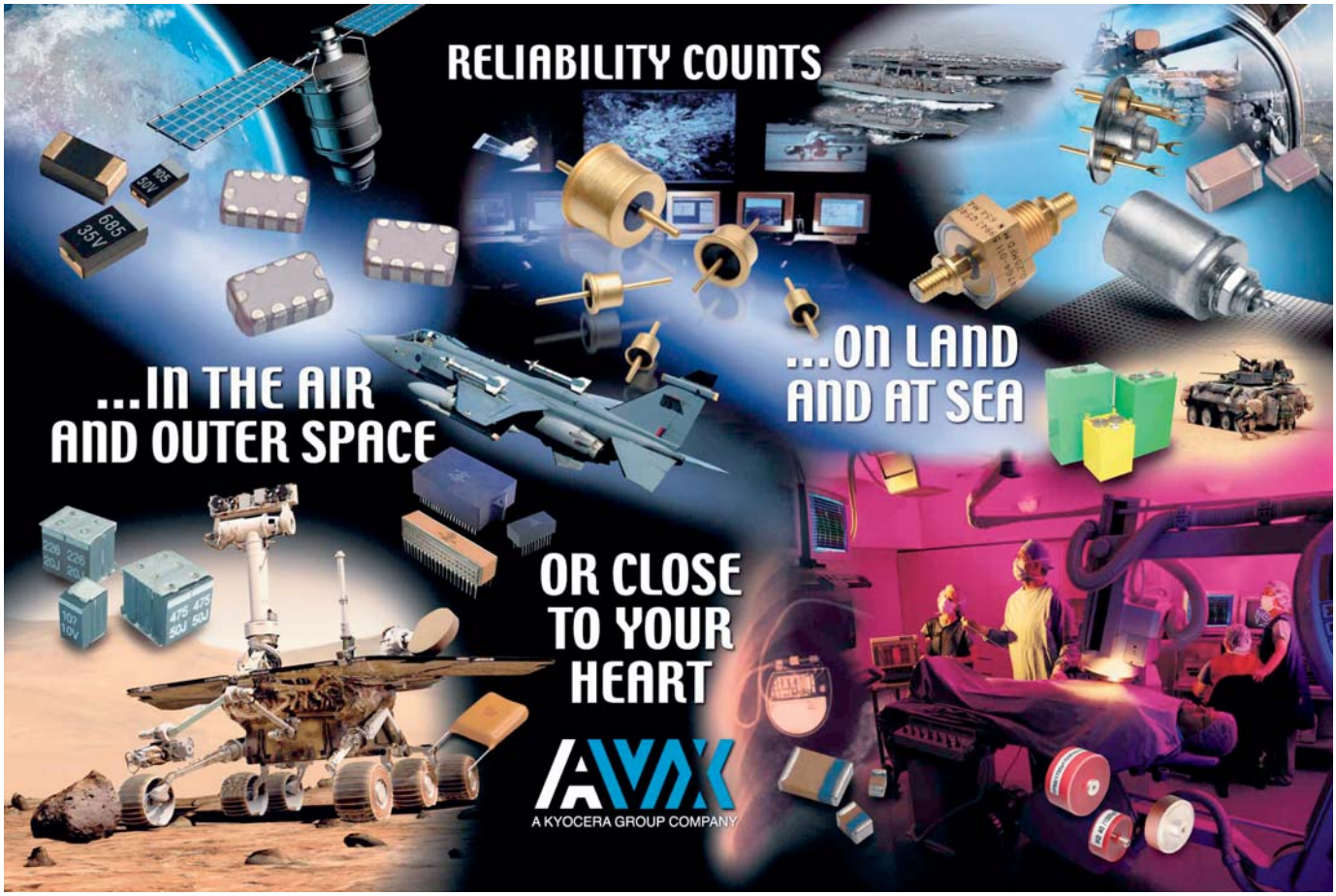
AVX **Ultimate Guide to Enhanced and High Reliability Components**

ADVANCED PASSIVES & INTERCONNECT

Version 7.1

A KYOCERA GROUP COMPANY

HIGH RELIABILITY
www.avx.com



AVX is the leading manufacturer of established and high reliability passive and interconnect components. We can offer a broad range of products including capacitors, filters and circuit protection devices which have been designed to provide industry leading performance and quality. Our factory certifications include AS9100, IECQ-CECC, TS16949-2002 and ISO9001-2000. We also have a number of products qualified to ESCC, SRC and DSCC drawings as well as optional custom screening and test service capabilities.

When you need a solution –

Make AVX your
High Reliability Partner

AVX

Established and High Reliability

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CWR09/19/29 Series Tantalum Chip

- CWR09, molded QPL tantalum chip MIL-PRF 55365/4
- CWR19/29, improved CV and low ESR ratings to MIL-PRF 55365/11
- SRC9000, Space level SCD with DPA and X-ray inspection
- TAZ COTS plus, latest ratings with full Weibull and surge options
- SnPb or gold termination available, custom testing options

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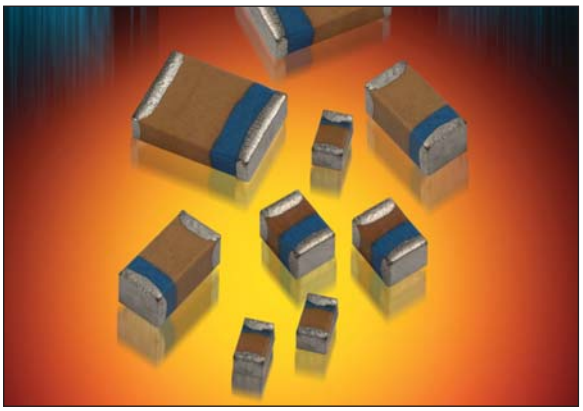
CWR15 Series Tantalum TACmicrochip®



- CWR15, QPL tantalum microchip
- Qualified to MIL-PRF 55365/12
- World's smallest QPL tantalum chip capacitor
- SRC9000, Space level SCD with DPA and X-ray inspection
- TBC COTS plus, latest ratings with full Weibull and surge options
- SnPb or gold termination available, custom testing options

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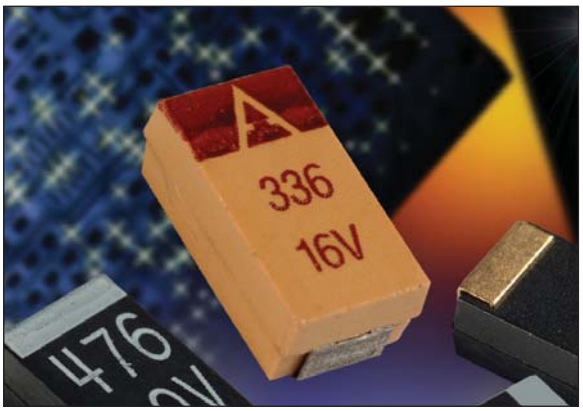
CWR11 Series Tantalum Chip



- CWR11, MIL QPL based on EIA standard case sizes
- Fully qualified to MIL-PRF 55365/8
- All legacy ratings fully supported
- SRC9000, Space level SCD with DPA and X-ray inspection
- TBJ COTS plus, latest ratings with full Weibull and surge options
- SnPb or gold termination available, custom testing options

FOR DETAILED INFORMATION – PAGE 21

TCP Series, Tantalum High CV Modules

- TCP series, tantalum custom modules
- Maximum CV, lowest ESR
- High packing density for military and aerospace
- Fused modules available
- Custom assemblies to SCD

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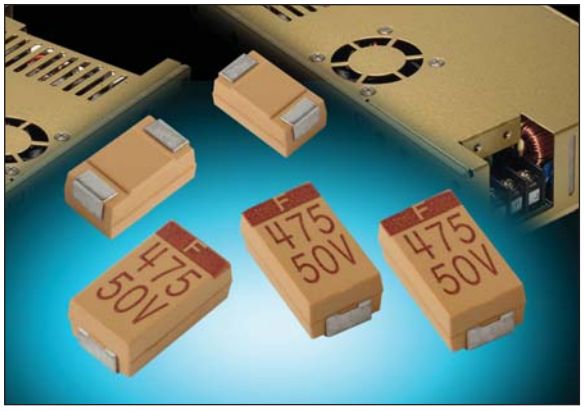
TBW Series, Fused Tantalum Chip



- TBW fused tantalum
- Failsafe with fast-acting internal fuse
- Full Weibull and surge options to MIL-PRF 55365
- DSCC drawings available: 04053
- Full MIL qualification pending

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TBJ COTS Plus, Established Reliability

- TBJ COTS plus, complete EIA standard low ESR series
- Full Weibull and surge options
- DSCC drawings available
- SRC9000, Space level SCD with DPA and X-ray inspection

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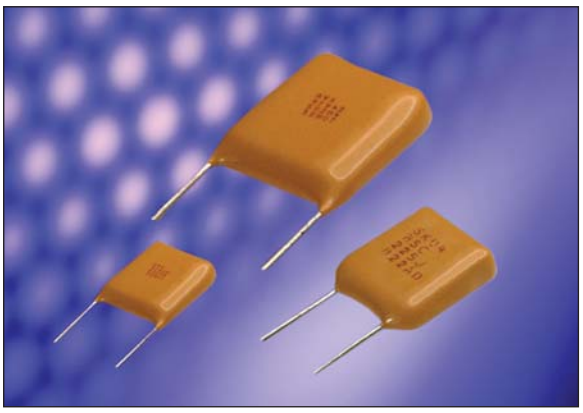
Large Radial MLC Capacitors



- Military, Avionics and Commercial Applications
- Low Cost, extremely low ESL
- Available in RoHS Compliant or Tin/Lead Finish
- Commercial to Space level availability
- Wide Temperature Range -55 to +125°C
- VR Range, space qualified to ESCC 3001/034

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SK SERIES – C0G, X7R, Z5U – PAGE 26
SE SERIES – EXTENDED RANGE – PAGE 27
BR SERIES – CECC, BS 9100, ESA – PAGE 28
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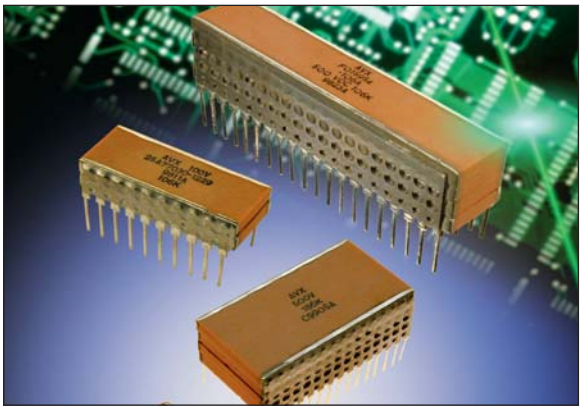
Stacked Leaded MLC Capacitors



- Power Supply Capacitors - Application Specific Capacitors
- Widest QPL Offering, including sole source space level
- Ultra Low ESR and ESL, with Temp ratings up to 200°C
- Extremely high current handling capabilities
- Custom/Customized sizes, values and ratings
- SM0 Series MIL PRF 49470, DSCC 87106/88011
- CH-CV Series - BS 9100, ESCC 3001

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SM0 SERIES – PAGE 30
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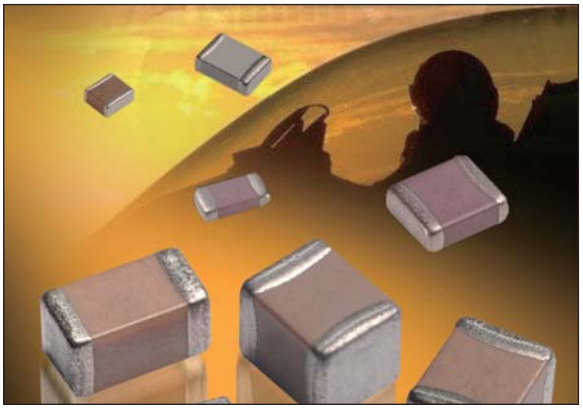
Ceramic Surface Mount MLC Capacitors



- 0402-2225 case sizes
- NP0, X7R, X5R, X8R Dielectrics
- 5% Min Lead Termination
- Optional FLEXITERM® termination with 5% min lead
- Standard Voltage Ranges 6V - 500V
- High voltage 600V - 5kV, 1206-3640 case size, space qualified ESCC 3009/034

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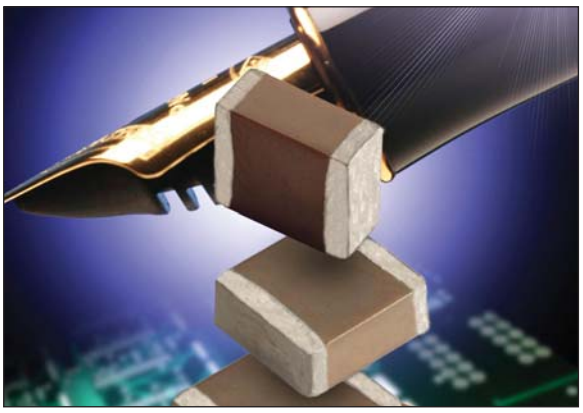
STANDARD PRODUCT – NP0 PAGE 32
STANDARD PRODUCT – X7R PAGE 33
STANDARD PRODUCT – X5R PAGE 34

CDR Series Surface Mount MLCC, MIL-PRF-55681



- CDR01-06, NP0 & BX dielectric, 0805-2225 case size
- CDR31-35, NP0 & BX dielectric, Metric equivalent of 0805-1825 case size
- CDR11-14, RF/Microwave, P90 & NP0 dielectric, 0605 & 1110 case size

FOR DETAILED INFORMATION –
CDR01-CDR06 PAGES 35-36
CDR31-CDR35 PAGE 37
CDR11-CDR14 PAGE 38

Extended Range Surface Mount MLCC to DSCC Drawings

- Lower Voltage Versions
- Higher Capacitance Versions
- DSCC 05006, 0805 case size
  - BP, BR and BX Dielectric
- DSCC 05007, 1206 case size
  - BP, BR and BX Dielectric

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Additional Surface Mount MLCC with DSCC Approvals

- DSCC 03028, 0603 case size
  - BP and BR Dielectric
  - 0.5pF to 0.224mF
- DSCC 03029, 0402 case size
  - BP and BR Dielectric
  - 0.5pF to 4700pF
- DSCC 06019, CDR12 MIL-PRF-123 equivalent
  - BP and BG Dielectric
  - 0.1pF to 1000pF
- DSCC 06022, CDR14 MIL-PRF-123 equivalent
  - BP and BG Dielectric
  - 0.1pF to 5100pF

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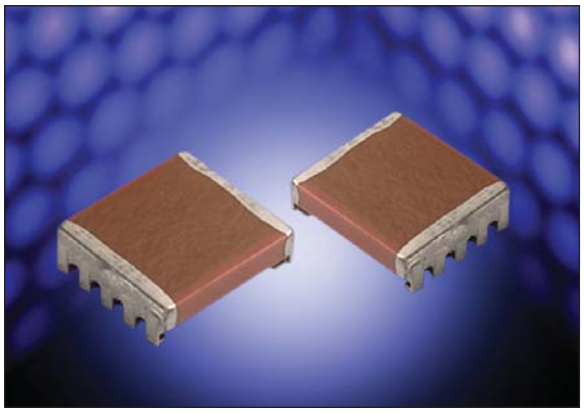
Stacked Surface Mount MLC Capacitors



- Offered in J, L, Z and low profile lead configurations
- Qualified for use in US, ESA, Space and Mil qualifications
- Offers enhanced resistance to shock, vibration and stress
- Maximum 1300µF, ratings to 5kV
- Available in Arrays, Modules and blocks

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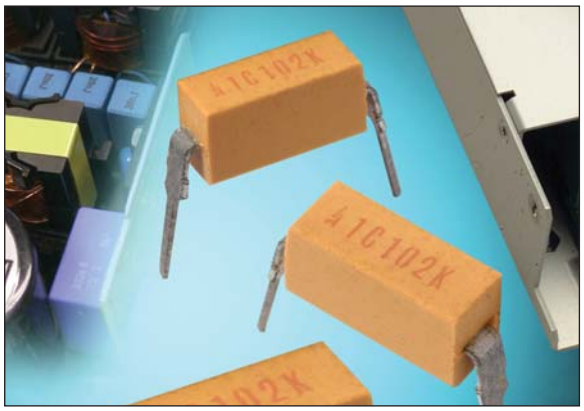
DiPGuard®, Two Pin DIP



- MD Series
- Military and Commercial Designs
- MIL-PRF-123 and MIL-PRF-39014
- Capacitance up to 1µF
- Voltage up to 200vdc

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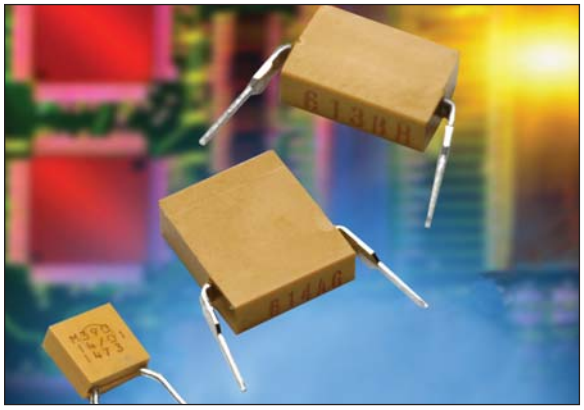
CKR Series, Molded Ceramic Capacitors



- Military Molded Radial and Axial Capacitors
- Military and Commercial Designs
- MIL-PRF-39014, MIL-PRF-20, MIL-C-11015
- Radial, Capacitance up to 2µF (CKR08)
- Axial, Capacitance up to 3.3µF Military and 8.2µF Commercial

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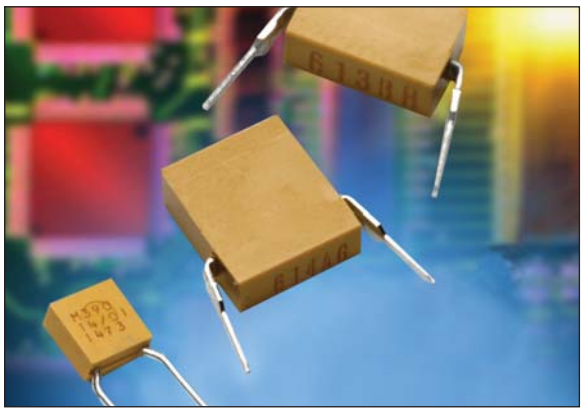
MIL 123 Molded Ceramic Capacitors



- M123 Molded Capacitors
- Military Designs
- Manufactured to MIL-PRF-123
- Radial, Axial and 2 Pin DIP
- Voltages up to 100Vdc

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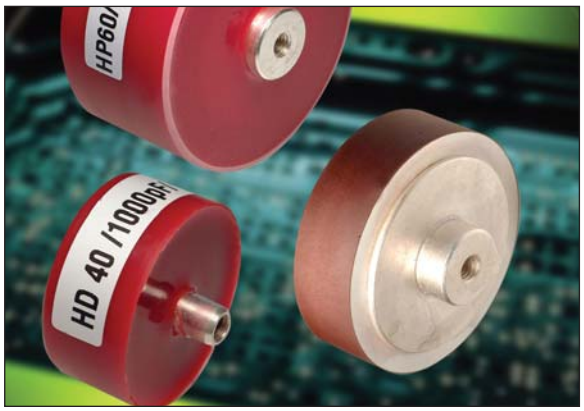
Very High Voltage MLC Capacitors



- Excellent performance under fast discharge conditions (peak current >15kA)
- Excellent capacitance versus DC voltage characteristic (<3% at Urated)
- Very low DF (<10 x E-4)
- Very low Corona effect
- Excellent behavior on both AC & DC supply

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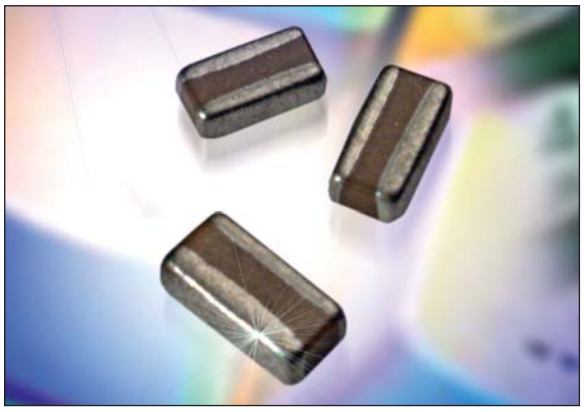
LICC Series, Low Inductance Capacitors



- Less than 0.2nH of Inductance
- High Capacitance for wide frequency filtering and decoupling
- Low Profile, ideal for both IC packages and in PCBs
- Available in Tin/Lead termination

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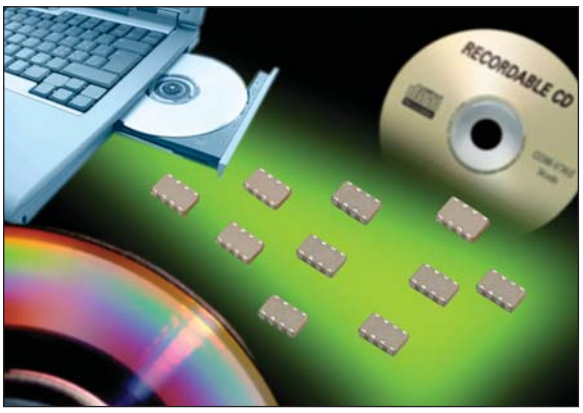
IDC Series, Interdigitated Capacitors



- Very Low Inductance
- Measured inductance of 60pH (0612) and 50pH (0508) 8 terminal
- High Capacitance for wide frequency filtering and decoupling
- Low Profile, ideal for both IC packages and PCBs
- Available in Tin/Lead termination

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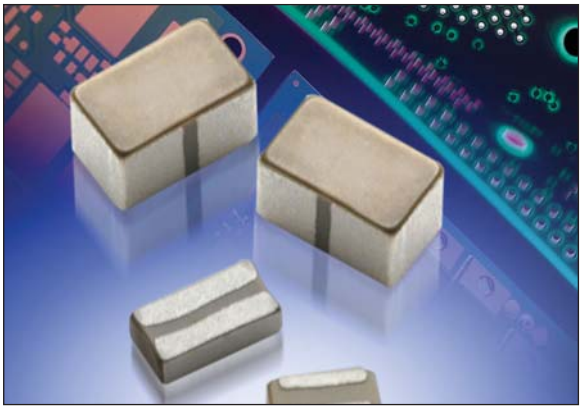
LGA Series, Low Inductance Capacitors



- Newly proprietory technology for low inductance
- Equivalent high frequency performance to IDCs
- Small form factor, down to 0204 case size
- High Capacitance for wide frequency filtering and decoupling
- Low Profile, ideal for both IC packages and PCBs

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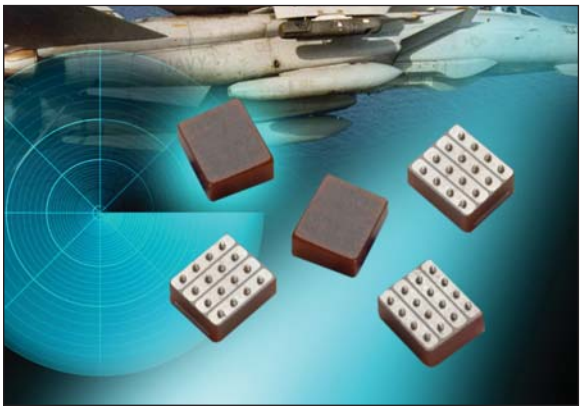
LICA Series, BGA Low Inductance Capacitors



- Extremely Low Inductance, less than 30pH
- C4 compatible proven Flip-Chip package technology
- Supports multiple rework passes in ceramic chip carrier packaging applications
- Excellent reliability
- Dielectric optimized for maximum capacitance at operating temperature
- Low Profile down to 0.5mm

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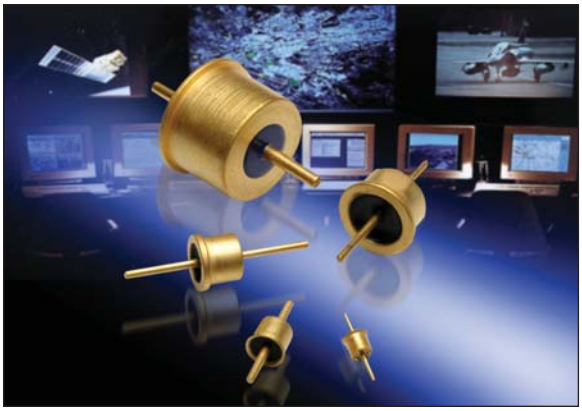
Solder-in Style EMI Filter



- Suitable for installation temperatures up to 300ºC
- Only qualified source to MIL-PRF-28861/12
- Non-magnetic designs with 2X higher current
- The only true hermetic seal, 15 years plus history
- Smallest size in the market and widest offering of configurations
- Commercial, Military, Medical, Space level qualified

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Bolt-in Style EMI Filter

- Epoxy resin sealed and hermetic versions
- Thread sizes 1-64 to 12-32
- Circuits offered: C, L, T, Pi
- High current option
- Commercial, Military, Medical and Space level qualified
- NASA SSQ 21215-21218

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Cylindrical Style EMI Filter

- First to qualify to MIL-PRF-28861
- Only qualified source for M28861/4
- Circuits offered: C, L, T, Pi
- Commercial, Military, Medical and Space level qualified
- NASA SSQ 21215-21218

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Custom EMI Filter Assemblies

- Configurations: C, L, LC, Pi and Double Pi
- Space level qualifications
- Custom shapes and lead configurations
- Custom brackets and filter connectors
- High temperature construction

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Feedthrough Array Filter

- 0508 and 0612 size, low weight
- Broadband LCT configured EMI filter
- Broad range of S21 characteristics
- High reliability - space screening available
- High shock capability

FOR DETAILED INFORMATION – PAGE 54

High Current Feedthrough Filter

- 0805, 1206 and 0612 size, low weight
- Broadband LCT configured EMI filter
- High reliability - space screening available
- High current capability - up to 5 amps steady state current
- High shock capability

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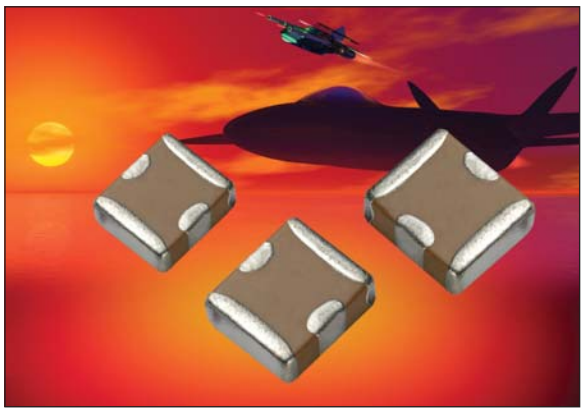
W8F, High Current Filter



- Low weight
- Broadband LCT configured EMI filter
- High reliability - space screening available
- High current capability - up to 8 amps steady state current
- High power filter capability

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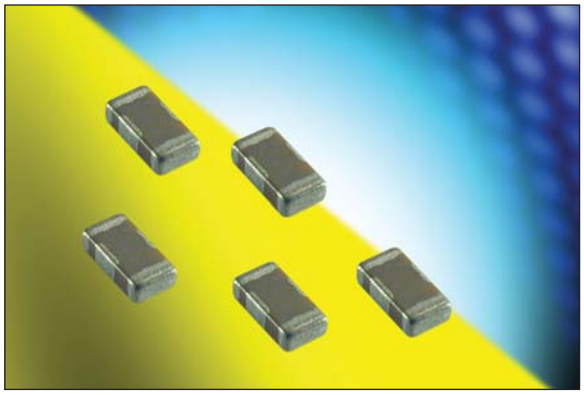
TransFeed, Feedthrough Filter



- 0805 and 1206 size, low weight
- Radiation resistant
- Off state EMI filter, on state transient protection
- High transient current capability
- Sub 500ps turn on time

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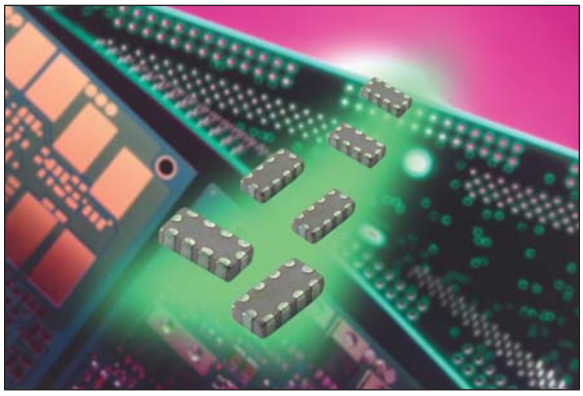
Transfeed Array Filter



- 0612 size, low weight
- Radiation resistant
- Off state EMI filter, on state transient protection
- High transient current capability - up to 20 amps
- Up to 18V array offered

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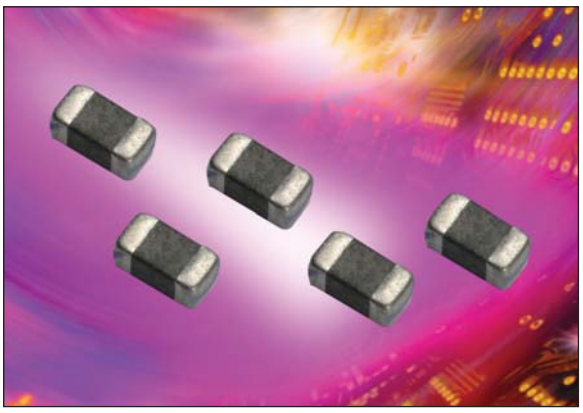
TransGuard®, Transient Voltage Suppressors



- 0402 to 2220 sizes, low weight, sub ns response time
- DSCC drawing series AA55562
- Radiation resistant, repetitive strike capability
- Off state EMI filter, on state transient protection
- Low leakage current transient protection (as low as 2μa)
- High peak current and transient energy capability

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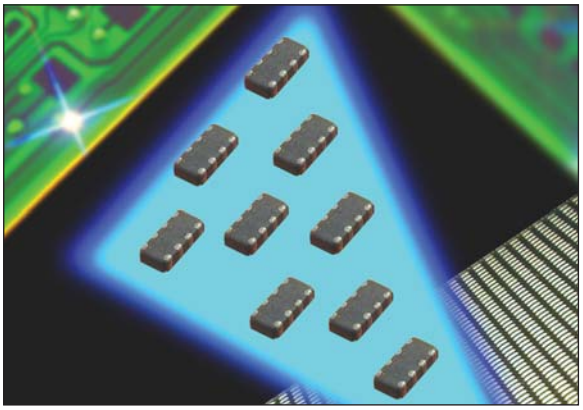
MultiGuard, TVS Array



- 0405, 0508, 0612 miniature sizes, low weight
- 0405 dual element devices for multiplex bus structures
- Radiation resistant
- Off state EMI filter, on state transient protection
- Fast turn on time - < 1ns

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NB12, Surface Mount Thermistor

- Miniature size, low weight
- Precision tolerances available
- Ni barrier termination
- Multiple temperature stability options
- Fast thermal response time

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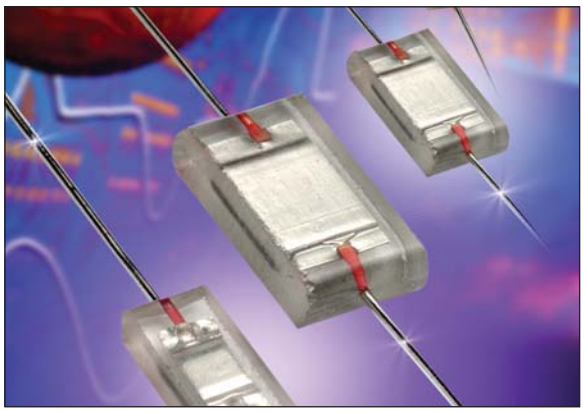
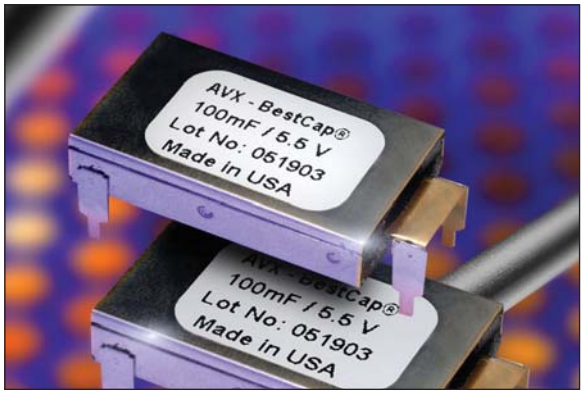
MIL-PRF-23269 Glass Dielectric Capacitor



- High reliability - space grade components available
- Radiation resistant
- Zero aging rate
- Low noise
- Retraceable TC
- MIL-PRF-23269 and MIL-PRF-11272

FOR DETAILED INFORMATION – PAGES 62-63

BestCap® Low Temp Supercapacitor



- Lightweight
- Small size
- Low ESR
- High specific energy
- High shock capability

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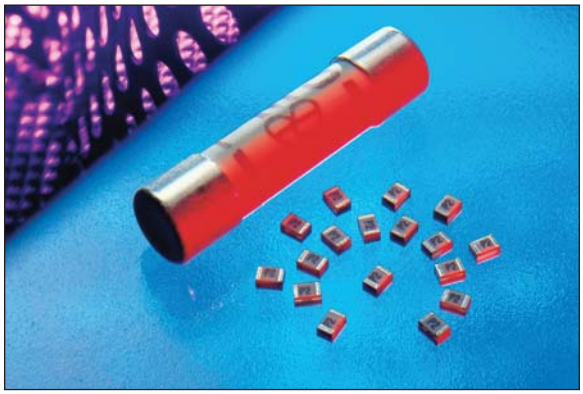
Surface Mount Fuse



- Miniature size - 0402 to 1206
- Fast response time
- Repeatable lot to lot performance
- High vibration and shock capability
- UL, cUL approvals

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TRAFIM, DC Filtering Capacitors

- Voltages up to 6000 Vdc
- Capacitance up to 48mF
- High reliability
- Highest specific energy in the market
- Controlled self-healing

FOR DETAILED INFORMATION – PAGE 66

FFLC, DC Filtering Capacitors

- Capability – 1900Vdc, 27mF
- High reliability, dry technology
- Low stray inductance
- Up to 40 liters / 10.5 US gallons
- Used for hybrid vehicles

FOR DETAILED INFORMATION – PAGE 67

FFVE/FFVI, DC Filtering Capacitors

- High rms current capability
- Capability 1900Vdc, 400µF
- Dry technology
- Custom design options
- Used for hybrid vehicles

FOR DETAILED INFORMATION – PAGES 68-69

DISFIM, High Voltage Film Capacitors

- Capability 75kVdc, 10mF
- High specific energy 2000J/liter
- Controlled self-healing
- High power fusion lasers
- Electromagnetic gun

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FPX, Medium Power Film Capacitor

- Voltage up to 13kVdc
- Dry technology, resin filled
- High voltage thyristor protection
- High peak current 729A^2s
- Used for hybrid vehicles

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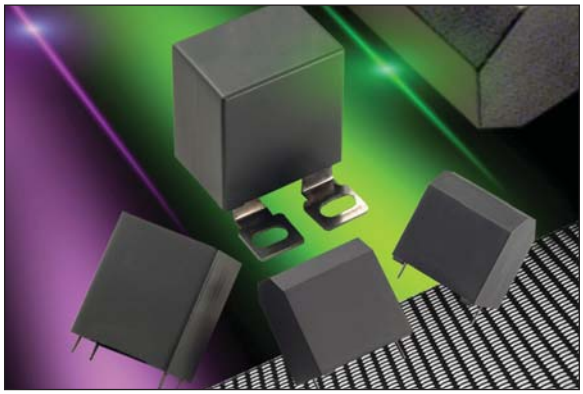
FSB, Medium Power Film Capacitors



- Controlled self-healing technology
- High peak current 1.6A^2s
- Dry technology
- IGBT decoupling
- Used for hybrid vehicles

FOR DETAILED INFORMATION – PAGE 72

M55302 Two Piece DIN41612 Connectors

- Two Piece high density board to board connectors
- 64 & 96 position male and female
- Qualified to M55302/131-134 and 157-158
- Heavy gold plating rated at 500+ mating cycles
- For back plane and Daughter card applications

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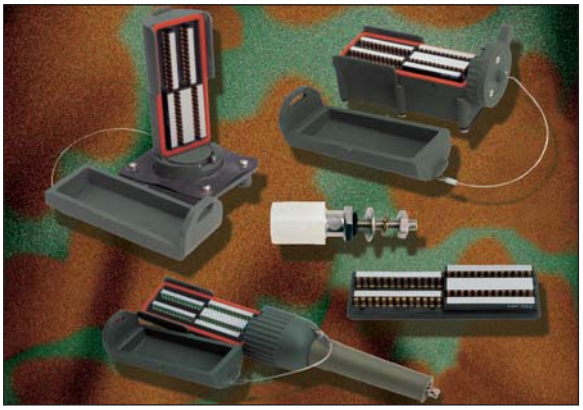
MIL-C-55074 Two Piece Military Communications Connectors



- Two piece high reliability Hermaphrocon™ connectors
- Qualified to M55074
- Designed for mobile and fixed military communications applications
- Designed for foolproof speedy interconnections under extreme field conditions
- Rugged and waterproof, these connectors resist wear and damage

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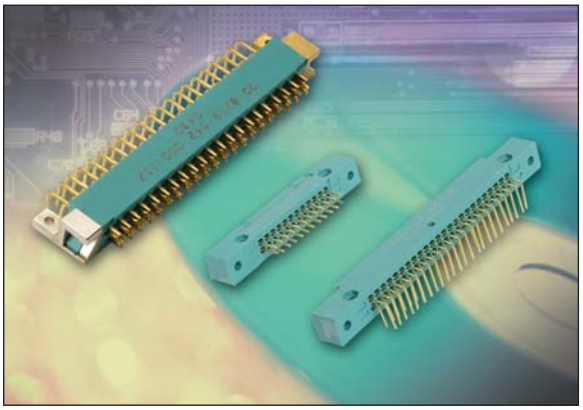
Rack and Panel Connectors



- Two piece high density board to board connectors
- Series 8219 and 8223
- Wide range of contact terminations
- Low withdrawal force contacts
- Proven Varicon® contact reliability

FOR DETAILED INFORMATION – PAGES 75-76

These series represent the most flexible of surface mount form factors, offering nine case sizes (A through X). The molded construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. The five smaller cases are characterized by their low profile construction, with the A case being the world's smallest molded military tantalum. There are three termination finishes available: fused solder plated ("K" per MIL-PRF-55365), hot solder dipped ("C") and gold plated ("B"). In addition, the molding compound has been selected to meet the requirements of UL94V-0 and outgassing requirements of NASA SP-R-0022A.

The **CWR09** series (Original series, A through H case sizes) is qualified to MIL-PRF-55365/4 and is fully interchangeable with CWR06 conformal types, while offering the advantages of molded body/compliant termination construction, polarity and capacitance.

The **CWR19** Series represents an extended range of capacitor ratings beyond CWR09 that is fully qualified to MIL-PRF-55365/11, including the new X case size for even higher Capacitance / Voltage ratings.

The **CWR29** series is a Low ESR series that incorporates the extended ratings of CWR19 and is also fully qualified to MIL-PRF-55365/11. This series offers the highest ripple capability for critical filtering applications.

HOW TO ORDER

CWR09	J	^	225	*	@	+	□
Type	**Voltage Code** C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	**Termination Finish** 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. Comm: Z = 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	**Packaging** Bulk = Standard \TR = 7" T&R \TR13 = 13" T&R \W = Waffle

CWR09 – 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		B
0.47	474					A		B	C
0.68	684				A	B	B	C	D
1.0	105			A		B	C	D	E
1.5	155		A		B	C	D	E	F
2.2	225	A		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							
150	157								
220	227								

HOW TO ORDER

CWR29	J	^	225	*	@	D	+	□
Type	**Voltage Code** C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	**Termination Finish** K = Fused Solder Plated 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. Comm: Z = 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

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)	50V (N)
0.10	104								
0.15	154								
0.22	224								
0.33	334							A	
0.47	474						A		C
0.68	684					A		C	
1.0	105				A	A	B/C		
1.5	155				A	B/C			
2.2	225			A	A/C	B	D		
3.3	335	A	A	A/C	B	D	E		
4.7	475	A	A/C	B/C	B/C/D	E			
6.8	685	A/C	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/X		
33	336	D/E	E	F	F/G	H	H/X		
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						

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/X		
33	336	D/E/F	E	F/G	F/G/H	H	H/X		
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						

SRC9000 Series

High Reliability Tantalum Capacitors for Space Applications

AVX SRC9000 microminiature capacitors are designed and built to meet the high reliability and long term requirements of military space applications. All SRC9000 capacitors meet all of the requirements of Mil-PRF-55365 and include DPA requirements per MIL-STD-1580. SRC9000 establishes a rigorous screening test schedule designed to detect and eliminate from shipment any capacitor or capacitor test lots that exhibits poor performance or reliability. SRC9000 establishes a continuous test schedule to determine baseline reliability data for specific product shipped under this specification. SRC9000 assures that proper lot control and lot traceability procedures are in effect.

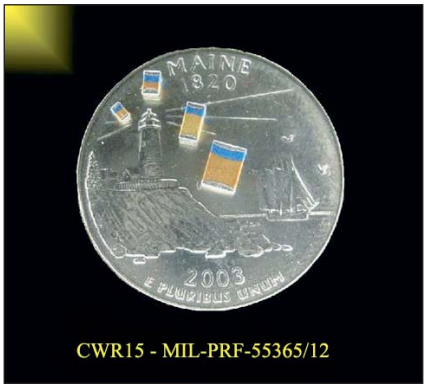
HOW TO ORDER

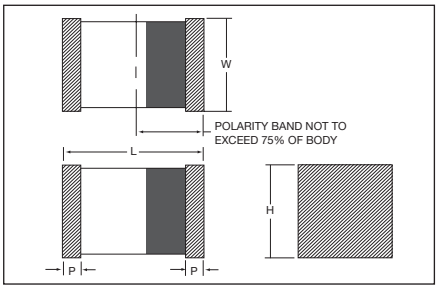
	D	227	*	006	C	□	#@	90	++
Type (3 letters) TBJ TAZ	**Case Size**	**Capacitance Code**	**Capacitance Tolerance** M = ±20% K = ±10% J = ±5%	**Voltage Code** 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc (TAZ) 016 = 16Vdc (TBJ) 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	**Standard or Low ESR Range** C = Std ESR L = Low ESR	**Packaging** B = Bulk R = 7" T&R S = 13" T&R	**Qualification/ Reliability # = Inspection Level** S = Std. Conformance L = Group A **@ = Failure Rate Level** Weibull: B = 0.1%/1000 hrs, 90% conf. C = 0.01%/1000 hrs, 90% conf. D = 0.001%/1000 hrs, 90% conf. Comm: Z = Non ER	**Termination Finish** 90 = SRC9000	**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

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

Capacitance		Voltage Rating DC (V_R) to 85°C															
µF	Code	4V		6V		10V		15V/16V		20V		25V		35V		50V	
		TAZ	TBJ	TAZ	TBJ	TAZ	TBJ	TAZ	TBJ	TAZ	TBJ	TAZ	TBJ	TAZ	TBJ	TAZ	TBJ
0.1	104														A	A	A
0.15	154														A	A	A(M)/B
0.22	224													A	A	B	A(M)/B
0.33	334											A	A	A	A	B	B
0.47	474									A	A	A	A	B	A(M)/B	C	C
0.68	684							A	A	A/B	A	B	A/B	C	A(M)/B	D	C
1	105					A	A	A	A	A/B	A	B/C	A/B	D	A/B	E	C
1.5	155			A	A		A	A/B	A	B/C	A/B	D	A/B	E	A/B/C	F	C/D
2.2	225	A	A		A	A/B	A	A/C	A/B	B/D	B	D/E	A/B/C		B/C	F	D
3.3	335	A		A/B	A	A/C	A/B	B/D	A/B	D/E	B	E	B/C	F	B/C	G	D
4.7	475	A/B	A	A/C	A/B	B/C/D	A/B	B/C/D/E	A/B	E	A/B/C	F	B/C	G	B/C/D	H	D
6.8	685	A/C	A/B	B/D	A/B	B/C/D/E	A/B	D/E	A/B/C	E/F	B/C	F/G	B/C/D	G/H	C/D		D
10	106	B/D	A/B	B/E	A/B	B/C/D/E	A/B/C	D/E/F	B/C	E/F	B/C	G	C/D	H	C/D		
15	156	B/E	A/B	B/D/E	A/B/C	D/E/F	A/B/C	E/F	B/C	F/G	B/C/D	G/H	D	X	C/D		
22	226	B/D	A	D/E/F	A/B/C	E	B/C	F/G	B/C/D	G/H	C/D	G/H/X	C/D		D/E		
33	336	D/E/F	A/B/C	E	B/C	F/G	B/C/D	F/G/H	C/D	H	C/D	H/X	D/E		D(M)		
47	476	E	B	F/G	C/D	F/G/H	C/D	G/H	C/D	H/X	D		D(M)				
68	686	E/G	C/D	F/G/H	B/C/D	G	C/D	G/H	D		D/E		V				
100	107	F/H	B/C/D	G	C/D	G/H	C/D	H	D/E		V						
150	157	G		G	D	H/X	D		D(M)/V								
220	227	H	D	H	C/D	H	D(M)/E		V								
330	337	H	E	H	E		D(M)/E										
470	477	H			E(M)/V		E(M)/V										
680	687																

CWR15 Series
QPL Tantalum Microchip





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.

CASE DIMENSIONS: millimeters (inches)

Case Code	Length (L)	Width (W)	Height (H)	Term. Width (W_1) ±0.10 (±0.004)
L	1.60+0.25/-0.15 (0.063+0.010/-0.006)	0.85+0.20/-0.10 (0.033+0.008/-0.004)	0.85+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)	2.00+0.25/-0.15 (0.079+0.001/-0.006)	0.15+0.35/-0.00 (0.006+0.014/-0.000)
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)

PART NUMBERING SYSTEM

CWR15	F	K	225	*	@	L	+
Style	**Voltage** C = 4Vdc D = 6Vdc F = 10Vdc	**Termination Finish** Solder Fused	**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%	**Product Level Designator** Weibull FRL B = 0.1 C = 0.01 D = 0.001	**Case Size**	**Surge Test Option** A = +25°C after Weibull B = -55°C to +85°C after Weibull C = -55°C to +85°C before Weibull

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)	15V
0.33	334				
0.47	474			L	
0.68	684			L	
1.0	105			L	
1.5	155			L	
2.2	225			L	
3.3	335		L	L	
4.7	475		L	R	
6.8	685	L		R	
10	106			R	
15	156		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 2005. A new case size will be added, and the voltage range will be extended to 20 volts. Ratings of 100µF at 4 volts to 10µF at 20 volts will be included in this extension of the product line.

CWR11 Series
MIL-PRF-55365/8

Fully qualified to MIL-PRF-55365/8, the CWR11 is the military version of EIA-535BAAC, the commercial industry standard. It comprises four case sizes (A through D). This series also offers molded body/compliant termination construction, polarity, capacitance and JAN brand marking. The molded construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. There are three termination finishes available: fused solder plated ("K" per MIL-PRF-55365), hot solder dipped ("C") and gold plated ("B").

HOW TO ORDER

CWR11	J	B	225	*	@	+	□
Type	**Voltage Code** C = 4Vdc D = 6Vdc F = 10Vdc H = 15Vdc J = 20Vdc K = 25Vdc M = 35Vdc N = 50Vdc	**Termination Finish** K = Fused Solder Plated 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. Comm: Z = 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 Z = None (required for CWR19 & CWR29 only)	**Packaging** Bulk = Standard \TR = 7" T&R \TR13 = 13" T&R \W = Waffle

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

Capacitance		Rated voltage DC (V_R) to 85°C							
µF	Code	4V (C)	6V (D)	10V (F)	16V (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	D					
68	686	D	D						
100	107	D							
150	157								
220	227								
330	337								

TBW Series

Tantalum Fused Capacitor

TBW Fused Tantalum Capacitors offer protection from possible damaging short circuit failure modes. This is accomplished with an internal fuse using thin film technology that is in series with the capacitor. See the photograph on the right. The AVX fused tantalum offers lower ESR limits than competitive fused tantalum capacitors, and is available with Weibull and surge testing per MIL PRF 55365.

Anode, fuse and leadframe assembly

HOW TO ORDER

TBW	D	476	*	015	C	S	#@	0^	++
Type	**Case Size**	**Capacitor 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** 015 = 15Vdc 035 = 35Vdc 050 = 50Vdc	**ESR Range** C = Std ESR	**Packaging** B = Bulk R = 7" T&R S = 13" T&R W = Waffle	**Qualification/ Reliability** **# = Inspection Level** D = DSCC Dwg 04053 S = Std. Conformance L = Group A **@ = Failure Rate Level** Weibull: B = 0.1%/1000 hrs, 90% conf. C = 0.01%/1000 hrs, 90% conf. D = 0.001%/1000 hrs, 90% conf. Comm: Z = Non ER	**Termination Finish** 08 = Tin/Lead 00 = Solder Fused	**Surge Test Option** 00 = None 23 = 10 cycles, +25ºC 24 = 10 cycles, -55ºC & +85ºC

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

Capacitance		Voltage Rating DC (V_R) to 85°C		
µF	Code	15V	35V	50V
3.3 4.7 6.8	335 475 685			D
10 15 22	106 156 226		D	
33 47 68	336 476 686	D		

TCP Series
Tantalum Modules

TCP Series tantalum modules represents the highest packing density for high capacitance / voltage available in surface mount tantalum.

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 to SRC9000 Space Level.

The stacked construction of fully molded capacitors is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques. There are three termination finishes available: fused solder plated ("K" per MIL-PRF-55365), hot solder dipped ("C") and gold plated ("B"). In addition, the molding compound has been selected to meet the requirements of UL94V-0 and outgassing requirements of NASA SP-R-0022A.

HOW TO ORDER

TC	2H	945	K	050	L	B	S	B	08	24
Type	**Case Size**	**Capacitor Code** pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Capacitance Tolerance** M = ±20% K = ±20% J = ±5%	**Voltage Code** 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	**Low ESR Range** L = Low ESR	**Packaging** B = Bulk	**Qualification/ Reliability** **# = Inspection Level** S = Std. Conformance L = Group A D = Order to DSCC Dwg xxx	**Reliability Grade** Weibull: B = 0.1%/1000 hrs, 90% conf. C = 0.01%/1000 hrs, 90% conf. D = 0.001%/1000 hrs, 90% conf. Comm: Z = Non ER	**Termination Finish** 09 = Tin/Lead 08 = Hot Solder Dipped	**Surge Test Option** 00 = None 23 = 10 cycles, +25ºC 24 = 10 cycles, -55ºC & +85ºC 45 = 10 cycles, -55ºC & +85ºC Before Weibull

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE CASE SIZE (ESR IN mΩ)

Capacitance		Rated voltage DC (V_R) to 85ºC						
µF	**Code**	**6V**	**10V**	**15V**	**20V**	**25V**	**35V**	**50V**
9.4	945							2H (200)
18.8	196							2H (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)						

The TAZ part has fully molded, compliant leadframe construction designed for use in applications utilizing solder (Reflow, Wave or Vapor Phase), conductive adhesive or thermal compression bonding techniques. Each chip is marked with polarity, capacitance code and rate voltage. The series comprises ten case sizes (see dimensional chart below) with the maximum size V case giving capacitance values to 470 µF. The C case, with its non-standard aspect ratio, is retained as a QPL (Qualified Product List) only special.

HOW TO ORDER

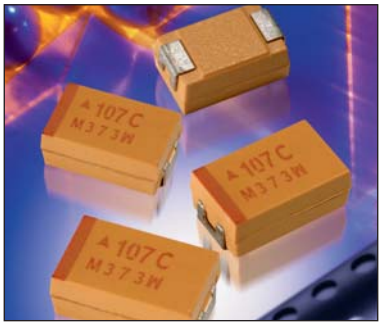
TAZ	H	227	*	006	C	□	#@	0^	++
Type	**Case Size**	**Capacitance Code** pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	**Capacitance Tolerance** M = ±20% K = ±10% J = ±5%	**Voltage Code** 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 015 = 15Vdc 020 = 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	**Qualification/ Reliability** **# = Inspection Level** S = Std. Conformance L = Group A **@ = Failure Rate Level** Weibull: B = 0.1%/1000 hrs, 90% conf. C = 0.01%/1000 hrs, 90% conf. D = 0.001%/1000 hrs, 90% conf. Comm: Z = Non ER	**Termination Finish** 09 = Gold Plated 08 = Hot Solder Dipped 00 = Solder Fused	**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

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/X		
33	336	D/E/F	E	F/G	F/G/H	H	H/X		
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						
470	447	H							

NOTE: TAZ Standard Range ratings are also available in CWR09 Military parts.

TBJ Series
COTS-Plus



This series features:

- CWR11 form factor in Standard and Extended ratings.
- Low ESR Ratings (Cases A through E).
- Extended Case size (E) for ratings to 470 µF.
- Weibull Reliability Grading and Surge Test options.

All ratings in this series offer the advantages of molded body/compliant termination construction, polarity, capacitance and voltage marking. The molded construction is compatible with a wide range of SMT board assembly processes including wave or reflow solder, conductive epoxy or compression bonding techniques.

HOW TO ORDER

TBJ	D	227	*	006	C	□	#@	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% J = ±5%	**Voltage Code** 004 = 4Vdc 006 = 6Vdc 010 = 10Vdc 016 = 16Vdc 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	**Qualification/ Reliability** **# = Inspection Level** S = Std. Conformance L = Group A **@ = Failure Level** Weibull: B = 0.1%/1000 hrs, 90% conf. C = 0.01%/1000 hrs, 90% conf. D = 0.001%/1000 hrs, 90% conf. Comm: Z = Non ER	**Termination Finish** 09 = Gold Plated 08 = Hot Solder Dipped 07 = 100% Tin 00 = Solder Fused	**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

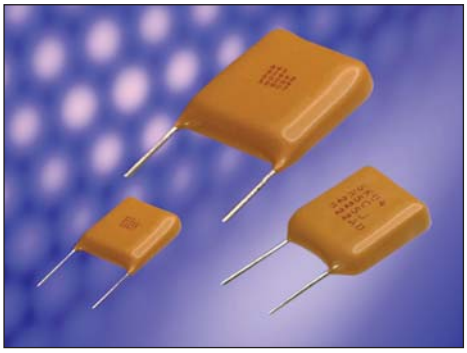
CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE) (ESR OPTIONS IN PARENTHESIS)

Capacitance		Rated voltage DC (V_R) to 85ºC							
µF	Code	4	6	10	16	20	25	35	50
0.15	154								A(15000)
0.22	224								A(18000)
0.47	474							A(12000)	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(300) 3(300)
6.8	685		A(5000)	A(4000)	A(1500), B(1200)	B(1000)	B(700,2800)	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)	E(400)
16	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(250)	D(250), E(250)
22	226		A(3000) B(600)	B(500, 700) C(300)	B(600) C(175, 375) B(500)	B(600) C(400) D(275)	C(275, 400) D(100, 200) E(225)	D(400) D(125) 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)	D(100, 300) E(100, 175)	D(200, 300) E(300)	
47	476		C(300)	C(200, 350) D(200)	C(110, 350) D(80, 150)	D(100, 2000) 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) 3(125, 200)	V(95)		
100	107	A(1400), B(900)	C(75, 150)	C(75, 200) D(50, 100), E(100)	D(50, 125) E(100)	V(60)			
150	157		D(125), E(125)	D(50, 100), E(100)	D(60, 150) V(45)				
220	227		D(50, 125), E(100)	D(50, 150) E(50, 100)	V(50)				
330	337		E(50, 150)	D(50, 150) E(50, 100), V(40)					
470	477		E(50, 200), V(40)	E(50, 200), V(40)					
1000	108	E(200)							

Released codes (M tolerance only)

Large Radial MLC Capacitors

SK Series for Output Filtering



AVX SK styles are conformally coated MLC capacitors for input or output filtering in switch mode power supplies. They are specially processed to handle high currents and are low enough in cost for commercial SMPS application.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/sk.pdf

HOW TO ORDER

SK	01	3	E	125	Z	A	A	*
Style	**Size**	**Voltage** 25V = 3 50V = 5 100V = 1 200V = 2 500V = 7	**Temperature Coefficient** Z5U = E X7R = C C0G = A	**Capacitance Code** (2 significant digits + no. of zeros) 22 nF = 223 220 nF = 224 1 µF = 105 100 µF = 107	**Capacitance Tolerance** C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80, -20% Z5U: Z = +80, -20% P = GMV (+100, -0%)	**Test Level** A = Standard B = Hi-Rel*	**Leads** A = Tin/Lead R = RoHS Compliant	**Packaging** (See Note 1)

Note 1: No suffix signifies bulk packaging, which is AVX standard packaging. SK01, SK*3, SK*4, SK*5, SK*6, SK*9 & SK*0 are available taped and reel per EIA-468. Use suffix "TR1" if tape & reel is required.

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.

C0G Capacitance Range (µF)

Style	25 WVDC min./max.	50 WVDC min./max.	100 WVDC min./max.	200 WVDC min./max.	500 WVDC min./max.
SK01	.001/0.015	.001/0.012	.001/0.010	.0010/0.0056	.0010/0.0018
SK03/SK53	.01/0.056	.01/0.047	.01/0.039	.001/0.022	.001/0.0068
SK04/SK54	.01/0.12	.01/0.10	.01/0.082	.01/0.047	.001/0.015
SK05/SK55	.01/0.18	.01/0.15	.01/0.12	.01/0.068	.001/0.022
SK06/SK56	.10/0.56	.01/0.47	.01/0.39	.01/0.22	.01/0.068
SK07	.10/0.68	.01/0.56	.01/0.47	.01/0.27	.01/0.082
SK08	.82/1.20	.68/1.10	.56/0.82	.33/0.47	.10/0.15
SK09/SK59	.10/0.27	.01/0.22	.01/0.18	.01/0.10	.001/0.039
SK10/SK60	.10/0.68	.01/0.56	.01/0.47	.01/0.27	.01/0.082

X7R Capacitance Range (µF)

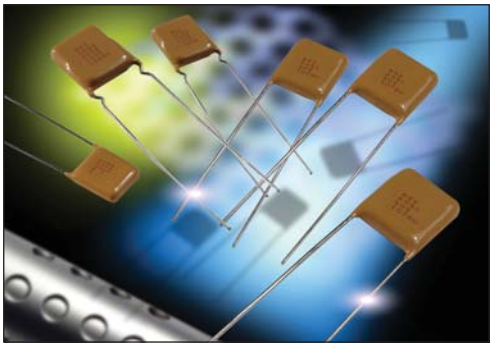
Style	25 WVDC min./max.	50 WVDC min./max.	100 WVDC min./max.	200 WVDC min./max.	500 WVDC min./max.
SK01	.01/0.39	.01/0.33	.01/0.27	.01/0.12	.001/0.033
SK03/SK53	.10/2.2	.10/1.8	.01/1.5	.01/0.56	.01/0.18
SK04/SK54	.10/4.7	.10/3.3	.10/2.7	.01/1.0	.01/0.33
SK05/SK55	.10/6.8	.10/5.6	.10/3.9	.10/1.8	.01/0.56
SK06/SK56	1.0/15	1.0/10	.10/5.6	.10/3.9	.10/1.2
SK07	1.0/18	1.0/14	1.0/8.2	.10/4.7	.10/1.8
SK08	22/33	15/22	10/15	5.6/8.2	2.2/3.3
SK09/SK59	.10/8.2	.10/5.6	.10/3.3	.10/2.2	.10/1.0
SK10/SK60	1.0/18	1.0/12	.10/6.8	.10/4.7	.10/1.5

Z5U Capacitance Range (µF)

Style	25 WVDC min./max.	50 WVDC min./max.	100 WVDC min./max.	200 WVDC min./max.
SK01	.10/1.2	.10/0.82	.10/0.47	.10/0.33
SK03/SK53	.10/5.6	.10/3.30	.10/2.20	.10/1.50
SK04/SK54	1.0/10.0	1.0/8.20	.10/4.70	.10/3.30
SK05/SK55	1.0/18.0	1.0/10.00	1.0/6.80	.10/4.70
SK06/SK56	1.0/47.0	1.0/39.00	1.0/22.00	1.0/15.00
SK07	1.0/68.0	1.0/47.00	1.0/27.00	1.0/18.00
SK08	82/120.0	56/100.00	33/47.00	22/33.00
SK09/SK59	1.0/27.0	1.0/18.00	1.0/10.00	1.0/6.80
SK10/SK60	1.0/56.0	1.0/39.00	1.0/22.00	1.0/18.00

Large Radial MLC Capacitors

SE Series of Extended Ranges



AVX SE styles offer capacitance extension to popular SK ranges. The CV product for SE-series, X7R capacitors (TCC: ±15% over -55 to +125°C) compares favorably to high CV ranges offered by other suppliers in much less stable Y5U dielectric (TCC: +22/-56% over -30 to +85°C). SE style capacitors are conformally coated and are designed for input and output filtering applications in switch mode power supplies.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/se.pdf

HOW TO ORDER

SE	01	3	C	125	M	A	A	*
Style	**Size**	**Voltage** 25V = 3 50V = 5 100V = 1	**Temperature Coefficient** X7R = C	**Capacitance Code** (2 significant digits + no. of zeros) 22 nF = 223 220 nF = 224 1 µF = 105 100 µF = 107	**Capacitance Tolerance** X7R: K = ±10% M = ±20% Z = +80, -20%	**Test Level** A = Standard B = Hi-Rel*	**Leads** A = Tin/Lead R = RoHS Compliant	**Packaging** (See Note 1)

Note 1: No suffix signifies bulk packaging, which is AVX standard packaging. Parts available tape and reel per EIA-468. Use suffix "TR1" if tape & reel is required.

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

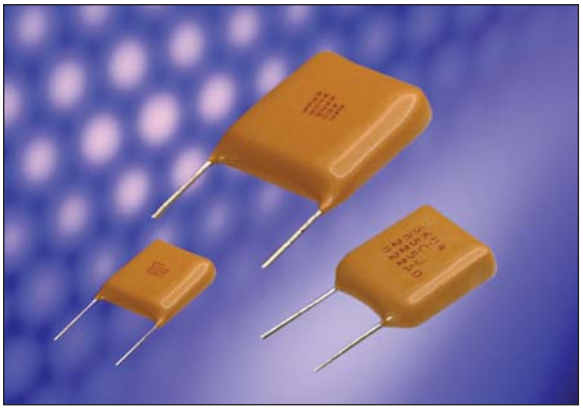
*Hi-Rel screening consists of 100% Group A, Subgroup 1 per MIL-PRF-39014.

X7R Capacitance Range (µF)

Style	25 WVDC min./max.	50 WVDC min./max.	100 WVDC min./max.
SE01	0.47/1.5	0.39/1.0	0.33/0.68
SE03/SE53	2.7/6.8	2.2/4.7	1.8/3.3
SE04/SE54	5.6/12	3.9/10	3.3/6.8
SE05/SE55	8.2/18	6.8/12	4.7/10.0
SE06/SE56	18/39	12/27	6.8/15

Large Radial MLC Capacitors

BR Series (CECC) for Output Filtering



AVX also offers ESA qualified and CECC approved SMPS capacitors, the BR series. These are coated radial capacitors that are offered in ranges from 50V to 500V and available in C0G and X7R type dielectrics. These capacitors are designed to withstand the harsh conditions found in input and output filtering requirements for today's demanding switch mode power supply applications. Customized and custom versions are also available.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/br.pdf

HOW TO ORDER

BR	84	1	C	156	K	T	A
Style Code	**Size Code**	**Voltage Code** 5 = 50V 1 = 100V 2 = 200V 7 = 500V	**Dielectric Code** A = C0G C = X7R	**Capacitance Code** (2 significant digits + no. of zeros)	**Capacitance Tolerance** G = ±2% C0G only J = ±5% C0G only K = ±10% M = ±20% P = -0 +100%	**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.

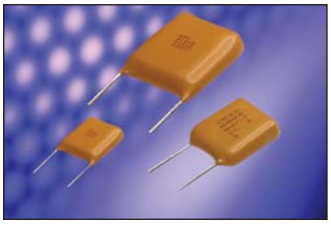
CECC Offering

	1B/C0G CECC 30 601 801 Issue 1				2C1/X7R CECC 30 701 801 Issue 1			
	50V	**100V**	**200V**	**500V**	**50V**	**100V**	**200V**	**500V**
BR40	683-104	473-683	333-473	4R5-153	185-275	125-185	334-474	473-154
BR50	124-224	104-154	683-104	820-333	395-475	225-395	684-105	104-394
BR84	104-564	104-474	104-334	223-104	475-186	475-156	105-335	474-155

BR SERIES IS QUALIFIED TO ESA SPEC. 3001

Large Radial MLC Capacitors

SV Series High Voltage, Available to DSCC Drawings



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. AVX special high voltage MLC radial leaded capacitors meet these performance characteristics. The added advantage of these capacitors lies in special internal design minimizing the electric field stresses within the MLC. These special design criteria result in significant reduction of partial discharge activity within the dielectric and having, therefore, a major impact on long-term reliability of the product. The SV high voltage radial capacitors are conformally coated with high insulation resistance, high dielectric strength epoxy eliminating the possibility of arc flashover.

The SV high voltage radial MLC designs exhibit low ESRs at high frequency. The same criteria governing the high voltage design carries the added benefits of extremely low ESR in relatively low capacitance and small packages. These capacitors are designed and are ideally suited for applications such as snubbers in high frequency power converters, resonators in SMPS, and high voltage coupling/DC blocking

HOW TO ORDER

AVX Styles: SV01 THRU SV67

SV01	A	A	102	K	A	A	*
AVX Style	**Voltage** 1000V = A 1500V = S 2000V = G 2500V = W 3000V = H 4000V = J 5000V = K	**Temperature Coefficient** C0G = A X7R = C	**Capacitance Code** (2 significant digits + no. of zeros) Examples: 10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1 µF = 105	**Capacitance Tolerance** C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	**Test Level** A = Standard B = Hi-Rel*	**Leads** A = Tin/Lead B = RoHS Compliant	**Packaging** (See Note 1)

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

Note 1: No suffix signifies bulk packaging which is AVX standard packaging. Use suffix "TR1" if tape and reel is required. Parts are reel packaged per EIA-468.

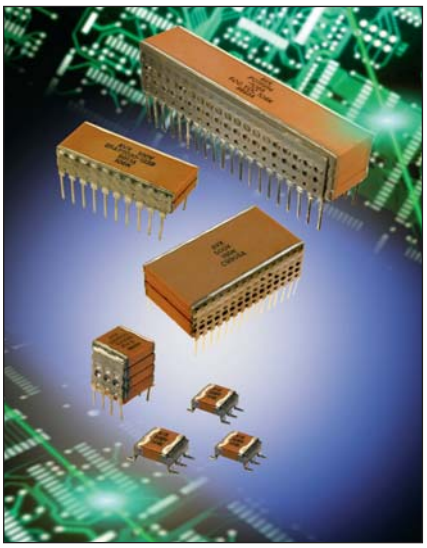
***Hi-Rel screening consists of 100% Group A, Subgroup 1 per MIL-PRF-49467. (Except partial discharge testing is not performed and DWV is at 120% rated voltage).

CAPACITANCE VALUE

Style	1000V min./max.	1500V min./max.	2000V min./max.	2500V min./max.	3000V min./max.	4000V min./max.	5000V min./max.
C0G							
SV01	100 pF / 1000 pF	10 pF / 330 pF	10 pF / 220 pF	10 pF / 120 pF	10 pF / 82 pF	—	—
SV02/SV52	100 pF / 4700 pF	100 pF / 1500 pF	10 pF / 1000 pF	10 pF / 680 pF	10 pF / 560 pF	10 pF / 150 pF	10 pF / 100 pF
SV03/SV53	100 pF / 8200 pF	100 pF / 2700 pF	100 pF / 1800 pF	10 pF / 1000 pF	10 pF / 680 pF	10 pF / 390 pF	10 pF / 220 pF
SV04/SV54	100 pF / 2700 pF	10 pF / 820 pF	10 pF / 560 pF	10 pF / 270 pF	10 pF / 180 pF	10 pF / 100 pF	10 pF / 68 pF
SV05/SV55	1000 pF / 0.018 µF	100 pF / 6800 pF	100 pF / 4700 pF	100 pF / 2700 pF	100 pF / 1500 pF	10 pF / 1000 pF	10 pF / 560 pF
SV06/SV56	100 pF / 0.010 µF	100 pF / 3300 pF	100 pF / 2200 pF	10 pF / 1200 pF	10 pF / 820 pF	10 pF / 470 pF	10 pF / 390 pF
SV07/SV57	1000 pF / 0.033 µF	1000 pF / 0.015 µF	100 pF / 0.010 µF	100 pF / 5600 pF	100 pF / 3900 pF	100 pF / 2200 pF	10 pF / 1200 pF
SV08/SV58	1000 pF / 0.047 µF	1000 pF / 0.022 µF	1000 pF / 0.015 µF	100 pF / 0.010 µF	100 pF / 6800 pF	100 pF / 3300 pF	100 pF / 2200 pF
SV09/SV59	1000 pF / 0.082 µF	1000 pF / 0.039 µF	1000 pF / 0.022 µF	1000 pF / 0.015 µF	100 pF / 8200 pF	100 pF / 4700 pF	100 pF / 3300 pF
SV10	1000 pF / 0.056 µF	1000 pF / 0.022 µF	1000 pF / 0.012 µF	100 pF / 8200 pF	100 pF / 5600 pF	100 pF / 3300 pF	100 pF / 2200 pF
SV11	1000 pF / 0.082 µF	1000 pF / 0.039 µF	1000 pF / 0.022 µF	1000 pF / 0.015 µF	100 pF / 8200 pF	100 pF / 4700 pF	100 pF / 3300 pF
SV12	0.01 µF / 0.15 µF	1000 pF / 0.056 µF	1000 pF / 0.033 µF	1000 pF / 0.022 µF	1000 pF / 0.015 µF	100 pF / 8200 pF	100 pF / 5600 pF
SV13/SV63	100 pF / 0.012 µF	100 pF / 4700 pF	100 pF / 2700 pF	100 pF / 1800 pF	100 pF / 1000 pF	10 pF / 470 pF	10 pF / 390 pF
SV14/SV64	1000 pF / 0.022 µF	100 pF / 8200 pF	100 pF / 5600 pF	100 pF / 3300 pF	100 pF / 1800 pF	10 pF / 820 pF	10 pF / 680 pF
SV15/SV65	1000 pF / 0.033 µF	1000 pF / 0.015 µF	100 pF / 0.01 µF	100 pF / 5600 pF	100 pF / 2700 pF	100 pF / 1800 pF	100 pF / 1200 pF
SV16/SV66	1000 pF / 0.082 µF	1000 pF / 0.039 µF	1000 pF / 0.027 µF	1000 pF / 0.015 µF	100 pF / 8200 pF	100 pF / 4700 pF	100 pF / 3300 pF
SV17/SV67	1000 pF / 0.10 µF	1000 pF / 0.056 µF	1000 pF / 0.039 µF	1000 pF / 0.022 µF	1000 pF / 0.012 µF	100 pF / 6800 pF	100 pF / 4700 pF
X7R							
SV01	1000 pF / 0.012 µF	100 pF / 3900 pF	100 pF / 1500 pF	—	—	—	—
SV02/SV52	1000 pF / 0.047 µF	1000 pF / 0.015 µF	100 pF / 5600 pF	100 pF / 3900 pF	100 pF / 2700 pF	—	—
SV03/SV53	1000 pF / 0.082 µF	1000 pF / 0.018 µF	1000 pF / 0.01 µF	100 pF / 6800 pF	100 pF / 4700 pF	100 pF / 1800 pF	—
SV04/SV54	1000 pF / 0.033 µF	100 pF / 6800 pF	100 pF / 3900 pF	100 pF / 2200 pF	100 pF / 1800 pF	100 pF / 820 pF	—
SV05/SV55	0.01 µF / 0.22 µF	1000 pF / 0.056 µF	1000 pF / 0.027 µF	1000 pF / 0.018 µF	1000 pF / 0.012 µF	100 pF / 4700 pF	—
SV06/SV56	0.01 µF / 0.10 µF	1000 pF / 0.033 µF	1000 pF / 0.012 µF	100 pF / 8200 pF	100 pF / 6800 pF	100 pF / 2700 pF	100 pF / 1200 pF
SV07/SV57	0.01 µF / 0.39 µF	0.01 µF / 0.10 µF	1000 pF / 0.047 µF	1000 pF / 0.033 µF	1000 pF / 0.027 µF	1000 pF / 0.01 µF	100 pF / 6800 pF
SV08/SV58	0.01 µF / 0.68 µF	0.01 µF / 0.18 µF	1000 pF / 0.082 µF	1000 pF / 0.068 µF	1000 pF / 0.047 µF	1000 pF / 0.018 µF	1000 pF / 0.012 µF
SV09/SV59	0.10 µF / 1.00 µF	0.01 µF / 0.27 µF	0.01 µF / 0.12 µF	0.01 µF / 0.10 µF	1000 pF / 0.068 µF	1000 pF / 0.027 µF	1000 pF / 0.018 µF
SV10	0.01 µF / 0.82 µF	0.01 µF / 0.22 µF	0.01 µF / 0.10 µF	1000 pF / 0.082 µF	1000 pF / 0.056 µF	1000 pF / 0.022 µF	1000 pF / 0.018 µF
SV11	0.10 µF / 1.2 µF	0.01 µF / 0.39 µF	0.01 µF / 0.18 µF	0.01 µF / 0.15 µF	0.01 µF / 0.10 µF	1000 pF / 0.039 µF	1000 pF / 0.027 µF
SV12	0.10 µF / 2.20 µF	0.01 µF / 0.56 µF	0.01 µF / 0.27 µF	0.01 µF / 0.22 µF	0.01 µF / 0.15 µF	1000 pF / 0.056 µF	1000 pF / 0.033 µF
SV13/SV63	0.01 µF / 0.10 µF	1000 pF / 0.033 µF	1000 pF / 0.012 µF	1000 pF / 0.01 µF	100 pF / 6800 pF	100 pF / 2700 pF	—
SV14/SV64	0.01 µF / 0.18 µF	1000 pF / 0.068 µF	1000 pF / 0.022 µF	1000 pF / 0.018 µF	1000 pF / 0.015 µF	100 pF / 5600 pF	—
SV15/SV65	0.01 µF / 0.33 µF	0.01 µF / 0.10 µF	1000 pF / 0.033 µF	1000 pF / 0.027 µF	1000 pF / 0.022 µF	1000 pF / 8200 pF	100 pF / 4700 pF
SV16/SV66	0.01 µF / 1.0 µF	0.01 µF / 0.27 µF	0.01 µF / 0.12 µF	0.01 µF / 0.10 µF	1000 pF / 0.068 µF	1000 pF / 0.027 µF	1000 pF / 0.018 µF
SV17/SV67	0.01 µF / 1.2 µF	0.01 µF / 0.39 µF	0.01 µF / 0.15 µF	0.01 µF / 0.12 µF	1000 pF / 0.082 µF	1000 pF / 0.039 µF	1000 pF / 0.027 µF

Note: Contact factory for other voltage ratings or values.

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.

HOW TO ORDER

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

SM0	1	7	C	106	M	B	N	650
AVX Style Size SM0 = Uncoated SM5 = Epoxy Coated	**Size** See dimensions chart	**Voltage** 50V = 5 100V = 1 200V = 2 500V = 7	**Temperature Coefficient** C0G = A X7R = C	**Capacitance Code** (2 significant digits + no. 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** C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	**Test Level** B = Hi-Rel*	**Termination** N = Straight Lead J = Leads formed in L = Leads formed out	**Height** 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.

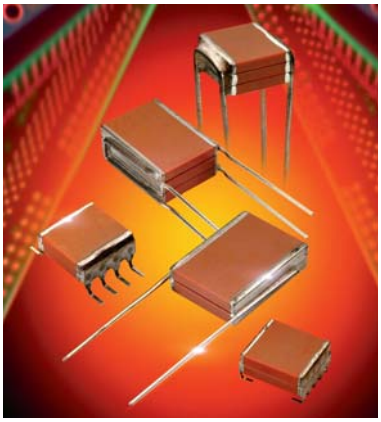
*Hi-Rel screening for C0G and X7R only. Screening consists of 100% Group A (B Level), Subgroup 1 per MIL-PRF-49470.

CAPABILITY

Case code	Voltage	X7R Cap range Min µF	X7R Cap range Max µF	Tolerances	Configurations
5	50	1.2	5.4	10 & 20%	N, J, L Leads
	100	0.68	3.3	10 & 20%	N, J, L Leads
	200	0.47	1.5	10 & 20%	N, J, L Leads
	500	0.15	0.68	10 & 20%	N, J, L Leads
4	50	6.8	15.0	10 & 20%	N, J, L Leads
	100	3.9	8.2	10 & 20%	N, J, L Leads
	200	1.8	3.9	10 & 20%	N, J, L Leads
	500	0.8	1.8	10 & 20%	N, J, L Leads
3	50	18.0	47.0	10 & 20%	N, J, L Leads
	100	10.0	27.0	10 & 20%	N, J, L Leads
	200	4.7	12.0	10 & 20%	N, J, L Leads
	500	2.5	5.4	10 & 20%	N, J, L Leads
2	50	120.0	150.0	10 & 20%	N, J, L Leads
	100	68.0	82.0	10 & 20%	N, J, L Leads
	200	33.0	39.0	10 & 20%	N, J, L Leads
	500	15.0	18.0	10 & 20%	N, J, L Leads
1	50	56.0	100.0	10 & 20%	N, J, L Leads
	100	33.0	56.0	10 & 20%	N, J, L Leads
	200	15.0	27.0	10 & 20%	N, J, L Leads
	500	6.8	12.0	10 & 20%	N, J, L Leads
6	50	180.0	270.0	10 & 20%	N, J, L Leads
	100	100.0	180.0	10 & 20%	N, J, L Leads
	200	47.0	120.0	10 & 20%	N, J, L Leads
	500	22.0	39.0	10 & 20%	N, J, L Leads

Stacked Leaded MLC Capacitors

CH-CV Series



- 10nF to 180 µF
- 50V to 500 VDC
- -55ºC to +125ºC
- 50-500V ESCC 3001/030
- BS9100 approved
- Low ESR/ESL
- 1B/C0G and 2C1/X7R Dielectrics
- 1-3kV ESCC 3001/034

This range allows SMPS engineers to select the best volumetric solution for input and output filter applications in high reliability designs. Utilizing advanced multilayer ceramic techniques to minimize ESR/ESL giving high current handling properties appropriate for filtering, smoothing and decoupling circuits. CH-CV series parts are qualified for ESA.

HOW TO ORDER

CV	**52**	**5**	**C**	**106**	**M**	**G**	**3**	**0**	**A**	**2**
Style Code	**Size Code**	**Voltage Code** 5 = 50V 1 = 100V 2 = 200V 7 = 500V	**Dielectric Code** A = C0G C = X7R	**Capacitance Code** (2 significant digits + no. of zeros) Examples: 1 µF = 105 10 µF = 106 100 µF = 107	**Capacitance Tolerance** J = ±5% K = ±10% M = ±20% P = -0 +100%	**Specification Code** A = Non-customized G = 9100	**Finish Code** 3 = Uncoated 8 = Coated (classified as uninsulated)	**Lead Dia. Code** 0 = Standard	**Lead Space Code** A = Standard	**Lead Style Code** 2 = 2 Terminal 4 = 4 Terminal This style is only available in 3 & 4 chip assemblies

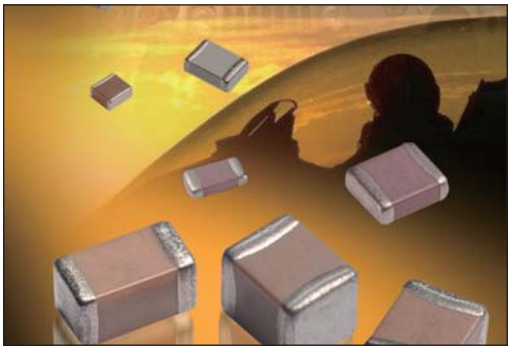
CH	**52**	**5**	**C**	**106**	**M**	**G**	**3**	**0**	**A**	**0**
Style Code	**Size Code**	**Voltage Code** 5 = 50V 1 = 100V 2 = 200V 7 = 500V	**Dielectric Code** A = C0G C = X7R	**Capacitance Code** (2 significant digits + no. of zeros) Examples: 1 µF = 105 10 µF = 106 100 µF = 107	**Capacitance Tolerance** J = ±5% K = ±10% M = ±20% P = -0 +100%	**Specification Code** A = Non-customized G = 9100	**Finish Code** 3 = Uncoated 8 = Coated (classified as uninsulated)	**Lead Dia. Code** 0 = Standard	**Lead Space Code** A = Standard	**Lead Style Code** 0 = Straight dual in line 4 = 4 Terminal

CAPACITANCE VALUE

		C0G Min Cap µF	**C0G Max Cap µF**	**X7R Min Cap µF**	**X7R Max Cap µF**
CH/CV41-44	50	0.068	0.39	1.8	12
	100	0.047	0.33	1.0	10
	200	0.033	0.27	0.33	2.2
	500	0.01	0.068	0.12	1.0
CH/CV51-54	50	0.12	0.68	3.9	22
	100	0.10	0.47	2.2	15
	200	0.068	0.39	0.68	3.9
	500	0.022	0.1	0.27	1.5
CH/CV61-64	50	0.22	1.2	6.8	39
	100	0.15	1.0	4.7	33
	200	0.12	0.68	1.0	10
	500	0.033	0.22	0.47	3.3
CH/CV71-74	50	0.39	2.2	12	68
	100	0.27	1.8	8.2	47
	200	0.22	1.2	2.2	12
	500	0.068	0.39	0.82	5.6
CH/CV76-79	50	0.39	2.2	12	68
	100	0.27	1.8	8.2	47
	200	0.22	1.2	2.2	12
	500	0.068	0.39	0.82	5.6
CH/CV81-84	50	0.39	2.7	15	82
	100	0.27	2.2	12	47
	200	0.22	1.8	2.2	12
	500	0.068	0.56	0.82	5.6
CH/CV86-89	50	0.68	3.9	22	120
	100	0.56	3.3	15	68
	200	0.39	2.7	3.9	27
	500	0.12	0.82	1.5	8.2
CH/CV91-94	50	1.2	5.6	39	180
	100	1.0	4.7	33	150
	200	0.82	3.9	8.2	39
	500	0.22	1.5	2.7	18

Ceramic Surface Mount MLC Capacitors

LD Series NP0 Dielectric, SnPb



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/tinterm.pdf

HOW TO ORDER

LD05	5	A	101	J	A	B	2	A
Size	**Voltage**	**Dielectric**	**Capacitance Code (In pF)**	**Capacitance Tolerance**	**Failure Rate**	**Terminations**	**Packaging**	**Special Code**
LD02 - 0402	6.3V = 6	C0G (NP0) = A	2 Sig. Digits +	B = ±.10 pF (<10pF)	A = Not	B = 5% min lead	2 = 7" Reel	A = Std. Product
LD03 - 0603	10V = Z	X7R = C	Number of	C = ±.25 pF (<10pF)	Applicable		4 = 13" Reel	
LD04 - 0504*	16V = Y	X5R = D	Zeros	D = ±.50 pF (<10pF)			7 = Bulk Cass.	
LD05 - 0805	25V = 3			F = ±1% (≥ 10 pF)			9 = Bulk	
LD06 - 1206	50V = 5			G = ±2% (≥ 10 pF)				
LD10 - 1210	100V = 1			J = ±5%			**Contact Factory For Multiples**	
LD12 - 1812	200V = 2			K = ±10%				
LD13 - 1825	500V = 7			M = ±20%				
LD14 - 2225								

*LD06 has the same CV ranges as LD03.

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.
Contact factory for non-specific capacitance values.

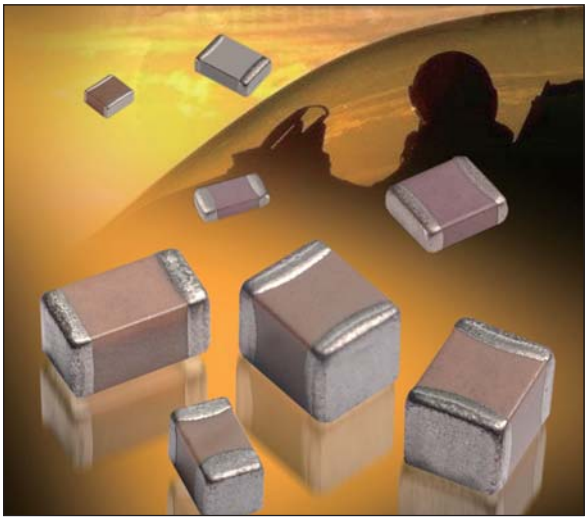
NP0 Dielectric

SIZE		LD02			LD03				LD05					LD06						LD10					LD12					LD13			LD14		
	WVDC	16	25	50	6.3	25	50	100	16	25	50	100	200	16	25	50	100	200	500	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200
Cap (pF)	0.5	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	1.0	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	1.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	1.5	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	1.8	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	2.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	2.7	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	3.3	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	3.9	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	4.7	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	5.6	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	6.8	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	8.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J																
	10	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	12	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	15	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	18	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	22	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	27	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	33	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	39	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	47	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	56	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	68	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	82	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	100	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	120	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	150	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	180	C	C	C	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J					J											
	220	C	C		G	G	G	G	J	J	J	J	J	J	J	J	J	J	M					J											
	270				G	G	G	G	J	J	J	J	M	J	J	J	J	J	M					J											
	330				G	G	G	G	J	J	J	J	M	J	J	J	J	J	M					J											
	390				G	G	G		J	J	J	J	M	J	J	J	J	J	M					M											
	470				G	G	G		J	J	J	J	M	J	J	J	J	J	M					M											
	560				G	G	G		J	J	J	J	M	J	J	J	J	J	M	J	J	J	J	M											
	680				G	G	G		J	J	J	J		J	J	J	J	J	P	J	J	J	J	M											
	820				G	G	G		J	J	J	J		J	J	J	J	M		J	J	J	J	M											
	1000				G	G	G		J	J	J	J		J	J	J	J	Q		J	J	J	J	M	K	K	K	K	M	M	M	M	M	M	P
	1200								J	J	J			J	J	J	J	Q		J	J	J	M		K	K	K	K	M	M	M	M	M	M	P
	1500								J	J	J			J	J	J	M	Q		J	J	J	M		K	K	K	K	M	M	M	M	M	M	P
	1800								J	J	J			J	J	M	M			J	J	J	M		K	K	K	K	M	M	M	M	M	M	P
	2200								J	J	M			J	J	M	P			J	J	J	Q		K	K	K	P	Q	M	M	M	M	M	P
	2700								J	J	M			J	J	M	P			J	J	J	Q		K	K	K	P	Q	M	M	M	M	M	P
	3300													J	J	M	P			J	J	J			K	K	K	P	Q	M	M	M	M	M	P
	3900													J	J	M	P			J	J	M			K	K	K	P	Q	M	M	M	M	M	P
	4700													J	J	M	P			J	J	M			K	K	K	P	Q	M	M	M	M	M	P
	5600													J	J	M									K	K	M	P	X	M	M	M	M	M	P
	6800													M	M										K	K	M	M		M	M		M	M	P
	8200													M	M										K	K	M	M		M	M		M	M	P
Cap (µF)	0.010													M	M										K	M	M			M	M		M	M	P
	0.012																								K	M	M			M	M		M	M	P
	0.015																								M	M				M	M		M	M	Y
	0.018																								M	M				P	M		M	M	Y
	0.022																													P			M	Y	Y
	0.027																																P	Y	Y
	0.033																																		
	0.039																																		
	0.047																																		
	0.068																																		
	0.082																																		
	0.1																																		
	WVDC	16	25	50	6.3	25	50	100	16	25	50	100	200	16	25	50	100	200	500	25	50	100	200	500	25	50	100	200	500	50	100	200	50	100	200
SIZE		LD02			LD03				LD05					LD06						LD10					LD12					LD13			LD14		

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)	0.86 (0.034)	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							

Ceramic Surface Mount MLC Capacitors

LD Series X7R Dielectric, SnPb



AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/tinterm.pdf

HOW TO ORDER

LD05	5	C	101	J	A	B	2	A
Size	**Voltage**	**Dielectric**	**Capacitance Code (In pF)**	**Capacitance Tolerance**	**Failure Rate**	**Terminations**	**Packaging**	**Special Code**
LD02 - 0402	6.3V = 6	C0G (NP0) = A	2 Sig. Digits +	B = ±.10 pF (<10pF)	A = Not	B = 5% min lead	2 = 7" Reel	A = Std. Product
LD03 - 0603	10V = Z	X7R = C	Number of	C = ±.25 pF (<10pF)	Applicable	X = FLEXITERM®	4 = 13" Reel	
LD04 - 0504*	16V = Y	X5R = D	Zeros	D = ±.50 pF (<10pF)		with 5% min	7 = Bulk Cass.	
LD05 - 0805	25V = 3			F = ±1% (≥ 10 pF)		lead	9 = Bulk	
LD06 - 1206	50V = 5			G = ±2% (≥ 10 pF)				
LD10 - 1210	100V = 1			J = ±5%			**Contact Factory For Multiples**	
LD12 - 1812	200V = 2			K = ±10%				
LD13 - 1825	500V = 7			M = ±20%				
LD14 - 2225								

*LD06 has the same CV ranges as LD03.

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.
Contact factory for non-specific capacitance values.

X7R Dielectric

SIZE		LD02			LD03							LD05							LD06								LD10							LD12				LD13		LD14	
	WVDC	16	25	50	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	500	10	16	25	50	100	200	500	50	100	200	500	50	100	50	100
Cap (pF)	100																																							
	150																																							
	220			C																																				
	330			C					G	G	G		J	J	J	J	J	J								K														
	470			C					G	G	G		J	J	J	J	J	J								K														
	680			C					G	G	G		J	J	J	J	J	J								K														
	1000			C					G	G	G		J	J	J	J	J	J								K														
	1500			C					G	G	G		J	J	J	J	J	J		J	J	J	J	J	J	M	J	J	J	J	J	J	M							
	2200			C					G	G	G		J	J	J	J	J	J		J	J	J	J	J	J	M	J	J	J	J	J	J	M							
	3300		C	C					G	G			J	J	J	J	J	J		J	J	J	J	J	J	M	J	J	J	J	J	J	M							
	4700		C						G	G			J	J	J	J	J	J		J	J	J	J	J	J	M	J	J	J	J	J	J	M							
	6800	C	C						G	G			J	J	J	J	J	J		J	J	J	J	J	J	P	J	J	J	J	J	J	M							
Cap (µF)	0.010	C							G	G			J	J	J	J	J	J		J	J	J	J	J	J	P	J	J	J	J	J	J	M	K	K	K	K	M	M	M	P
	0.015	C						G	G				J	J	J	J	J	M		J	J	J	J	J	J		J	J	J	J	J	J	P	K	K	K	P	M	M	M	P
	0.022	C						G	G				J	J	J	J	J	N		J	J	J	J	J	M		J	J	J	J	J	J	Q	K	K	K	P	M	M	M	P
	0.033							G	G				J	J	J	J	N			J	J	J	J	J	M		J	J	J	J	J	J		K	K	K	X	M	M	M	P
	0.047						G	G	G				J	J	J	J	N			J	J	J	J	J	M		J	J	J	J	J	J		K	K	K	Z	M	M	M	P
	0.068						G	G	G				J	J	J	J	N			J	J	J	J	J	P		J	J	J	J	J	M		K	K	K		M	M	M	P
	0.10					G	G	G	G				J	J	J	J	N			J	J	J	J	M	P		J	J	J	J	J	M		K	K	K		M	M	M	P
	0.15					G							J	J	J	N	N			J	J	J	J	Q			J	J	J	J	M	P		K	K	P		M	M	M	P
	0.22					G							J	J	J	N	N			J	J	J	J	Q			J	J	J	J	P			K	K	P		M	M	M	P
	0.33												N	N	N	N	N			J	J	M	P	Q			J	J	J	J	Z			K	M			M	M	M	P
	0.47												N	N	N	N	N	N		M	M	M	P	Q			M	M	M	M	Z			K	P			M	M	M	P
	0.68												N	N	N					M	M	Q	Q				M	M	P	X	Z			M	Q			M		M	P
	1.0					J	J						N	N	N					M	M	Q	Q	Q			N	N	P	X	Z			M	X			M		M	P
	1.5																			P	Q	Q					N	N	Z	Z				Z	Z			M		M	X
	2.2				J										N					Q	Q	Q					Z	Z	Z	Z	Z			Z	Z			M			
	3.3																										Z	Z	Z	Z				Z							
	4.7												P	P						Q	Q	Q					Z	Z	Z	Z				Z							
	10											P								Q	Q						Z	Z	Z												
	22																		Q								Z	Z													
	47																																								
	100																																								
	WVDC	16	25	50	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	500	10	16	25	50	100	200	500	50	100	200	500	50	100	50	100
SIZE		LD02			LD03							LD05							LD06								LD10							LD12				LD13		LD14	

= Under development

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)	0.86 (0.034)	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							

Ceramic Surface Mount MLC Capacitors

LD Series X5R Dielectric, SnPb

AVX Corporation will support those customers for commercial and military Multilayer Ceramic Capacitors with a termination consisting of 5% minimum lead. This termination is indicated by the use of a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products to our customers. AVX has provided in the following pages a full range of values that we are currently offering in this special "B" termination. Please contact the factory if you require additional information on our MLCC Tin/Lead Termination "B" products.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/tinterm.pdf

HOW TO ORDER

LD05	5	D	101	J	A	B	2	A
Size	**Voltage**	**Dielectric**	**Capacitance Code (In pF)**	**Capacitance Tolerance**	**Failure Rate**	**Terminations**	**Packaging**	**Special Code**
LD02 - 0402	6.3V = 6	C0G (NP0) = A	2 Sig. Digits +	B = ±.10 pF (<10pF)	A = Not	B = 5% min lead	2 = 7" Reel	A = Std. Product
LD03 - 0603	10V = Z	X7R = C	Number of	C = ±.25 pF (<10pF)	Applicable	X = FLEXITERM®	4 = 13" Reel	
LD04 - 0504*	16V = Y	X5R = D	Zeros	D = ±.50 pF (<10pF)			7 = Bulk Cass.	
LD05 - 0805	25V = 3			F = ±1% (≥ 10 pF)			9 = Bulk	
LD06 - 1206	50V = 5			G = ±2% (≥ 10 pF)				
LD10 - 1210	100V = 1			J = ±5%			**Contact Factory For Multiples**	
LD12 - 1812	200V = 2			K = ±10%				
LD13 - 1825	500V = 7			M = ±20%				
LD14 - 2225								

*LD06 has the same CV ranges as LD03.

NOTE: Contact factory for availability of Tolerance Options for Specific Part Numbers.
Contact factory for non-specific capacitance values.

X5R Dielectric

SIZE		LD02						LD03							LD05						LD06						LD10							LD12			
	WVDC	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	6.3	10	25	50
Cap (pF)	100																																				
	150																																				
	220						C																														
	330						C																														
	470						C																														
	680						C																														
	1000						C																														
	1500						C																														
	2200						C																														
	3300					C								G																							
	4700					C								G																							
	6800					C								G																							
Cap (µF)	0.010					C						G	G	G						N																	
	0.015					C						G	G	G						N																	
	0.022					C						G	G	G						N																	
	0.033				C							G	G	G						N																	
	0.047				C							G	G	G						N																	
	0.068				C							G	G	G						N																	
	0.10			C	C							G	G	G				N	N	N																	
	0.15			C	C							G	G	G				N	N	N																	
	0.22		C	C							G	G	G	G				N	N	N						Q											
	0.33	C	C								G	G	G					N	N	N				Q	Q								X				
	0.47	C	C								G	G	G					N	N	N				Q	Q								X				
	0.68	C	C								G	G	G					N	N	N*				Q	Q								X				
	1.0	C	C	C					G	G	G	G	J			N	N	N	N	P			Q	Q							X	X	X				
	1.5	C						G	G	J	J					N	N	N	N				Q	Q							Z	X					
	2.2	C						G	G	J	J					N	N	N	N				Q	Q							Z	X					Z
	3.3														N	N	N					Q	Q	Q	Q						Z	Z					
	4.7							G	G						N	N	N	N	N*			Q	Q	Q	Q					Z		Z	Z				
	10							K							N	N	N	N	N*			Q	Q	Q	Q					Z		Z	Z				
	22														N							Q	Q	Q					Z	Z	Z	Z	Z				
	47																					Q							Z	Z*							
	100																										Z										
	WVDC	4	6.3	10	16	25	50	4	6.3	10	16	25	35	50	6.3	10	16	25	35	50	6.3	10	16	25	35	50	4	6.3	10	16	25	35	50	6.3	10	25	50
SIZE		LD02						LD03							LD05						LD06						LD10							LD12			

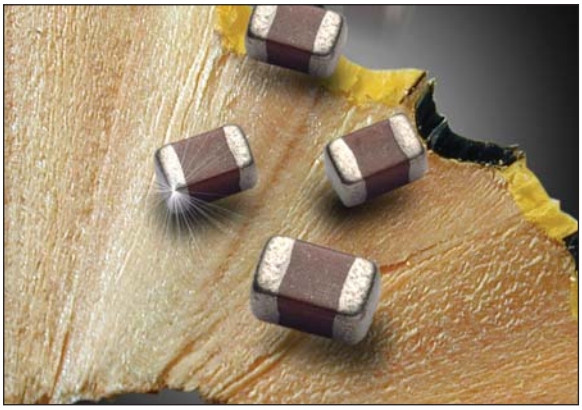
= Under development

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)	0.86 (0.034)	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							

*Optional Specifications – Contact factory

NOTE: Contact factory for non-specified capacitance values

MIL-PRF-55681 Chips
CDR01-CDR06



The CDR01 through CDR06 series (MIL-PRF-55681) of high reliability, high frequency capacitors are available in BP and BX, voltage/temperature options. They are offered in 50 and 100V versions and capacitance tolerance varies with capacitance and voltage specifications. Failure rates are between "S" = 0.001% and "M" = 1.0%.

HOW TO ORDER

CDR01	BP	101	B	K	S	M
MIL Style CDR01 CDR02 CDR03 CDR04 CDR05 CDR06	**Voltage Temperature Limits** BP = 0 ± 30 ppm/ºC without voltage; 0 ± 30 ppm/ºC with rated voltage from -55ºC to +125ºC BX = ±15% without voltage; +15 -25% with rated voltage from -55ºC to +125ºC	**Capacitance** Two digit figures followed by multiplier (number of zeros to be added) e.g. 101 = 100pF	**Rated Voltage** A = 50V B = 100V	**Capacitance Tolerance** J = ±5% K = ±10% M = ±20%	**Termination Finish** M = Palladium Silver N = Silver Nickel Gold S = Solder-Coated U = Base Metallization/Barrier Metal/Solder Coated* W = Base Metallization/Barrier Metal/Tinned (Tin or Tin/Lead Alloy)	**Failure Rate Level** M = 1.0% P = .1% R = .01% S = .001%

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

*Solder shall have a melting point of 200ºC or less.

PACKAGING

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

CDR01 thru CDR06 to MIL-PRF-55681

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

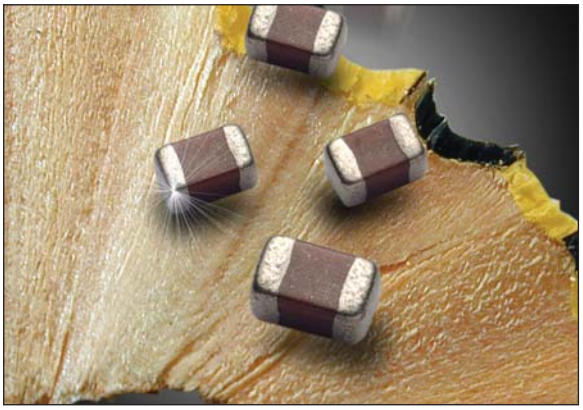
Military Type Designation	Capacitance in pF	Capacitance tolerance	Rated temperature and voltage-temperature limits	WVDC
AVX Style 1808/CDR03				
CDR03BP331B---	330	J,K	BP	100
CDR03BP391B---	390	J	BP	100
CDR03BP471B---	470	J,K	BP	100
CDR03BP561B---	560	J	BP	100
CDR03BP681B---	680	J,K	BP	100
CDR03BP821B--	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

MIL-PRF-55681 Chips
CDR31-CDR35



The CDR31 through CDR35 series (MIL-PRF-55681) of high reliability, high frequency capacitors are available in BP and BX, voltage/temperature options. They have a metric dimension body size and are offered in 50 and 100V versions. Capacitance tolerance varies with capacitance and voltage specifications and failure rates are between “S” = 0.001% and “M” = 1.0%.

HOW TO ORDER

CDR31	BP	101	B	K	S	M

MIL Style
CDR31
CDR32
CDR33
CDR34
CDR35

Voltage Temperature Limits
BP = 0 ± 30 ppm/ºC without voltage; 0 ± 30 ppm/ºC with rated voltage from -55ºC to +125ºC
BX = ±15% without voltage; +15 -25% with rated voltage from -55ºC to +125ºC

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

Rated Voltage
A = 50V
B = 100V

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

Termination Finish
M = Palladium Silver
N = Silver Nickel Gold
S = Solder-Coated
Y = 100% Tin
U = Base Metallization/Barrier Metal/Solder Coated*
W = Base Metallization/Barrier Metal/Tinned (Tin or Tin/Lead Alloy)

*Solder shall have a melting point of 200ºC or less.

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

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

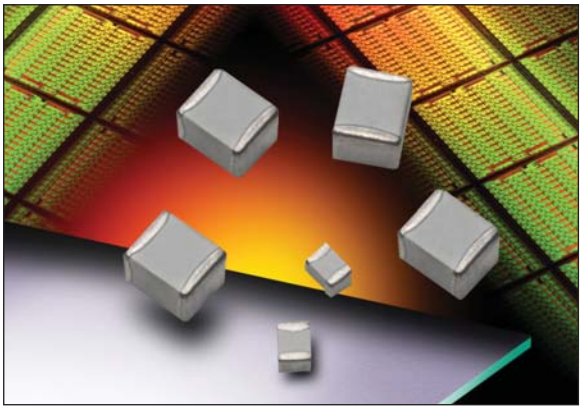
PACKAGING

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

CDR31 thru CDR35 to MIL-PRF-55681

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
CDR31	BP	1.0 - 2.4	B,C	100
CDR31	BP	2.7 - 9.1	B,C,D	100
CDR31	BP	10.0 - 470	F,J,K	100
CDR31	BP	510 - 680	F,J,K	50
CDR31	BX	470 - 4,700	K,M	100
CDR31	BX	5,600 - 18,000	K,M	100
CDR32	BP	1.0 - 2.4	B,C	100
CDR32	BP	2.7 - 9.1	B,C,D	100
CDR32	BP	10.0 - 1,000	F,J,K	100
CDR32	BP	1,100 - 2,200	F,J,K	50
CDR32	BX	4,700 - 15,000	K,M	100
CDR32	BX	18,000 - 39,000	K,M	50
CDR33	BP	1,000 - 2,200	F,J,K	100
CDR33	BP	2,700 - 3,300	F,J,K	50
CDR33	BX	15,000 - 27,000	K,M	100
CDR33	BX	39,000 - 100,000	K,M	50
CDR34	BP	2,200 - 4,700	F,J,K	100
CDR34	BP	5,100 - 10,000	F,J,K	50
CDR34	BX	27,000 - 56,000	K,M	100
CDR34	BX	100,000 - 180,000	K,M	50
CDR35	BP	4,700 - 10,000	F,J,K	100
CDR35	BP	11,000 - 22,000	F,J,K	50
CDR35	BX	56,000 - 150,000	K,M	100
CDR35	BX	180,000 - 470,000	K,M	50

MIL-PRF-55681 Chips
CDR11-CDR14



The CDR11 through CDR14 series (MIL-PRF-55681) of high reliability, high frequency capacitors are available in BG and BP, voltage/temperature options. They are offered in versions from 50 to 500V. Case sizes are 0605 for CDR11 & 12 and 1111 for CDR13 & 14. Failure rate are between "S" = 0.001% and "M" = 1.0%.

HOW TO ORDER

CDR12	BG	101	A	K	U	S
MIL Style CDR11 CDR12 CDR13 CDR14	**Voltage Temperature Limits** BG = +90 ± 20 ppm/ºC with and without rated voltage from -55ºC to +125ºC BP = 0 ± 30 ppm/ºC with and without rated voltage from -55ºC to +125ºC	**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** A = 50V B = 100V C = 200V D = 300V E = 500V	**Capacitance Tolerance** B = ±.1 pF C = ±.25 pF D = ±.5 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%	**Termination Finish (Military Designations) Code** M = Palladium Silver (CDR11 & 13 only) N = Silver, Nickel, Gold (CDR11 & 13 only) S = Solder-Coated, Final (CDR12 & 14 only) U = Base Metallization/Barrier Metal/Solder Coated* (CDR12 & 14 only) W = Base Metallization/Barrier Metal/Tinned (Tin or Tin/Lead Alloy) (CDR12 & 14 only) Y = 100% Tin Z = Base Metallization, Barrier Metal (Tin Lead Alloy with 4% Lead Min.)	**Failure Rate Level** M = 1.0% P = .1% R = .01% S = .001%

PACKAGING

Standard packaging = Waffle Pack (maximum quantity is 80)

CDR11 thru CDR14 to MIL-PRF-55681

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
CDR11/12	BG,BP	0.1 - 0.2	B	50
CDR11/12	BG,BP	0.3 - 0.4	B,C	50
CDR11/12	BG,BP	0.5 - 6.2	B,C,D	50
CDR11/12	BG,BP	6.8 - 9.1	B,C,J,K,M	50
CDR11/12	BG,BP	10 - 100	F,G,J,K,M	50
CDR11/12	BP	110 - 1,000	F,G,J,K,M	50
CDR13/14	BG,BP	0.1 - 0.2	B	200/500
CDR13/14	BG,BP	0.3 - 0.4	B,C	200/500
CDR13/14	BG,BP	0.5 - 6.2	B,C,D	200/500
CDR13/14	BG,BP	6.8 - 9.1	B,C,J,K,M	200/500
CDR13/14	BG,BP	10 - 100	F,G,J,K,M	200/500
CDR13/14	BG,BP	110 - 200	F,G,J,K,M	200/300
CDR13/14	BG,BP	220 - 470	F,G,J,K,M	200
CDR13/14	BG,BP	510 - 620	F,G,J,K,M	100
CDR13/14	BG,BP	680 - 1,000	F,G,J,K,M	50
CDR13/14	BP	1,100 - 5,100	F,G,J,K,M	50

Extended Range Surface Mount MLCC to DSCC Drawings

These extended range surface mount, multilayer ceramic capacitors provide options for lower voltages and higher capacitance versions to DSCC drawings. Dielectric options are BP, BR and BX. DSCC 05006 covers 0805 case size and DSCC 05007 provides the 1206 case size capability.

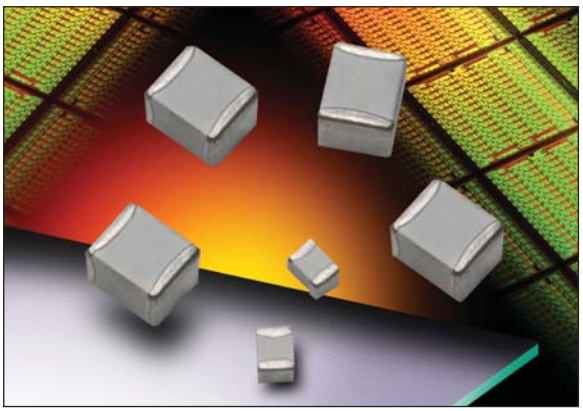
DSCC 05006 0805 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 05006	BP	0.5	C,D	16/25/50/100/200
DSCC 05006	BP	1 - 8.2	C,D	16/25/50/200
DSCC 05006	BP	10 - 470	F,G,J	16/25/50/200
DSCC 05006	BP	560 - 680	F,G,J	16/25/100/200
DSCC 05006	BP	820 - 1,000	F,G,J	16/25/50/100
DSCC 05006	BP	1,200 - 3,900	F,G,J	16/25/50
DSCC 05006	BP	4,700 - 5,600	F,G,J	16/25
DSCC 05006	BP	6,800 - 8,200	F,G,J	16
DSCC 05006	BR	330 - 22,000	K,M	10/16/25/50/100/200
DSCC 05006	BR	33,000 - 47,000	K,M	10/16/25/50/100
DSCC 05006	BR	68,000 - 100,000	K,M	10/16/25/50/100
DSCC 05006	BR	150,000	K,M	10/16/25/50
DSCC 05006	BR	220,000	K,M	10/16/25
DSCC 05006	BR	330,000 - 470,000	K,M	10/16
DSCC 05006	BR	680,000 - 1µF	K,M	10

DSCC 05007 1206 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 05007	BP	0.5 - 8.2	C,D	16/25/50/100/200
DSCC 05007	BP	10 - 680	F,G,J	16/25/50/100/200
DSCC 05007	BP	820 - 1,000	F,G,J	16/25/50/100
DSCC 05007	BP	1,200 - 3,900	F,G,J	16/25/50
DSCC 05007	BP	4,700 - 5,600	F,G,J	16/25
DSCC 05007	BP	6,800 - 8,200	F,G,J	16
DSCC 05007	BR	1,500 - 6,800	K,M	10/16/25/50/100/200
DSCC 05007	BR	10,000	K,M	10/16/25/50/100
DSCC 05007	BR	15,000 - 33,000	K,M	10/16/25/50
DSCC 05007	BR	47,000	K,M	10/16/25
DSCC 05007	BR	68,000	K,M	10/16
DSCC 05007	BR	100,000	K,M	10/16/25
DSCC 05007	BR	150,000 - 220,000	K,M	10

Additional Surface Mount MLCC with DSCC Approvals



These additional ranges of surface mount multilayer ceramic capacitors provide additional capability in 0603 and 0402 case sizes. DSCC 03028 covers 0603 case size BP and BR dielectric and DSCC 03029 is for 0402 case size in BP and BR dielectric.

For RF surface mount capacitor versions DSCC 06019 covers 0605 case size for BP and BG dielectric. DSCC 06022 is for 1210 case size and BP and BG dielectric devices.

DSCC 05002 covers RF capacitors in 0603 case size, C0G dielectric.

DSCC 03028 0603 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 03028	BP	0.5 - 9.1	C,D	6.3/10/16/25/50/100
DSCC 03028	BP	10 - 330	F,G,J	6.3/10/16/25/50/100
DSCC 03028	BP	390 - 1,000	F,G,J	6.3/10/16/25/50
DSCC 03028	BP	1,200 - 1,500	F,G,J	6.3/10/16/25
DSCC 03028	BR	100 - 1,000	K,M	6.3/10/16/25/50/100/200
DSCC 03028	BR	1,200 - 12,000	K,M	6.3/10/16/25/50/100
DSCC 03028	BR	15,000 - 39,000	K,M	6.3/10/16/25/50
DSCC 03028	BR	47,000	K,M	6.3/10/16/25
DSCC 03028	BR	56,000 - 100,000	K,M	6.3/10/16
DSCC 03028	BR	120,000 - 220,000	K,M	6.3/10

DSCC 03029 0402 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 03029	BP	0.5 - 9.1	C,D	6.3/10/16/25/50
DSCC 03029	BP	10 - 220	F,G,J	6.3/10/16/25/50
DSCC 03029	BP	270 - 330	F,G,J	6.3/10/16
DSCC 03029	BR	100 - 3,300	K,M	6.3/10/16/25/50
DSCC 03029	BR	3,900 - 4,700	K,M	6.3/10/16/25

DSCC 06019 RF Capacitor 0605 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 06019	BP,BG	0.1 - 0.2	B	50/150
DSCC 06019	BP,BG	0.3 - 0.4	B,C	50/150
DSCC 06019	BP,BG	0.5 - 6.2	B,C,D	50/150
DSCC 06019	BP,BG	6.8 - 9.1	B,C,J,K,M	50/150
DSCC 06019	BP,BG	10 - 100	F,G,J,K,M	50/150
DSCC 06019	BP,BG	110 - 1,000	F,G,J,K,M	50

DSCC 06022 RF Capacitor 1210 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 06022	BP,BG	0.1 - 0.2	B	200/500
DSCC 06022	BP,BG	0.3 - 0.4	B,C	200/500
DSCC 06022	BP,BG	0.5 - 6.2	B,C,D	200/500
DSCC 06022	BP,BG	6.8 - 9.1	B,C,J,K,M	200/500
DSCC 06022	BP,BG	10 - 100	F,G,J,K,M	200/500
DSCC 06022	BP,BG	110 - 200	F,G,J,K,M	200/300
DSCC 06022	BP,BG	220 - 470	F,G,J,K,M	200
DSCC 06022	BP,BG	510 - 620	F,G,J,K,M	100
DSCC 06022	BP,BG	680 - 1,000	F,G,J,K,M	50
DSCC 06022	BP	1,100 - 5,100	F,G,J,K,M	50

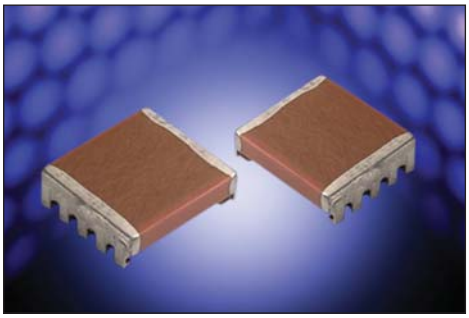
DSCC 05002 0603 Case Size

Type	Dielectric	Capacitance pF	Tolerance	Voltage WVDC
DSCC 05002	C0G	0.1 - 0.2	A,B	50/100/200/250
DSCC 05002	C0G	0.3 - 1	A,B,C	50/100/200/250
DSCC 05002	C0G	1.1 - 6.2	A,B,C,D	50/100/200/250
DSCC 05002	C0G	6.8 - 100	B,C,J,K,M	50/100/200/250

Stacked Surface Mount MLC Capacitors

SM0 Series

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.

HOW TO ORDER

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

SM0	1	7	C	106	M	B	J	650
AVX Style Size SM0 = Uncoated SM5 = Epoxy Coated	**Size** See dimensions chart	**Voltage** 50V = 5 100V = 1 200V = 2 500V = 7	**Temperature Coefficient** C0G = A X7R = C	**Capacitance Code** (2 significant digits + no. 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** C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	**Test Level** B = Hi-Rel*	**Termination** J = Leads formed in	**Height** Max Dimension "A" 120 = 0.120" 240 = 0.240" 360 = 0.360" 480 = 0.480" 650 = 0.650"

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

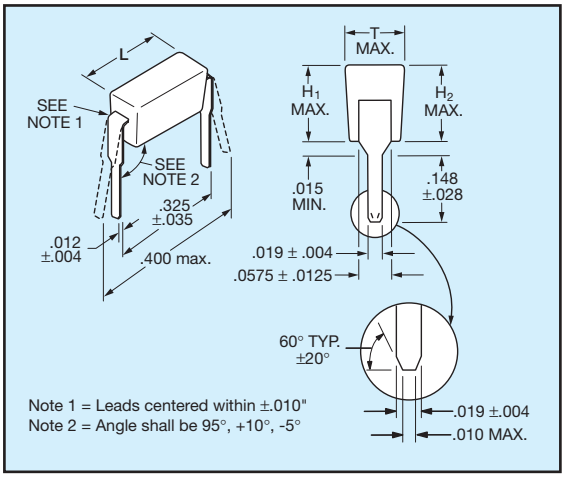
*Hi-Rel screening for C0G and X7R only. Screening consists of 100% Group A (B Level), Subgroup 1 per MIL-PRF-49470.

CAPABILITY

Case code	Voltage	X7R Cap range Min µF	X7R Cap range Max µF	Tolerances	Configurations
5	50	1.2	5.4	10 & 20%	J Leads*
	100	0.68	3.3	10 & 20%	J Leads*
	200	0.47	1.5	10 & 20%	J Leads*
	500	0.15	0.68	10 & 20%	J Leads*
4	50	6.8	15.0	10 & 20%	J Leads*
	100	3.9	8.2	10 & 20%	J Leads*
	200	1.8	3.9	10 & 20%	J Leads*
	500	0.8	1.8	10 & 20%	J Leads*
3	50	18.0	47.0	10 & 20%	J Leads*
	100	10.0	27.0	10 & 20%	J Leads*
	200	4.7	12.0	10 & 20%	J Leads*
	500	2.5	5.4	10 & 20%	J Leads*
2	50	120.0	150.0	10 & 20%	J Leads*
	100	68.0	82.0	10 & 20%	J Leads*
	200	33.0	39.0	10 & 20%	J Leads*
	500	15.0	18.0	10 & 20%	J Leads*
1	50	56.0	100.0	10 & 20%	J Leads*
	100	33.0	56.0	10 & 20%	J Leads*
	200	15.0	27.0	10 & 20%	J Leads*
	500	6.8	12.0	10 & 20%	J Leads*
6	50	180.0	270.0	10 & 20%	J Leads*
	100	100.0	180.0	10 & 20%	J Leads*
	200	47.0	120.0	10 & 20%	J Leads*
	500	22.0	39.0	10 & 20%	J Leads*

* Other lead options available

DiPGuard®
2 Pin DIP



AVX MD series is a Molded 2 Pin DIP capacitor. We offer NP0, X7R, and Z5U dielectrics. Voltages available are 50 and 100Vdc.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/dipguard.pdf

HOW TO ORDER

MD01 — **AVX Style**
MD01
CKR22*
CKS22**
MD02
CKR23*
CKS23*
MD03
CKR24*
CKS24**

5 — **Voltage**
Y = 16V
5 = 50V
1 = 100V

E — **Temperature Coefficient**
A = C0G (NP0)
C = X7R
E = Z5U

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.

M — **Capacitance Tolerance**

C0G (NP0):	X7R:	Z5U:
F = ±1%	J = ±5%	M = ±20%
J = ±5%	K = ±10%	Z = +80% -20%
K = ±10%	M = ±20%	

A — **Failure Rate**
A = Not Applicable

B — **Assembly Method**
A = Hand Assembled
B = Automated Assembly

C0G (NP0)

Cap. in pF*	EIA Characteristic	C0G (NP0) WVDC 100	50
	AVX Style	**MD01**	
10	MD015A100KAB		
15	MD015A150KAB		
22	MD015A220KAB		
33	MD015A330KAB		
47	MD015A470KAB		
68	MD015A680KAB		
100	MD015A101KAB		
150	MD015A151KAB		
220	MD015A221KAB		
330	MD015A331KAB		
470	MD015A471KAB		
680	MD015A681KAB		
1000	MD015A102KAB		
1500	MD015A152KAB		
2200	MD015A222KAB		
3300	MD015A332KAB		
	AVX Style	**MD02**	
Cap. in pF*		**WVDC 100**	**50**
4700	MD025A472KAB		
6800	MD025A682KAB		
10000	MD025A103KAB		

For other voltages and tolerances see Part No. Codes.

X7R

Cap. in pF*	EIA Characteristic	X7R WVDC 100	50
	AVX Style	**MD01**	
220	MD015C221KAB		
330	MD015C331KAB		
470	MD015C471KAB		
680	MD015C681KAB		
1000	MD015C102KAB		
1500	MD015C152KAB		
2200	MD015C222KAB		
3300	MD015C332KAB		
4700	MD015C472KAB		
6800	MD015C682KAB		
10,000	**MD011C103KAB**		
15,000	MD015C153KAB		
22,000	MD015C223KAB		
33,000	MD015C333KAB		
47,000	MD015C473KAB		
68,000	MD015C683KAB		
100,000	**MD015C104KAB**		
	AVX Style	**MD02**	
Cap. in pF*		**WVDC 100**	**50**
150,000	MD025C154KAB		
220,000	MD025C224KAB		
	AVX Style	**MD03**	
Cap. in pF*		**WVDC 100**	**50**
330,000	MD035C334KAA		
470,000	MD035C474KAA		
680,000	MD035C684KAA		
1,000,000	**MD035C105KAA**		

For other voltages and tolerances see Part No. Codes.

Z5U

Cap. in pF*	EIA Characteristic	Z5U WVDC 100	50
	AVX Style	**MD01**	
10,000	**MD015E103ZAB**		
15,000	MD015E153ZAB		
22,000	MD015E223ZAB		
33,000	MD015E333ZAB		
47,000	MD015E473ZAB		
68,000	MD015E683ZAB		
100,000	**MD015E104ZAB**		
150,000	MD015E154ZAB		
220,000	MD015E224ZAB		
330,000	**MD015E334ZAB**		
	AVX Style	**MD02**	
Cap. in pF*		**WVDC 100**	**50**
470,000	MD025E474ZAB		
	AVX Style	**MD03**	
Cap. in pF*		**WVDC 100**	**50**
680,000	MD035E684ZAA		
1,000,000	**MD035E105ZAA**		

For other voltages and tolerances see Part No. Codes.
***Other capacitance values available upon special request.**
= Industry preferred values

CKR Series
Molded Ceramic Capacitors

The CKR series of multilayer ceramic capacitors are molded radial and molded axial leaded devices. They provide a rugged construction and are designed specifically for military applications. Terminations are Tin/Lead for improved solderability. Available to military specifications MIL-PRF-39014, MIL-PRF-20 and MIL-C-11014.

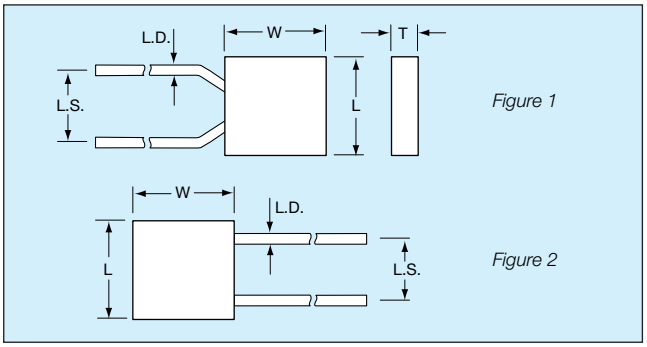


Figure 1

Figure 2

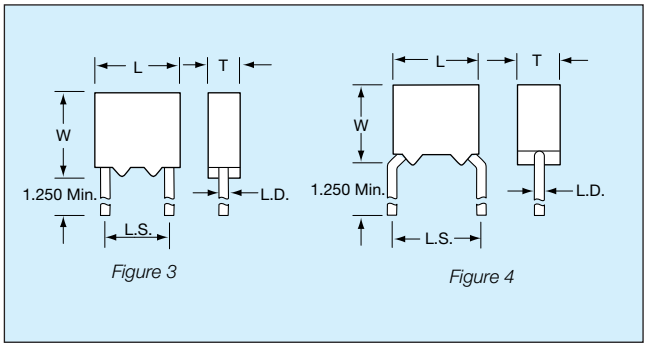


Figure 3

Figure 4

HOW TO ORDER

Military Type Designation: Styles CKR04, CKR05, CKR06, CKR08, CKR11, CKR12, CKR14, CKR15, CKR16

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

CKR05 BX 104 K S (V)

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

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%
R Axial Only	+15, -15%	+15, -40%

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.)

Capacitance Tolerance
K = ±10%
M = ±20%

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

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

PACKAGING REQUIREMENTS

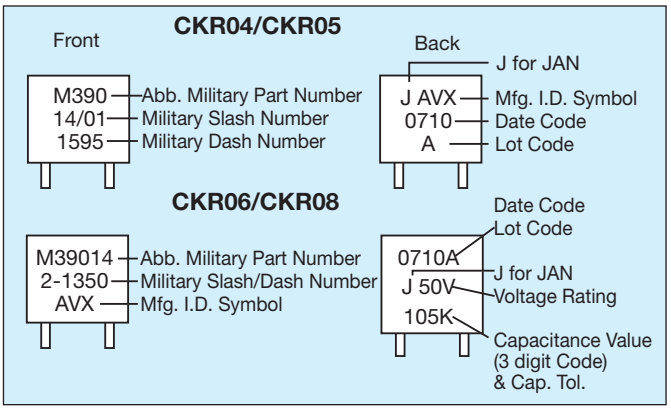
Packaging: 100 Pcs/bag; Radial Tape and Reel Packaging available upon request (2500 pcs./reel).

SIZE SPECIFICATIONS

Dimensions: Millimeters (Inches)

Per Mil Spec	Case Size				
MIL-PRF-39014	Length (L)	Width (W)	Thickness (T)	Lead Spacing (L.S.)	Lead Diameter (L.D.)
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



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	Capacitance Code	Capacitance Tolerance	Termination

Temperature Characteristic

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%

Voltage
B = 50
C = 100

Capacitance Tolerance
C = ±0.25pF
D = ±0.5pF
F = ±1%
J = ±5%
K = ±10%

Termination
C = Copper, solder coated (type C-4 or C-5 of MIL-STD-1276)
W = Copper clad steel, solder coated, 60 micro inches minimum.

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	No	No	No
Thermal Shock 100 Cycles	Lot by Lot	No	No	No

High Voltage Ceramic Capacitors

Type HP/HW

Type HD/HE

SELECTION GUIDE

Main Signal Component	Application	Series	Type	Size	Finish
Pulses AC or DC	High Energy Pulses or AC or DC	Molded discs with connections	HP	30 40 50 60	Epoxy potted
		Uncoated discs with connections	HW	30 40 50 60	Uncoated
AC	AC Voltage dividers at line frequency	Molded discs with connectors	HD	30 40 60	Epoxy potted
		Uncoated discs with connectors	HE	30 40 60	Uncoated

GENERAL CHARACTERISTICS

HIGH VOLTAGE / AC USES

- The main applications include live line indicators, AC dividers, grading systems for power distribution network, protection for HV switches and power circuit breakers. Coupling, by-passing high frequency circuits also use HV ceramic disc capacitors.
- These applications require:
  - a high internal resistance.
  - a high dielectric strength.
  - low or moderate losses at working frequencies (from 50 Hz up to 10 kHz).

  The active power (or losses) being:

  $Wa = 2\Pi FC \cdot tg\ \delta \cdot V^2 = k\ (C \cdot tg\ \delta)\ (F \cdot V^2)$

  This shows that improved performances are obtained when:
  - Good dielectric properties (low tg δ) and
  - No long term overvoltage are present and
  - Capacitors free of “partial discharge” (corona) effect, up to rated rms voltage.

  TPC is able to perform “discharge free test” and may guarantee a rate as low as 5 picocoulombs at V_{rms} upon request.
- High voltage capacitors for AC uses are mainly made of type II dielectrics. Most of these materials except strontium titanate exhibit a significant non-linearity. Consequently, the capacitance value depends on the voltage across the component and on the frequency of the applied signal.

HIGH ENERGY PULSES

- Laser pulses circuitry, high energy/high voltage test equipment (HV accelerators, physics research) require products especially adapted to their specific requirements.
- Because of the high energy involved, the design of the capacitors have to provide:
  - a very low ESR (equivalent series resistance) to minimize the lossed energy.

$$W = \int^{ip} (ESR \cdot I^2)\ di$$

  - a very low ESL (equivalent series inductance) to keep the correct pulse shape.

    Typically due to the design of the electrodes, the products exhibit:
    - ESR: ~ 10 mΩ
    - ESL: < 30 nH
    - peak current up to 50 kA
  - a high withstanding of very large $\frac{dV}{dt}$ or short signal rise time.
  - a high energy density J

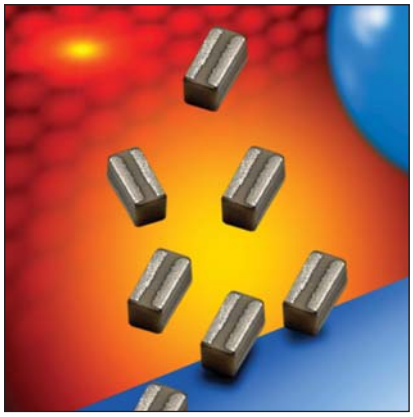
    $J = \frac{1}{2}\ k\ \varepsilon_o\ \varepsilon_r\ E^2$ (with E = V/m)

    even under high electric field, (implying that ε_r is very little voltage dependent).

    Through the use of almost linear or non-voltage dependent capacitors, the stored energy can reach 50 to 100 J/liter for the HP/HW products.
- To ensure these properties, traditional ferroelectric type II capacitors cannot be used due to their electrostrictive and piezoelectric properties. The capacitors use quasi “paraelectric”, strontium-based, ceramic material.
- The main applications are coupling, decoupling, multipliers circuits, HV DC power supplies, high voltage dividers.

Low Inductance Capacitors (SnPb)

LICC 0612/0508/0306 X7R & X5R Dielectric



The total inductance of a chip capacitor is determined both by its length to width ratio and by the mutual inductance coupling between its electrodes.

Thus a 1210 chip size has a lower inductance than a 1206 chip. This design improvement is the basis of AVX's Low Inductance Chip Capacitors (LICC), where the electrodes are terminated on the long side of the chip instead of the short side. The 1206 becomes an 0612, in the same manner, an 0805 becomes an 0508, an 0603 becomes an 0306. This results in a reduction in inductance from the 1nH range found in normal chip capacitors to less than 0.2nH for LICCs. Their low profile is also ideal for surface mounting (both on the PCB and on IC package) or inside cavity mounting on the IC itself.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/licc.pdf

HOW TO ORDER

LD18	Z	D	105	M	A	B	2	A
Size	**Voltage**	**Dielectric**	**Capacitance Code (In pF)**	**Capacitance Tolerance**	**Failure Rate**	**Terminations**	**Packaging**	**Thickness**
LD16	6 = 6.3V	C = X7R	2 Sig. Digits +	K = ±10%	A = N/A	B = 5% min lead	Available	Thickness
LD17	Z = 10V	D = X5R	Number of Zeros	M = ±20%			2 = 7" Reel	mm (in)
LD18	Y = 16V						4 = 13" Reel	0.56 (0.022)
	3 = 25V							0.61 (0.024)
	5 = 50V							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.

SIZE		LD16					LD17					LD18				
Soldering		Reflow Only					Reflow Only					Reflow/Wave				
Packaging		All Paper					All Paper					Paper/Embossed				
(L) Length	MM (in.)	0.81 ± 0.15 (0.032 ± 0.006)					1.27 ± 0.25 (0.050 ± 0.010)					1.60 ± 0.25 (0.063 ± 0.010)				
(W) Width	MM (in.)	1.60 ± 0.15 (0.063 ± 0.006)					2.00 ± 0.25 (0.080 ± 0.010)					3.20 ± 0.25 (0.126 ± 0.010)				
	WVDC	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50
Cap (pF)	1000	A	A	A	A		S	S	S	S	V	S	S	S	S	V
	2200	A	A	A	A		S	S	S	S	V	S	S	S	S	V
	4700	A	A	A	A		S	S	S	S	V	S	S	S	S	V
Cap (µF)	0.010	A	A	A	A		S	S	S	S	V	S	S	S	S	V
	0.015	A	A	A	A		S	S	S	S	V	S	S	S	S	W
	0.022	A	A	A	A		S	S	S	S	V	S	S	S	S	W
	0.047	A	A	A			S	S	S	V	A	S	S	S	S	W
	0.068	A	A	A			S	S	S	A	A	S	S	S	V	W
	0.10	A	A	A			S	S	V	A	A	S	S	S	V	W
	0.15	A	A				S	S	V			S	S	S	W	W
	0.22	A	A				S	S	A			S	S	V		
	0.47						V	V	A			S	S	V		
	0.68						A	A				V	V	W		
	1.0						A	A				V	V	A		
	1.5						A					W	W			
	2.2											A	A			
	3.3											A				
	4.7															
	10															
	WVDC	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50
SIZE		0306					0508					0612				

0306	
Code	Thickness
A	0.61 (0.024)

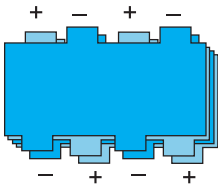
0508	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
A	1.02 (0.040)

0612	
Code	Thickness
S	0.56 (0.022)
V	0.76 (0.030)
W	1.02 (0.040)
A	1.27 (0.050)

Solid = X7R **= X5R**

IDC Low Inductance Capacitors (SnPb)

0612/0508 Interdigitated Capacitors



AVX will support those customers who desire commercial and military type ceramic capacitors with a new series consisting of a termination with a 5% minimum lead content. This new series is AVX's "LD" series incorporating a "B" in the 12th position of the AVX Catalog Part Number. This fulfills AVX's commitment to providing a full range of products.

- Very low equivalent series inductance (ESL), surface mountable, high speed decoupling capacitor in 0612 and 0508 case size.
- Measured inductances of 60 pH (for 0612) and 50 pH (for 0508) are the lowest in the FR4 mountable device family.
- Opposing current flow creates opposing magnetic fields. This causes the fields to cancel, effectively reducing the equivalent series inductance.
- Perfect solution for decoupling high speed microprocessors by allowing the engineers to lower the power delivery inductance of the entire system through the use of eight vias.
- Overall reduction in decoupling components due to very low series inductance and high capacitance.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/l2l-l3l.pdf

HOW TO ORDER

L	3	L	1	6	D	225	M	A	B	3	A
Style	**Case Size** 2 = 0508 3 = 0612	**Low Inductance** ESL = 50pH ESL = 60pH	**Number of Terminals** 1 = 8 Terminals	**Voltage** 4 = 4V 6 = 6.3V Z = 10V Y = 16V	**Dielectric** C = X7R D = X5R	**Capacitance Code (In pF)** 2 Sig. Digits + Number of Zeros	**Capacitance Tolerance** M = ±20%	**Failure Rate** A = N/A	**Termination** B = 5% min. Lead	**Packaging** Available 1 = 7" Reel 3 = 13" Reel	**Thickness** Max. Thickness mm (in.) A = 0.95 (0.037) S = 0.55 (0.022)

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

SIZE		Thin 0508				0508				Thin 0612				0612			
Length	MM (in.)	2.03 ± 0.20 (0.080 ± 0.008)				2.03 ± 0.20 (0.080 ± 0.008)				3.20 ± 0.20 (0.126 ± 0.008)				3.20 ± 0.20 (0.126 ± 0.008)			
Width	MM (in.)	1.27 ± 0.20 (0.050 ± 0.008)				1.27 ± 0.20 (0.050 ± 0.008)				1.60 ± 0.20 (0.063 ± 0.008)				1.60 ± 0.20 (0.063 ± 0.008)			
Terminal Pitch	MM (in.)	0.50 ± 0.05 (0.020 ± 0.002)				0.50 ± 0.05 (0.020 ± 0.002)				0.80 ± 0.10 (0.031 ± 0.004)				0.80 ± 0.10 (0.031 ± 0.004)			
Thickness	MM (in.)	0.55 MAX. (0.022) MAX.				0.95 MAX. (0.037) MAX.				0.55 MAX. (0.022) MAX.				0.95 MAX. (0.037) MAX.			
Inductance	(pH)	95				95				120				120			
WVDC		4	6.3	10	16	4	6.3	10	16	4	6.3	10	16	4	6.3	10	16
CAP (µF) and Thickness																	
0.047																	
0.068																	
0.10																	
0.22																	
0.33																	
0.47																	
0.68																	
1.0																	
1.5																	
2.2																	
3.3																	

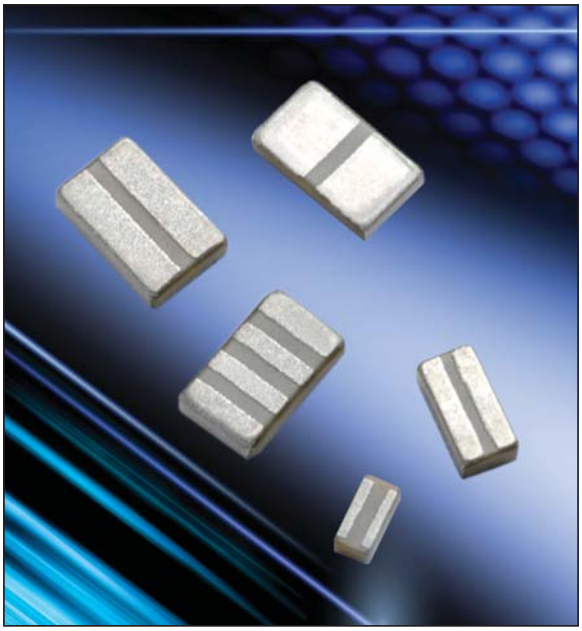
Consult factory for additional requirements

= X7R

= X5R

LGA Low Inductance Capacitors

0204/0306/0508/0805 Land Grid Arrays



AVX has introduced a revolutionary new capacitor for low inductance applications. Low inductance LGA (land grid array) capacitors have virtually the equivalent high frequency performance of 8-terminal IDC's (Inter-Digitated Capacitors) but are built in a simplified 2 terminal package. This provides for lower manufacturing cost and easier handling and design. LGA are ideal for decoupling in semiconductor package-level and board-level applications.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/lga2t.pdf

HOW TO ORDER

LG	1	2	6	Z	104	M	A	T	2	S	1
Style	**Case Size** 1 = 0204 2 = 0306 3 = 0508 C = 0805	**Number of Terminals** 2	**Working Voltage** 4 = 4V 6 = 6.3V	**Temperature Characteristic** C = X7R D = X5R Z = X7S	**Coded Cap**	**Cap Tolerance** M = 20%	**Termination Style** A = "U" Land	**Termination** 100% Sn SnPb*	**Packaging Tape & Reel** 2 = 7" Reel 4 = 13" Reel	**Thickness** S = 0.55mm max	**Number of Capacitors**

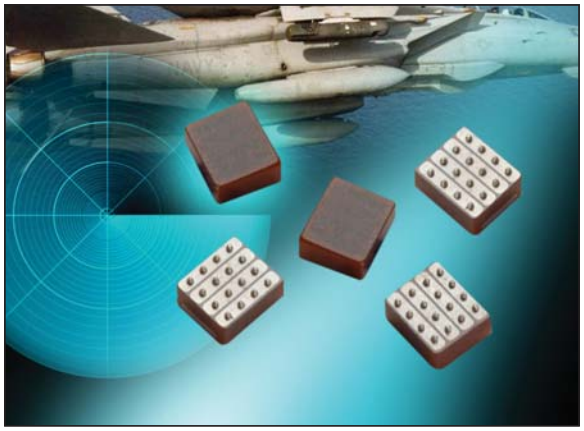
*Contact Factory

Size	Voltage	Dielectric	Capacitance (µF)								
			0.010	0.022	0.047	0.10	0.22	0.47	1.0	2.2	4.7
LG12	4V	Z									
	6.3	D									
LG22	4V	Z									
	6.3V	D									
LG32	4V	Z									
	6.3V	D									
LGC2	4V	Z									
	6.3V	D									

Development

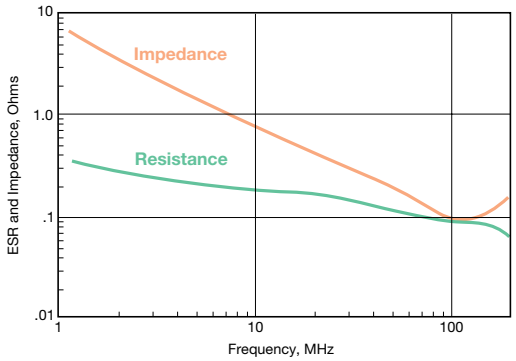
RoHS COMPLIANT

LICA Series
BGA Low Inductance Capacitors



LICA® arrays utilize up to four separate capacitor sections in single ceramic body. This design exhibits a number of technical advancements:

- Low resistance platinum electrodes in a low aspect ratio pattern
- Double electrode pickup and perpendicular current paths
- C4 “flip-chip” technology for minimal interconnect inductance



Impedance vs. Frequency

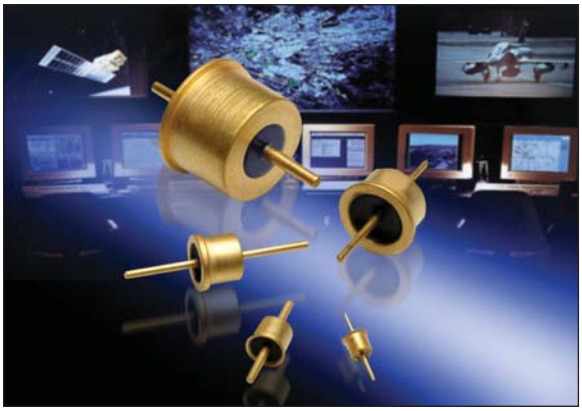
LICA VALID PART NUMBER LIST

Part Number	Voltage	Thickness (mm)	Capacitors per Package
LICA3T193M3FC4AA	25	0.650	4
LICA3T153P3FC4AA	25	0.650	4
LICA3T134M1FC1AA	25	0.875	1
LICA3T104P1FC1AA	25	0.875	1
LICA3T333M1FC4AA	25	0.875	4
LICA3T263P3FC4AA	25	0.650	4
LICA3T244M5FC1AA	25	1.100	1
LICA3T194P5FC1AA	25	1.100	1
LICA3T394M7FC1AB	25	1.600	1
LICA3T314P7FC1AB	25	1.600	1
Extended Range			
LICAZT623M3FC4AB	10	0.650	4
LICA3T104M3FC1A	25	0.650	1
LICA3T803P3FC1A	25	0.650	1
LICA3T503M3FC2A	25	0.650	2
LICA3T403P3FC2A	25	0.650	2
LICA3S253M3FC4A	25	0.650	4
LICAZD753M3FC4AD	10	0.650	4
LICAZD504M3FC1AB	10	0.650	1
LICAZD604M7FC1AB	10	1.600	1
LICA3D193M3FC4AB	25	0.650	4

TABLE 1

Typical Parameters	T55T	Units
Capacitance, 25°C	Co	Nanofarads
Capacitance, 55°C	1.4 x Co	Nanofarads
Capacitance, 85°C	0.7 x Co	Nanofarads
Dissipation Factor 25°	15	Percent
ESR	20	Megohms
DC Resistance	0.2	Ohms
IR (Minimum @25°)	2.0	Megaohms
Dielectric Breakdown, Min	500	Volts
Thermal Coefficient of Expansion	8.5	ppm/°C 25-100°
Inductance: (Design Dependent)	30	Pico-Henries
Frequency of Operation	DC to 5 Gigahertz	
Ambient Temp Range	-55° to 125°C	

Solder-in Style EMI Filter



AVX solder-in style C and L section filters, utilize patented conductive polymer technology to provide effective attenuation in the RF to microwave frequency spectrum from 10MHz to 50GHz. Designed in accordance with MIL-PRF-28861, they perform well in high impedance circuits where large capacitance values are not practical. They are ideal for filtering signal/data lines of high impedance source and load systems. These filters are designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity).

CHARACTERISTICS

- Miniature and Microminiature versions for Aerospace applications
- High temperature construction, withstands 300ºC installation temperatures
- Rugged monolithic discoidal capacitor construction
- Custom lead lengths and capacitance values available on request
- Glass hermetic seal on one end with epoxy on the opposite end
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding
- Rated DC current up to 10A
- NASA SSQ 21215-21218

HOW TO ORDER

ZS	2	C	2	B	103	H
Style	Circuit	Voltage	Options	MIL-28861 Screening	3 Digit Capacitor Code (in pF)	H = Polyimide Y = Solder Z = Braze

Style
ZZ = (.118 Dia.) M28861/12
ZYS* = (.105 Dia.)
ZXS* = (.075 Dia.)
ZZS* = (.120 Dia.)
ZS* = (.128 Dia.) M28861/12
ZR* = (.128 Dia.) M28861/12
YS* = (.165 Dia.) M28861/15
YR* = (.165 Dia.) M28861/15
XS* = (.250 Dia.) M28861/14
XR* = (.250 Dia.) M28861/14
WS* = (.400 Dia.) M28861/13
WR* = (.400 Dia.) M28861/13

Circuit
1 = C Section (Feed Thru)
2 = L-Section
8 = Grounded Feed Thru

Voltage
A = 100 VDC
B = 200 VDC
C = 50 VDC
E = 400 VDC/230 VAC OR 400 VDC
K = 250 VDC
L = 300 VDC OR 200 VDC/115 VAC
M = 350 VDC
N = 70 VDC
Y = 300 VDC
Z = 400 VDC
X = 500 VDC

*Glass Seal Orientation:
S = Standard
R = Reverse
N = No Glass (Epoxy both Sides)
M = Mid Flange

Options
1 = Copper (std. for non-hermetic)
2 = Nickel Iron (std.)
3 = Special
4 = Aluminum compatible with seating flange (std. lead)
5 = Aluminum compatible with seating flange (special lead)
D = Aluminum compatible with centering flange (std. lead)
E = Aluminum compatible with centering flange (special lead)
F = Aluminum compatible special design
Y = Solder

MIL-28861 Screening
B = Class B
S = Class S

Style	Capacitance Range (in pF if not indicated)					Current Rating	Circuit Available
	50VDC	100VDC	200VDC/115VAC	400VDC/230VAC	500VDC		
ZXS	5-5,600	5-1,800	5-1,000	–	–	1.5A	C
ZYS	5-22,000	5-8,200	5-4,700	5-2,700	–	2.5A	C
ZZS	5-27,000	5-10,000	5-5,600	5-3,300	5-1,800	5A	C, L
ZZ	5-27,000	5-10,000	5-5,600	5-3,300	5-1,800	5A	C
ZS/ZR	5-33,000	5-12,000	5-6,800	5-3,900	5-2,200	5A	C, L
YS/YR	5-68,000	5-27,000	5-18,000	5-10,000	5-6,800	5A	C, L
XS/XR	5pF-.39µF	5pF-.15µF	5pF-.1µF	5pF-.056µF	5pF-.033µF	10A	C, L
WS/WR	5pF-1.8µF	5pF-.68µF	5pF-.39µF	5pF-.22µF	5pF-.15µF	15A	C, L

Bolt-in Style EMI Filter

AVX bolt-in style Pi filters, utilize discoidal capacitor technology to provide effective attenuation in the RF to microwave frequency spectrum from 10MHz to 26GHz.

Some versions offer large hex sizes which mean much higher capacitance levels are available and that a 125 VAC/400Hz rating can be offered for certain values.

In the "L" section version an internal ferrite bead element provides both inductance and series resistance which improves insertion loss and provides superior transient performance. They are ideal for filtering signal/data lines of high impedance source and load systems. These filters are designed to be mounted in a tapped bulkhead or with a standard nut and lock-washer provided.

CHARACTERISTICS (Varies with series)

- Miniature and Subminiature versions available
- Rugged monolithic discoidal capacitor construction
- Epoxy seal at both ends
- Conservatively rated for 125VAC/400Hz
- Pi design offers steeper insertion loss
- NASA SSQ 21215-21218

HOW TO ORDER

SB	2	A	1	–	103
Style	Circuit	Voltage Rating	Options	MIL-28861 Screening	3 Digit Capacitor Code (in pF)

Style
SXD = 1-64 Epoxy Sealed
SYD = 2-56 Epoxy Sealed
SZD = 2-56 Epoxy Sealed
SA = 4-40 Epoxy Sealed
SG = 6-32 Epoxy Sealed
SB = 8-32 Epoxy Sealed
SM = 8-32 Hermetic Sealed
SH = 10-32 Epoxy Sealed
SJ = 12-28 Epoxy Sealed
SC = 12-32 Epoxy Sealed (.187 HEX)
SP = 12-32 Epoxy Sealed (.250 HEX)
SN = 12-32 Hermetic Sealed
SL = ¼-28 Epoxy Sealed
SD = 5/16-24 Epoxy Sealed
SF = 5/16-32 Epoxy Sealed

Circuit
1 = Feed Thru (C)
2 = L-Section (L)
3 = PI-Section (π)
8 = Grounded Feed Thru

Voltage Rating
A = 100 VDC
B = 200 VDC
C = 50 VDC
F = 500 VDC
G = 1000 VDC
H = 150 VDC
J = 600 VDC
K = 250 VDC
L = 200 VDC/125 VAC
M = 350 VDC
N = 70 VDC
X = 500 VDC
Y = 300 VDC

Options
1 = Copper
2 = Steel
3 = Special Lead Design
4 = Beryllium Copper
G = Olean Exact Equivalent

MIL-28861 Screening
B = Class B
S = Class S

Style	Capacitance Range (in pF if not indicated)					Current Rating	Circuit Available
	50VDC	100VDC	200VDC/115VAC	400VDC/230VAC	500VDC		
SXD	5-5,600	5-1,800	5-1,000	–	–	3A	C, L
SYD	5-6,200	5-2,200	5-1,200	–	–	3A	C, L
SZD	5-22,000	5-8,200	5-4,700	5-2,700	–	5A	C, L
SA	5-33,000	5-12,000	5-6,800	5-3,900	5-2,200	5A	C, L
SG	5-33,000	5-12,000	5-6,800	5-3,900	5-2,200	5A	C, L
SB/SM	5-33,000	5-12,000	5-6,800	5-3,900	5-2,200	10A	C, L, π
SH	5pF-.33μF	5pF-.12μF	5pF-.082μF	5pF-.047μF	5pF-.027μF	10A	C, L, π
SJ/SC/SP/SN	5pF-.33μF	5pF-.12μF	5pF-.082μF	5pF-.047μF	5pF-.027μF	10A	C, L, π
SL/SD/SF	5pF-1.5μF	5pF-.56μF	5pF-.39μF	5pF-.22μF	5pF-.12μF	25A	C, L, π

Cylindrical Style EMI Filter

AVX cylindrical style EMI filters offer effective filtering from 14KHz to 10GHz. Sealing options include epoxy sealed at both ends to optimize volumetric efficiency and cost, and a glass to metal hermetic seal version for severe moisture environments. They are designed for bulkhead mounting in a slotted hole with a nut and lockwasher supplied. These are ideal for low to medium impedance circuits where large amounts of capacitance to ground can be tolerated. In the "L" section version, an internal wound toroidal or ferrite bead element provides both inductance and series resistance which improves insertion loss at lower current ratings as well as superior transient performance.

CHARACTERISTICS (Varies with series)

- High DC current rating up to 25A
- Impervious to high moisture, solvents and other severe environmental conditions
- High capacitance values
- A 230VAC "T" section can handle very high pulse currents
- NASA SSQ 21215-21218

HOW TO ORDER

G **K** **2** **A** **A** **–** **S07** **X**

Basic Style
A = Button Type (.410 Dia.)
B = Button Type (.375 Dia.)
C = Extended Button
G = .375 Dia.
J = .690 Dia.
H = .410 Dia.
Q = Special

Thread Type
K = ¼-28 Herm. Seal
L = ¼-28 Epoxy Seal
M = 8-32 Herm. Seal
N = 12-32 Herm. Seal
T = ¼-28 Post Terminal (Both Ends)
V = ¼-28 Post and Flag Terminal
X = ¼-28 Hex Adapter
Y = 5/8-24 Epoxy Sealed
D = 5/16-24
F = 5/16-32
Z = Special

Circuit
0 = Feed Thru Lead (Without Capacitor)
1 = Feed Thru Capacitor
2 = L-Section Filter
3 = PI Filter
4 = T-Section
5 = Double L-Section
6 = Five Element Cap Input
7 = Five Element IND Input
8 = Grounded Feed Thru

Voltage
A = 100 VDC
B = 200 VDC
C = 50 VDC
E = 400 VDC/230 VAC
F = 500 VDC
G = 1000 VDC
H = 150 VDC
J = 600 VDC
K = 250 VDC
L = 200 VDC/125 VAC (EXCEPT JD SERIES 300 VDC/125 VAC)
M = 350 VDC
N = 70 VDC
X = 500 VDC
Y = 300 VDC
W = 400 VDC

Thread Length
A = .187
B = .312
C = Special

MIL-28861 Screening
B = Class B
S = Class S

Plating Finish
G = Gold
S = Silver

Feed Thrus and BK2, CK2

XXX
Capacitance in Picofarads

Circuit
S = Standard L (Inductor on Thread End)
R = Reverse L (Capacitor at Thread End)
P = PI Circuit
T = T Circuit

All Other Circuit Types

Current Rating

Code	Current	Code	Current
01	.06 Amp	09	2
02	.1	10	3
03	.15	11	5
04	.25	12	10
05	.3	16	4
06	.45	17	6
07	.5	18	.75
08	1	19	1.5

Style	Capacitance Range					Current Rating	Circuit Available
	50VDC	100VDC	200VDC/115VAC	400VDC/230VAC	500VDC		
BL	5pF-1.5μF	5pF-.56μF	5pF-.39μF	5pF-.22μF	5pF-.12μF	15A	C, L
BK	5pF-1.5μF	5pF-.56μF	5pF-.39μF	5pF-.22μF	5pF-.12μF	15A	C, L
AK	5pF-1.8μF	5pF-.68μF	5pF-.39μF	5pF-.27μF	5pF-.15μF	15A	C, L
CK	5pF-1.5μF	5pF-.56μF	5pF-.39μF	5pF-.22μF	5pF-.12μF	15A	C, L
GK	5pF-1.5μF	5pF-.56μF	5pF-.39μF	5pF-.22μF	5pF-.12μF	Up to 15A	C, L, π, T
HK	5pF-1.8μF	5pF-.68μF	5pF-.39μF	5pF-.27μF	5pF-.15μF	Up to 15A	C, L, π, T
JD	5pF-1.8μF	5pF-.68μF	5pF-.39μF	5pF-.27μF	5pF-.15μF	Up to 15A	C, L, π, T

Custom EMI Filter Assemblies

AVX filters has expanded its portfolio of custom and customized filters and filter plates/filter assemblies. These designs are suitable for use in low frequency to high frequency applications and can be configured in a variety of capacitive and inductive filter elements. Also available are high current assemblies and filter assemblies that are geared toward harsh environments such as high temperature, high shock and vibration. All of these solutions are ideal for industrial, avionic, downhole exploration and space level applications.

HOW TO ORDER

MFB	007	Q	–	001	T1	XX
Bracket Array	**Number of Filters** 001 - 999	**Hermeticity** Q = Hermetic (Glass Both Sides) H = Hermetic (Glass One Side) N = No Hermeticity Requirements		**Customer Dash Number***	**Customer ID Code**	**Customer Drawing**

*If customer dash no. is 4 digits long, (e.g. - 0001) omit the first digit.

Feedthru Array Filters – W2F4/W3F4 Series

EMI Filtering, Broadband Filtering, LCD Filtering

Available in a 4-Element 0508 and 0612 Feedthru Array package, AVX's line of Feedthrus is an ideal choice for EMI suppression, broadband I/O filtering, LCD filtering and V_{CC} power line conditioning. The unique construction of the 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 up to 5 GHz. A range of filtering characteristics is available. The Feedthru Array contains four elements with a common ground connection, making it an ideal choice for multi-line designs. Additional benefits of the multi-element array package are reduced placement costs, reduced component counts and PCB space savings. Feedthru filters can be used to meet IEC, MIL-STD-461E, FCC, and SAE radiated and conducted emission requirements.

FREQUENCY CHARACTERISTICS

Part Number	Roll Off Frequency	Center Frequency	10 db Point	20 db Range	
W3F41A2208AT	270 MHz	2640 MHz	970 MHz	1780 MHz	3500 MHz
W3F41A4708AT	65 MHz	2000 MHz	185 MHz	600 MHz	3400 MHz
W3F41A1018AT	65 MHz	2030 MHz	185 MHz	560 MHz	3500 MHz
W3F45C2218AT	35 MHz	1885 MHz	120 MHz	470 MHz	3300 MHz
W3F45C4718AT	20 MHz	1860 MHz	60 MHz	220 MHz	3500 MHz
W2F43A2208AT	208 MHz	4750 MHz	616 MHz	1407 MHz	7300 MHz
W2F43A4708AT	110 MHz	2750 MHz	330 MHz	900 MHz	4600 MHz
W2F43A1018AT	60 MHz	1300 MHz	179 MHz	501 MHz	7200 MHz

CAPACITOR VALUES & PERFORMANCE CHARACTERISTICS

Part Number	Typical Capacitance	Insulation Resistance	Temperature Characteristics
W3F41A2208AT	22pF	> 1000 M_	NP0
W3F41A4708AT	47pF	> 1000 M_	NP0
W3F41A1018AT	100pF	> 1000 M_	NP0
W3F45C2218AT	220pF	> 1000 M_	X7R
W3F45C4718AT	470pF	> 1000 M_	X7R
W2F43A2208AT	22pF	> 1000 M_	NP0
W2F43A4708AT	47pF	> 1000 M_	NP0
W2F43A1018AT	100pF	> 1000 M_	NP0

CASE SIZE & VOLTAGE RATINGS

Part Number	Case Size	Current Rating	DC Resistance	Voltage Rating
W3F41A2208AT W3F41A4708AT W3F41A1018AT	0612	300 mA	< 0.6_	100 V
W3F45C2218AT W3F45C4718AT	0612	300 mA	< 0.6_	50 V
W2F43A2208AT W2F43A4708AT W2F43A1018AT	0508	50 mA	< 3.0_	25 V

High Current Feedthru Filter

W2H/W3H Series

High current feedthru capacitors are designed as a broadband EMI filter that is specially structured to have high current handling capability. These SMT feedthru filters offer an optimized frequency response with high attenuation across a wide RF spectrum due to optimized parallel and series inductances. These W2H/W3H feedthru filters can actually replace discrete L/C filter networks.

HOW TO ORDER

W2H1	5	C	473	8	A	T	1A
Size & Style W2H1=0805 W3H1=0612	**Voltage** 3=25v 5=50v 1=100v	**Dielectric** A=NP0 C=X7R	**Capacitance Code**	**Capacitance Tolerance** 8=+50/-20% M=±20%	**Failure Rate** A=Not Applicable	**Terminations** T=Plated Ni And Sn	**Packaging** 1A=7" Reel 4000 pcs 3A=13" Reel 4000 pcs

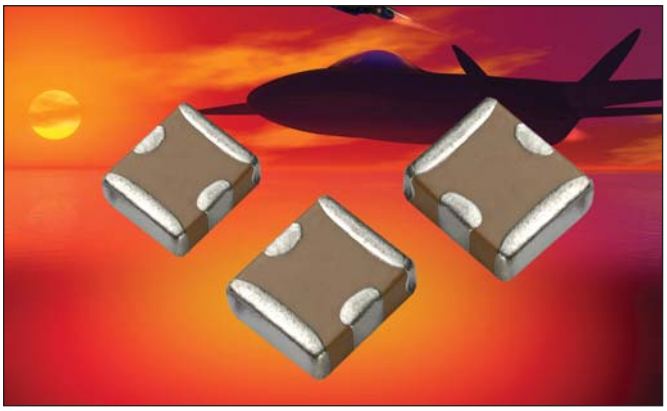
ELECTRICAL PARAMETERS

Insulation Resistance	1000 mOhms Minimum
DC Resistance	<150 mOhms
Operating Temperature	-55C to +125C

CAPACITOR VALUES

Part Number	Size	Dielectric	Capacitance	Tolerance	Voltage	Current
W2H13C 104 8AT	0805	X7R	100,000pF	+50%, -20%	25V	2A
W2H15C 473 8AT	0805	X7R	47,000pF	+50%, -20%	50V	2A
W2H15C 223 8AT	0805	X7R	22,000pF	+50%, -20%	50V	1A
W2H15C 103 8AT	0805	X7R	10,000pF	+50%, -20%	50V	1A
W2H15C 102 8AT	0805	X7R	1,000pF	+50%, -20%	50V	1A
W2H11A 471 8AT	0805	NP0	470pF	+50%, -20%	100V	0.5A
W2H11A 221 8AT	0805	NP0	220pF	+50%, -20%	100V	0.5A
W2H11A 101 8AT	0805	NP0	100pF	+50%, -20%	100V	0.5A
W2H11A 470 8AT	0805	NP0	47pF	+50%, -20%	100V	0.5A
W2H11A 220 8AT	0805	NP0	22pF	+50%, -20%	100V	0.5A
W3H13C 104 8AT	0612	X7R	100,000pF	+50%, -20%	25V	up to 5A
W3H15C 473 8AT	0612	X7R	47,000pF	+50%, -20%	50V	up to 5A
W3H15C 223 8AT	0612	X7R	22,000pF	+50%, -20%	50V	up to 4A
W3H15C 103 8AT	0612	X7R	10,000pF	+50%, -20%	50V	up to 3A
W3H11A 471 8AT	0612	NP0	470pF	+50%, -20%	100V	up to 4A
W3H11A 221 8AT	0612	NP0	220pF	+50%, -20%	100V	up to 4A
W3H11A 101 8AT	0612	NP0	100pF	+50%, -20%	100V	up to 4A
W3H11A 470 8AT	0612	NP0	47pF	+50%, -20%	100V	up to 3A
W3H11A 220 8AT	0612	NP0	22pF	+50%, -20%	100V	up to 3A

W8F, High Current Filter



The W8F is a very high power feedthrough filter that has large capacitance values (up to 1.5µF) and high current capability (up to 8A). They act as a symmetrical broadband filter for power supply line applications.

HOW TO ORDER

W	8	F	1	5	C	155	8	A	T	1	A
Style	**Chip Size** 8 = 2220	**Filter**	**Element** 1 = 1 Element	**Voltage** 5 = 50V	**Dielectric** C = X7R	**Cap Code** 155 = 1.5µF	**Cap Tolerance** 8 = +50/-20%	**Failure Rate** A=Not Applicable	**Termination**	**Reel Size** 1 = 7" 3 = 13"	**Quantity Code**

ELECTRICAL CHARACTERISTICS

Capacitance at 1kHz:
1.5µF +80%, -20%

Rated Voltage:
50Vdc

Dielectric Withstanding Voltage (for 10 seconds):
125Vdc

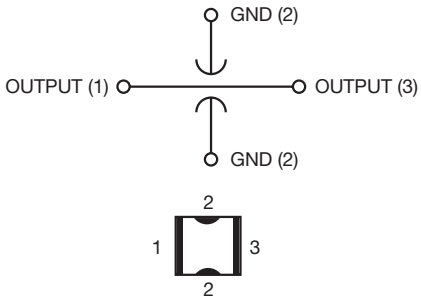
Current Rating at 400Hz:
6 amps square wave

Insulation Resistance at 400Vdc:
100M ohms min.

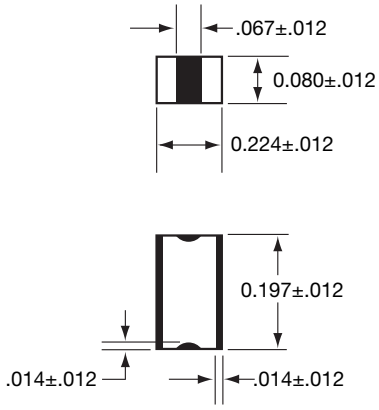
DC Resistance:

Terminal 1 to 3	0.1 ohm max.
Ground Terminals 2	0.2 ohm max.

Schematic Diagram



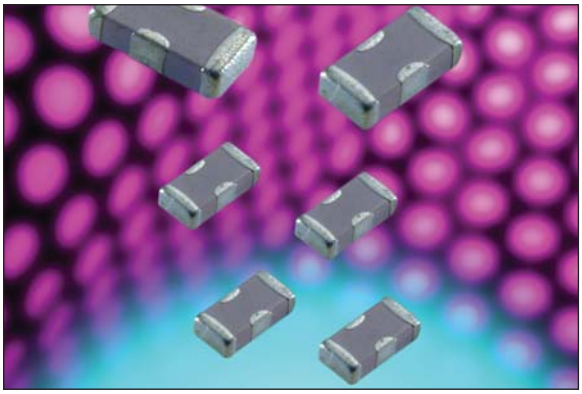
Dimensions



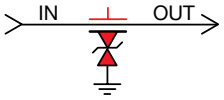
TransFeed, Feedthrough Filter

AVX Multilayer Ceramic Transient Voltage Suppressors

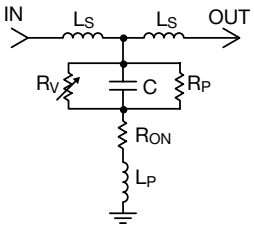
TVS Protection and EMI Attenuation in a Single Chip



Schematic Diagram



Electrical Model



AVX has combined the best electrical characteristics of its TransGuard® Transient Voltage Suppressors (TVS) and its Feedthru Capacitors into a single chip for state-of-the-art overvoltage circuit protection and EMI reduction over a broad range of frequencies. This unique combination of multilayer ceramic construction in a feedthru configuration gives the circuit designer a single 0805 chip that responds to transient events faster than any TVS device on the market today, and provides significant EMI attenuation when in the off-state.

The reduction in parallel inductance, typical of the feedthru chip construction when compared to the construction of standard TVS or ceramic capacitor chips, gives the TransFeed product two very important electrical advantages: (1) faster "turn-on" time. Calculated response times of <200 pSec are not unusual with this device, and measured response times range from 200 – 250 pSec; (2) the second electrical advantage of lower parallel inductance, coupled with optimal series inductance, is the enhanced attenuation characteristics of the TransFeed product. Typical applications include filtering/protection on Microcontroller I/O Lines, Interface I/O Lines, Power Line Conditioning and Power Regulation.

HOW TO ORDER

V	2	F	1	05	A	150	Y	2	E	D	P
Varistor	**Chip Size** 2 = 0805 3 = 0612	**Feedthru Capacitor**	**No. of Elements**	**Voltage** 05 = 5.6VDC 09 = 9.0VDC 14 = 14.0VDC 18 = 18.0VDC	**Energy Rating** X = 0.05J A = 0.1J C = 0.3J	**Varistor Clamping Voltage** 150 = 18V 200 = 22V 300 = 32V 400 = 42V 500 = 50V	**Capacitance Tolerance** Y = +100/-50%	**DC Resistance** 1 = 0.150 Ohms 2 = 0.200 Ohms 3 = 0.250 Ohms	**Feedthru Current** D = 500 mA E = 750 mA F = 1.0 Amp	**Packaging Code Pcs./Reel** D = 1,000 R = 4,000 T = 10,000	**Termination Finish** P = Ni/Sn Alloy (Plated) M = Ni/Sn Pb (Plated)

TRANSFEED ELECTRICAL SPECIFICATIONS

AVX Part Number	Working Voltage (DC)	Working Voltage (AC)	Breakdown Voltage	Clamping Voltage	Maximum Leakage Current	Transient Energy Rating	Peak Current Rating	Typical Cap	DC Resistance	Maximum Feedthru Current
V2F105A150Y2E _ _	5.6	4.0	8.5±20%	18	35	0.10	30	800	0.200	0.75
V2F105C150Y1F _ _	5.6	4.0	8.5±20%	18	35	0.30	120	2500	0.150	1.00
V2F109A200Y2E _ _	9.0	6.4	12.7±15%	22	25	0.10	30	575	0.200	0.75
V2F109C200Y1F _ _	9.0	6.4	12.7±15%	22	25	0.30	120	1800	0.150	1.00
V2F114A300Y2E _ _	14.0	10.0	18.5±12%	32	15	0.10	30	300	0.200	0.75
V2F114C300Y1F _ _	14.0	10.0	18.5±12%	32	15	0.30	120	900	0.150	1.00
V2F118A400Y2E _ _	18.0	13.0	25.5±10%	42	10	0.10	30	200	0.200	0.75
V2F118C400Y1F _ _	18.0	13.0	25.5±10%	42	10	0.30	120	500	0.150	1.00
V2F118X500Y3D _ _	18.0	13.0	25.5±10%	50	10	0.05	20	75	0.250	0.50

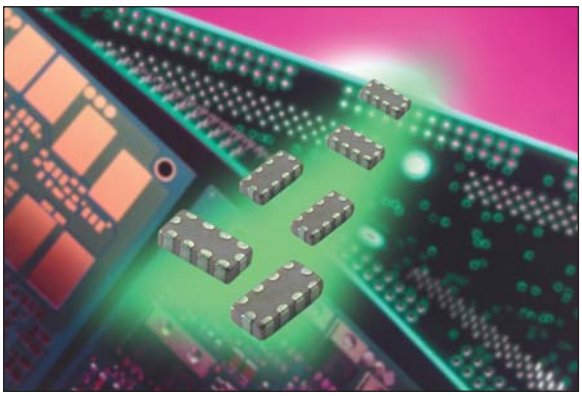
Termination Finish Code

Packaging Code

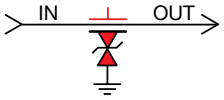
TransFeed Array Filter

AVX Multilayer Ceramic Transient Voltage Suppressors

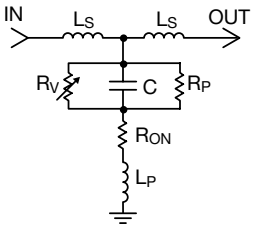
TVS Protection and EMI Attenuation in a Single Chip



Schematic Diagram



Electrical Model



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The reduction in parallel inductance, typical of the feedthru chip construction when compared to the construction of standard TVS or ceramic capacitor chips, gives the TransFeed product two very important electrical advantages: (1) faster "turn-on" time. Calculated response times of <200 pSec are not unusual with this device, and measured response times range from 200 – 250 pSec; (2) the second electrical advantage of lower parallel inductance, coupled with optimal series inductance, is the enhanced attenuation characteristics of the TransFeed product. Typical applications include filtering/protection on Microcontroller I/O Lines, Interface I/O Lines, Power Line Conditioning and Power Regulation.

HOW TO ORDER

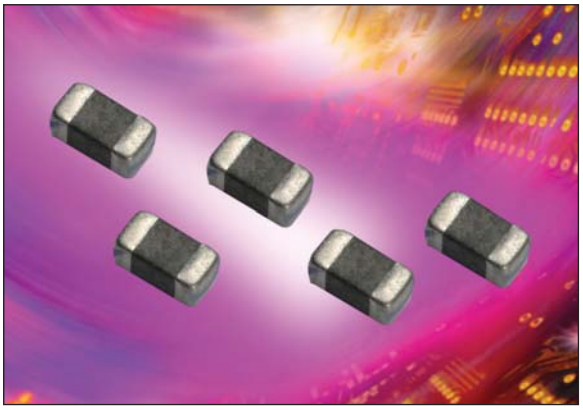
V	3	F	4	18	X	500	Y	3	G	D	P
Array	**Chip Size** 2 = 0805 3 = 0612	**Feedthru Capacitor**	**No. of Elements**	**Voltage** 18 = 18.0VDC	**Energy Rating** X = 0.05J A = 0.1J	**Varistor Clamping Voltage** 400 = 42V 500 = 50V	**Capacitance Tolerance** Y = +100/-50%	**DC Resistance** 3 = 0.250 Ohms	**Feedthru Current** G = 200 mA	**Packaging Code Pcs./Reel** D = 1,000 R = 4,000 T = 10,000	**Termination Finish** P = Ni/Sn Alloy (Plated) M = Ni/Sn Pb (Plated)

TRANSFEED ELECTRICAL SPECIFICATIONS

AVX Part Number	Working Voltage (DC)	Working Voltage (AC)	Breakdown Voltage	Clamping Voltage	Maximum Leakage Current	Transient Energy Rating	Peak Current Rating	Typical Cap	DC Resistance	Maximum Feedthru Current
V3F418A400Y3G _ _	18.0	13.0	25.5±10%	42	10	0.10	20	150	0.200	0.30
V3F418X500Y3G _ _	18.0	13.0	25.5±10%	50	10	0.05	15	65	0.250	0.20

Termination Finish Code

Packaging Code



TransGuard® act as an EMI filter, in the "off state" and a transient voltage suppressor in the "on state". They are bidirectional and therefore act as back to back zener diodes, but offer other advantages, for example, fast turn-on time (sub 1ns) and repetitive strike capability. Package options include EIA case sizes 0402, 0603, 0805, 1206, 1210, 1812 and 2220, as well as axial leaded configuration.

DESC drawing Series AA55562

PART NUMBER IDENTIFICATION

Surface Mount Devices

Important: For part number identification only, not for construction of part numbers.
The information below only defines the numerical value of part number digits, and cannot be used to construct a desired set of electrical limits. Please refer to the TransGuard® part number data for the correct electrical ratings.

V	C	1206	05	D	150	R	M

Product Designator
V = Varistor

Case Style
C = Chip

Case Size Designator

Size	Length	Width
0402	1.00±0.10mm (0.040"±0.004")	0.5±0.10mm (0.020"±0.004")
0603	1.60±0.15mm (0.063"±0.006")	0.8±0.15mm (0.032"±0.006")
0805	2.01±0.2mm (0.079"±0.008")	1.25±0.2mm (0.049"±0.008")
1206	3.20±0.2mm (0.126"±0.008")	1.60±0.2mm (0.063"±0.008")
1210	3.20±0.2mm (0.126"±0.008")	2.49±0.2mm (0.098"±0.008")

Working Voltage
03 = 3.3 VDC
05 = 5.6 VDC
09 = 9.0 VDC
12 = 12.0 VDC
14 = 14.0 VDC
18 = 18.0 VDC
26 = 26.0 VDC
30 = 30.0 VDC
48 = 48.0 VDC
60 = 60.0 VDC

Energy
A = 0.1J
B = 0.2J
C = 0.3J
D = 0.4J
E = 0.5J
F = 0.7J
G = 0.9J
H = 1.2J
J = 1.5J
K = 0.6J
L = 0.8J
M = 1.0J
N = 1.1J
P = 3.0J
Q = 1.3J
R = 1.7J
S = 1.9-2.0J
T = 0.01J
U = 4.0-5.0J
V = 0.02J
W = 6.0J
X = 0.05J
Y = 12.0J
Z = 25.0J

Clamping* Voltage
100 = 12V
150 = 18V
200 = 22V
250 = 27V
300 = 32V
390 = 42V
400 = 42V
500 = 50V
560 = 60V
580 = 60V
620 = 67V
650 = 67V
101 = 100V
121 = 120V

Packaging (Pcs/Reel)

Style	"D"	"R"	"T"	"W"
VC0402	N/A	N/A	N/A	10,000
VC0603	1,000	4,000	10,000	N/A
VC0805	1,000	4,000	10,000	N/A
VC1206	1,000	4,000	10,000	N/A
VC1210	1,000	2,000	10,000	N/A

Termination Finish
M = Ni/Sn Pb (Plated)

Marking
All standard surface mount TransGuard® chips will **not** be marked.

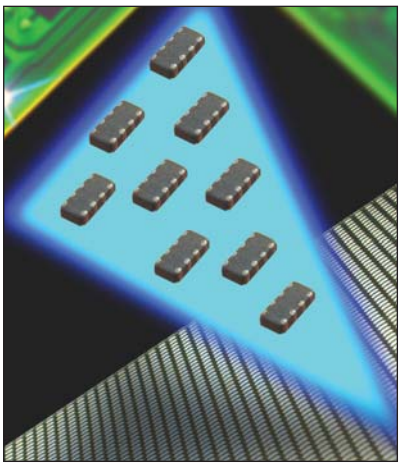
ELECTRICAL CHARACTERISTICS RANGE

Range	Working Voltage (DC)	Breakdown Voltage	Clamping Voltage	Test Current For V_c	Maximum Leakage Current	Transient Energy Rating	Peak Current Rating	Typical Cap
Lowest Value	3.3	5.0±20%	12	1	100	0.05	20	65
Highest Value	65	82.0±10%	135	10	10	4.80	800	5000

* Please check the AVX website for actual clamping to working voltage available on these devices.

MultiGuard TVS Array

AVX Multilayer Ceramic Transient Voltage Suppression Arrays – ESD Protection for CMOS and Bi Polar Systems



AVX's Transient Voltage Suppression (TVS) Arrays address six trends in today's electronic circuits: (1) mandatory ESD protection, (2) mandatory EMI control, (3) signal integrity improvement, (4) PCB downsizing, (5) reduced component placement costs, and (6) protection from induced slow speed transient voltages and currents.

AVX's MultiGuard products offer numerous advantages, which include a faster turn-on-time (<1nS), repetitive strike capability, and space savings. In some cases, MultiGuard consumes less than 75% of the PCB real estate required for the equivalent number of discrete chips. This size advantage, coupled with the savings associated with placing only one chip, makes MultiGuard the TVS component of choice for ESD protection of I/O lines in portable equipment and programming ports in cellular phones. Other applications include differential data line protection, ASIC protection and LCD driver protection for portable computing devices.

Where multiple lines require the ESD protection, the 4-element 0612 or 0508 chip is an ideal solution. While the 2-element 0405 MultiGuard is the smallest TVS array, the 4-element 0508 MultiGuard is the smallest 4-element TVS device available in the market today.

Available with standard working voltage of 5.6V up to 18V with low capacitance in the 3 case sizes, AVX MultiGuard arrays offer a very broad range of integrated TVS solutions to the design community.

HOW TO ORDER

MG	04	2	L	14	A	300	T	P
MultiGuard	**Case Size** 04 = 0405 05 = 0508 06 = 0612	**Configuration** 2 = 2 Elements 4 = 4 Elements	**Style** S = Standard Construction L = Low Capacitance	**Working Voltage** 05 = 5.6VDC 09 = 9.0VDC 14 = 14.0VDC 18 = 18.0VDC	**Energy Rating** A = 0.10 Joules V = 0.02 Joules X = 0.05 Joules	**Clamping Voltage** 150 = 18V 200 = 22V 300 = 32V 400 = 42V 500 = 50V	**Packaging** (PCS/REEL) D = 1,000 R = 4,000 T = 10,000	**Termination Finish** P = Ni/Sn Alloy (Plated) M = Ni/Sn Pb (Plated)

ELECTRICAL CHARACTERISTICS PER ELEMENT

	AVX Part Number	Working Voltage (DC)	Working Voltage (AC)	Breakdown Voltage	Clamping Voltage	Test Current For V_C	Maximum Leakage Current	Transient Energy Rating	Peak Current Rating	Typical Cap
2 Element 0405 Chip	MG042S05X150 _ _	5.6	4.0	8.5±20%	18	1	35	0.05	15	300
	MG042L14V400 _ _	14.0	10.0	18.5±12%	32	1	15	0.02	15	45
	MG042L18V500 _ _	18.0	14.0	N/A	50	1	10	0.02	15	40
2 Element 0508 Chip	MG052S05A150 _ _	5.6	4.0	8.5±20%	18	1	35	0.10	30	825
	MG052S09A200 _ _	9.0	6.4	12.7±15%	22	1	25	0.10	30	550
	MG052S14A300 _ _	14.0	10.0	19.5±12%	32	1	15	0.10	30	425
	MG052S18A400 _ _	18.0	14.0	25.5±10%	42	1	10	0.10	30	225
	MG052L18X500 _ _	≤18.0	≤14.0	N/A	50	1	10	0.10	20	50
4 Element 0508 Chip	MG054S05X150 _ _	5.6	4.0	8.5±20%	18	1	35	0.05	15	400
	MG054S09X200 _ _	9.0	6.4	12.7±15%	22	1	25	0.05	15	300
	MG054S14X300 _ _	14.0	10.0	19.5±12%	32	1	15	0.05	15	150
	MG054S18X400 _ _	18.0	14.0	25.5±10%	42	1	10	0.05	15	120
	MG054L18V500 _ _	≤18.0	≤14.0	N/A	50	1	10	0.02	15	50
4 Element 0612 Chip	MG064S05A150 _ _	5.6	4.0	8.5±20%	18	1	35	0.10	30	825
	MG064S09A200 _ _	9.0	6.4	12.7±15%	22	1	25	0.10	30	550
	MG064S14A300 _ _	14.0	10.0	19.5±12%	32	1	15	0.10	30	425
	MG064S18A400 _ _	18.0	14.0	25.5±10%	42	1	10	0.05	15	120
	MG064L18X500 _ _	≤18.0	≤14.0	N/A	50	1	10	0.10	20	75

Termination Finish Code

Packaging Code

V_W (DC)	DC Working Voltage (V)
V_W (AC)	AC Working Voltage (V)
V_B	Typical Breakdown Voltage (V @ 1mA$_{DC}$)
V_B Tol	V_B Tolerance is ± from Typical Value
V_C	Clamping Voltage (V @ I_{VC})
I_{VC}	Test Current for V_C (A, 8x20µS)
I_L	Maximum Leakage Current at the Working Voltage (µA)
E_T	Transient Energy Rating (J, 10x1000µS)
I_P	Peak Current Rating (A, 8x20µS)
Cap	Typical Capacitance (pF) @ 1MHz and 0.5 V_{RMS}

NB12, Surface Mount Thermistors

NC 12 – NC 20

Chip thermistors are a high quality and low cost device especially developed for surface mounting applications. They are widely used for temperature compensation but can also achieve temperature control of printed circuits. Its silver - palladium - platinum metallization provides a high degree of resistance to dewetting of the terminations during soldering (typically 260°C / 30 s).

HOW TO ORDER

NC 20 — **Type**

K 0 — **Material Code**
K

0103 — **Resistance**
10,000 Ω

M — **Tolerance**
M (±20%)
J (±5%)
K (±10%)

BA — **Suffix: Packaging**
– –: Bulk
BA: Plastic tape (180mm diam. reel)
BE: Plastic tape (1/2 reel)
BC: Plastic tape (330mm diam. reel)
BB: Cardboard tape (180mm diam. reel)
BF: Cardboard tape (1/2 reel)
BD: Cardboard tape (330mm diam. reel)

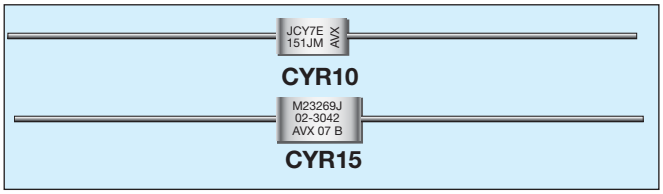
TABLE OF VALUES (Min/Max)

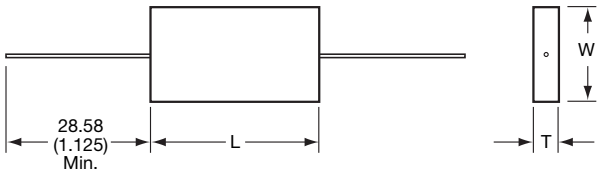
NC 12 IEC SIZE : 0805				
Types	**Rn at 25°C (Ω)**	**Material Code**	**B (K) ($\Delta B/B$ (1) ± 5% (2) ± 3%)**	**α at 25°C (%/°C)**
NC 12 KC 0 180 NC 12 KC 0 101	18 100	KC	3470 ± 5%	– 3.9
NC 12 MC 0 121 NC 12 MC 0 332	120 3,300	MC	3910 ± 3%	– 4.4
NC 12 J 0 0332 NC 12 J 0 0562	3,300 5,600	J	3480 ± 3%	– 3.9
NC 12 K 0 0682 NC 12 K 0 0123	6,800 12,000	K	3630 ± 3%	– 4.0
NC 12 L 0 0153 NC 12 L 0 0183	15,000 18,000	L	3790 ± 3%	– 4.2
NC 12 M 0 0223 NC 12 M 0 0393	22,000 39,000	M	3950 ± 3%	– 4.4
NC 12 N 0 0473 NC 12 N 0 0563	47,000 56,000	N	4080 ± 3%	– 4.6
NC 12 L 2 0683	68,000	L2	3805 ± 3%	– 4.1
NC 12 N 0 0823	82,000	N	4080 ± 3%	– 4.6
NC 12 P 0 0104 NC 12 P 0 0184	100,000 180,000	P	4220 ± 3%	– 4.7
NC 12 Q 0 0224	220,000	Q	4300 ± 3%	-4.7

NC 20 IEC SIZE : 1206				
Types	**Rn at 25°C (Ω)**	**Material Code**	**B (K) ($\Delta B/B$ (1) ± 5% (2) ± 3%)**	**α at 25°C (%/°C)**
NC 20 KC 0 100 NC 20 KC 0 101	10 100	KC	3470 ± 5%	– 3.9
NC 20 MC 0 121 NC 20 MC 0 152	120 1,500	MC	3910 ± 3%	– 4.4
NC 20 I 0 0182 NC 20 I 0 0332	1,800 3,300	I	3250 ± 5%	– 3.7
NC 20 J 0 0392 NC 20 J 0 0682	3,900 6,800	J	3480 ± 3%	– 3.9
NC 20 K 0 0822 NC 20 K 0 0153	8,200 15,000	K	3630 ± 3%	– 4.0
NC 20 L 0 0183 NC 20 L 0 0223	18,000 22,000	L	3790 ± 3%	– 4.2
NC 20 M 0 0273 NC 20 M 0 0473	27,000 47,000	M	3950 ± 3%	– 4.4
NC 20 N 0 0563 NC 20 N 0 0104	56,000 100,000	N	4080 ± 3%	– 4.6
NC 20 P 0 0124 NC 20 P 0 0224	120,000 220,000	P	4220 ± 3%	– 4.7
NC 20 Q 0 0274 NC 20 Q 0 0474	270,000 470,000	Q	4300 ± 3%	– 4.7
NC 20 R 0 0564 NC 20 R 0 0105	560,000 1,000,000	R	4400 ± 3%	– 4.8

Glass Dielectric Capacitors

MIL-PRF-23269





DIMENSIONS:

millimeters (inches)

Case Size	L	W	T	Lead Dia. +0.1(+0.004) -0.03(±0.001)
CYR10	8.74 ± 1.19 (0.344 ± 0.047)	4.37 ± .79 (0.172 ± 0.031)	1.98 ± .79 (0.078 ± 0.031)	.51 (0.020)
CYR15	11.91 ± 1.19 (0.469 ± 0.047)	6.76 ± .79 (0.266 ± 0.031)	2.77 ± 1.19 (0.109 ± 0.047)	.51 (0.020)

Note: Standard leads are solder-coated Dumet.

MARKING

CYR10

J = JAN Trademark
C = Capacitor
Y = Glass Dielectric
7 = Last digit of year
A = 4 week lot code

0R5 = Capacitance code – 0R5 = 0.5pF
J = Capacitance tolerance – J = ±5%, G = ±2%, F = ±1%
M = Failure level
AVX = AVX Corporation

CYR15

M23269 = Military specification established reliability glass capacitor
J = JAN Trademark
02 = Case size (CYR15)
3 = Failure rate (M level)

057 = Dash Number – (capacitance in pF and capacitance tolerance)
AVX = AVX Corporation
07 = Year
B = Lot Code

HOW TO ORDER

M23269 / **01** — **3** **001**

Style
Military Specification
Established Reliability
Glass Capacitor

Case Size
01 = CYR10
02 = CYR15

Failure Rate
3 = M level 1%/1000 hrs.
7 = S level .001%/1000 hrs.
(100 volt rating only)

Capacitance Code
Capacitance value coded in accordance with MIL-PRF-23269 – (see Part Number section)

RATINGS & PART NUMBER REFERENCE

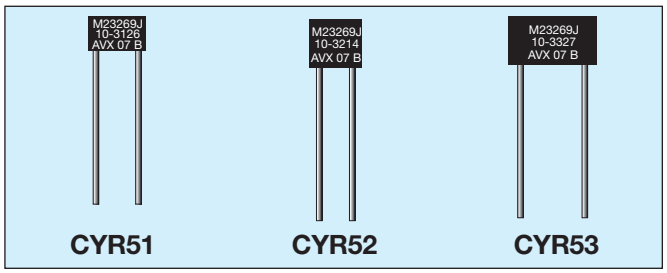
Cap. Value (pF)	Part Number* Capacitance Tolerance		
	CYR10 M23269/01-		
500 Volts**	±.25pF	±.5pF	±5%
.5	*001	–	–
1.0	002	–	–
1.5	003	–	–
2.2	004	*005	–
2.7	006	–	–
3.0	007	008	–
3.3	009	–	–
3.6	010	011	–
3.9	012	–	–
4.3	013	014	–
4.7	015	–	–
5.1	016	–	–
5.6	017	–	*018
6.2	019	–	020
6.8	021	–	022
7.5	023	–	024
8.2	025	–	026
9.1	027	–	028
10	029	–	030
11	031	–	032
12	033	–	034

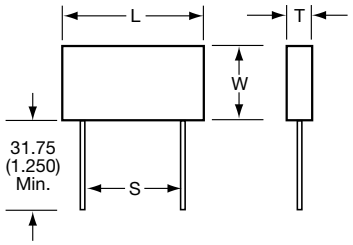
Cap. Value (pF)	Part Number* Capacitance Tolerance		
	CYR10 M23269/01- (cont'd.)		
500 Volts**	±1%	±2%	±5%
13	–	*035	*036
15	–	037	038
16	–	039	040
18	–	041	042
20	–	043	044
22	–	045	046
24	–	047	048
27	*049	050	051
30	052	053	054
33	055	056	057
36	058	059	060
39	061	062	063
43	064	065	066
47	067	068	069
51	070	071	072
56	073	074	075
62	076	077	078
68	079	080	081
75	082	083	084
82	085	086	087
91	088	089	090
100	091	092	093
110	094	095	096
120	097	098	099
130	100	101	102
150	103	104	105
160	106	107	108
180	109	110	111
200	112	113	114

Cap. Value (pF)	Part Number* Capacitance Tolerance		
	CYR10 M23269/01- (cont'd.)		
300 Volts**	±1%	±2%	±5%
220	115	116	117
240	118	119	120
270	121	122	123
300	124	125	126
	CYR15 M23269/02-		
500 Volts**	±1%	±2%	±5%
220	*001	*002	*003
240	004	005	006
270	007	008	009
300	010	011	012
330	013	014	015
360	016	017	018
390	019	020	021
430	022	023	024
470	025	026	027
510	028	029	030
300 Volts**	±1%	±2%	±5%
560	031	032	033
620	034	035	036
680	037	038	039
750	040	041	042
820	043	044	045
910	046	047	048
1,000	049	050	051
1,100	052	053	054
1,200	055	056	057

* Add first digit to indicate failure rate.
** S LEVEL = 100V rating for all values.

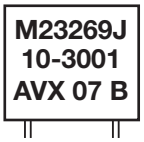
Glass Dielectric Capacitors
MIL-PRF-23269





MARKING

CYR51, 52, 53



M23269 = Military specification established reliability glass capacitor
J = JAN Trademark
10 = Slash sheet for case sizes – CYR51, CYR52, CYR53
3 = Failure rate (M level)
001 = Capacitance value coded in accordance with MIL-C-23269
AVX = AVX Corporation
07 = Year
B = Lot Code

DIMENSIONS:

millimeters (inches)

Case Size	L ±0.13 (±0.005)	W ±0.25 (±0.010)	T ±0.13 (±0.005)	S ±0.51 (±0.020)	Lead Dia. ±0.051 (±0.002)
CYR51	7.62 (0.300)	5.08 (0.200)	2.92 (0.115)	5.08 (0.200)	.51 (0.020)
CYR52	7.62 (0.300)	7.62 (0.300)	2.92 (0.115)	5.08 (0.200)	.51 (0.020)
CYR53	12.70 (0.500)	7.62 (0.300)	2.92 (0.115)	10.16 (0.400)	.51 (0.020)

Note: Leads are solderable and weldable gold-plated Dumet, per MIL-STD-1276, Type D.

CROSS REFERENCE

MIL-C-23269 Style	MIL-C-11272 Style
CYR10	CY10
CYR15	CY15
CYR20	CY20
CYR30	CY30
CYR51	CY06
CYR52	CY07
CYR53	CY08

HOW TO ORDER

M23269 / **10** — **3** **001**

Style
Military Specification
Established Reliability
Glass Capacitor

Case Size
Slash sheet
CYR51
CYR52
CYR53

Failure Rate
3 = M level, 1%/1000 hrs.

Capacitance Code
Capacitance value coded in accordance with MIL-C-23269 –
(see Part Number section)

RATINGS & PART NUMBER REFERENCE

Cap. Value (pF)	Part Number Capacitance Tolerance		
	CYR51 M23269/10-		
300 Volts	±.25pF	±2%	±5%
1	3001	—	—
1.5	3002	—	—
2.2	3003	—	—
2.7	3004	—	—
3.0	3005	—	—
3.3	3006	—	—
3.6	3007	—	—
3.9	3008	—	—
4.3	3009	—	—
4.7	3010	—	—
5.1	3011	—	3012
5.6	3013	—	3014
6.2	3015	—	3016
6.8	3017	—	3018
7.5	3019	—	3020
8.2	3021	—	3022
9.1	3023	—	3024
10	3025	—	3026
11	3027	—	3028
12	3029	—	3030
13	3031	3032	3033
15	3034	3035	3036
16	3037	3038	3039
18	3040	3041	3042
20	3043	3044	3045
22	3046	3047	3048
24	3049	3050	3051

*Add first digit to indicate failure rate.

Cap. Value (pF)	Part Number Capacitance Tolerance		
	CYR51 M23269/10- (cont'd)		
300 Volts	±1%	±2%	±5%
27	3052	3053	3054
30	3055	3056	3057
33	3058	3059	3060
36	3061	3062	3063
39	3064	3065	3066
43	3067	3068	3069
47	3070	3071	3072
51	3073	3074	3075
56	3076	3077	3078
62	3079	3080	3081
68	3082	3083	3084
75	3085	3086	3087
82	3088	3089	3090
91	3091	3092	3093
100	3094	3095	3096
110	3097	3098	3099
120	3100	3101	3102
130	3103	3104	3105
150	3106	3107	3108
160	3109	3110	3111
180	3112	3113	3114
200	3115	3116	3117
220	3118	3119	3120
240	3121	3122	3123
270	3124	3125	3126
300	3127	3128	3129
330	3130	3131	3132
360	3133	3134	3135
390	3136	3137	3138
430	3139	3140	3141
470	3142	3143	3144
510	3145	3146	3147
560	3148	3149	3150

Cap. Value (pF)	Part Number Capacitance Tolerance		
	CYR52 M23269/10-		
300 Volts	±1%	±2%	±5%
620	3201	3202	3203
680	3204	3205	3206
750	3207	3208	3209
820	3210	3211	3212
910	3213	3214	3215
1,000	3216	3217	3218
	CYR53 M23269/10-		
1,100	3301	3302	3303
1,200	3304	3305	3306
1,300	3307	3308	3309
1,500	3310	3311	3312
1,600	3313	3314	3315
1,800	3316	3317	3318
2,000	3319	3320	3321
2,200	3322	3323	3324
2,400	3325	3326	3327

BestCap®
Pulse Supercapacitors

AVX's BestCap® technology provides excellent high power pulse characteristics based upon the combination of very high capacitance and ultra-low ESR, together with extremely low leakage current.

Based on a unique patented aqueous chemistry and an innovative design, this series offers high capacitance, even with short pulse applications such as in GSM, GPRS, Edge and PCS based systems.

While BestCap® technology offers more efficient energy savings in battery circuits than conventional supercapacitors, its Low ESR results in a high current handling capability, making this an ideal solution for any portable or wireless device requiring high power availability.

The Low Profile versions are ideally suited to PCMCIA, PDA, DSC and similar applications.

Check for up-to-date CV Tables at
http://www.avx.com/docs/catalogs/bestcap.pdf

HOW TO ORDER

(See Detailed Electrical Specifications for valid combinations)

BZ	0	1	5	A	503	Z	A	B	XX
BestCap®	**Standard**	**Case Size** 1 = 28mmx17mm 2 = 48mmx30mm 5 = 20mmx15mm	**Rated Voltage** 3 = 3.6V 4 = 4.5V 5 = 5.5V 7 = 7.0V 9 = 9.0V C = 12.0V	**Series** A = Maximum Capacitance B = Low Profile	**Capacitance Code (Farad Code)**	**Capacitance Tolerance** Z = (-20/+80)%	**Lead Format** A, H, L or S	**Packaging** B = Bulk	**Not Used For Standard Product (Consult Factory For Special Requirements)**

A-SERIES – MAXIMUM CAPACITANCE

Capacitance		Rated Voltage DC at 25°C									
mF	Code	3.6V		5.5V		7.0V		9.0V		12.0V	
		Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles
10	103									BZ05	S
22	223									BZ01	A, H, S
33	333			BZ05	S	BZ01	A, H, S	BZ01	A, H, S		
47	473									BZ11	S
50	503			BZ01	A, H, S						
68	683			BZ05	S						
70	703	BZ01	A, H, S								
90	903									BZ02	A, H, L
100	104			BZ01	A, H, S						
120	124							BZ02	A, H, L		
140	144	BZ01	A, H, **S**								
150	154										
200	204			BZ02	A, H, L						
280	284	BZ02	A, H, L								
400	404	BZ11	S	BZ02	A, H, L, S						
560	564	BZ02	A, H, L								
1000	105			BZ12	S						

■ Available
■ In Development

B-SERIES – LOW PROFILE

Capacitance		Rated Voltage DC at 25°C									
mF	Code	3.6V		4.5V		5.5V		9.0V		12.0V	
		Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles	Case Size	Lead Styles
15	153					BZ05	S			BZ01	A, H, S
22	223			BZ05	S			BZ01	A, H, S		
30	303					BZ01	S				
33	333			BZ01	S	BZ05	S				
47	473					BZ15	S				
50	503	BZ01	S								
60	603					BZ01	A, H, **S**				

■ Available
■ In Development

Surface Mount Fuse

Accu-Guard® II is a version of Accu-Guard® fuses for a wider range of current and voltage ratings. Constructed on alumina substrates, Accu-Guard® II fuses display superior electrical, mechanical and environmental properties. Accu-Guard® II dimensions are standard 0402, 0603, 0805, 1206 and 0612 chip sizes.

HOW TO ORDER

F	1206	A	0R20	F	W	TR
Product Fuse	**Size** See table for standard sizes	**Fuse Version** A=Accu-Guard® B=Accu-Guard® II C=Accu-Guard® II 0603 D=Accu-Guard® II 0612 E=Accu-Guard® II 0402, 0603	**Rated Current** Current expressed in Amps. Letter R denotes decimal point. e.g. 0.20A=0R20 1.75A=1R75	**Fuse Speed** F=Fast	**Termination** S=Nickel/Lead-Free Solder coated (Sn 100) W=Nickel/solder coated (Sn 63, Pb 37)	**Packaging** TR=Tape and reel

Type	Part Number	Current Rating A	Resistance 10% x I rated, 25°C Ω (max.)	Voltage Drop @1 x I rated, 25°C mV (max.)	Fusing Current (within 5 sec), 25°C A	Pre-Arc I^2t @ 50A A^2-sec	Rated Voltage V
F0402E	F0402E0R25FSTR	0.25	0.650	220	0.625	0.00005*	32
	F0402E0R50FSTR	0.50	0.250	180	1.25	0.0003	32
	F0402E0R75FSTR	0.75	0.200	180	1.875	0.003	32
	F0402E1R00FSTR	1.00	0.130	160	2.50	0.008	32
	F0402E1R50FSTR	1.50	0.060	140	3.75	0.03	32
	F0402E2R00FSTR	2.00	0.040	120	5.00	0.06	32
F0603E	F0603E0R25FSTR	0.25	0.650	220	0.625	0.00005*	32
	F0603E0R37FSTR	0.375	0.450	220	0.940	0.0001	32
	F0603E0R50FSTR	0.50	0.250	180	1.25	0.0003	32
	F0603E0R75FSTR	0.75	0.200	180	1.875	0.003	32
	F0603E1R00FSTR	1.00	0.130	160	2.50	0.008	32
	F0603E1R25FSTR	1.25	0.090	140	3.125	0.01	32
	F0603E1R50FSTR	1.50	0.060	140	3.75	0.03	32
	F0603E1R75FSTR	1.75	0.050	120	4.375	0.04	32
	F0603E2R00FSTR	2.00	0.040	120	5.00	0.06	32
	F0603E2R50FSTR	2.50	0.035	100	6.25	0.12	32
	F0603E3R00FSTR	3.00	0.030	100	7.50	0.25	32
F0603C	F0603C0R25FWTR	0.25	0.800	280	0.50	0.00003*	32
	F0603C0R37FWTR	0.375	0.500	280	0.75	0.0001	32
	F0603C0R50FWTR	0.50	0.320	280	1.00	0.0002	32
	F0603C0R75FWTR	0.75	0.300	280	1.50	0.0015	32
	F0603C1R00FWTR	1.00	0.200	240	2.00	0.004	32
	F0603C1R25FWTR	1.25	0.170	240	2.50	0.007	32
	F0603C1R50FWTR	1.50	0.110	240	3.00	0.012	32
	F0603C1R75FWTR	1.75	0.090	240	3.50	0.02	24
	F0603C2R00FWTR	2.00	0.075	240	4.00	0.03	24
	F0603C2R50FWTR	2.50	0.055	200	5.00	0.05	16
	F0603C3R00FWTR	3.00	0.045	200	6.00	0.1	16
F0805B	F0805B0R25FWTR	0.25	0.750	280	0.50	0.00003*	63
	F0805B0R50FWTR	0.50	0.350	280	1.00	0.0002	63
	F0805B0R75FWTR	0.75	0.270	280	1.50	0.001	63
	F0805B1R00FWTR	1.00	0.220	280	2.00	0.003	63
	F0805B1R25FWTR	1.25	0.170	280	2.50	0.007	63
	F0805B1R50FWTR	1.50	0.120	240	3.00	0.010	63
	F0805B2R00FWTR	2.00	0.080	220	4.00	0.030	63
	F0805B2R50FWTR	2.50	0.060	220	5.00	0.050	63
	F0805B3R00FWTR	3.00	0.050	220	6.00	0.10	63
F1206B	F1206B0R25FWTR	0.25	0.750	280	0.50	0.00003	63
	F1206B0R50FWTR	0.50	0.350	280	1.00	0.0002	63
	F1206B1R00FWTR	1.00	0.180	240	2.00	0.003	63
	F1206B1R50FWTR	1.50	0.120	240	3.00	0.010	63
	F1206B2R00FWTR	2.00	0.080	220	4.00	0.030	63
	F1206B3R00FWTR	3.00	0.050	220	6.00	0.10	63
F0612D	F0612D4R00FWTR	4.00	0.040	260	10	0.10	32
	F0612D5R00FWTR	5.00	0.025	200	12.5	0.25	32

*Current is limited to less than 50A at 32V due to internal fuse resistance.

APPLICATIONS

DC voltage filtering for:

- DC link
- Resonant filtering
- Active correction (FACTS, UPFC, DVR...)
- Speed converters (drives and traction)
- Windmills
- Substation

PACKAGING

Rectangular stainless steel case sandblasted. Grounding is via a threaded screw located on the cover of the case.

ELECTRICAL CHARACTERISTICS – STANDARD PRODUCTS

Capacitance range C_n	610µF to 15600µF
Tolerance on C_n	±10%
DC voltage range	1200V to 5000V
Maximum hot-spot temperature	85°C
Life duration at nominal voltage and 70°C hot-spot temperature	100000 hours
Stray inductance	<400nH
Test voltage between terminals	$1.5V_n$ during 10s
Test voltage between short terminals and case	$10kV_{rms}$ (at 50Hz during 1mn)
Standard reference	Conforms with IEC 61071 and 61881, 61373, 60068 and 60077

ELECTRICAL CHARACTERISTICS – CUSTOM PRODUCTS

Capacitance range C_n	83µF to 15300µF
Tolerance on C_n (±5% or ±2% available for specific requirements)	±10%
DC voltage range	1200V to 6000V
Maximum hot-spot temperature	85°C
Life duration at nominal voltage and 70°C hot-spot temperature	100,000 hours
Stray inductance On option low inductance for IGBT and other applications	200nH to 430nH down to 40nH
Test voltage between terminals	$1.5V_n$ during 10s
Test voltage between short terminals and case	$10kV_{rms}$ (at 50Hz during 1mn)
Standard reference	Conforms with IEC 61071, 61881 and 61373, IEC 60068 and IEC 60077

DC FILTERING

APPLICATIONS

The FFLC is specifically designed for DC filtering, low reactive power.

PACKAGING

Rectangular resin filled aluminum case.

FFLC capacitors meet the level 2 requirement of the fire behavior standard NF F 16 102.

PRESENTATION

Non-painted rectangular resin filled aluminium case

4 x M10 terminals*

NEW *Available with M10 X 12 female terminal upon request (last codification digit "--" become in that case "JE")*

ELECTRICAL CHARACTERISTICS

Capacitance range C_n	1120µF to 8800µF (other values available upon request)
Tolerance on C_n	±10%
Rated DC voltage $V_n$dc	680 to 1200 V
Maximum rms current I_{rms} max	140 Arms to 300 Arms
Stray inductance L_s*	28 nH to 40 nH

FFLC

Part Number	Capacitance (µF)	Height mm (in)	Width mm (in)	Irms (A)	Ls* (nH)	Rs (mΩ)	Rth (°C/W)	Weight (kg)
U_N dc: 680 V								
FFLC6A8807K--	8800	240 (9.449)	170 (6.693)	220	40	0.58	1.2	18
FFLC6A7157K--	7150	240 (9.449)	145 (5.709)	230	38	0.50	1.2	13.2
FFLC6A6507K--	6500	240 (9.449)	145 (5.709)	210	38	0.55	1.3	15.5
FFLC6A5607K--	5600	170 (6.693)	170 (6.693)	140	35	0.88	1.8	15.5
FFLC6A4557K--	4550	170 (6.693)	145 (5.709)	150	30	0.77	1.8	11.3
FFLC6A4187K--	4180	240 (9.449)	95 (3.740)	300	35	0.34	1.0	10.3
FFLC6A2667K--	2660	170 (6.693)	95 (3.740)	170	28	0.49	1.6	7.3
U_N dc: 1000 V								
FFLC6L5067K--	5060	240 (9.449)	170 (6.693)	250	40	0.61	1.2	17.2
FFLC6L3207K--	3200	170 (6.693)	170 (6.693)	150	35	0.89	1.9	12.4
FFLC6L4307K--	4300	240 (9.449)	145 (5.709)	300	38	0.52	1.1	15.5
FFLC6L2737K--	2730	170 (6.693)	145 (5.709)	170	30	0.75	1.6	11.3
FFLC6L2537K--	2530	240 (9.449)	95 (3.740)	300	35	0.36	0.8	10.3
FFLC6L1607K--	1600	170 (6.693)	95 (3.740)	170	28	0.51	1.2	7.3
U_N dc : 1200 V								
FFLC6U3527K--	3520	240 (9.449)	170 (6.693)	250	40	0.71	1.2	18.8
FFLC6U2247K--	2240	170 (6.693)	170 (6.693)	150	35	1.1	1.9	12.7
FFLC6U3007K--	3000	240 (9.449)	145 (5.709)	300	38	0.60	1.1	15.5
FFLC6U1907K--	1900	170 (6.693)	145 (5.709)	170	30	0.87	1.6	11.3
FFLC6U1757K--	1750	240 (9.449)	95 (3.740)	300	35	0.41	0.8	10.3
FFLC6U1127K--	1120	170 (6.693)	95 (3.740)	170	28	0.59	1.2	7.3

*Very low stray inductance for high frequency applications on request.

The FFV capacitor is specifically designed for DC filtering, low reactive power.

The series uses a non-impregnated metallized polypropylene or polyester dielectric, which features a controlled self-healing process, specially treated to have a very high dielectric strength in operating conditions up to 105°C.

The FFV special design gives this series a very low level of stray inductance (18 nH to 40 nH).

Furthermore, the performance levels of the FFVE capacitor makes them a very interesting alternative to electrolytic technology, because they can withstand much higher levels of surge voltage, very high rms current ratings, and longer lifetimes.

PACKAGING

Self-extinguishing plastic case (V0 = in accordance with UL 94) filled thermosetting resin.

Self-extinguishing thermosetting resin (V0 = in accordance with UL 94; I3F1 = in accordance with NF F 16-101).

FFVE capacitors meet the Level 2 requirement of the fire behavior standard NF F 16-102.

POLYESTER DIELECTRIC

Dimensions: millimeters (inches)

Capacitance (µF)	Height	Irms max. (A)	Ls max. (nH)	Rs (mΩ)	Rth (°C/W)	Part Number*
$V_n$dc 300 volts						
180	34 (1.339)	100	18	0.8	4.7	FFVE4H0187K--
195	34 (1.339)	100	18	0.8	4.4	FFVE4H1956K--
250	40 (1.575)	100	25	0.6	5.2	FFVE4H0257K--
350	51 (2.008)	100	32	0.8	7.2	FFVE4H0357K--
400	51 (2.008)	110	32	0.8	7.1	FFVE4H0407K--
$V_n$dc 400 volts						
100	34 (1.339)	80	18	0.7	4.7	FFVE4I0107K--
120	34 (1.339)	100	18	0.6	4.1	FFVE4I0127K--
150	40 (1.575)	100	25	0.7	5.0	FFVE4I0157K--
180	51 (2.008)	80	32	1.0	8.5	FFVE4I0187K--
220	51 (2.008)	100	32	0.9	7.2	FFVE4I0227K--

*Change “K--” to “KJE” for female connectors M5 x 7.5mm

POLYPROPYLENE DIELECTRIC

Capacitance (µF)	Height	Irms max. (A)	Ls max. (nH)	Rs (mΩ)	Rth (°C/W)	Part Number*
$V_n$dc 600 volts						
25	34 (1.339)	90	18	0.7	4.3	FFVE6K0256K--
100	40 (1.575)	100	25	0.6	4.8	FFVE6K0107K--
150	51 (2.008)	110	32	0.9	6.9	FFVE6K0157K--
220	64 (2.520)	100	40	1.0	8.4	FFVE6K0227K--
$V_n$dc 800 volts						
66	40 (1.575)	100	25	0.7	4.7	FFVE6B0666K--
100	51 (2.008)	90	32	1.0	6.7	FFVE6B0107K--
140	64 (2.520)	100	40	1.3	8.4	FFVE6B0147K--
$V_n$dc 900 volts						
12	34 (1.339)	70	18	0.9	4.4	FFVE6C0126K--
38	34 (1.339)	100	18	1.6	3.9	FFVE6C0386K--
47	40 (1.575)	100	25	0.8	4.6	FFVE6C0476K--
70	51 (2.008)	100	32	1.2	6.7	FFVE6C0706K--
100	64 (2.520)	90	40	1.1	8.2	FFVE6C0107K--
$V_n$dc 1000 volts						
66	40 (1.575)	70	25	1.5	5.1	FFVE6L0666KJ7
100	51 (2.008)	64	32	2.0	7.3	FFVE6L0107KJ7
140	64 (2.520)	51	40	2.5	9.2	FFVE6L0147KJ7
$V_n$dc 1200 volts						
47	40 (1.575)	66	25	1.7	4.9	FFVE6U0476KJ7
70	51 (2.008)	59	32	2.4	7.2	FFVE6U0706KJ7
100	64 (2.520)	49	40	2.9	8.9	FFVE6U0107KJ7
$V_n$dc 1900 volts						
15	40 (1.575)	73	25	1.1	5.2	FFVE6N0156KJ7
24	51 (2.008)	73	32	1.3	6.5	FFVE6N0246KJ7
35	64 (2.520)	67	40	1.6	8.4	FFVE6N0356KJ7

*Change “K--” to “KJE” for female connectors M5 x 7.5mm
*Change “KJ7” to “K7X” for female connectors M5 x 7.5mm

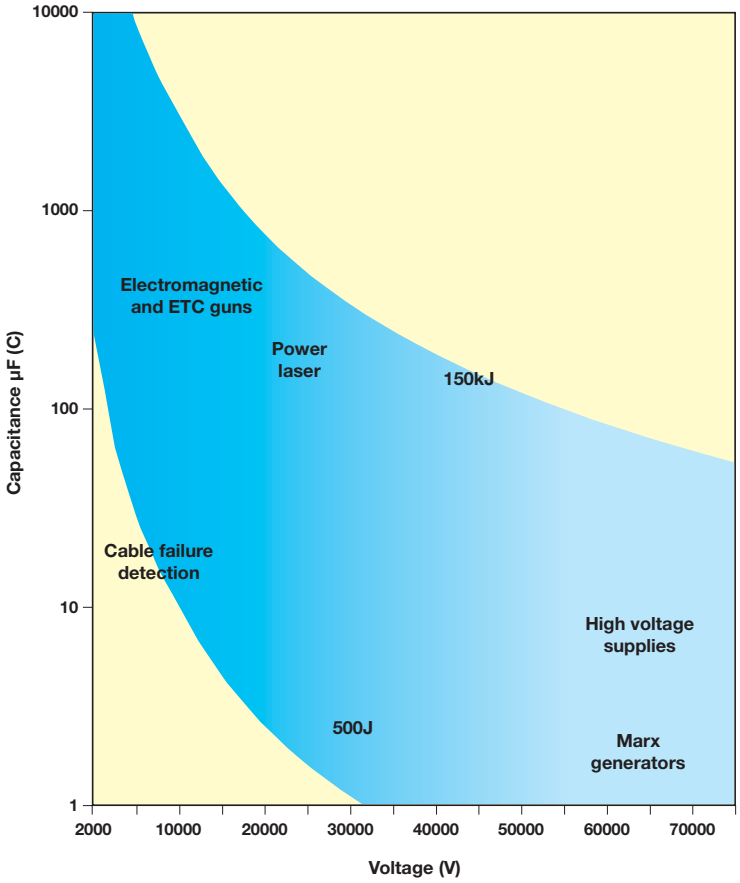
POLYPROPYLENE DIELECTRIC

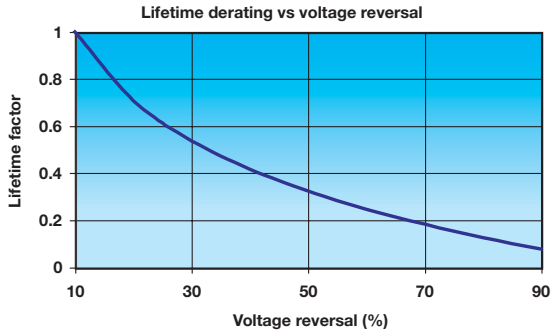
Capacitance (µF)	Height	Irms max. (A)	Ls max. (nH)	Rs (mΩ)	Rth (°C/W)	Part Number*
$V_n$dc 500 volts						
125	40 (1.575)	90	25	0.6	5.0	FFVI6J1256K--
200	51 (2.008)	90	32	0.8	6.7	FFVI6J0207K--
275	64 (2.520)	90	40	0.9	8.7	FFVI6J2756K--
$V_n$dc 700 volts						
100	40 (1.575)	100	25	0.6	4.8	FFVI6A0107K--
150	51 (2.008)	100	32	0.9	6.9	FFVI6A0157K--
220	64 (2.520)	100	40	1.0	8.4	FFVI6A0227K--
$V_n$dc 900 volts						
66	40 (1.575)	100	25	0.7	4.7	FFVI6C0666K--
100	51 (2.008)	90	32	1.0	6.7	FFVI6C0107K--
140	64 (2.520)	100	40	1.3	8.4	FFVI6C0147K--
$V_n$dc 1100 volts						
47	40 (1.575)	100	25	0.8	4.6	FFVI6L0476K--
70	51 (2.008)	100	32	1.2	6.7	FFVI6L0706K--
100	64 (2.520)	90	40	1.1	8.2	FFVI6L0107K--

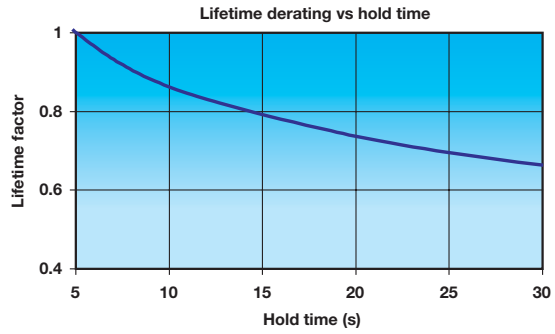
*Change “K--” to “KJE” for female connectors M5 x 7.5mm

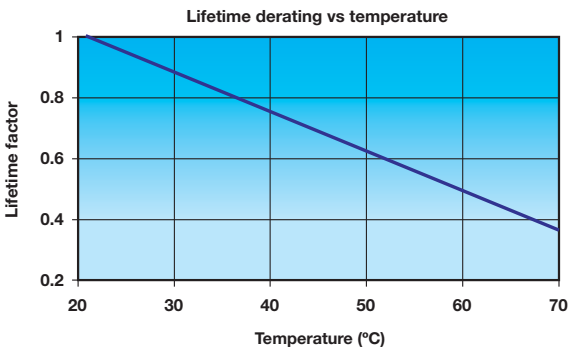
DISFIM High Voltage Film Capacitors

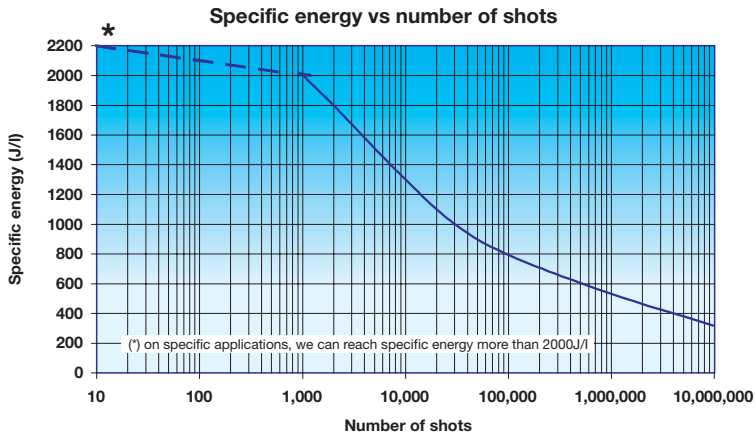
Controlled self-healing film capacitor technology, is ideal for discharge applications. DISFIM capacitors range from 2kV to 75kV and the maximum energy per can is 150kJ. Each capacitor is divided into several million elementary capacitances. The weak points in the dielectric are insulated and the capacitor continues to work without a short circuit or risk of explosion. They are designed to lose less than 5% of their capacitance during their lifetime.











Medium Power Film Capacitors
FPX

APPLICATIONS

Protection of thyristors.
Protection of gate turn-off thyristor (G.T.O.).
Clamping (Secondary snubber).

TECHNOLOGY

Metallized polypropylene dielectric capacitor with controlled self-healing.

Reinforced metallization developed for high impulse currents.

Axial connections specially developed to reduce series inductance and to provide rigid mechanical mounting.

PACKAGING

Cylindrical in plastic case filled with thermosetting resin.

Outputs: threaded inserts either M6 or M8.

PROTECTION

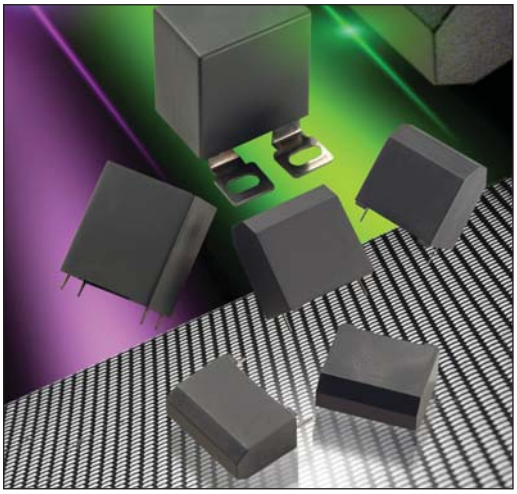
Dimensions: millimeters (inches)

Cn (µF)	Dimensions					I^2t max. (A^2s)	I_{rms} max. (A)	Rs (mΩ)	Rth (°C/W)	Part Number
	Case Type	H* ±0.5 (±0.020)	h ±2 (±0.079)	D max.	d ±0.1					
FPX 2000 V		**$V_n$dc = 1000 V**		**V_{peak} = 1600 V**		**V_{rms} = 560 V**		**V_s = 2000 V**		
1	Plastic case M6/6	52 (2.072)	5 (0.197)	40 (1.575)	18 (0.709)	2	15	2.4	14	FPX66N0105J--
2	Plastic case M8/8	52 (2.072)	5 (0.197)	60 (2.362)	22 (0.866)	8	30	1.2	6.1	FPX86N0205J--
3	Plastic case M8/8	52 (2.072)	5 (0.197)	72 (2.835)	22 (0.866)	18	45	0.9	4.5	FPX86N0305J--
3.5	Plastic case M8/8	52 (2.072)	5 (0.197)	72 (2.835)	22 (0.866)	25	50	0.85	4.5	FPX86N0355J--
4	Plastic case M8/8	52 (2.072)	5 (0.197)	82 (3.228)	22 (0.866)	32	60	0.75	3.5	FPX86N0405J--
5	Plastic case M8/8	52 (2.072)	5 (0.197)	82 (3.228)	22 (0.866)	50	70	0.65	2.5	FPX86N0505J--
FPX 2500 V		**$V_n$dc = 1300 V**		**V_{peak} = 2000 V**		**V_{rms} = 700 V**		**V_s = 2500 V**		
0.5	Plastic case M6/6	52 (2.072)	5 (0.197)	40 (1.575)	18 (0.709)	1	15	3	14	FPX66P0504J--
1	Plastic case M8/8	52 (2.072)	5 (0.197)	60 (2.362)	22 (0.866)	3	20	2.3	10.5	FPX86P0105J--
1.5	Plastic case M8/8	52 (2.072)	5 (0.197)	60(2.362)	22 (0.866)	7	30	1.5	6.1	FPX86P0155J--
2	Plastic case M8/8	52 (2.072)	5 (0.197)	72 (2.835)	22 (0.866)	12.7	40	1.1	4.5	FPX86P0205J--
2.5	Plastic case M8/8	52 (2.072)	5 (0.197)	72(2.835)	22 (0.866)	20	60	0.89	3.7	FPX86P0255J--
3	Plastic case M8/8	52 (2.072)	5 (0.197)	82 (3.228)	22 (0.866)	28	60	0.85	3.2	FPX86P0305J--
3.5	Plastic case M8/8	52 (2.072)	5 (0.197)	82(3.228)	22 (0.866)	39	65	0.78	2.9	FPX86P0355J--
FPX 3500 V		**$V_n$dc = 2000 V**		**V_{peak} = 2400 V**		**V_{rms} = 850 V**		**V_s = 3500 V**		
2	Plastic case M8/8	62 (2.441)	5 (0.197)	72 (2.835)	22 (0.866)	23	41	1.24	6.1	FPX86X0205J-
3	Plastic case M8/8	62 (2.441)	5 (0.197)	92 (3.622)	22 (0.866)	50	62	0.92	3.9	FPX86X0305J--
3.5	Plastic case M8/8	62 (2.441)	5 (0.197)	92 (3.622)	22 (0.866)	70	72	0.83	3.4	FPX86X0355J--
4	Plastic case M8/8	62 (2.441)	5 (0.197)	92 (3.622)	22 (0.866)	85	80	0.78	3.1	FPX86X0405J--
FPX 4500 V		**$V_n$dc = 2500 V**		**V_{peak} = 3200 V**		**V_{rms} = 1130 V**		**V_s = 4500 V**		
0.9	Plastic case M8/8	62 (2.441)	5 (0.197)	72 (2.835)	22 (0.866)	15	40	1.5	6.2	FPX86Z0904J--
1	Plastic case M8/8	62 (2.441)	5 (0.197)	72 (2.835)	22 (0.866)	15	38	1.4	6.2	FPX86Z0105J--
2	Plastic case M8/8	62 (2.441)	5 (0.197)	92 (3.622)	22 (0.866)	70	75	0.85	3.1	FPX86Z0205J--
FPX 4600 V		**$V_n$dc = 3000 V**		**V_{peak} = 4000 V**		**V_{rms} = 1400 V**		**V_s = 4600 V**		
0.5	Plastic case M8/8	62 (2.441)	5 (0.197)	72 (2.835)	22 (0.866)	7	40	1.7	12	FPX86Y0504J--
0.68	Plastic case M8/8	62 (2.441)	5 (0.197)	72 (2.835)	22 (0.866)	14	35	1.59	6.2	FPX86Y0684J--
1.25	Plastic case M8/8	62 (2.441)	5 (0.197)	92 (3.622)	22 (0.866)	50	65	1	3.3	FPX86Y1254J--
1.5	Plastic case M8/10	79 (3.110)	6 (0.236)	98 (3.858)	–	32	60	1.4	8.3	FPX86Y0155J--
1.7	Plastic case M8/10	79 (3.110)	6 (0.236)	98 (3.858)	–	40	70	1.3	7.4	FPX86Y0175J--
2	Plastic case M8/10	79 (3.110)	6 (0.236)	98 (3.858)	–	56	80	1.1	6.3	FPX86Y0205J--
2.5	Plastic case M8/10	118 (4.646)	6 (0.236)	98 (3.858)	–	200	130	0.8	1.1	FPX86Y0255J--
2.7	Plastic case M8/10	118 (4.646)	6 (0.236)	98 (3.858)	–	232	140	0.7	1.1	FPX86Y0275J--
3	Plastic case M8/10	143 (5.630)	6 (0.236)	98 (3.858)	–	128	100	0.9	1.5	FPX86Y0305J--
3.5	Plastic case M8/10	143 (5.630)	6 (0.236)	98 (3.858)	–	170	110	0.8	1.4	FPX86Y0355J--
4	Plastic case M8/10	143 (5.630)	6 (0.236)	98 (3.858)	–	224	115	0.8	1.4	FPX86Y0405J--
4.5	Plastic case M8/10	163 (6.417)	6 (0.236)	98 (3.858)	–	522	120	0.6	1.7	FPX86Y0455J--
5	Plastic case M8/10	163 (6.417)	6 (0.236)	98 (3.858)	–	600	130	0.6	1.7	FPX86Y0505J--
6	Plastic case M8/10	163 (6.417)	6 (0.236)	98 (3.858)	–	729	160	0.5	1.7	FPX86Y0605J--

* Tol: +0 / -3mm for H ≥ 118mm

Medium Power Film Capacitors

FSB



Metallized polypropylene dielectric capacitor with controlled self-healing. Reinforced metallization developed for high impulse currents.

APPLICATIONS

- IGBT protection
- IGBT clamping

PACKAGING

- Parallelipedic plastic case with thermosetting resin

References	Capacitance (µF)	Box Kind	(I²t) (A²s)	Irms (A)	Rs (mΩ)	Rth (hotspot/amb.)
$U_N$dc = 1200V		**Vpeak = 1600V**		**Vrms = 560V**		**Vs = 2000V**
FSB16U0154J--	0.15	P0	0.05	3	14.3	45.9
FSB26U0274J--	0.27	18	0.15	7.6	8.4	36.8
FSB36U0394J--	0.39	19	0.31	11	6.2	32.2
FSB46U0474J--	0.47	26	0.41	12	5.6	29.4
FSB56U0684J--	0.68	R68 (2 terminals)	0.94	12	3.8	23.7
FSB56U0684JJC	0.68	R68 (4 terminals)	0.94	16.7	3.8	23.7
$U_N$dc = 1600V		**Vpeak = 2000V**		**Vrms = 630V**		**Vs = 2300V**
FSB16M0134J--	0.13	P0	0.05	4.6	13.3	44.9
FSB26M0184J--	0.18	18	0.1	6.4	9.9	35.9
FSB36M0244J--	0.24	19	0.18	8.5	7.8	32.4
FSB46M0334J--	0.33	26	0.35	11.7	5.6	28.6
FSB56M0434J--	0.43	R68 (2 terminals)	0.59	12	4.6	23.8
FSB56M0434JJC	0.43	R68 (4 terminals)	0.59	15.2	4.6	23.8
$U_N$dc = 2000V		**Vpeak = 2400V**		**Vrms = 700V**		**Vs = 2600V**
FSB16N0104J--	0.1	P0	0.05	4.2	14.3	44.6
FSB26N0134J--	0.13	18	0.08	5.5	11.3	35.7
FSB36N0184J--	0.18	19	0.15	7.6	8.5	32.1
FSB46N0224J--	0.22	26	0.22	9.3	6.8	29.1
FSB56N0304J--	0.3	R68 (2 terminals)	0.41	12	5.3	23.8
FSB56N0304JJC	0.3	R68 (4 terminals)	0.41	12.7	5.3	23.8

Part Number	Capacitance (µF)	(I²t) (A²s)	$I_{rms\ max.}$ (A)	R_s (mΩ)	R_{th} (°C/W)
FSB 850V	**$V_n$dc = 850V**	**V_{peak} = 1200V**	**V_{rms} = 450V**		**V_S = 1500V**
FSB66B0205K--	2	0.99	25	3.4	19.1
FSB66B0225K--	2.2	1.19	28	3.1	18.6
FSB66B0255K--	2.5	1.54	28	2.7	17.8
FSB 1200V	**$V_n$dc = 1200V**	**V_{peak} = 1600V**	**V_{rms} = 560V**		**V_S = 2000V**
FSB66U0105K--	1	1.47	25	3.6	17.2
FSB66U0125K--	1.2	1.69	26	3.4	17.5
FSB66U0155K--	1.5	1	26	3.4	17.5
FSB 2000V	**$V_n$dc = 2000V**	**V_{peak} = 2400V**	**V_{rms} = 700V**		**V_S = 2600V**
FSB66N0474K--	0.47	0.41	22	6.3	19.4
FSB66N0564K--	0.56	0.62	23	5.2	17.9
FSB66N0684K--	0.68	0.91	24	4.4	17.3

M55302 Two Piece Edge Board Connectors

- M55302 Qualified
- 64 & 96 Pin Male and Female
- Vertical and Right Angle
- Gold Plated Contacts
- Certified to M55302 (500 mating cycles)
- Marked with Military number
- Group A & B testing standard

M55302 / XXX - XX

01-09 =
Contact Style
Contact Tail Length

131 = 96 Pin R/A Male
132 = 96 Pin Vert Female
133 = 64 Pin R/A Male
134 = 64 Pin Vert Female
157 = 64 Pin Vert Male
148 = 64 Pin R/A Female

MIL-C-55074

Hermaphrocon™ Connecting System

FEATURES:

- Designed for mobile, transportable, and semi-permanent military communications facilities (telephone, telegraph, teletype, radio, etc.)
- High-reliability Hermaphrocon™ connectors are designed for speedy, foolproof interconnections under extreme field conditions, are impossible to mismate, even in the dark
- Hermaphrocon™ plugs mate interchangeably with both receptacles and plugs, permitting connection of either cable end to any other cable end of distribution box
- Redundant Hermaphrocon™ design provides 104 contacts for 52 cable conductors (52 pairs) assures circuit continuity with up to 50% contact damage (jumpers linking redundant contact pairs are welded for reliability)
- Rugged, waterproof Hermaphrocon™ connectors resist wear and damage caused by dragging on the ground or through water, even without covers

SPECIFICATIONS:

- PLUG, ELECTRICAL U-185B/G CONNECTOR
- RECEPTACLE, ELECTRICAL U-186C/G CONNECTOR
- RECEPTACLE, ELECTRICAL U-187A/G CONNECTOR
- CONTACT ASSEMBLY, ELECTRICAL MX-3227/G (as applicable)
- HOUSINGS: Die-cast aluminum alloy with protective finish per MIL-F-14072
- GASKETS AND GLANDS: Silicone rubber
- INSULATORS: Fortron-PPS-Black
- INSULATION RESISTANCE: 1000 megohms, minimum
- CONTACTS: Beryllium copper, gold plated
- CONTACT RESISTANCE: 7 milliohms, maximum
- IMMERSION: per MIL-C-55074
- MOISTURE RESISTANCE: per MIL-C-55074
- AIR LEAKAGE: per MIL-C-55074
- VIBRATION: per MIL-C-55074
- TEMPERATURE: –65°F to 150°F
- OVERALL DIMENSIONS (approx.):
  U-185B/G 2.437" x 2.750" x 13.125"
  U-186C/G 3.500" x 4.000" x 6.375"
  U-187A/G 2.375" x 3.125" x 6.375"
- MILITARY SPECIFICATION: MIL-C-55074, MIL-STD-454

Plug (Cable Connector)

U-185B/G

Receptacle

U-186C/G Bottom Mount

Side Mount

U-187A/G

Contact Assembly

MX-3227/G

Binding Post

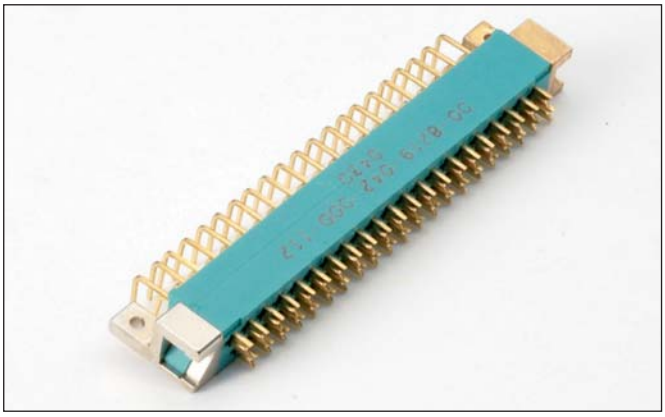
SC-C-136011

ELCO P/N 08 2264 0130 00 000
MATERIAL: Brass, machined (terminal)
Nylon (housing)

PART	ELCO PART NUMBER	MILITARY PART NUMBER	DESCRIPTION
ELCO HERMAPHROCON™ CONNECTORS	08 2260 0110 00 000	U-185B/G M-55074/1-01	HERMAPHROCON™ PLUG, cable type
	08 2276 0110 00 000	U-186C/G M-55074/2-01	HERMAPHROCON™ RECEPTACLE, panel type
	08 2263 0110 00 000	U-187A/G M-55074/3-01	HERMAPHROCON™ RECEPTACLE, panel type
	08 2260 9010 00 000	MX-3227/G M-55074/4-01	HERMAPHROCON™ CONTACT ASSEMBLY
BINDING POSTS	08 2264 0110 00 000	SIG. CORPS. DWG. # SC-C-136011	SHORT SPRING BINDING POST ASSEMBLY with O-ring, flat washer, split washer and nut - White
	08 2264 0120 00 000	SIG. CORPS. DWG. # SC-C-136001	SHORT SPRING BINDING POST ASSEMBLY without hardware - White
	08 2264 0130 00 000	SIG. CORPS. DWG. # SC-C-136001	LONG SPRING BINDING POST with O-ring, flat washer, split washer and nut - White
	08 2264 0121 00 000	SIG. CORPS. DWG. # SC-C-136001	LONG SPRING BINDING POST without hardware - White

Varicon®

Series 8219 – 0.050" Staggered Dual Row



FEATURES

- For p.c. card-to-card applications
- High contact density
- Low withdrawal force contacts
- Rugged, color coded end guides
- Parallel or perpendicular p.c. board mounting
- Mates with Series 8218

TECHNICAL SPECIFICATIONS

Current Rating:
5 amperes, maximum

Contact Resistance:
6 milliohms, maximum

Contact Material and Plating:
Phosphor Bronze

Gold, 10 microinches minimum, over nickel, 50 to 100 microinches

Insulator Material:
Diallyl phthalate, glass-filled, flame resistant per MIL-M-14F, Type SDGF.

Guidance Hardware:
Left hand guides: Metal, gold color
Right hand guides: Metal, silver color

Insulation Resistance:
5,000 megohms, minimum

Dielectric Withstanding Voltage:
Sea Level: 1000 Volts rms
3.4" Hg: 500 Volts rms

Insertion/Withdrawal Force:
2 to 8 ounces per contact

ORDERING CODE

00	8219	042	722	001
		Number of Contacts: 018, 030, 036, 042, 054, 072	Contact Code (see below)	Variation Code

For Variation = 001

Code No.	Contact Type	"X" Dim.
722	Wire hole tail	.187
721	P. C. solder tail	.250
736	P. C. solder tail	.281
737	P. C. solder tail	.562
753	P. C. solder tail	.125
771	P. C. solder tail	.484

For Variation = 002

Code No.	Contact Type
000	P. C. solder tails formed
722	Wire hole tail unformed

For Variation = 005

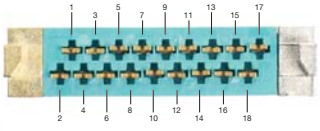
Code No.	Contact Type	"Y" Dim.
722	Wire hole tail	.157
721	P. C. solder tail	.219
736	P. C. solder tail	.250
737	P. C. solder tail	.531
753	P. C. solder tail	.093
771	P. C. solder tail	.453

Without Keying	001 = Receptacle
	002 = Plug, parallel board mounting
	005 = Plug, perpendicular board mounting

NOTE: Connector is supplied with mounting screws or eyelets, as applicable (see drawings).

Contact Factory for Special Variations.

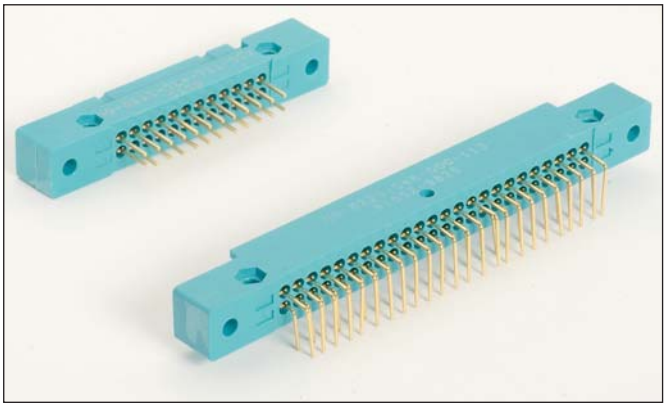
POLARIZING SYSTEM



When Keying is ordered with part number, the Key is installed at the factory.

Varicon®

Series 8223 – 0.100" Dual Row Square Grid



FEATURES

- Wide range of contact terminations including wire wrapping, P.C. solder tail, wire hole, wire crimp
- For 1/16", 3/32" P.C. card
- Polarity and keying are built into the connector body to prevent mismating
- Perpendicular or parallel connector mounting
- Proven Varicon® contact reliability
- Protected male; recessed female contacts

TECHNICAL SPECIFICATIONS

CONTACTS

Current Rating:
5 amperes with 22 AWG wire

Contact Resistance:
6 milliohms, maximum

Contact Material and Plating:
Phosphor Bronze

Nickel plate, 50 to 100 microinches, followed by gold plate.

10 microinches minimum

INSULATORS

Material:
Diallyl Phthalate, glass-filled, flame resistant, per MIL-M-14-F, Type SDGF

Insulation Resistance:
5,000 megohms, minimum

Dielectric Withstanding Voltage:
Sea Level: 1,000 Volts rms

Insertion/Withdrawal Force:
2 to 8 ounces per contact

ORDERING CODE

00	8223	024	000	001
		Number of Contacts	Contact Code	Variation Code
		024, 048, 072 & 096		

Use three digit code number when contacts are to be factory installed. If contacts are to be supplied loose, or contact tails to be formed, use three zeros (000) in contact code section. Note that the wire crimp tail contacts can only be ordered as separate items by part numbers.

Code	Profile	Description	Part No.	H Dim.	Board Thk.
000		Coined Tail Formed 90° after installing (Max. 0236 Diag.)	60 8223 0223 60 8223 0213		.080 .062
000		Coined Tail Formed 90° after installing (Max. 0236 Diag.)	60 8223 0243 60 8223 0253		.093
722		Wire Hole Tail (.032 x .050)	60 8200 1613	.162	
721		P.C. Tail .020 Sq.	60 8200 1623	.228	
736		P.C. Tail .020 Sq.	60 8200 1633	.259	
737		P.C. Tail .020 Sq.	60 8200 1643	.541	
753		P.C. Tail .020 Sq.	60 8200 1653	.103	
771		P.C. Tail .020 Sq.	60 8200 1663	.462	
000		Crimp Contact (Reel 3000) 22-30 AWG	60 8216 0323		
000		Crimp Contact (Loose) 22-30 AWG	60 8216 0313		
491		Wrappable/Removable Contact (.025 Sq.)	60 8216 0413	.560	

Insulator Type	Variation	Contact Style	Accessories: Guide Pins Sockets (R) Keying	Board Thickness
Male (Exposed Contacts)	001	Formed Contact Terminal	X	.080 2.03 .062 1.57
	002	PC Terminal	X	
		Wire Hole Terminal	X	
		PC Straight Terminal	X	
	003	Crimp Contact	X	
		Wrappable Removable	X	
	004	Formed Contact Terminal	X	.093 2.36
Female (Exposed Contacts)	901	Formed Contact Terminal	X	.080 2.03 .062 1.57
	902	PC Terminal	X	
		Wire Hole Terminal	X	
		PC Straight Terminal	X	
	903	Crimp Contact	X	
		Wrappable Removable	X	
	904	Formed Contact Terminal	X	.093 2.36

Military QPL Listings

The MIL-QPL listings are intended as a guide to users. AVX Corporation should be consulted for latest information.

AVX LEADED CERAMIC CAPACITORS (MLCs)

MIL-PRF-20 Non-Established Reliability

50V, 100V, 200V (CG, CH, CJ, CK, CX)
Style CC05, CC06, CC07, CC08, CC09, CC14, CC75, CC76, CC77, CC78, CC79
Slash Sheets /27, /28, /29, /30, /31, /32, /33, /34, /35, /36, /37, /38, /48

MIL-PRF-20 Established Reliability

M, P, R and S Failure Rate Level
50V, 100V, 200V (CX, CK, CJ, CH, CG)
Style CCR05, CCR05V, CCR06, CCR06V, CCR07, CCR08, CCR09, CCR14, CCR75, CCR76, CCR77,CCR78, CCR79
Slash Sheets /27, /28, /29, /30, /31, /32, /33, /34, /35, /36, /37, /38, /48

MIL-C-11015

50V, 100V, 200V (BR, BX, BT, BU and BV)
Style CK05, CK06, CK12, CK13, CK14, CK15, CK16, CK31, CK32
Slash Sheets /18, /19, /20, /25

MIL-PRF-123

50V, 100V (BP, BX and BR)
Style CKS05, CKS06, CKS11, CKS12, CKS14, CKS15, CKS16, CKS22, CKS23, CKS24
Slash Sheets /01, /02, /04, /05, /06, /07, /08, /16, /17, /18

MIL-PRF-39014

M, P, R and S Failure Rate Level
50V, 100V, 200V (BR, BX, BT, BU and BV)
Style CKR04, CKR05, CKR05V, CKR06, CKR06V, CKR08 (M-Level only)
CKR11, CKR12, CKR13, CKR14, CKR15, CKR16, CKR31, CKR32
Slash Sheets /01, /02, /05, /20, /21, /23

M, P, R and S Failure Rate Level
50V, 100V, 200V (CG, CH, BX and BR)
Style CKR22, CKR23, CKR24
Slash Sheet /22

AVX SURFACE MOUNT AND MICROWAVE CAPACITORS

MIL-PRF-55681

M, P, R and S Failure Rate Level
50V, 100V (BP and BX)
Style CDR01, CDR02, CDR03, CDR04, CDR05, CDR06, CDR31, CDR32, CDR33, CDR34, CDR35
Slash Sheets /01, /02, /03, /07, /08, /09, /10, /11

MIL-PRF-55681/04

M, P, R and S Failure Rate Level
50V, 100V, 200V, 300V, 500V (BP and BG)
Style CDR11, CDR12, CDR13, CDR14
End Terminations: M, N, S, U, W, Y

AVX SWITCH MODE POWER SUPPLY CERAMIC CAPACITORS

MIL-PRF-49470

Style PS01 (Unencapsulated), Style PS02 (Encapsulated)
Level B (Standard Reliability)
50V, 100V (BX) Case Codes: 1 - 6
200V (BR) Case Codes: 1 - 6
500V (BQ) Case Codes: 3, 4, 5
Level T (High Reliability)
50V, 100V (BX) Case Codes: 1 - 6
200V (BR) Case Codes: 1 - 6
500V (BQ) Case Codes: 3, 4, 5

Note: MIL-PRF-49470 supersedes DSCC dwgs
87106 and 88011
These remain available on request.

AVX TANTALUM CHIP CAPACITORS

MIL-PRF-55365 Established Reliability

B, C, Weibull Failure Rate Level (these supersede exponential M, P, R and S FRL, which remain available for legacy programs).
All Voltages, All Case Sizes Terminations B, C, K
Style CWR09 / 19 / 29 (Slash Sheet /4, /11)
Style CWR11 (Slash Sheet /8)
Style CWR15 Microchip (Slash Sheet /12)

Consult AVX for QPL crosses to all tantalum DSCC dwgs.

AVX GLASS CAPACITORS

MIL-PRF-23269 Established Reliability

M and S Failure Rate Level
100V, 300V, 500V
Style CYR10, CYR15, CYR51, CYR52, CYR53
Slash Sheets /01-3001-3126, 7001-7126
/02-3001-3057, 7001-7057
/10-3001-3150, 3201-3218, 3301-3327

MIL-C-11272

300V, 500V
Style CY10, CY15, CY06, CY07, CY08
Slash Sheets /01, /02, /13, /14, /15

AVX CONNECTORS

MIL-C-55074 MIL std 454 Hermaphrocon Style

U185B/G M-55074/1-01; U186C/G M-55074/2-01
U187A/G M-55074/3-01; MX-3227/G M-55074/4-01
Binding Posts SC-C-136001/011

M55032-131/132/133/134/157/158 DIN41612 Style
8457 series B/C style, 64 and 96 positions
8477 series R style 96 positions

AVX FILTERS

MIL-PRF-28861 QPL List

All are Class B • All are Tin/Tin-Lead Plated
M28861/01-001GB through M28861/01-006GB
M28861/01-009GB through M28861/01-016GB
M28861/01-019GB through M28861/01-026GB
M28861/01-031GB through M28861/01-036GB
M28861/01-001TB through M28861/01-006TB
M28861/01-009TB through M28861/01-016TB
M28861/01-019TB through M28861/01-026TB
M28861/01-031TB through M28861/01-036TB
M28861/04-001GB through M28861/04-036GB
M28861/04-001TB through M28861/04-036TB
M28861/05-001GB through M28861/04-024GB
M28861/05-001TB through M28861/04-024TB
M28861/12-002GB through M28861/12-016GB
M28861/12-018GB through M28861/12-032GB
M28861/12-034GB; M28861/12-036GB

MIL-F-15733 are superseded by M28861; for cross-references to the following consult AVX:

MIL-F-15733/23
Style -000 -0006; -0013-0018; -0025-0030; -0037-0042; -0049-0054

MIL-F-15733/25
Style -0001-0006; -0008-0011; -0013-0018; -0020-0023

MIL-F-15733/26
Style -0001-0007; -0009-0011; -0013-0019; -0021-0023

MIL-F-15733/34
Style -0014 thru -0015; -0019; -0023; -0025-0027

ESCC APPROVAL LIST

MLC SURFACE MOUNT CAPACITORS

ESCC3009/003/004/005/006/022 (for NP0 dielectric)
AVX Styles - 0805 to 2220 ceramic chip capacitors (25V up to 400V)

ESCC3009/008/009/010/011/023 (for 2C1 or BX)
AVX Styles - 0805 to 2220 ceramic chip capacitors (25V up to 400V)

ESCC3009/034
AVX Styles - 1812/1825 1-3KV - Type 2

AVX LEADED CERAMIC CAPACITORS (MLC's)

ESCC3001030
AVX Styles - BR/CH/CV - 50-500 volts - Type 2

ESCC3001/034
AVX Styles - VR/CH/CV - 1-5KV - Type 2

BS9100
AVX Styles - BR/CH/CV - 50-500 volts. Custom builds 1B and 2C1 dielectrics

AVX TANTALUM SURFACE MOUNT CAPACITORS

ESCC3012/001
AVX Styles - TAJA, TAJB, TAJC, TAJD, TAJE, TAJR, TAJS, TAJT

NASA APPROVAL LIST

AVX TANTALUM SURFACE MOUNT CAPACITORS

NASA SRC9000
AVX Styles - TBM

AVX FILTERS

NASA SSQ 21215-21218
AVX EMI Filters

CECC APPROVAL LIST

AVX SWITCH MODE POWER SUPPLY CERAMIC CAPACITORS

CECC 30601-801
AVX Styles - BR40, BR50, BR84

CECC 30701-801
AVX Styles - BR40, BR50, BR84

AVX LEADED CERAMIC CAPACITORS (MLC's)

CECC 30601-801
AVX Styles - SR15, SR20, SR21, SR30, SR40, SR50, SR65

CECC 30701-801
AVX Styles - SR15, SR20, SR21, SR30, SR40, SR50, SR65

CECC 30701-802
AVX Styles - SR15, SR20, SR21, SR30, SR40, SR50, SR65

CECC 30601-009
AVX Styles - MR05, MR06

CECC 30701-007
AVX Styles - MR05, MR06

AVX MLC SURFACE MOUNT CAPACITORS

CECC 32101-801 + 32101 - 002 & - 003 (military version)
AVX Styles - AN12, AN13, AN14, AN15, AN20, AC12, AC13, AC14, AC15, AC20 (and upgraded level T3 & T5)

AVX TANTALUM CHIP CAPACITORS

CECC 30801-005
AVX Styles - TAJA, TAJB, TAJC, TAJD

CECC 30801-011
AVX Styles - TAJA, TAJB, TAJC, TAJD

AVX TANTALUM LEADED CAPACITORS

CECC 30201-032
AVX Style - TAP

CECC 30201-801
AVX Style - TAA

HIGH VOLTAGE LEADED CERAMIC CAPACITORS DSCC DRAWINGS

Specification #	Description	Capacitance Range
87046	C0G-1000 VDC	10 pF - 0.025 µF
87043	X7R-1000 VDC	100 pF - 0.47 µF
87040	X7R-2000 VDC	100 pF - 0.22 µF
87114	C0G-3000 VDC	10 pF - 8200 pF
87047	X7R-3000 VDC	100 pF - 0.1 µF
87076	C0G-4000 VDC	10 pF - 6800 pF
89044	X7R-4000 VDC	100 pF - 0.056 µF
87077	C0G-5000 VDC	10 pF - 5800 pF
87070	X7R-5000 VDC	100 pF - 0.033µF

Upscreening Options Available

TEST TYPE

DPA
DPA (chip)
DPA (assmb)
SOLDERABILITY
Group A
Group B
Group B (chip)
Group B (assmb)
Group C
CSI
GSI
Thermal Shock
Life Test (1000 hrs)
Life Test (2000 hrs)
Life Test (4000 hrs)
LVH
VTL
Moisture
Special 100Hr or 250Hr Life testing
Special Temperature Cycling
2-Plane X-Ray with Films, single emulsion
X-Ray with Films and Serialization
Terminal Strength Test
Ultrasonic Scan
Matched Pair Testing
Special Color Dot Marking
Special Part Marking
Nickel Leads
Gold Leads
Special T.C. Testing
Special "No Failure" Burn-In
NAVAIR solderability (purity per Mil-Std 2000)
Special Heat Soak (Sample test)
Failure Analysis From Screening
RTSH (Resistance to Solder Heat)
100% Thermal Shock
Special 168 Hour Sample Burn-In
Special HALT test
Special unencapsulated DPA at 7-10x
Low voltage breakdown per D04669
100% X-Ray per AS3316
Special ESR sample testing
Barometric Test
C-Mode Scanning Acoustic Microscope
Reports and photographs
First Article Inspection
100% Cap, DF, IF, Attributes Data
100% Cap, DF, IF, Variables Data
100% IR @ 125ºC
Burn In (168 hr)
Burn In (250 hr)
Burn In Other
Bondability
Surge Test
Hi Frequency Test
Low Frequency Test
Power Testing
Lightning Simulation
Pretty Much Anything Else you can dream up

DATA CHARGES

C-SAM data
Screening data
Marking Perm data
Solderability data
Group A data
Group A data (chip)
Group A data (assmb)
Group B data
Group B data (chip)
Group B data (assmb)
Group C data
Generic Group C data
DPA data (chip)
DPA data (assmb)
Serialization (R&R)
Attributes Data
Variables Data

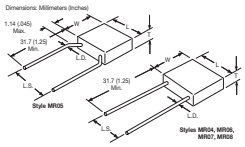
SPECIAL PACKAGING

Blister Package (Std. Slide pack)
Special Blister Pack (AS153219 Ford)
Barrier Bag (1-5 pcs)
Barrier Bag (6 pcs or more)
Auto Bag (Less than 100 pcs)
Vial Package (1 per vial)
T&R

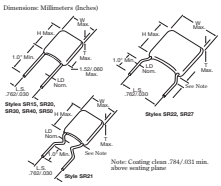
Contact your local sales team for further details.

CECC 30-601 & 30-701 Range

Molded Radial – CECC	Qual level	Voltage range	Cap range
1B/C0G	CECC 30 601 009 Issue 1	50V - 200V	1pF to 22nF
2C1/X7R	CECC 30 701 007 Issue 1	50V - 200V	220pF to 1µF
2F4/Y5V	CECC 30 701 008 Issue 1	50V - 100V	10nF to 3.3µF

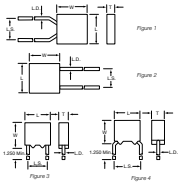


SkyCap – CECC	Qual level	Voltage range	Cap range
1B/C0G	CECC 30 601 801 Issue 2	50V - 500V	1pF to 27nF
2C1/X7R	CECC 30 701 801 Issue 2	50V - 500V	22pF to 1µF
2F4/Y5V	CECC 30 701 802 Issue 1	50V - 100V	10nF to 2.2µF

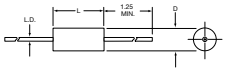


MIL-C-39014 RANGE

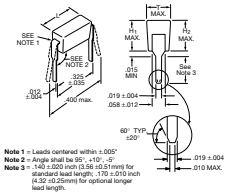
Radial Leads MIL-C-39014	Qual level	Voltage range	Cap range
BX (+15-15% no voltage, +15-25 RV)	MIL-C-39014	50V - 200V	10pF to 1µF



Axial Leads MIL-C-39014	Qual level	Voltage range	Cap range
BX (+15-15% no voltage, +15-25 RV)	MIL-C-39014	50V - 100V	10pF to 0.1µF
BR (+15-15% no voltage, +15-40 RV)	MIL-C-39014	50V - 100V	56nF to 3.3µF

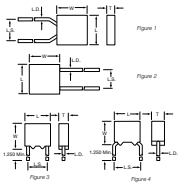


2 Pin DIP MIL-C-39014	Qual level	Voltage range	Cap range
CKR**CH (-55+150°C 60ppm/°C)	MIL-C-39014	200V	1pF to 18pF
CKR**CG (-55+150°C 30ppm/°C)	MIL-C-39014	50V - 200V	22pF to 10nF
CKR**BX (+15-15% no voltage, +15-25 RV)	MIL-C-39014	50V - 200V	270pF to 0.22µF
CKR**BR (+15-15% no voltage, +15-25 RV)	MIL-C-39014	50V - 100V	0.12nF to 1µF

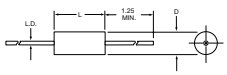


MIL-C-11015 RANGE

Radial Leads MIL-C-39015	Qual level	Voltage range	Cap range
BX (+15-15% no voltage, +15-25 RV)	MIL-C-39015	50V - 200V	10pF to 1µF

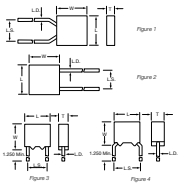


Axial Leads MIL-C-39015	Qual level	Voltage range	Cap range
BX (+15-15% no voltage, +15-25 RV)	MIL-C-39015	50V - 100V	10pF to 0.1µF
BR (+15-15% no voltage, +15-40 RV)	MIL-C-39015	50V - 100V	56nF to 3.3µF

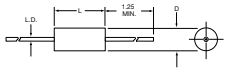


MIL-C-20 RANGE

Radial Leads MIL-C-20	Qual level	Voltage range	Cap range
CX ultra stable (not possible to measure)	MIL-C-20	200V	1pF to 2pF
CK ±250ppm/°C	MIL-C-20	200V	2.2pF to 3.9pF
CJ ±120ppm/°C	MIL-C-20	200V	4.3pF to 7.5pF
CH ±60ppm/°C	MIL-C-20	200V	8.2pF to 18pF
CG ±30ppm/°C	MIL-C-20	50V to 200V	20pF to 100nF

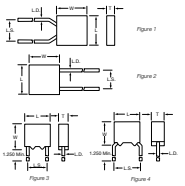


Axial Leads MIL-C-20	Qual level	Voltage range	Cap range
CX ultra stable (not possible to measure)	MIL-C-20	200V	1pF to 2pF
CK ±250ppm/°C	MIL-C-20	200V	2.2pF to 3.9pF
CJ ±120ppm/°C	MIL-C-20	200V	4.3pF to 7.5pF
CH ±60ppm/°C	MIL-C-20	200V	8.2pF to 18pF
CG ±30ppm/°C	MIL-C-20	50V to 200V	20pF to 82nF

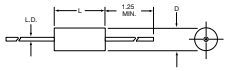


MIL-C-123 RANGE

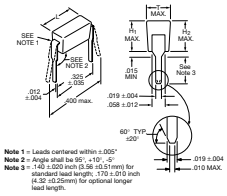
Radial Leads MIL-C-123	Qual level	Voltage range	Cap range
BP ±30ppm/°C	MIL-C-123	50V - 100V	4.7pF to 4.7nF
BX (+15-15% no voltage, +15-25 RV)	MIL-C-123	50V - 100V	270pF to 0.47µF



Axial Leads MIL-C-123	Qual level	Voltage range	Cap range
BP ±30ppm/°C	MIL-C-123	50V - 100V	4.7pF to 22nF
BX (+15-15% no voltage, +15-25 RV)	MIL-C-123	50V - 100V	100pF to 1µF



2 πPin DIP MIL-C-123	Qual level	Voltage range	Cap range
BP ±30ppm/°C	MIL-C-123	50V - 200V	1pF to 10nF
BX (+15-15% no voltage, +15-25 RV)	MIL-C-123	50V - 200V	270pF to 0.22µF
BR (+15-15% no voltage, +15-40 RV)	MIL-C-123	50V - 100V	120nF to 0.47µF



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