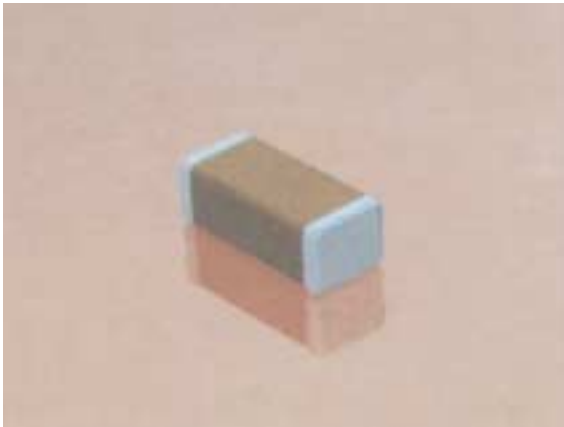


# High Voltage MLC Chips



For 600V to 5000V Application



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. AVX special high voltage MLC chips capacitors meet these performance characteristics and are designed for applications such as snubbers in high frequency power converters, resonators in SMPS, and high voltage coupling/DC blocking. These high voltage chip designs exhibit low ESRs at high frequencies.

Larger physical sizes than normally encountered chips are used to make high voltage chips. These larger sizes require that special precautions be taken in applying these chips in surface mount assemblies. This is due to differences in the coefficient of thermal expansion (CTE) between the substrate materials and chip capacitors. Apply heat at less than 4°C per second during the preheat. Maximum preheat temperature must be within 50°C of the soldering temperature. The solder temperature should not exceed 230°C. Chips 1808 and larger to use reflow soldering only.

Capacitors with X7R Dielectrics are not intended for AC line filtering applications. Contact plant for recommendations.

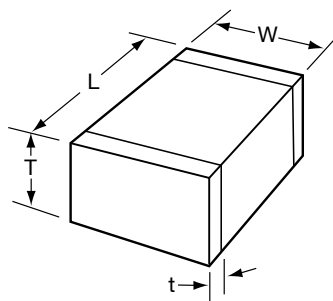
Capacitors may require protective surface coating to prevent external arcing.

## HOW TO ORDER

1808	A	A	271	K	A	1	1A
<b>AVX Style</b>	<b>Voltage</b>	<b>Temperature Coefficient</b>	<b>Capacitance Code</b> (2 significant digits + no. of zeros) Examples:	<b>Capacitance Tolerance</b> COG: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	<b>Failure Rate</b> A = Not Applicable	<b>Termination*</b> 1 = Pd/Ag T = NiGuard Nickel Barrier Solder Plate	<b>Packaging/Marking**</b> ME = 7" Reel Marked RE = 13" Reel Marked BE = Bulk/Marked 1A = 7" Reel Unmarked 3A = 13" Reel Unmarked 9A = Bulk/Unmarked
1206	600V = C 1000V = A 1210 1500V = S 1808 2000V = G 1812 2500V = W 1825 3000V = H 2220 4000V = J 2225 5000V = K 3640	COG = A X7R = C	10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1 μF = 105				

**\*Note:** Leaded terminations are available.  
Styles 1825, 2225, & 3640 are available with "N", "L" or "J" leads as seen on page 9.  
"V" denotes uncoated leaded units similar to SM0 product.  
"W" denotes leaded epoxy coated units similar to SM5 product.  
IE 1825AA103KAV00J would be uncoated leaded part with "J" style leads.

**\*\*Note:** Style 1808 cannot have the marking oriented in tape & reel packaging due to square cross-section of chip.  
Unmarked product is standard.



## DIMENSIONS

SIZE	1206	1210	1808*	1812*	1825*	2220*	2225*	3640*
(L) Length	3.20 ± 0.2 (0.126 ± 0.008)	3.20 ± 0.2 (0.126 ± 0.008)	4.57 ± 0.25 (0.180 ± 0.010)	4.50 ± 0.3 (0.177 ± 0.012)	4.50 ± 0.3 (0.177 ± 0.012)	5.7 ± 0.4 (0.224 ± 0.016)	5.72 ± 0.25 (0.225 ± 0.010)	9.14 ± 0.25 (0.360 ± 0.010)
(W) Width	1.60 ± 0.2 (0.063 ± 0.008)	2.50 ± 0.2 (0.098 ± 0.008)	2.03 ± 0.25 (0.080 ± 0.010)	3.20 ± 0.2 (0.126 ± 0.008)	6.40 ± 0.3 (0.252 ± 0.012)	5.0 ± 0.4 (0.197 ± 0.016)	6.35 ± 0.25 (0.250 ± 0.010)	10.2 ± 0.25 (0.400 ± 0.010)
(T) Thickness Max.	1.52 (0.060)	1.70 (0.067)	2.03 (0.080)	2.54 (0.100)	2.54 (0.100)	3.3 (0.130)	2.54 (0.100)	2.54 (0.100)
(t) terminal min. max.	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 0.75 (0.030)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	0.25 (0.010) 1.02 (0.040)	0.76 (0.030) 1.52 (0.060)

\*Reflow Soldering Only



# High Voltage MLC Chips



For 600V to 5000V Applications

## C0G Dielectric

### Performance Characteristics

Capacitance Range	10 pF to 0.047 $\mu$ F (25°C, 1.0 $\pm$ 0.2 Vrms at 1kHz, for $\leq$ 1000 pF use 1 MHz)
Capacitance Tolerances	$\pm$ 5%, $\pm$ 10%, $\pm$ 20%
Dissipation Factor	0.1% max. (+25°C, 1.0 $\pm$ 0.2 Vrms, 1kHz, for $\leq$ 1000 pF use 1 MHz)
Operating Temperature Range	-55°C to +125°C
Temperature Characteristic	0 $\pm$ 30 ppm/°C (0 VDC)
Voltage Ratings	600, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)
Insulation Resistance (+25°C, at 500 VDC)	100K M $\Omega$ min. or 1000 M $\Omega$ - $\mu$ F min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K M $\Omega$ min. or 100 M $\Omega$ - $\mu$ F min., whichever is less
Dielectric Strength	120% rated voltage for 5 seconds at 50 mA max. current

## HIGH VOLTAGE C0G CAPACITANCE VALUES

VOLTAGE	1206	1210	1808	1812	1825	2220	2225	3640
600 min.	100 pF	100 pF	100 pF	100 pF	1000 pF	1000 pF	1000 pF	1000 pF
600 max.	680 pF	1500 pF	2700 pF	5600 pF	0.012 $\mu$ F	0.012 $\mu$ F	0.015 $\mu$ F	0.047 $\mu$ F
1000 min.	10 pF	100 pF	100 pF	100 pF	100 pF	1000 pF	1000 pF	1000 pF
1000 max.	470 pF	820 pF	1500 pF	2700 pF	6800 pF	0.010 $\mu$ F	0.010 $\mu$ F	0.018 $\mu$ F
1500 min.	10 pF	100 pF	10 pF	10 pF	100 pF	1000 pF	1000 pF	100 pF
1500 max.	150 pF	330 pF	470 pF	1000 pF	2700 pF	2700 pF	3300 pF	8200 pF
2000 min.	10 pF	10 pF	10 pF	10 pF	100 pF	1000 pF	1000 pF	100 pF
2000 max.	68 pF	150 pF	270 pF	680 pF	1800 pF	2200 pF	2200 pF	5600 pF
2500 min.	—	—	10 pF	10 pF	10 pF	100 pF	100 pF	100 pF
2500 max.	—	—	150 pF	390 pF	1000 pF	1000 pF	1200 pF	3900 pF
3000 min.	—	—	10 pF	10 pF	10 pF	10 pF	10 pF	100 pF
3000 max.	—	—	100 pF	330 pF	680 pF	680 pF	820 pF	2200 pF
4000 min.	—	—	10 pF	10 pF	10 pF	10 pF	10 pF	100 pF
4000 max.	—	—	39 pF	100 pF	220 pF	220 pF	330 pF	1000 pF
5000 min.	—	—	—	—	—	—	—	10 pF
5000 max.	—	—	—	—	—	—	—	680 pF

## X7R Dielectric

### Performance Characteristics

Capacitance Range	10 pF to 0.56 $\mu$ F (25°C, 1.0 $\pm$ 0.2 Vrms at 1kHz)
Capacitance Tolerances	$\pm$ 10%; $\pm$ 20%; +80%, -20%
Dissipation Factor	2.5% max. (+25°C, 1.0 $\pm$ 0.2 Vrms, 1kHz)
Operating Temperature Range	-55°C to +125°C
Temperature Characteristic	$\pm$ 15% (0 VDC)
Voltage Ratings	600, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)
Insulation Resistance (+25°C, at 500 VDC)	100K M $\Omega$ min. or 1000 M $\Omega$ - $\mu$ F min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K M $\Omega$ min. or 100 M $\Omega$ - $\mu$ F min., whichever is less
Dielectric Strength	120% rated voltage for 5 seconds at 50 mA max. current

## HIGH VOLTAGE X7R MAXIMUM CAPACITANCE VALUES

VOLTAGE	1206	1210	1808	1812	1825	2220	2225	3640
600 min.	1000 pF	1000 pF	.01 $\mu$ F	.01 $\mu$ F	.01 $\mu$ F	.01 $\mu$ F	.01 $\mu$ F	.01 $\mu$ F
600 max.	0.015 $\mu$ F	0.027 $\mu$ F	0.033 $\mu$ F	0.068 $\mu$ F	0.15 $\mu$ F	0.15 $\mu$ F	0.22 $\mu$ F	0.56 $\mu$ F
1000 min.	1000 pF	1000 pF	1000 pF	1000 pF	1000 pF	.01 $\mu$ F	.01 $\mu$ F	.01 $\mu$ F
1000 max.	4700 pF	0.010 $\mu$ F	0.015 $\mu$ F	0.027 $\mu$ F	0.068 $\mu$ F	0.068 $\mu$ F	0.082 $\mu$ F	0.22 $\mu$ F
1500 min.	100 pF	100 pF	100 pF	100 pF	1000 pF	1000 pF	1000 pF	.01 $\mu$ F
1500 max.	1200 pF	2700 pF	3900 pF	8200 pF	0.018 $\mu$ F	0.022 $\mu$ F	0.027 $\mu$ F	0.068 $\mu$ F
2000 min.	10 pF	100 pF	100 pF	100 pF	100 pF	1000 pF	1000 pF	1000 pF
2000 max.	470 pF	1000 pF	1800 pF	4700 pF	8200 pF	0.010 $\mu$ F	0.012 $\mu$ F	0.027 $\mu$ F
2500 min.	—	—	10 pF	10 pF	100 pF	1000 pF	1000 pF	1000 pF
2500 max.	—	—	1200 pF	2200 pF	5600 pF	6800 pF	8200 pF	0.022 $\mu$ F
3000 min.	—	—	10 pF	10 pF	100 pF	1000 pF	1000 pF	1000 pF
3000 max.	—	—	560 pF	1200 pF	2700 pF	3300 pF	4700 pF	0.018 $\mu$ F
4000 min.	—	—	—	—	—	—	—	100 pF
4000 max.	—	—	—	—	—	—	—	6800 pF
5000 min.	—	—	—	—	—	—	—	100 pF
5000 max.	—	—	—	—	—	—	—	3300 pF



# High Voltage MLC Chips



## Packaging of Chip Components

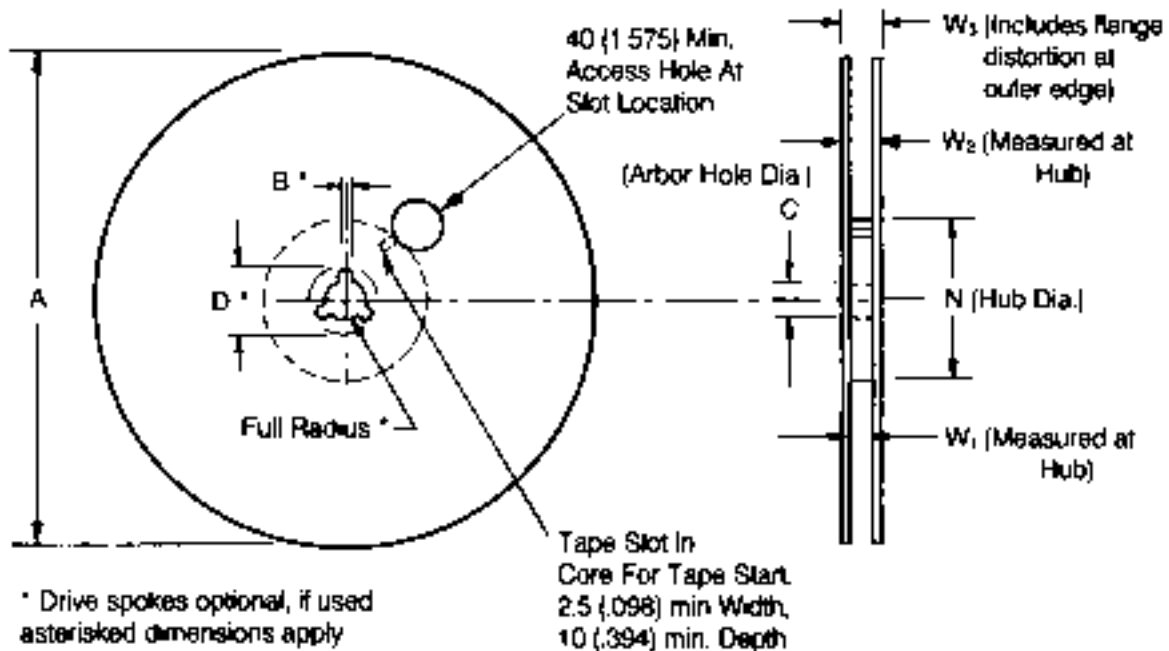
### AUTOMATIC INSERTION PACKAGING

#### TAPE & REEL QUANTITIES

All tape and reel specifications are in compliance with EIA481 & IEC-286-3.

	8mm	12mm		24mm
	1206 1210	1808	1812, 1825 2220, 2225	3640
Qty. per Reel/7" Reel	2000	2000	1000	N/A
Qty. per Reel/13" Reel	10,000	4000	4000	1000

#### REEL DIMENSIONS



#### DIMENSIONS

millimeters (inches)

Tape Size	A Max.	B* Min.	C	D* Min.	N Min.	W <sub>1</sub>	W <sub>2</sub> Max.	W <sub>3</sub>
8mm	330 (12.992)	1.5 (0.059)	13.0±0.20 (0.512±0.008)	20.2 (0.795)	50 (1.969)	8.4 <sup>+1.5</sup> <sub>-0.0</sub> (0.331 <sup>+0.060</sup> <sub>-0.0</sub> )	14.4 (0.567)	7.9 Min. (0.311) 10.9 Max. (0.429)
12mm	330 (12.992)	1.5 (0.059)	13.0±0.20 (0.512±0.008)	20.2 (0.795)	50 (1.969)	12.4 <sup>+2.0</sup> <sub>-0.0</sub> (0.488 <sup>+0.079</sup> <sub>-0.0</sub> )	18.4 (0.724)	11.9 Min. (0.469) 15.4 Max. (0.607)
24mm	360 (14.173)	1.5 (0.059)	13.0 <sup>+0.5</sup> <sub>-0.2</sub> (0.512 <sup>+0.020</sup> <sub>-0.008</sub> )	20.2 (0.795)	60 (2.362)	24.4 <sup>+2.0</sup> <sub>-0.0</sub> (0.961 <sup>+0.079</sup> <sub>-0.0</sub> )	30.4 (1.197)	23.9 Min. (0.941) 27.4 Max. (1.079)



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