

Automotive MLCC

Automotive

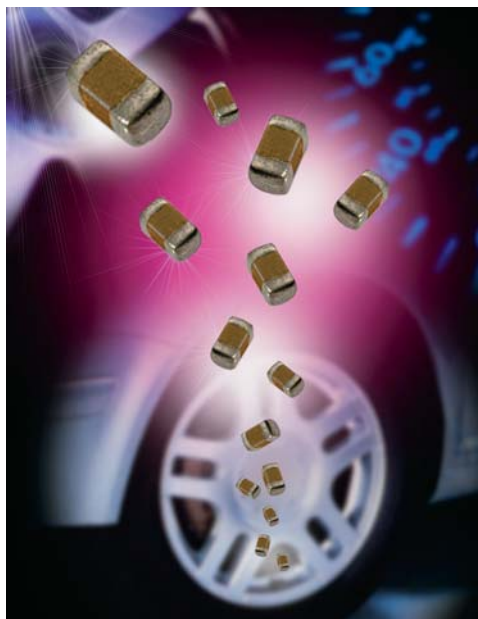
GENERAL DESCRIPTION

AVX Corporation has supported the Automotive Industry requirements for Multilayer Ceramic Capacitors consistently for more than 10 years. Products have been developed and tested specifically for automotive applications and all manufacturing facilities are QS9000 and VDA 6.4 approved.

As part of our sustained investment in capacity and state of the art technology, we are now transitioning from the established Pd/Ag electrode system to a Base Metal Electrode system (BME).

AVX is using AECQ200 as the qualification vehicle for this transition. A detailed qualification package is available on request and contains results on a range of part numbers including:

- X7R dielectric components containing BME electrode and copper terminations with a Ni/Sn plated overcoat.
- X7R dielectric components, BME electrode with epoxy finish for conductive glue mounting.
- X7R dielectric components BME electrode and soft terminations with a Ni/Sn plated overcoat.
- NP0 dielectric components containing Pd/Ag electrode and silver termination with a Ni/Sn plated overcoat.



HOW TO ORDER

0805	5	A	104	K	4	T	2	A
Size	Voltage	Dielectric	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	Terminations	Packaging	Special Code
0402	10V = Z	NP0 = A	2 Significant	F = $\pm 1\%$	4 = Automotive	T = Plated Ni and Sn	2 = 7" Reel	A = Std. Product
0603	16V = Y	X7R = C	Digits + Number	($\geq 10\text{pF}$)*		Z = FLEXITERM®**	4 = 13" Reel	
0805	25V = 3	X8R = F	of Zeros	G = $\pm 2\%$		U = Conductive Epoxy**		
1206	50V = 5		e.g. 10 μF = 106	($\geq 10\text{pF}$)*				
1210	100V = 1			J = $\pm 5\%$		**X7R & X8R only		
1812	200V = 2			($\leq 1\mu\text{F}$)				
	500V = 7			K = $\pm 10\%$				
				M = $\pm 20\%$				

*NP0 only

Contact factory for availability of Tolerance Options for Specific Part Numbers.

NOTE: Contact factory for non-specified capacitance values.
0402 case size available in T termination only.

COMMERCIAL VS AUTOMOTIVE MLCC PROCESS COMPARISON

	Commercial	Automotive
Administrative	Standard Part Numbers. No restriction on who purchases these parts.	Specific Automotive Part Number. Used to control supply of product to Automotive customers.
Design	Minimum ceramic thickness of 0.020"	Minimum Ceramic thickness of 0.029" (0.74mm) on all X7R product.
Dicing	Side & End Margins = 0.003" min	Side & End Margins = 0.004" min Cover Layers = 0.003" min
Lot Qualification (Destructive Physical Analysis - DPA)	As per EIA RS469	Increased sample plan – stricter criteria.
Visual/Cosmetic Quality	Standard process and inspection	100% inspection
Application Robustness	Standard sampling for accelerated wave solder on X7R dielectrics	Increased sampling for accelerated wave solder on X7R and NP0 followed by lot by lot reliability testing.

All Tests have Accept/Reject Criteria 0/1

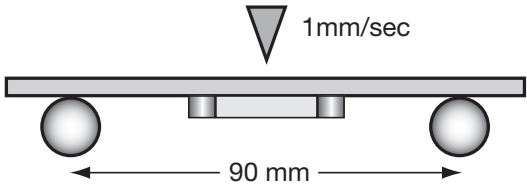


Automotive MLCC

NP0/X7R Dielectric

FLEXITERM® FEATURES

- a) Bend Test
The capacitor is soldered to the PC Board as shown:



- b) Temperature Cycle testing
FLEXITERM® has the ability to withstand at least 1000 cycles between -55°C and +125°C

Typical bend test results are shown below:

Style	Conventional Term	Soft Term
0603	>2mm	>5
0805	>2mm	>5
1206	>2mm	>5

Automotive MLCC - NP0

Capacitance Range

Soldering		0603			0805			1206					1210			
		Reflow/Wave			Reflow/Wave			Reflow/Wave					Reflow Only			
		25V	50V	100V	25V	50V	100V	25V	50V	100V	200V	500V	25V	50V	100V	200V
100	10pF	G	G	G	J	J	J	J	J	J	J	J				
120	12	G	G	G	J	J	J	J	J	J	J	J				
150	15	G	G	G	J	J	J	J	J	J	J	J				
180	18	G	G	G	J	J	J	J	J	J	J	J				
220	22	G	G	G	J	J	J	J	J	J	J	J				
270	27	G	G	G	J	J	J	J	J	J	J	J				
330	33	G	G	G	J	J	J	J	J	J	J	J				
390	39	G	G	G	J	J	J	J	J	J	J	J				
470	47	G	G	G	J	J	J	J	J	J	J	J				
510	51	G	G	G	J	J	J	J	J	J	J	J				
560	56	G	G	G	J	J	J	J	J	J	J	J				
680	68	G	G	G	J	J	J	J	J	J	J	J				
820	82	G	G	G	J	J	J	J	J	J	J	J				
101	100	G	G	G	J	J	J	J	J	J	J	J				
121	120	G	G	G	J	J	J	J	J	J	J	J				
151	150	G	G	G	J	J	J	J	J	J	J	J				
181	180	G	G	G	J	J	J	J	J	J	J	J				
221	220	G	G	G	J	J	J	J	J	J	J	J				
271	270	G	G	G	J	J	J	J	J	J	J	J				
331	330	G	G	G	J	J	J	J	J	J	J	J				
391	390	G	G		J	J	J	J	J	J	J	J				
471	470	G	G		J	J	J	J	J	J	J	J				
561	560				J	J	J	J	J	J	J	J				
681	680				J	J	J	J	J	J	J	J				
821	820				J	J	J	J	J	J	J	J				
102	1000				J	J	J	J	J	J	J	J	J	J	J	J
122	1200							J	J	J	J	J	J	J	M	M
152	1500							J	M	M	M	M	J	J	M	M
182	1800							J	M	M	M	M	J	J	M	M
222	2200							J	M	M	M	M	J	J	M	M
272	2700							J	M				J	J	M	
332	3300							J	M				J	J	P	
392	3900												J	J	P	
472	4700												J	J	P	
103	10nF															
		25V	50V	100V	25V	50V	100V	25V	50V	100V	200V	500V	25V	50V	100V	200V
		0603			0805			1206					1210			

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max.	0.33	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.78	2.29	2.54	2.79
Thickness	(0.013)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
	PAPER					EMBOSSED							

Automotive MLCC - X7R

Capacitance Range

			0402			0603					0805					1206						1210				1812		2220			
Soldering			Reflow/Wave			Reflow/Wave					Reflow/Wave					Reflow/Wave						Reflow Only				Reflow Only		Reflow Only			
			16V	25V	50V	10V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	500V	16V	25V	50V	100V	50V	100V	25V	50V	100V
221	Cap	220	C	C	C																										
271	(pF)	270	C	C	C																										
331		330	C	C	C																										
391		390	C	C	C																										
471		470	C	C	C																										
561		560	C	C	C																										
681		680	C	C	C																										
821		820	C	C	C																										
102		1000	C	C	C		G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
182		1800	C	C	C		G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
222		2200	C	C	C		G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
332		3300	C	C	C		G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
472		4700	C	C	C		G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
103	Cap	0.01	C				G	G	G	G		J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	K	K			
123	(µF)	0.012	C				G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
153		0.015					G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
183		0.018					G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
223		0.022					G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
273		0.027					G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
333		0.033					G	G	G			J	J	J	M		J	J	J	J	J		K	K	K	K	K	K			
473		0.047					G	G	G			J	J	J	M		J	J	J	M	J		K	K	K	K	K	K			
563		0.056					G	G	G			J	J	J	M		J	J	J	M	J		K	K	K	M	K	K			
683		0.068					G	G	G			J	J	J	M		J	J	J	M	J		K	K	K	M	K	K			
823		0.082					G	G	G			J	J	J	M		J	J	J	M	J		K	K	K	M	K	K			
104		0.1					G	G	G			J	J	M	M		J	J	J	M	J		K	K	K	M	K	K			
124		0.12										J	J	M	N		J	J	M	M			K	K	K	P	K	K			
154		0.15										M	N	M	N		J	J	M	M			K	K	K	P	K	K			
224		0.22				G						M	N	M	N		J	M	M	Q			M	M	M	P	M	M			
334		0.33										N	N	M	N		J	M	P	Q			P	P	P	Q	X	X			
474		0.47										N	N	M	N		M	M	P	Q			P	P	P	Q	X	X			
684		0.68										N	N	N			M	Q	Q	Q			P	P	Q	X	X	X			
105		1										N	N	N			M	Q	Q	Q			P	Q	Q	X	X	X			
155		1.5															Q	Q	Q				P	Q	Z	Z	X	X			
225		2.2															Q	Q	Q				X	Z	Z	Z	Z	Z			
335		3.3																Q					X	Z	Z	Z	Z				
475		4.7																	Q				X	Z	Z	Z	Z				
106		10																					Z	Z							
226		22																													
			16V	25V	50V	10V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	500V	16V	25V	50V	100V	50V	100V	25V	50V	100V
			0402			0603					0805					1206						1210				1812		2220			

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)
PAPER						EMBOSSED							

Automotive MLCC - X8R

Capacitance Range

SIZE		0603		0805		1206	
Soldering		Reflow/Wave		Reflow/Wave		Reflow/Wave	
	WVDC	25V	50V	25V	50V	25V	50V
271	Cap 270	G	G				
331	(pF) 330	G	G	J	J		
471	470	G	G	J	J		
681	680	G	G	J	J		
102	1000	G	G	J	J	J	J
152	1500	G	G	J	J	J	J
182	1800	G	G	J	J	J	J
222	2200	G	G	J	J	J	J
272	2700	G	G	J	J	J	J
332	3300	G	G	J	J	J	J
392	3900	G	G	J	J	J	J
472	4700	G	G	J	J	J	J
562	5600	G	G	J	J	J	J
682	6800	G	G	J	J	J	J
822	8200	G	G	J	J	J	J
103	Cap 0.01	G	G	J	J	J	J
123	(μF) 0.012	G	G	J	J	J	J
153	0.015	G	G	J	J	J	J
183	0.018	G	G	J	J	J	J
223	0.022	G	G	J	J	J	J
273	0.027	G	G	J	J	J	J
333	0.033	G	G	J	J	J	J
393	0.039	G	G	J	J	J	J
473	0.047	G	G	J	J	J	J
563	0.056	G		N	N	M	M
683	0.068	G		N	N	M	M
823	0.082			N	N	M	M
104	0.1			N	N	M	M
124	0.12			N	N	M	M
154	0.15			N	N	M	M
184	0.18			N		M	M
224	0.22			N		M	M
274	0.27					M	M
334	0.33					M	M
394	0.39					M	
474	0.47					M	
684	0.68						
824	0.82						
105	1						
	WVDC	25V	50V	25V	50V	25V	50V
SIZE		0603		0805		1206	

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max.	0.33	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.78	2.29	2.54	2.79
Thickness	(0.013)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
	PAPER					EMBOSSED							