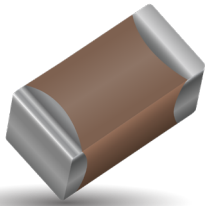


High Voltage MLC Chips

FLEXITERM® - 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 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.

To make high voltage chips, larger physical sizes than are normally encountered are necessary. These larger sizes require that special precautions be taken in applying these chips in surface mount assemblies. In response to this, and to follow from the success of the FLEXITERM® range of low voltage parts, KYOCERA AVX is delighted to offer a FLEXITERM® high voltage range of capacitors, FLEXITERM®.

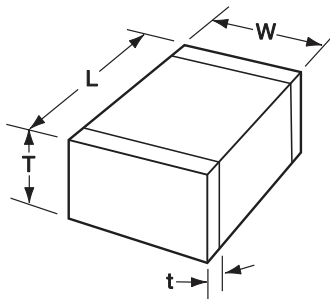
The FLEXITERM® layer is designed to enhance the mechanical flexure and temperature cycling performance of a standard ceramic capacitor, giving customers a solution where board flexure or temperature cycle damage are concerns.

HOW TO ORDER

1808	A	C	272	K	A	Z	2	A
Style	Voltage	Temperature Coefficient	Capacitance Code (2 significant digits + no. of zeros)	Capacitance Tolerance	Test Level	Termination*	Packaging	Special Code
0805	600V/630V = C	COG = A X7R = C	Examples: 10 pF = 100 100 pF = 101 1,000 pF = 102 22,000 pF = 223 220,000 pF = 224 1 μF = 105	COG: J = ±5% K = ±10% M = ±20% X7R: K = ±10% M = ±20% Z = +80%, -20%		Z = FLEXITERM® 100% Tin (RoHS Compliant)	2 = 7" Reel 4 = 13" Reel	A = Standard
1206	1000V = A							
1210	1500V = S							
1808	2000V = G							
1812	2500V = W							
1825	3000V = H							
2220	4000V = J							
2225	5000V = K							

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.

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



DIMENSIONS millimeters (inches)

SIZE	0805	1206	1210*	1808*	1812*	1825*	2220*	2225*
(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)
(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)	6.30 ± 0.40 (0.248 ± 0.016)	5.00 ± 0.40 (0.197 ± 0.016)	6.30 ± 0.40 (0.248 ± 0.016)
(t) terminal	min. 0.50 ± 0.20 max. (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)

*Reflow Soldering Only



Performance of SMPS capacitors can be simulated by downloading SpiCalci software program - <http://www.avx.com/SpiApps/default.asp#spicalci>
Custom values, ratings and configurations are also available.

High Voltage MLC Chips

FLEXITERM® - 600V to 5000V Applications

NP0 (C0G) CAPACITANCE RANGE

PREFERRED SIZES ARE SHADED

Case Size	1825									2220									2225								
	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 (0.224 ± 0.020)								
(W) Width	6.30 ± 0.40 (0.248 ± 0.016)									5.00 ± 0.40 (0.197 ± 0.016)									6.30 ± 0.40 (0.248 ± 0.016)								
(t) Terminal	0.75 ± 0.35 (0.030 ± 0.014)									0.85 ± 0.35 (0.033 ± 0.014)									0.85 ± 0.35								
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	
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	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	12	120	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	15	150	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	18	180	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	22	220	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	27	270	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	33	330	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	39	390	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	F	
	47	470	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	56	560	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	68	680	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	82	820	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	100	101	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	120	121	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	150	151	E	E	E	E	E	E	F	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	F	G	
	180	181	E	E	E	E	E	E	F	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	F	G	
	220	221	E	E	E	E	E	E	F	E	E	E	E	E	E	E	F	F	E	E	E	E	E	E	F	G	
	270	271	E	E	E	E	E	E	F	E	E	E	E	E	E	E			E	E	E	E	E	E	F	G	
	330	331	E	E	E	E	E	E	F	E	E	E	E	E	E	E			E	E	E	E	E	E	F	G	
	390	391	E	E	E	E	E	E	E	E	E	E	E	E	E	E			E	E	E	E	E	E	F	G	
	470	471	E	E	E	E	E	E	E	E	E	E	E	E	E	E			E	E	E	E	E	E	F	G	
	560	561	E	E	E	E	E	E	E	E	E	E	E	E	E	E			E	E	E	E	E	E	F	G	
	680	681	E	E	E	E	E	F	F	E	E	E	E	E	F	F			E	E	E	E	E	E	F	G	
	750	751	E	E	E	E	E	F	F	E	E	E	E	F	F			E	E	E	E	E	E	E	F	G	
	820	821	E	E	E	E	E	F	F	E	E	E	E	F	F			E	E	E	E	E	F	E			
	1000	102	E	E	E	E	E	F	F	E	E	E	E	F	F			E	E	E	E	E	E	E	F	G	
	1200	122	E	E	E	E	E	G	G	E	E	E	E	G	G			E	E	E	E	E	F	F			
	1500	152	E	E	E	F	F	G	G	E	E	E	F	F	G	G			E	E	E	E	F	F			
	1800	182	E	E	E	F	F	G	G	E	E	E	F	F	G	G			E	E	E	E	G	G			
	2200	222	E	E	E	G	G			E	E	E	G	G				E	E	E	E	E					
	2700	272	E	E	E	G	G			E	E	E	G	G				E	E	E	F	F					
	3300	332	E	E	E	G	G			E	E	E	G	G				E	E	E	F	F					
	3900	392	E	E	E	G	G			E	E	E	G	G				E	E	E	G	G					
	4700	472	E	E	E	G	G			E	E	E	G	G				F	F	F	G	G					
	5600	562	F	F	F	G	G			F	F	F						F	F	F	G	G					
	6800	682	F	F	F					F	F	F						F	F	F	G	G					
	8200	822	G	G	G					G	G	G						F	F	F	G	G					
Cap (µF)	0.010	103																G	G	G							
	0.012	123																G	G								
	0.015	153																G	G								
	0.018	183																G	G								
	0.022	223																G	G								
	0.033	333																G	G								
	0.047	473																G	G								
	0.056	563																G	G								
	0.068	683																G	G								
	0.100	104																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	
Case Size	1825									2220									2225								

Letter	A	C	E	F	G	X
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)

NOTE: Contact factory for non-specified capacitance

High Voltage MLC Chips

FLEXITERM® - 600V to 5000V Applications



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 Soldering	0805			1206					1210					1808							1812								
	Reflow/Wave			Reflow/Wave					Reflow Only					Reflow Only							Reflow Only								
(L) Length mm (in.)	2.10 ± 0.20 (0.083 ± 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)								
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 ± 0.012)								
(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	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
120 121	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
150 151	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
180 181	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
220 221	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	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	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	E	E	E	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	E	E	E	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	E	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	E	E	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	E	E	E	E	E	E	E	E	E		
750 751	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
820 821	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
1000 102	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
1200 122	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
1500 152	X	X	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
1800 182	X	X		C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
2200 222	X	X		C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
2700 272	X	X		C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
3300 332	X	X		C	C	E			E	E	E	F	E	E	E	E	F	F				F	F	F	F	F	F		
3900 392	X	X		C	C	E			E	E	E	G		E	E	E	F					F	F	F	F	F	F		
4700 472	X	X		C	C	E			E	E	E	G		E	E	E	F					F	F	F	F	F	F		
5600 562	X	X		C	C	E			E	E	E	G		E	E	E	F					F	F	F	F	F	F		
6800 682	X	X		C	C	E			E	E	E			E	E	E	F					F	F	F	F	F	F		
8200 822	X	X		C	C	E			E	E	E			E	E	E						F	F	E	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	E			F	F	F						F	F	G					
0.027 273				E	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								

High Voltage MLC Chips

FLEXITERM® - 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	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	6.30 ± 0.40 (0.248 ± 0.016)								5.00 0.40 (0.197 0.016)								6.30 ± 0.40 (0.248 ± 0.016)								5.72 ± 0.25 (0.225 ± 0.010)										
(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 (0.062)										
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							100	101								100	101								100	101							
120	121								120	121								120	121								120	121							
150	151								150	151								150	151								150	151							
180	181								180	181								180	181								180	181							
220	221								220	221								220	221								220	221							
270	271								270	271								270	271								270	271							
330	331								330	331								330	331								330	331							
390	391								390	391								390	391								390	391							
470	471								470	471								470	471								470	471							
560	561								560	561								560	561								560	561							
680	681								680	681								680	681								680	681							
750	751								750	751								750	751								750	751							
820	821								820	821								820	821								820	821							
1000	102	F	F	F	F	F	F	F	1000	102	F	F	F	F	F	F	G	1000	102	F	F	F	F	F	F	F	1000	102	G	G	G	G	G	G	G
1200	122	F	F	F	F	F	F	F	1200	122	F	F	F	F	F	F	G	1200	122	F	F	F	F	F	F	F	1200	122	G	G	G	G	G	G	G
1500	152	F	F	F	F	F	F	F	1500	152	F	F	F	F	F	F	G	1500	152	F	F	F	F	F	F	F	1500	152	G	G	G	G	G	G	G
1800	182	F	F	F	F	F	F	F	1800	182	F	F	F	F	F	F	G	1800	182	F	F	F	F	F	F	F	1800	182	G	G	G	G	G	G	G
2200	222	F	F	F	F	F	F	F	2200	222	F	F	F	F	F	F	G	2200	222	F	F	F	F	F	F	F	2200	222	G	G	G	G	G	G	G
2700	272	F	F	F	F	F	F	F	2700	272	F	F	F	F	F	F	G	2700	272	F	F	F	F	F	F	F	2700	272	G	G	G	G	G	G	G
3300	332	F	F	F	F	F	F	F	3300	332	F	F	F	F	F	F	G	3300	332	F	F	F	F	F	F	F	3300	332	G	G	G	G	G	G	G
3900	392	F	F	F	F	F	F	F	3900	392	F	F	F	F	F	F	G	3900	392	F	F	F	F	F	F	F	3900	392	G	G	G	G	G	G	G
4700	472	F	F	F	F	F	F	F	4700	472	F	F	F	F	F	F	G	4700	472	F	F	F	F	F	F	F	4700	472	G	G	G	G	G	G	G
5600	562	F	F	F	F	F	F	F	5600	562	F	F	F	F	F	F	G	5600	562	F	F	F	F	F	F	F	5600	562	G	G	G	G	G	G	G
6800	682	F	F	F	G	G	G	G	6800	682	F	F	F	F	F	G	G	6800	682	F	F	F	F	F	G	G	6800	682	G	G	G	G	G	G	G
8200	822	F	F	F	G	G	G	G	8200	822	F	F	F	G	G	G	G	8200	822	F	F	F	F	F	G	G	8200	822	G	G	G	G	G	G	G
Cap (µF)	0010	103	F	F	F	G	G	G	0010	103	F	F	F	G	G	G	0010	103	F	F	F	F	F	G	G	0010	103	G	G	G	G	G	G	G	
0015	153	F	F	F	G	G	G		0015	153	F	F	F	G	G	G	0015	153	F	F	F	G	G	G	0015	153	G	G	G	G	G	G	G		
0018	183	F	F	F	G	G	G		0018	183	F	F	F	G	G	G	0018	183	F	F	F	G	G	G	0018	183	G	G	G	G	G	G	G		
0022	223	F	F	F	G	G	G		0022	223	F	F	F	G	G	G	0022	223	F	F	F	G	G	G	0022	223	G	G	G	G	G	G	G		
0027	273	F	F	F	G	G	G		0027	273	F	F	F	G	G	G	0027	273	F	F	F	G	G	G	0027	273	G	G	G	G	G	G	G		
0033	333	F	F	F	G	G	G		0033	333	F	F	F	G	G	G	0033	333	F	F	F	G	G	G	0033	333	G	G	G	G	G	G	G		
0039	393	F	F	F	G	G	G		0039	393	F	F	F	G	G	G	0039	393	F	F	F	G	G	G	0039	393	G	G	G	G	G	G	G		
0047	473	F	F	F	P				0047	473	F	F	F	G			0047	473	F	F	F	G			0047	473	G	G	G	G					
0056	563	F	F	F	G				0056	563	F	F	F	G			0056	563	F	F	F	G			0056	563	G	G	G	G					
0068	683	F	F	G					0068	683	F	F	G				0068	683	F	F	F	G			0068	683	G	G	G	G					
0082	823	F	F	G					0082	823	F	F	G				0082	823	F	F	G				0082	823	G	G							
0100	104	F	F	G					0100	104	F	F	G				0100	104	F	F	G				0100	104	G	G							
0150	154	F	F						0150	154	F	F	G				0150	154	F	F	G				0150	154	G	G							
0220	224	F	F						0220	224	F	F	G				0220	224	F	F	G				0220	224	G	G							
0270	274	F	F						0270	274	F	F					0270	274	F	F					0270	274	G	G							
0330	334	F	F						0330	334	F	F					0330	334	F	F					0330	334	G	G							
0390	394	F	F						0390	394	F	F					0390	394	F	F					0390	394	G	G							
0470	474	F	F						0470	474	F	F					0470	474	F	F					0470	474	G	G							
0560	564	G	G						0560	564	G	G					0560	564	F	F					0560	564	G	G							
0680	684								0680	684	G	G					0680	684	G	G					0680	684									
0820	824								0820	824	G	G					0820	824	G	G					0820	824									
1000	105								1000	105	G	G					1000	105	G	G					1000	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	P	X
Max. Thickness	0.81 (0.032)	1.45 (0.057)	1.80 (0.071)	2.20 (0.087)	2.80 (0.110)	3.10 (0.120)	0.94 (0.037)

NOTE: Contact factory for non-specified capacitance values