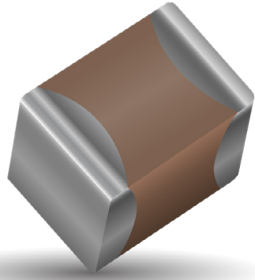


High Voltage MLC Chips

For 600V to 5000V Applications



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. KYOCERA AVX special high voltage MLC chip 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 MLC chip products. Special precautions must be taken in applying these chips in surface mount assemblies. The temperature gradient during heating or cooling cycles should not exceed 4°C per second. The preheat temperature must be within 50°C of the peak temperature reached by the ceramic bodies through the soldering process. Chip sizes 1210 and larger should be reflow soldered only. Capacitors may require protective surface coating to prevent external arcing.

For 1825, 2225 and 3640 sizes, KYOCERA AVX offers leaded version in either thru-hole or SMT configurations (for details see section on high voltage leaded MLC chips)

NEW 630V RANGE

HOW TO ORDER

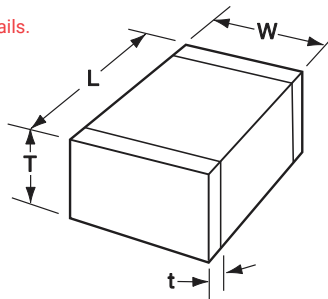
1808	A	A	271	M	A	T	2	A
Style	Voltage	Temperature Coefficient	Capacitance Code	Capacitance Tolerance	Test Level	Termination*	Packaging	Special Code
0805 1206 1210 1808 1812 1825 2220 2225 3640 ***	C = 600V/630V A = 1000V S = 1500V G = 2000V W = 2500V H = 3000V J = 4000V K = 5000V	A = NPO (C0G) C = X7R	(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	C0G: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%	A = Standard	T = Plated Ni and Sn (RoHS Compliant)	2 = 7" Reel** 4 = 13" Reel** 6 = Tray (3640 Style)	A = Standard

Notes:

- Capacitors with X7R dielectrics are not intended for applications across AC supply mains or AC line filtering with polarity reversal. Contact plant for recommendations. Contact factory for availability of Termination and Tolerance options for Specific Part Numbers.
- *Terminations with 5% minimum lead (Pb) is available, see pages 100 and 101 for LD style. Leaded terminations are available, see pages 102-106.

**The 3640 Style is not available on Reels.

*** KYOCERA AVX offers nonstandard chip sizes. Contact factory for details.



DIMENSIONS: millimeters (inches)

SIZE	0805	1206	1210*	1808*	1812*	1825*	2220*	2225*	3640*
(L) Length	2.10 ± 0.20 (0.083 ± 0.008)	3.30 ± 0.30 (0.130 ± 0.012)	3.30 ± 0.40 (0.130 ± 0.016)	4.60 ± 0.50 (0.181 ± 0.020)	4.60 ± 0.50 (0.181 ± 0.020)	4.60 ± 0.50 (0.181 ± 0.020)	5.70 ± 0.50 (0.224 ± 0.020)	5.70 ± 0.50 (0.224 ± 0.020)	9.14 ± 0.25 (0.360 ± 0.010)
(W) Width	1.25 ± 0.20 (0.049 ± 0.008)	1.60 ± 0.20 (0.063 ± 0.008)	2.50 ± 0.30 (0.098 ± 0.012)	2.00 ± 0.20 (0.079 ± 0.008)	3.20 ± 0.30 (0.126 ± 0.012)	6.30 ± 0.40 (0.248 ± 0.016)	5.00 ± 0.40 (0.197 ± 0.016)	6.30 ± 0.40 (0.248 ± 0.016)	10.2 ± 0.25 (0.400 ± 0.010)
(t) terminal min. max.	0.50 ± 0.20 (0.020 ± 0.008)	0.60 ± 0.20 (0.024 ± 0.008)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.75 ± 0.35 (0.030 ± 0.014)	0.85 ± 0.35 (0.033 ± 0.014)	0.85 ± 0.35 (0.033 ± 0.014)	0.76 (0.030) 1.52 (0.060)

*Reflow Soldering Only

Capacitance Range	10 pF to 0.100 μ 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, 630, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)
Insulation Resistance (+25°C, at 500 VDC)	100K M Ω min. or 1000 M Ω - μ F min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K M Ω min. or 100 M Ω - μ F min., whichever is less
Dielectric Strength	Minimum 120% rated voltage for 5 seconds at 50 mA max. current

[illegible]

NOTE: Contact factory for non-specified capacitance values

Case Size			1825								2220								2225								3640										
Soldering			Reflow Only								Reflow Only								Reflow Only								Reflow Only										
(L) Length	mm		4.60 ± 0.50								5.70 ± 0.50								5.70 ± 0.50								9.14 ± 0.25										
	(in.)		(0.181 ± 0.020)								(0.224 ± 0.020)								(0.224 ± 0.020)								(0.360 ± 0.010)										
(W) Width	mm		6.30 ± 0.40								5.00 ± 0.40								6.30 ± 0.40								10.2 ± 0.25										
	(in.)		(0.248 ± 0.016)								(0.197 ± 0.016)								(0.248 ± 0.016)								(0.400 ± 0.010)										
(t) Terminal	mm		0.75 ± 0.35								0.85 ± 0.35								0.85 ± 0.35								0.76 (0.030)										
	max		(0.030 ± 0.014)								(0.033 ± 0.014)								(0.033 ± 0.014)								1.52 (0.060)										
Voltage (V)			600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000
Cap (pF)	1.5	1R5																																			
	1.8	1R8																																			
	2.2	2R2																																			
	2.7	2R7																																			
	3.3	3R3																																			
	3.9	3R9																																			
	4.7	4R7																																			
	5.6	5R6																																			
	6.8	6R8																																			
8.2	8R2																																				
10	100	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F										
12	120	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
15	150	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
18	180	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
22	220	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
27	270	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
33	330	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
39	390	E	E	G	E	F	E	F	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F									
47																																					

NOTE: Contact factory for non-specified capacitance values

High Voltage MLC Chips

For 600V to 5000V Applications



X7R Dielectric

Performance Characteristics

Capacitance Range	10 pF to 0.82 μ 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, 630, 1000, 1500, 2000, 2500, 3000, 4000 & 5000 VDC (+125°C)
Insulation Resistance (+25°C, at 500 VDC)	100K M Ω min. or 1000 M Ω - μ F min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K M Ω min. or 100 M Ω - μ F min., whichever is less
Dielectric Strength	Minimum 120% rated voltage for 5 seconds at 50 mA max. current

X7R CAPACITANCE RANGE – PREFERRED SIZES ARE SHADED

Case Size Soldering	0805				1206				1210				1808								1812									
	Reflow/Wave				Reflow/Wave				Reflow Only				Reflow Only								Reflow Only									
(L) Length	2.10 ± 0.20 (0.085 ± 0.008)				3.30 ± 0.30 (0.130 ± 0.012)				3.30 ± 0.40 (0.130 ± 0.016)				4.60 ± 0.50 (0.181 ± 0.020)								4.60 ± 0.50 (0.181 ± 0.020)									
(W) Width	1.25 ± 0.20 (0.049 ± 0.008)				1.60 +0.30/-0.10 (0.063 +0.012/-0.004)				2.50 ± 0.30 (0.098 ± 0.012)				2.00 ± 0.20 (0.079 ± 0.008)								3.20 ± 0.30 (0.126 ± 0.012)									
(t) Terminal	0.50 ± 0.20 (0.020 ± 0.008)				0.60 ± 0.20 (0.024 ± 0.008)				0.75 ± 0.35 (0.030 ± 0.014)				0.75 ± 0.35 (0.030 ± 0.014)								0.75 ± 0.35 (0.030 ± 0.014)									
Voltage (V)	600	630	1000		600	630	1000	1500	2000	600	630	1000	1500	2000	600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000
Cap (pF)	100	101	X	X	C	C	C	E	E	E	E	E	E	E	E															
	120	121	X	X	C	C	C	E	E	E	E	E	E	E	E															
	150	151	X	X	C	C	C	E	E	E	E	E	E	E	E															
	180	181	X	X	C	C	C	E	E	E	E	E	E	E	E															
	220	221	X	X	C	C	C	E	E	E	E	E	E	E	E															
	270	271	X	X	C	C	C	E	E	E	E	E	E	E	E								E	E	E	E	E			
	330	331	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F		E	E	E	E	E			
	390	391	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F		E	E	E	E	E			
	470	471	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F		E	E	E	E	E	E	E	
	560	561	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	E	
	680	681	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	F	F	
	750	751	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	F	F	
	820	821	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	F	F	
	1000	102	X	X	X	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	E	E	E	E	E	F	F	
	1200	122	X	X	X	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	F	F	F	F	F	F	F	
	1500	152	X	X	X	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	F	F	F	F	F	G	G	
	1800	182	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	F	F	F	F	G	G		
	2200	222	X	X	X	C	C	E	E	E	E	E	E	E	E	E	E	E	E	F	F	F	F	F	F	F	G	G		
	2700	272	C	C		C	C	E	E		E	E	E	F	E	E	E	E	F	F			F	F	F	F	F	G	G	
	3300	332	C	C		C	C	E			E	E	E	F	E	E	E	E	F	F			F	F	F	F	F	G	G	
	3900	392	C	C		C	C	E			E	E	E	F		E	E	E	F				F	F	F	F	F	G	G	
	4700	472	C	C		C	C	E			E	E	E	F		E	E	E	F				F	F	F	F	F	G	G	
	5600	562	C	C		C	C	E			E	E	E	F		E	E	E	F				F	F	F	G	G	G		
	6800	682	C	C		C	C	E			E	E	E			E	E	E	F				F	F	F	G	G			
	8200	822	C	C		C	C	E			E	E	E			E	E	E					F	F	F	G	G			
Cap (µF)	0.010	103	C	C		C	C	E			E	E	E			E	E	E					F	F	F	G	G			
	0.015	153	C	C		E	E	E			E	E	E			F	F	F					F	F	F	G				
	0.018	183	C	C		E	E				E	E	E			F	F	F					F	F	G					
	0.022	223	C	C		E	E				E	E	F			F	F	F					F	F	G					
	0.027	273				E	E				E	E				F	F						F	F	G					
	0.033	333				E	E				E	E				F	F						F	F	G					
	0.039	393									E	E				F	F						F	F	G					
	0.047	473									E	E				F	F						F	F	G					
	0.056	563									F	F				F	F						F	F						
	0.068	683									F	F				F	F						F	F						
	0.082	823									F	F											F	F						
	0.100	104									F	F											F	F						
	0.150	154																					G	G						
	0.220	224																					G	G						
	0.270	274																												
	0.330	334																												
	0.390	394																												
	0.470	474																												
	0.560	564																												
	0.680	684																												
	0.820	824																												
	1.000	105																												
Voltage (V)	600	630	1000		600	630	1000	1500	2000	600	630	1000	1500	2000	600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000
Case Size	0805				1206				1210				1808								1812									

Letter	A	C	E	F	G	X	7
Max. Thickness	0.81 (0.032)	1.45 (0.057)	1.80 (0.071)	2.20 (0.087)	2.80 (0.110)	0.94 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

TDS-SMDMLCC-0008 | Rev 1

— SURFACE MOUNT CERAMIC CAPACITOR PRODUCTS —

High Voltage MLC Chips
For 600V to 5000V Applications



X7R CAPACITANCE RANGE
PREFERRED SIZES ARE SHADED

Case Size	1825								2220								2225								3640											
Soldering	Reflow Only								Reflow Only								Reflow Only								Reflow Only											
(L) Length	mm	4.60 ± 0.50								5.70 ± 0.50								5.70 ± 0.50								9.14 ± 0.25										
	(in.)	(0.181 ± 0.020)								(0.224 ± 0.020)								(0.224 ± 0.020)								(0.360 ± 0.010)										
W) Width	mm	6.30 ± 0.40								5.00 ± 0.40								6.30 ± 0.40								10.2 ± 0.25										
	(in.)	(0.248 ± 0.016)								(0.197 ± 0.016)								(0.248 ± 0.016)								(0.400 ± 0.010)										
(t) Terminal	mm	0.75 ± 0.35								0.85 ± 0.35								0.85 ± 0.35								0.76 (0.030)										
	max	(0.030 ± 0.014)								(0.033 ± 0.014)								(0.033 ± 0.014)								1.52 (0.060)										
Voltage (V)		600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000
Cap (pF)	100	101																																		
	120	121																																		
	150	151																																		
	180	181																																		
	220	221																																		
	270	271																																		
	330	331																																		
	390	391																																		
	470	471																																		
	560	561																																		
	680	681																																		
	750	751																																		
	820	821																																		
	1000	102	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	1200	122	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	1500	152	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	1800	182	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	2200	222	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	2700	272	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	3300	332	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	3900	392	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	4700	472	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	5600	562	F	F	F	F	F	F	F	F	F	F	F	F	F	G			F	F	F	F	F	F	F	F					G	G	G	G	G	
	6800	682	F	F	F	F	G	G	G	G	G	G	G	G	G				F	F	F	F	F	G	G	G					G	G	G	G	G	
	8200	822	F	F	F	G	G	G	G										F	F	F	F	F	G	G	G					G	G	G	G	G	
Cap (µF)	0.010	103	F	F	F	G	G	G	G										F	F	F	F	F	G	G	G					G	G	G	G	G	
	0.015	153	F	F	F	G	G	G											F	F	F	G	G	G	G					G	G	G	G	G		
	0.018	183	F	F	F	G	G												F	F	F	G	G	G						G	G	G	G	G		
	0.022	223	F	F	F	G	G												F	F	F	G	G							G	G	G	G	G		
	0.027	273	F	F	F	G													F	F	F	G	G							G	G	G	G	G		
	0.033	333	F	F	F	G													F	F	F	G								G	G	G	G			
	0.039	393	F	F	F	G													F	F	F	G								G	G	G	G			
	0.047	473	F	F	F	P													F	F	F	G								G	G	G	G			
	0.056	563	F	F	F	G													F	F	F	G								G	G	G	G			
	0.068	683	F	F	G														F	F	F	G								G	G	G	G			
	0.082	823	F	F	G														F	F	G									G	G					
	0.100	104	F	F	G														F	F	G									G	G					
	0.150	154	F	F															F	F	G									G	G					
	0.220	224	F	F															F	F										G	G					
	0.270	274	F	F															F	F										G	G					
	0.330	334	F	F															F	F										G	G					
	0.390	394	F	F															F	F										G	G					
	0.470	474	F	F															F	F										G	G					
	0.560	564	G	G															F	F										G	G					
	0.680	684																	G	G																
	0.820	824																	G	G																
	1.000	105																	G	G																
Voltage (V)		600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000	600	630	1000	1500	2000	2500	3000	4000	5000
Case Size		1825								2220								2225								3640										

Letter	A	C	E	F	G	X	7
Max. Thickness	0.81 (0.032)	1.45 (0.057)	1.80 (0.071)	2.20 (0.087)	2.80 (0.110)	0.94 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values