up capacitors for converters and other digital systems.

- Glass Capacitors
- TransGuard Multilayer Varistors
- MLCC Capacitors
- Tantalum Capacitors
- SMT Feedthrough Filters
- Bolt-in EMI Filters
- Solder-in EMI Filters

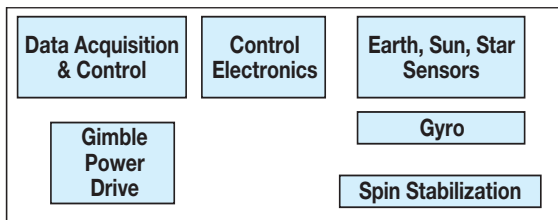
Payload Communications



The payload communications function of the spacecraft primarily revolves around the idea that usable signal must be transmitted over potentially long distance, without being lost to EMI and radiation. As such, passive components must be selected to first allow for RF communications, and secondly ensure that those communications are transmitted through systems which reject external sources of RF noise.

- RF Capacitors
- Inductors
- Accu-P
- Glass Capacitors
- MLCC Capacitors
- Tantalum Capacitors
- SMT Feedthrough Filters
- Bolt-in EMI Filters
- Solder-in EMI Filters

Attitude Control Systems



A flight path being off by a few degrees, or the spin of a craft not being timed correctly may seem like minor issues, but when a craft must stay on a set course for an extended period of time these two factors can have drastic effects. From the most basic level, most craft's flight plans would see constant small corrections in direction as a massive waste of fuel. AVX makes a variety of components with very tight tolerances, to help keep filters stable across all operating conditions:

- Glass Capacitors
- TransGuard Multilayer Varistors
- MLCC Capacitors
- SMO
- High Voltage Ceramic Chip Capacitors
- Tantalum Capacitors
- SMT Feedthrough Filters
- Bolt-in EMI Filters
- Solder-in EMI Filters

Primary CPU



The Primary CPU of a spacecraft struggles with the same issues that an Earth-based CPU will experience. The CPU must have carefully controlled transient voltage suppression, low inductance decoupling, and some sort of hold up capacitance to maintain clean DC voltage to power inputs.

- LICC/IDC/LGA
- MLCC Capacitors
- Tantalum Capacitors
- SMT Feedthrough Filters
- TransGuard Multilayer Varistors

RF Deck

**TT&C
Transponder**

Diplexer



The RF deck is responsible for ship-to-command communications. This subsystem revolves around the use of high power antennas, RF communication equipment, and tight tolerance components intended to filter out EMI and RF noise, to improve signal-to-noise ratios.

- RF Capacitors
- Accu-L
- Accu-P
- Glass Capacitors
- TransGuard
- MLCC Capacitors
- Tantalum Capacitors
- SMT Feedthrough Filters
- Bolt-in EMI Filters
- Solder-in EMI Filters

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