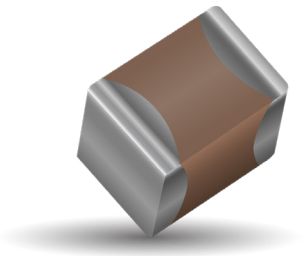
Automotive MLCC

General Specifications



GENERAL DESCRIPTION

AVX Corporation has supported the Automotive Industry requirements for Multilayer Ceramic Capacitors consistently for more than 25 years. Products have been developed and tested specifically for automotive applications and all manufacturing facilities are QS9000 and VDA 6.4 approved.

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.

HOW TO ORDER

0805	5	A	104	K	4	T	2	A
Size 0402 0603 0805 1206 1210 1812	**Voltage** 6.3V = 6 10V = Z 16V = Y 25V = 3 35V = D 50V = 5 100V = 1 200V = 2 500V = 7	**Dielectric** NP0 = A X7R = C X8R = F	**Capacitance Code (In pF)** 2 Sig. Digits + Number of Zeros e.g. 10 F = 106	**Capacitance Tolerance** B = ± 0.1pF (<10pF)* C = ± 0.25pF (<10pF)* D = ± 0.5pF (<10pF)* F = ± 1%* G = ± 2%* J = ± 5% (<=1µF) K = ± 10% M = ± 20% *NPO only	**Failure Rate** 4=Automotive	**Terminations** T = Plated Ni and Sn Z = FLEXITERM®** U = Conductive Epo **X7R X8R only	**Packaging** 2 = 7" Reel 4 = 13" Reel	**Special Code** A = Std.Product

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.

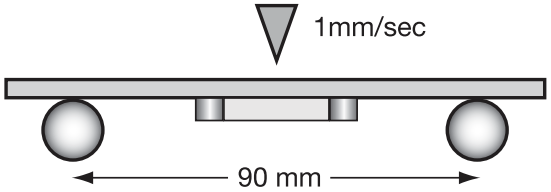
COMMERCIAL VS AUTOMOTIVE MLCC PROCESS COMPARISON

	Commercial	Automotive
Administrative	Standard Part Numbers. No restriction on who purchases these parts.	Specific Automotive Part Number. sed to control supply of product to Automotive customers.
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

FLEXITERM FEATURES

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



Typical bend test results are shown below:

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

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

Automotive MLCC-NP0

Capacitance Range

SIZE		0402		0603				0805					1206					
Soldering		Reflow/Wave		Reflow/Wave				Reflow/Wave					Reflow/Wave					
WVDC		25V	50V	25V	50V	100V	200V	25V	50V	100V	200V	250V	25V	50V	100V	200V	250V	500V
0R5	0.5	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
1R0	1.0	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
1R2	1.2	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
1R5	1.5	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
1R8	1.8	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
2R2	2.2	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
2R7	2.7	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
3R3	3.3	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
3R9	3.9	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
4R7	4.7	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
5R6	5.6	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
6R8	6.8	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
8R2	8.2	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
100	10.0	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
120	12	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
150	15	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
180	18	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
220	22	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
270	27	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
330	33	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
390	39	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
470	47	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J	J	J
510	51	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J		
560	56	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J		
680	68	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J		
820	82	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J		
101	100	C	C	G	G	G	G	J	J	J	N	N	J	J	J	J		
121	120			G	G	G		J	J	J	N	N	J	J	J	J		
151	150			G	G	G		J	J	J	N	N	J	J	J	J		
181	180			G	G	G		J	J	J	N	N	J	J	J	J		
221	220			G	G	G		J	J	J	N	N	J	J	J	J		
271	270			G	G	G		J	J	J	N	N	J	J	J	J		
331	330			G	G	G		J	J	J	N	N	J	J	J	J		
391	390			G	G			J	J	J			J	J	J	J		
471	470			G	G			J	J	J			J	J	J	J		
561	560			G	G			J	J	J			J	J	J	J		
681	680			G	G			J	J	J			J	J	J	J		
821	820							J	J	J			J	J	J	J		
102	1000							J	J	J			J	J	J	J		
122	1200																	
152	1500																	
182	1800																	
222	2200																	
272	2700																	
332	3300																	
392	3900																	
472	4700																	
103	**10nF**																	
WVDC		**25V**	**50V**	**25V**	**50V**	**100V**	**200V**	**25V**	**50V**	**100V**	**200V**	**250V**	**25V**	**50V**	**100V**	**200V**	**250V**	**500V**
Size		**0402**		**0603**				**0805**					**1206**					

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 - X7R

Capacitance Range

Size		0402			0603							0805						1206							1210						1812		2220					
Soldering		Reflow/Wave			Reflow/Wave							Reflow/Wave						Reflow/Wave							Reflow Only						Reflow Only		Reflow Only					
(L) Length	mm (in.)	1 ± 0.1 (0.04 ± 0.004)			1.6 ± 0.15 (0.063 ± 0.006)							2.01 ± 0.2 (0.079 ± 0.008)						3.2 ± 0.2 (0.126 ± 0.008)							3.2 ± 0.2 (0.126 ± 0.008)						4.5 ± 0.3 (0.177 ± 0.012)		5.7 ± 0.5 (0.224 ± 0.02)					
(W) Width	mm (in.)	0.5 ± 0.1 (0.02 ± 0.004)			0.81 ± 0.15 (0.032 ± 0.006)							1.25 ± 0.2 (0.049 ± 0.008)						1.6 ± 0.2 (0.063 ± 0.008)							2.5 ± 0.2 (0.098 ± 0.008)						3.2 ± 0.2 (0.126 ± 0.008)		5 ± 0.4 (0.197 ± 0.016)					
(t) Terminal	mm (in.)	0.25 ± 0.15 (0.01 ± 0.006)			0.35 ± 0.15 (0.014 ± 0.006)							0.5 ± 0.25 (0.02 ± 0.01)						0.5 ± 0.25 (0.02 ± 0.01)							0.5 ± 0.25 (0.02 ± 0.01)						0.61 ± 0.36 (0.024 ± 0.014)		0.64 ± 0.39 (0.025 ± 0.015)					
WVDC		16V	25V	50V	10V	16V	25V	50V	100V	200V	250V	16V	25V	50V	100V	200V	250V	16V	25V	50V	100V	200V	250V	500V	16V	25V	50V	100V	200V	250V	50V	100V	25V	50V	100V	200V	250V	500V
101	100																												M	Q								
221	220	C	C	C	G	G	G	G	G	G																			M	Q								
271	270	C	C	C	G	G	G	G	G	G																			M	Q								
331	330	C	C	C	G	G	G	G	G	G																			M	Q								
391	390	C	C	C	G	G	G	G	G	G																			M	Q								
471	470	C	C	C	G	G	G	G	G	G																			M	Q								
561	560	C	C	C	G	G	G	G	G	G																			M	Q								
681	680	C	C	C	G	G	G	G	G	G																			M	Q								
821	820	C	C	C	G	G	G	G	G	G																			M	Q								
102	1000	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
122	1220	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
152	1500	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
182	1800	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
222	2200	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
272	2700	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
332	3300	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
392	3900	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
472	4700	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
562	5600	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
682	6800	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
822	8200	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
103	Cap 0.01	C	C	C	G	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	M	Q	K	K						
123	(uF) 0.012	C			G	G	G	G	G			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
153	0.015	C			G	G	G	G	G			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
183	0.018	C			G	G	G	G	G			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
223	0.022	C			G	G	G	G	G			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
273	0.027	C			G	G	G	G	J			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
333	0.033	C			G	G	G	G	J			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	M	Q	K	K						
393	0.039				G	G	G	G	J			J	J	J	N	N	N	J	J	J	J	M	M		K	K	K	K	M	Q	K	K						
473	0.047				G	G	G	G	J			J	J	J	N	N	N	J	J	J	M	M	M		K	K	K	K	M	Q	K	K						
563	0.056				G	G	G	G	J			J	J	J	N			J	J	J	M	M	M		K	K	K	M	M	Q	K	K						
683	0.068				G	G	G	G	J			J	J	J	N			J	J	J	M	M	M		K	K	K	M	M	Q	K	K						
823	0.082				G	G	G	G	J			J	J	J	N			J	J	J	M	M	M		K	K	K	M	Q	Q	K	K						
104	0.1				G	G	G	G	J			J	J	J	N			J	J	J	M	P	P		K	K	K	M	Q	Q	K	K						X
124	0.12				G	J	J					J	J	N	N			J	J	M	M	Q	Q		K	K	K	P	Q	Q	K	K						
154	0.15				G	J	J					M	N	N	N			J	J	M	M	Q	Q		K	K	K	P	Q	Q	K	K						
224	0.22				G	J	J					M	N	N	N			J	M	M	Q	Q	Q		M	M	M	P	Q	Q	M	M						
334	0.33											N	N	N	N			J	M	P	Q				P	P	P	Q	Z	Z	X	X						
474	0.47											N	N	N	N			M	M	P	Q				P	P	P	Q			X	X						
684	0.68											N	N	N	N			M	Q	Q	Q				P	P	Q	X			X	X						
105	1											N	N	N	N			M	Q	Q	Q				P	Q	Q	Z			X	X		Z	Z	X	X	
155	1.5											N	N					Q	Q	Q	Q				P	Q	Z	Z			X	X		Z	Z	Z	Z	
225	2.2											N	N					Q	Q	Q	Q				Z	Z	Z	Z			Z	Z		Z	Z			
335	3.3																	Q	Q	Q					X	Z	Z	Z			Z			Z	Z			
475	4.7																	Q	Q	Q					X	Z	Z	Z			Z			Z	Z			
106	10																								Z	Z	Z				Z		Z	Z	Z			
226	22																																Z						
WVDC		16V	25V	50V	10V	16V	25V	50V	100V	200V	250V	16V	25V	50V	100V	200V	250V	16V	25V	50V	100V	200V	250V	500V	16V	25V	50V	100V	200V	250V	50V	100V	25V	50V	100V	200V	250V	500V
Size		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 (0.04)	1.27 (0.05)	1.40 (0.055)	1.52 (0.060)	1.78 (0.07)	2.29 (0.09)	2.54 (0.1)	2.79 (0.11)
	PAPER					EMBOSSED							

Automotive MLCC - X8R

Capacitance Range

SIZE			0603			0805			1206	
Soldering			Reflow/Wave			Reflow/Wave			Reflow/Wave	
WVDC	WVDC		25V	50V	100V	25V	50V	100V	25V	50V
472	pF	4700	G	G	G	J	J	J	J	J
562		5600	G	G	G	J	J	J	J	J
682		6800	G	G	G	J	J	J	J	J
822		8200	G	G	G	J	J	J	J	J
103	uF	0.01	G	G	G	J	J	J	J	J
123		0.012	G	G		J	J	N	J	J
153		0.015	G	G		J	J	N	J	J
183		0.018	G	G		J	J	N	J	J
223		0.022	G	G		J	J	N	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	M
474		0.47							M	Q
684		0.68							Q	Q
824		0.82							Q	Q
105		1							Q	Q
WVDC	WVDC		25V	50V	100V	25V	50V	100V	25V	50V
SIZE			0603			0805			1206	

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							