

For 600V to 5000V Applications



NP0 (C0G) Dielectric Performance Characteristics

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

NPO (C0G) 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	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 (in.)	0.50 ± 0.20 (0.020 ± 0.008)						0.60 ± 0.20 (0.04 ± 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	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	C						
	3.3 3R3	A	A	C	X	X	X	X	X								C	C	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	C	C					
	4.7 4R7	A	A	C	X	X	X	X	X								C	C	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	C	C					
	6.8 6R8	A	A	C	X	X	X	X	X								C	C	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	C	C					
	10 100	A	A	C	X	X	X	X	X		C	M	M	D	M	F	C	C	C	C	C		C	C	C	C	C	C	C	E	
	12 120	A	A	C	X	X	X	X	X	C	M	M	D	M	F	C	C	C	C	C	C		C	C	C	C	C	C	C	E	
	15 150	A	A	C	X	X	X	X	X	C	M	M	D	M	F	C	C	C	C	C	C		C	C	C	C	C	C	C	E	
	18 180	A	A	C	X	X	X	X	X	C	M	M	D	M	F	C	C	C	C	C	C		C	C	C	C	C	C	C	E	
	22 220	A	A	C	X	X	X	X	X	C	M	M	D	M	F	C	C	C	C	C	C		C	C	C	C	C	C	C	E	
	27 270	A	A	C	X	X	X	X	X	C	M	M	D	M	F	C	C	C	C	C	C		E	C	C	C	C	F	C	E	
	33 330	A	A	C	X	X	X	D	M	C	M	M	D	M	F	C	C	C	C	C	C		F	C	C	C	C	F	C	E	
	39 390	A	A	C	X	X	X	D	M	C	M	M	D	M	F	C	C	C	C	C	C		F	C	C	C	C	F	C	E	
	47 470	A	A	C	X	X	C	D	M	C	M	M	D	M	F	C	C	C	C	C	C		C	C	C	C	F	C	E		
	56 560	A	A	C	X	X	C	C	C	M	M	M	C	C	F	C	C	C	C	C	C			C	C	C	C	F	C	F	
	68 680	A	A	C	X	X	C	C	C	C	M	M	C	C	F	C	C	C	C	C	C			C	C	C	C	F	C	F	
	82 820	X	X	X	X	X	C	C	C	C	M	M	C	C	F	C	C	C	C	C	C			C	C	C	C	F	C	F	
	100 101	X	X	X	X	X	C	C	C	C	M	C	C	C	F	C	C	C	C	C	F			C	C	C	C	F	C	F	
	120 121	C	C	C	X	X	C	E	E	C	M	C	C	C	F	C	C	C	C	C	F			C	C	C	C	F	C	G	
	150 151	C	C	C	X	X	C	E	E	C	M	C	E	E	F	C	C	C	F	F	F			C	C	C	C	F	C	C	
	180 181	C	C	C	X	X	E	E	E	C	M	E	E	E	F	C	C	C	F	F	F			C	C	C	C	F	F	F	
	220 221	C	C	C	X	X	E	E	E	C	M	E	E	E	F	C	C	C	F	F	F			C	C	C	C	F	F	F	
	270 271	C	C	C	C	M	E	E	E	C	M	E	E	E	G	C	F	C	F	F	F			C	C	C	C	F	F	F	
	330 331	C	C	C	C	M	E	E	E	C	M	E	E	E		C	F	F	F	F	F			C	C	C	F	F	F	F	
	390 391	C	C	C		E	E	E	E	C	M	E	E	E		C	F	F	F	F	F			C	C	C	F	F	F	F	
	470 471	C	C	C	C	M	E	E	E	C	M	E	E	E		C	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				
	1500 152		C		E	E				C	C	F		G		E	F	F		F				C	C	F	F	E			
	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					
	3900 392				E					E	C					E	F							C	C	F					
	4700 472				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 (pF)	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																														
	0.12 124																														
	0.15 154																														
	0.18 184																														
	0.22 224																														
	0.27 274																														
	0.33 334																														
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



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	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	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	3.40 (0.134)								3.40 (0.134)								3.40 (0.100)								2.54 (0.100)																															
(t) Terminal	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	E	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	E	G	G			G	G	G	G	G																						
	390	391	E	E	G	E	F	E	F	F	E	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	F	E	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	F	E	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	E	F	E		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																						
	1200	122	E	E	G	E	F	G	G		E	E	E	E	E	E	G	G		E	E	E	E	E	F	F		G	G			G	G	G																						
	1500	152	E	E	G	F	G	G	G		E	E	E	F	F	G	G	G		E	E	E	E	E	F	F		G	G			G	G	G																						
	1800	182	E	E	G	F	G	G	G		E	E	E	F	F	G	G	G		E	E	E	E	E	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																							
	2700	272	E	E	G	G	G		G		E	E	E	G	G				E	E	E	F	F				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																							
	3900	392	E	E	G	G	G				E	E	E	G	G				E	E	E	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	G	G	G		G				G	G	G						G	G	G						G	G			G	G	G																							
Cap (µF)	0.010	103	F	E	G					7	7	7							G	G	G						G	G			G	G	G																							
	0.012	123		E	G														G	G							G	G			G	G	G																							
	0.015	153		E															G	G							G	G			G	G	G																							
	0.018	183		E															G	G							G	G			G	G	G																							
	0.022	223		E															G	G							G	G			G	G	G																							
	0.027	227		F																																																				
	0.033	333		F															G	G							G	G																												
	0.039	393		G																																																				
	0.047	473		G															G	G							G	G																												
	0.056	563		G															G	G																																				
	0.068	683		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																																																								

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	0805	1206	1210	1808	1812
Soldering	Reflow/Wave	Reflow/Wave	Reflow Only	Reflow Only	Reflow Only
(L) Length mm (in.)	2.10 $\pm$ 0.20 (0.085 $\pm$ 0.008)	3.30 $\pm$ 0.30 (0.130 $\pm$ 0.012)	3.30 $\pm$ 0.40 (0.130 $\pm$ 0.016)	4.60 $\pm$ 0.50 (0.181 $\pm$ 0.020)	4.60 $\pm$ 0.50 (0.177 $\pm$ 0.012)
(W) Width mm (in.)	1.25 $\pm$ 0.20 (0.049 $\pm$ 0.008)	1.60 $\pm$ 0.30/-0.10 (0.063 $\pm$ 0.012/-0.004)	2.50 $\pm$ 0.30 (0.098 $\pm$ 0.012)	2.00 $\pm$ 0.20 (0.079 $\pm$ 0.008)	3.20 $\pm$ 0.30 (0.126 $\pm$ 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 $\pm$ 0.20 (0.020 $\pm$ 0.008)	0.60 $\pm$ 0.20 (0.024 $\pm$ 0.008)	0.75 $\pm$ 0.35 (0.030 $\pm$ 0.014)	0.75 $\pm$ 0.35 (0.030 $\pm$ 0.014)	0.75 $\pm$ 0.35 (0.030 $\pm$ 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	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	1200 122
	1500 152	1800 182	2200 222	2700 272	3300 332
	3900 392	4700 472	5600 562	6800 682	8200 822
Cap (μ F)	0.010 103	0.015 153	0.018 183	0.022 223	0.027 273
	0.033 333	0.039 393	0.047 473	0.056 563	0.068 683
	0.082 823	0.100 104	0.150 154	0.220 224	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

[illegible]

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