

# High Voltage MLC Radials (SV Style)

## Application Information on High Voltage MLC Capacitors



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.

### COG Dielectric General Specifications

#### Capacitance Range

10 pF to 0.15  $\mu$ F  
(+25°C, 1.0  $\pm$ 0.2 Vrms at 1kHz,  
for  $\leq$ 100 pF use 1 MHz)

#### Capacitance Tolerances

$\pm$ 5%;  $\pm$ 10%;  $\pm$ 20%

#### Operating Temperature Range

-55°C to +125°C

#### Temperature Characteristic

0  $\pm$  30 ppm/°C

#### Voltage Ratings

600 VDC thru 5000 VDC (+125°C)

#### Dissipation Factor

0.15% max.  
(+25°C, 1.0  $\pm$ 0.2 Vrms at 1kHz,  
for  $\leq$ 100 pF use 1 MHz)

#### Insulation Resistance (+25°C, at 500V)

100K M $\Omega$  min. or 1000 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Insulation Resistance (+125°C, at 500V)

10K M $\Omega$  min., or 100 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Dielectric Strength

120% rated voltage, 5 seconds

#### Life Test

100% rated and +125°C

### N1500 General Specifications

#### Capacitance Range

100 pF to 0.47  $\mu$ F  
(+25°C, 1.0  $\pm$ 0.2 Vrms (open circuit  
voltage) at 1kHz)

#### Capacitance Tolerances

$\pm$ 5%;  $\pm$ 10%; 20%

#### Operating Temperature Range

-55°C to +125°C

#### Temperature Characteristic

-1500  $\pm$ 250 ppm/°C

#### Voltage Ratings

600 VDC thru 5000 VDC (+125°C)

#### Dissipation Factor

0.15% max.  
(+25°C, 1.0  $\pm$ 0.2 Vrms (open circuit  
voltage) at 1kHz)

#### Insulation Resistance (+25°C, at 500V)

100K M $\Omega$  min., or 1000 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Insulation Resistance (+125°C, at 500V)

10K M $\Omega$  min., or 100 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Dielectric Strength

120% rated voltage, 5 seconds

#### Life Test

100% rated and +125°C

### X7R Dielectric General Specifications

#### Capacitance Range

100 pF to 2.2  $\mu$ F  
(+25°C, 1.0  $\pm$ 0.2 Vrms at 1kHz)

#### Capacitance Tolerances

$\pm$ 10%;  $\pm$ 20%; +80%, -20%

#### Operating Temperature Range

-55°C to +125°C

#### Temperature Characteristic

$\pm$ 15% (0 VDC)

#### Voltage Ratings

600 VDC thru 5000 VDC (+125°C)

#### Dissipation Factor

2.5% max.  
(+25°C, 1.0  $\pm$ 0.2 Vrms at 1kHz)

#### Insulation Resistance (+25°C, at 500V)

100K M $\Omega$  min., or 1000 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Insulation Resistance (+125°C, at 500V)

10K M $\Omega$  min., or 100 M $\Omega$ - $\mu$ F min.,  
whichever is less

#### Dielectric Strength

120% rated voltage, 5 seconds

#### Life Test

100% rated and +125°C



Performance of SMPS capacitors can be simulated by downloading SpiCalci software program -  
<http://www.avx.com/download/software/SpiCalci-AVX.zip>  
Custom values, ratings and configurations are also available.



# High Voltage MLC Radials (SV Style)



SV01 thru SV17

SV52 thru SV59 and SV63 thru SV67

**Not RoHS Compliant**



For RoHS compliant products, please select correct termination style.

## HIGH VOLTAGE RADIAL LEAD HOW TO ORDER

### AVX Styles: SV01 THRU SV67

<b>SV01</b>	<b>A</b>	<b>A</b>	<b>102</b>	<b>K</b>	<b>A</b>	<b>A</b>	<b>*</b>
<b>AVX Style</b>	<b>Voltage</b>	<b>Temperature Coefficient</b>	<b>Capacitance Code</b> (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	<b>Capacitance Tolerance</b> C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80 -20%	<b>Test Level</b> A = Standard B = Hi-Rel*	<b>Leads</b> A = Tin/Lead R = RoHS Compliant	<b>Packaging</b> (See Note 1)
600V/630V = C 1000V = A 1500V = S 2000V = G 2500V = W 3000V = H 4000V = J 5000V = K	C0G = A X7R = C N1500 = 4						<b>Note 1:</b> 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.

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-49467. (Except partial discharge testing is not performed and DWV is at 120% rated voltage).

## DIMENSIONS

millimeters (inches)

AVX Style	Length (L) max	Height (H) max	Thickness (T) max	Lead Spacing ±.762 (.030) (S)	LD (Nom)
SV01	6.35 (0.250)	5.59 (0.220)	5.08 (0.200)	4.32 (0.170)	0.64 (0.025)
SV02/SV52	8.13 (0.320)	7.11 (0.280)	5.08 (0.200)	5.59 (0.220)	0.64 (0.025)
SV03/SV53	9.40 (0.370)	7.62 (0.300)	5.08 (0.200)	6.99 (0.275)	0.64 (0.025)
SV04/SV54	11.4 (0.450)	5.59 (0.220)	5.08 (0.200)	7.62 (0.300)	0.64 (0.025)
SV05/SV55	11.9 (0.470)	10.2 (0.400)	5.08 (0.200)	9.52 (0.375)	0.64 (0.025)
SV06/SV56	14.0 (0.550)	7.11 (0.280)	5.08 (0.200)	10.16 (0.400)	0.64 (0.025)
SV07/SV57	14.5 (0.570)	12.7 (0.500)	5.08 (0.200)	12.1 (0.475)	0.64 (0.025)
SV08/SV58	17.0 (0.670)	15.2 (0.600)	5.08 (0.200)	14.6 (0.575)	0.64 (0.025)
SV09/SV59	19.6 (0.770)	18.3 (0.720)	5.08 (0.200)	17.1 (0.675)	0.64 (0.025)
SV10	26.7 (1.050)	12.7 (0.500)	5.08 (0.200)	22.9 (0.900)	0.64 (0.025)
SV11	31.8 (1.250)	15.2 (0.600)	5.08 (0.200)	27.9 (1.100)	0.64 (0.025)
SV12	36.8 (1.450)	18.3 (0.720)	5.08 (0.200)	33.0 (1.300)	0.64 (0.025)
SV13/SV63	7.62 (0.300)	9.14 (0.360)	5.08 (0.200)	5.08 (0.200)	0.51 (0.020)
SV14/SV64	10.2 (0.400)	11.7 (0.460)	5.08 (0.200)	5.08 (0.200)	0.51 (0.020)
SV15/SV65	12.7 (0.500)	14.2 (0.560)	5.08 (0.200)	10.2 (0.400)	0.64 (0.025)
SV16/SV66	22.1 (0.870)	16.8 (0.660)	5.08 (0.200)	20.1 (0.790)	0.81 (0.032)
SV17/SV67	23.6 (0.930)	19.8 (0.780)	6.35 (0.250)	20.3 (0.800)	0.81 (0.032)

TAPE & REEL QUANTITY	
Part	Pieces
SV01	1000
SV02/SV52	1000
SV03/SV53	1000
SV04/SV54	1000
SV05/SV55	1000
SV06/SV56	500
SV07/SV57	500
SV08/SV58	500
SV09/SV59	500
SV10	N/A
SV11	N/A
SV12	N/A
SV13/SV63	1000
SV14/SV64	1000
SV15/SV65	500
SV16/SV66	500
SV17/SV67	400

RoHS	
Part	Available
SV01	Yes
SV02/SV52	Yes
SV03/SV53	Yes
SV04/SV54	Yes
SV05/SV55	Yes
SV06/SV56	Yes
SV07/SV57	Yes
SV08/SV58	Yes
SV09/SV59	Yes
SV10	Yes
SV11	Yes
SV12	Yes
SV13/SV63	Yes
SV14/SV64	Yes
SV15/SV65	Yes
SV16/SV66	Yes
SV17/SV67	Yes



# High Voltage DSCC Radials

## AVX IS QUALIFIED TO THE FOLLOWING 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 - 5600 pF
87070	X7R-5000 VDC	100 pF - 0.033 μF

### Group A inspection

Inspection	Requirement paragraph of MIL-PRF-49467	Test method paragraph of MIL-PRF-49467	Sampling procedure
<b>Subgroup 1</b> Thermal Shock Voltage Conditioning	3.6 3.6	4.8.2.1 4.8.2.2	100% Inspection
<b>Subgroup 3</b> Visual and mechanical examination: Material Physical dimensions Interface requirements (other than physical dimensions) Marking Workmanship	3.4 and 3.4.1 3.1 3.5 3.25 3.27	4.8.1	13 samples 0 failures
<b>Subgroup 4</b> Solderability	3.13	4.8.9	5 samples 0 failures

### Group B inspection\*

Inspection	Requirement paragraph of MIL-PRF-49467	Test method paragraph of MIL-PRF-49467	Number of sample units to be inspected	Number of defectives permitted	
<b>Subgroup 1</b> Terminal strength Resistance to soldering heat Moisture resistance	3.18 3.11 3.19	4.8.14 4.8.7 4.8.15	12	1	1
<b>Subgroup 2</b> Voltage-temperature limits** Low temperature storage Marking legibility	3.14 3.23 3.25.1	4.8.10 4.8.19 4.8.1.1	6	1	
<b>Subgroup 3</b> Resistance to solvents	3.21	4.8.17	4	1	
<b>Subgroup 4</b> Life (at elevated ambient temperature)	3.22	4.8.18	10	1	

\*Customers may accept at their discretion, a certificate of compliance with group B requirements in lieu of performing group B tests.

\*\*For Steps E, F & G in Table VII of MIL-PRF-49467, 500 Vdc shall be applied.