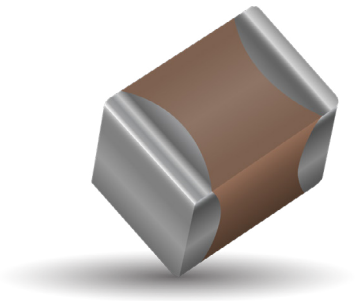
High Voltage MLC Chips

For 600V to 5000V Applications



High value, low leakage and small size are difficult parameters to obtain in capacitors for high voltage systems. 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 4ºC per second. The preheat temperature must be within 50ºC 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, AVX offers leaded version in either thru-hole or SMT configurations (for details see section on high voltage leaded MLC chips)

NEW 630V RANGE

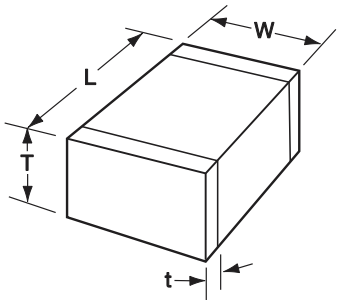
HOW TO ORDER

1808	A	A	271	M	A	1	2	A
AVX Style 0805 1206 1210 1808 1812 1825 2220 2225 3640 ***	**Voltage** 600V/630V = C 1000V = A 1500V = S 2000V = G 2500V = W 3000V = H 4000V = J 5000V = K	**Temperature Coefficient** NPO (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	**Termination*** 1 = Pd/Ag T = Plated Ni and Sn (RoHS Compliant)	**Packaging** 1 or 2 = 7" Reel** 3 or 4 = 13" Reel	**Special Code** A = Standard

Notes:

1. 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.
2. *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 7" Reels.
*** AVX offers nonstandard chip sizes. Contact factory for details.



RoHS COMPLIANT

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)	5.72 ± 0.25 (0.225 ± 0.010)	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)	6.35 ± 0.25 (0.250 ± 0.010)	10.2 ± 0.25 (0.400 ± 0.010)
(T) Thickness Max.	1.35 (0.053)	1.80 (0.071)	2.80 (0.110)	2.20 (0.087)	2.80 (0.110)	3.40 (0.134)	3.40 (0.134)	2.54 (0.100)	2.54 (0.100)
(t) terminal min.	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)
max.									1.52 (0.060)

*Reflow Soldering Only

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

High Voltage MLC Chips

For 600V to 5000V Applications

AVX A KYOCERA GROUP COMPANY

NP0 (C0G) DIELECTRIC – PERFORMANCE CHARACTERISTICS

Capacitance Range	10 pF to 0.100 µF (25°C, 1.0 ±0.2 Vrms at 1kHz, for ≤ 1000 pF use 1 MHz)
Capacitance Tolerances	±5%, ±10%, ±20%
Dissipation Factor	0.1% max. (+25°C, 1.0 ±0.2 Vrms, 1kHz, for ≤ 1000 pF use 1 MHz)
Operating Temperature Range	-55°C to +125°C
Temperature Characteristic	0 ±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 MΩ min. or 1000 MΩ - µF min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K MΩ min. or 100 MΩ - µF min., whichever is less
Dielectric Strength	Minimum 120% rated voltage for 5 seconds at 50 mA max. current

NPO (C0G) CAPACITANCE RANGE – PREFERRED SIZES ARE SHADED

Case Size		0805			1206					1210						1808								1812							
Soldering		Reflow/Wave			Reflow/Wave					Reflow Only						Reflow Only								Reflow Only							
(L) Length	mm (in.)	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 (0.177 + 0.012)							
W) Width	mm (in.)	1.25 ± 0.2 0 (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 + 0.008)							
(T) Thickness	mm (in.)	1.35 (0.053)			1.80 (0.071)					2.80 (0.110)						2.20 (0.087)								2.80 (0.100)							
(t) Terminal	mm (in.)	0.50 + 0.20 (0.020 + 0.008)			0.60 + 0.20 (0.0 4 + 0.008)					0.75 + 0.35 (.030 0.014)						0.75 + 0.35 (.030 0.014)								0.75 + 0.35 (.030 0.014)							
Voltage (V)		600	630	1000	600	630	1000	1500	2000	600	630	1000	1500	2000	3000	600	630	1000	1500	2000	2500	3000	4000	600	630	1000	1500	2000	2500	3000	4000
Cap (pF)	.5 0R5		A	C																											
	1.0 1R0		A	C																											
	1.2 1R2		A	C																											
	1.5 1R5	A	A	C	X	X	X	X	X																						
	1.8 1R8	A	A	C	X	X	X	X	X																						
	2.2 2R2	A	A	C	X	X	X	X	X								C	C		C		C	C								
	2.7 2R7	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	3.3 3R3	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	3.9 3R9	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	4.7 4R7	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	5.6 5R6	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	6.8 6R8	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	8.2 8R2	A	A	C	X	X	X	X	X								C	C	C	C	C	C	C								
	10 100	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E
	12 120	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E
	15 150	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E
	18 180	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	E
	22 220	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	E	C	C	C	C	C	C	C	E
	27 270	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	E	C	C	C	C	F	C	C	E
	33 330	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	F	C	C	C	C	F	C	C	E
	39 390	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	F	C	C	C	C	F	C	C	E
	47 470	A	A	C	C	C	C	C	C	C	M	M	D	M	F	C	C	C	C	C	C	C	C	C	C	C	C	F	C	C	E
	56 560	A	A	C	C	C	C	C	C	C	M	M	C	C	F	C	C	C	C	C	C	C		C	C	C	C	F	C	C	F
	68 680	A	A	C	C	C	C	C	C	C	M	M	C	C	F	C	C	C	C	C	C	C		C	C	C	C	F	C	C	F
	82 820	X	X	X	C	C	C	C	C	C	M	M	C	C	F	C	C	C	C	C	C	C		C	C	C	C	F	C	C	F
	100 101	X	X	X	C	C	C	C	C	C	M	C	C	C	F	C	C	C	C	C	F	F		C	C	C	C	F	C	C	F
	120 121	C	C	C	C	C	C	E	E	C	M	C	C	C	F	C	C	C	C	C	F	F		C	C	C	C	F	C	C	G
	150 151	C	C	C	C	C	C	E	E	C	M	C	E	E	F	C	C	C	F	F	F	F		C	C	C	C	F	C	C	G
	180 181	C	C	C	C	C	E	E	E	C	M	E	E	E	F	C	C	C	F	F	F	F		C	C	C	C	F	F	F	
	220 221	C	C	C	C	C	E	E	E	C	M	E	E	E	F	C	C	C	F	F	F	F		C	C	C	C	F	F	F	
	270 271	C	C	C	C	C	E	E	E	C	M	E	E	E	G	C	F	C	F	F	F	F		C	C	C	C	F	F	F	
	330 331	C	C	C	C	C	E	E	E	C	M	E	E	E		C	F	F	F	F	F	F		C	C	C	F	F	F	F	
	390 391	C	C	C	C	C	E	E	E	C	M	E	E	E		C	F	F	F	F	F	F		C	C	C	F	F	F	F	
	470 471	C	C		C	C	E	E	E	C	M	E	E	E		C	F	F	F	F	F	F		C	C	F	F	F	F	F	
	560 561	C	C		C	C	E			C	M	E	E	E		C	F	F	F	F		F		C	C	F	F	F	F	F	
	680 681	C	C		C	C	E			C	M	E	F	E		C	F	F	F	F				C	C	F	F	F	G	G	
	750 751	C	C		E	E	E			C	M	E	G	E		C	F	F	F	F				C	C	F	F	F	G	G	
	820 821	C	C		E	E	E			C	M	E	G	E		C	F	F	E	F				C	C	F	F	F	G	G	
	1000 102		C		E	E	E			C	C	E	F	F		C	F	F	E	F				C	C	F	F	F	G	G	
	1200 122		C		E	E	E			C	C	E		F		C	F	F	E	F				C	C	F	E	E			
	1500 152		C		E	E				C	C	F		G		E	F	F		F				C	C	F	F	F			
	1800 182		C		E	E				C	C	G		G		E	F	F		F				C	C	F	G	F			
	2200 222		C		E	E				E	C	G				E	F	F						C	C	E	G	G			
	2700 272				E	E				E	C	G				E	F	F						C	C	E	G	G			
	3300 332				E	E				E	C	G				E	F	F						C	C	F		G			
	3900 392				E	E				E	C	G				E	F							C	C	F					
	4700 472				E	E				E	C					E	F							C	C	G					
	5600 562									E	E					E	F							C	C	G					
	6800 682										E					F	F							C	C						
	8200 822										F						F							E	C						
Cap (µF)	0.010 103										F						F							E	C						
	0.012 123										G													F	F						
	0.015 153																							G	G						
	0.018 183																							G	G						
	0.022 223																								F						
	0.027 273																								G						
	0.033 333																								G						
	0.047 473																														
	0.056 563																														
	0.068 683																														
	0.100 104																														
Voltage (V)		600	630	1000	600	630	1000	1500	2000	600	630	1000	1500	2000	3000	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	0.813 (0.032)	1.448 (0.057)	1.8034 (0.071)	2.2098 (0.087)	2.794 (0.110)	0.940 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values

High Voltage MLC Chips

For 600V to 5000V Applications

A KYOCERA GROUP COMPANY

NP0 (C0G) CAPACITANCE RANGE – PREFERRED SIZES ARE SHADED

Case Size		1825								2220									2225									3640								
Soldering		Reflow Only								Reflow Only									Reflow Only									Reflow Only								
(L) Length	mm (in.)	4.60 ± 0.50 (0.181 ± 0.020)								5.70 0.50 (0.224 0.020)									5.70 ± 0.50 (0.225 ± 0.010)									9.14 ± 0.25 (0.360 ± 0.010)								
W) Width	mm (in.)	6.30 ± 0.40 (0.248 ± 0.016)								5.00 0.40 (0.197 0.016)									6.30 0.40 (0.250 ± 0.010)									10.2 ± 0.25 (0.400 ± 0.010)								
(T) Thickness	mm (in.)	3.40 (0.134)								3.40 (0.134)									3.40 (0.100)									2.54 (0.100)								
(t) Terminal	mm max	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)								
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	E	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	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	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	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	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	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	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	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F								
	47 470	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G								G
	56 560	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G								G
	68 680	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G								G
	82 820	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G								G
	100 101	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	120 121	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	150 151	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	180 181	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	220 221	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	270 271	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E			E	E	E	E	E	E	E	G	G				G	G	G	G	G	G
	330 331	E	E	G	E	F	E	F	F	E	E	E	E	E	E	E			E	E	E	E	E	E	E	G					G	G	G	G	G	G
	390 391	E	E	G	E	F	E	F		E	E	E	E	E	E	E			E	E	E	E	E	E	E	G					G	G	G	G	G	G
	470 471	E	E	G	E	F	E	F		E	E	E	E	E	E	E			E	E	E	E	E	E	E	G					G	G	G	G	G	G
	560 561	E	E	G	E	F	E	F		E	E	E	E	E	E	E			E	E	E	E	E	E	E	G					G	G	G	G	G	G
	680 681	E	E	G	E	F	F	G		E	E	E	E	E	F	F			E	E	E	E	E	E	E						G	G	G	G	G	G
	750 751	E	E	G	E	F	F	G		E	E	E	E	E	F	F			E	E	E	E	E	E	E						G	G	G	G	G	G
	820 821	E	E	G	E	F	F	G		E	E	E	E	E	F	F			E	E	E	E	E	F	E						G	G	G	G	G	G
	1000 102	E	E	G	E	F	F	G		E	E	E	E	E	F	F			E	E	E	E	E	E	E			G	G	G	G	G	G	G	G	
	1200 122	E	E	G	E	F	G	G		E	E	E	E	E	G	G			E	E	E	E	E	F	F			G	G	G	G	G	G	G	G	
	1500 152	E	E	G	F	G	G	G		E	E	E	F	F	G	G			E	E	E	E	E	F	F			G	G	G	G	G	G	G		
	1800 182	E	E	G	F	G	G	G		E	E	E	F	F	G	G			E	E	E	E	E	G	G			G	G	G	G	G	G	G		
	2200 222	E	E	G	G	G		G		E	E	E	G	G					E	E	E	E	E					G	G	G	G	G	G	G		
	2700 272	E	E	G	G	G		G		E	E	E	G	G					E	E	E	F	F					G	G	G	G	G	G	G		
	3300 332	E	E	G	G	G				E	E	E	G	G					E	E	E	F	F					G	G	G	G	G	G			
	3900 392	E	E	G	G	G				E	E	E	G	G					E	E	E	G	G					G	G	G	G	G	G			
	4700 472	E	E	G	G	G				E	E	E	G	G					F	F	F	G	G					G	G	G	G	G				
	5600 562	F	F	G	G	G				F	F	F	G	G					F	F	F	G	G					G	G	G	G	G				
	6800 682	F	F	G		G				F	F	F							F	F	F	G	G					G	G	G	G	G				
	8200 822	F	F	G		G				G	G	G							G	G	G							G	G	G	G					
Cap (µF)	0.010 103	F	F	G						7	7	7							G	G	G							G	G	G	G					
	0.012 123	F	F	G															G	G								G	G	G						
	0.015 153	F	F																G	G								G	G	G						
	0.018 183	F	F																G	G								G	G	G						
	0.022 223	F	F																G	G								G	G	G						
	0.027 273	F	F																																	
	0.033 333	F	F																G	G								G	G							
	0.039 393	G	G																																	
	0.047 473	G	G																G	G								G	G							
	0.056 563	G	G																G	G																
	0.068 683	G	G																G	G																
	0.100 104																																			
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	0.813 (0.032)	1.448 (0.057)	1.8034 (0.071)	2.2098 (0.087)	2.794 (0.110)	0.940 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values

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X7R Dielectric

Performance Characteristics

Capacitance Range	10 pF to 0.82 µF (25°C, 1.0 ±0.2 Vrms at 1kHz)
Capacitance Tolerances	±10%; ±20%; +80%, -20%
Dissipation Factor	2.5% max. (+25°C, 1.0 ±0.2 Vrms, 1kHz)
Operating Temperature Range	-55°C to +125°C
Temperature Characteristic	±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 MΩ min. or 1000 MΩ - µF min., whichever is less
Insulation Resistance (+125°C, at 500 VDC)	10K MΩ min. or 100 MΩ - µF 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		0805			1206					1210					1808								1812							
Soldering		Reflow/Wave			Reflow/Wave					Reflow Only					Reflow Only								Reflow Only							
(L) Length	mm (in.)	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 (0.177 ± 0.012)							
W) Width	mm (in.)	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 ± 0.008)							
(T) Thickness	mm (in.)	1.35 (0.053)			1.80 (0.071)					2.80 (0.110)					2.20 (0.087)								2.80 (0.100)							
(t) Terminal	mm 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)							
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	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	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	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	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	
	2200 222	X	X	X	C	C	E	E	E	E	E	E	F	E	E	E	E	F	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	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	0.813 (0.032)	1.448 (0.057)	1.8034 (0.071)	2.2098 (0.087)	2.794 (0.110)	0.940 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values

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 (in.)	4.60 ± 0.50 (0.181 ± 0.020)								5.70 ± 0.50 (0.224 ± 0.020)								5.70 ± 0.50 (0.225 ± 0.010)								9.14 ± 0.25 (0.360 ± 0.010)							
W) Width	mm (in.)	6.30 ± 0.40 (0.248 ± 0.016)								5.00 ± 0.40 (0.197 ± 0.016)								6.30 ± 0.40 (0.250 ± 0.010)								10.2 ± 0.25 (0.400 ± 0.010)							
(T) Thickness	mm (in.)	3.40 (0.134)								3.40 (0.134)								3.40 (0.100)								2.54 (0.100)							
(t) Terminal	mm max	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)							
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	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	102	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	1200	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	122	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	1500	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	152	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	1800	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	182	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	2200	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	222	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	2700	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	272	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	3300	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	332	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	G
	3900	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	392	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	4700	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	472	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	5600	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	562	F	F	F	F	F	F	F		F	F	F	F	F	F	G			F	F	F	F	F	F	F			G	G	G	G	G	G	G	G	
	6800	F	F	F	G	G	G	G		F	F	F	F	F	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G	G	
	682	F	F	F	G	G	G	G		F	F	F	F	F	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G	G	
	8200	F	F	F	G	G	G	G		F	F	F	G	G	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G		
	822	F	F	F	G	G	G	G		F	F	F	G	G	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G		
Cap (µF)	0.010	F	F	F	G	G	G	G		F	F	F	G	G	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G		
	103	F	F	F	G	G	G	G		F	F	F	G	G	G	G			F	F	F	F	F	G	G			G	G	G	G	G	G	G		
	0.015	F	F	F	G	G	G			F	F	F	G	G	G				F	F	F	G	G	G	G			G	G	G	G	G	G	G		
	153	F	F	F	G	G	G			F	F	F	G	G	G				F	F	F	G	G	G	G			G	G	G	G	G	G	G		
	0.018	F	F	F	G	G				F	F	F	G	G	G				F	F	F	G	G	G				G	G	G	G	G	G	G		
	183	F	F	F	G	G				F	F	F	G	G	G				F	F	F	G	G	G				G	G	G	G	G	G	G		
	0.022	F	F	F	G	G				F	F	F	G	G					F	F	F	G	G	G				G	G	G	G	G	G			
	223	F	F	F	G	G				F	F	F	G	G					F	F	F	G	G	G				G	G	G	G	G	G			
	0.027	F	F	F	G					F	F	F	G	G					F	F	F	G	G					G	G	G	G	G				
	273	F	F	F	G					F	F	F	G	G					F	F	F	G	G					G	G	G	G	G				
	0.033	F	F	F	G					F	F	F	G						F	F	F	G	G					G	G	G	G					
	333	F	F	F	G					F	F	F	G						F	F	F	G	G					G	G	G	G					
	0.039	F	F	F	G					F	F	F	G						F	F	F	G						G	G	G	G					
	393	F	F	F	G					F	F	F	G						F	F	F	G						G	G	G	G					
	0.047	F	F	F	P					F	F	F	G						F	F	F	G						G	G	G	G					
	473	F	F	F	P					F	F	F	G						F	F	F	G						G	G	G	G					
	0.056	F	F	F	G					F	F	F	G						F	F	F	G						G	G	G	G					
	563	F	F	F	G					F	F	F	G						F	F	F	G						G	G	G	G					
	0.068	F	F	G						F	F	G							F	F	F	G						G	G	G	G					
	683	F	F	G						F	F	G							F	F	F	G						G	G	G	G					
	0.082	F	F	G						F	F	G							F	F	G							G	G							
	823	F	F	G						F	F	G							F	F	G							G	G							
	0.100	F	F	G						F	F	G							F	F	G							G	G							
	104	F	F	G						F	F	G							F	F	G							G	G							
	0.150	F	F							F	F	G							F	F	G							G	G							
	154	F	F							F	F	G							F	F	G							G	G							
	0.220	F	F							F	F	G							F	F								G	G							
	224	F	F							F	F	G							F	F								G	G							
	0.270	F	F							F	F								F	F								G	G							
	274	F	F							F	F								F	F								G	G							
	0.330	F	F							F	F								F	F								G	G							
	334	F	F							F	F								F	F								G	G							
	0.390	F	F							F	F								F	F								G	G							
	394	F	F							F	F								F	F								G	G							
	0.470	F	F							F	F								F	F								G	G							
	474	F	F							F	F								F	F								G	G							
	0.560	G	G							G	G								F	F								G	G							
	564	G	G							G	G								F	F								G	G							
	0.680									G	G								G	G															
	684									G	G								G	G															
	0.820																		G	G															
	824																		G	G															
	1.000																																		
	105																																		
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	0.813 (0.032)	1.448 (0.057)	1.8034 (0.071)	2.2098 (0.087)	2.794 (0.110)	0.940 (0.037)	3.30 (0.130)

NOTE: Contact factory for non-specified capacitance values

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