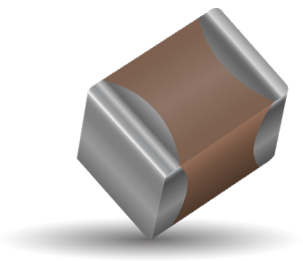


GENERAL DESCRIPTION

KYOCERA AVX 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.

KYOCERA 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.

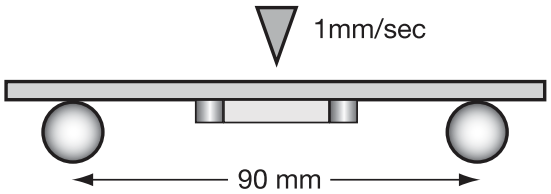
COMMERCIAL VS AUTOMOTIVE MLCC PROCESS COMPARISON

	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

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Automotive MLCC-NP0

Capacitance Range

Case Size		0402			0603					0805							1206								1210						
Length (L)	mm (in.)	1.00 ± 0.10 (0.040 ± 0.004)			1.60 ± 0.15 (0.063 ± 0.006)					2.01 ± 0.20 0.079 ± 0.008							3.20 ± 0.20 (0.126 ± 0.008)								3.20 ± 0.20 (0.126 ± 0.008)						
Width (W)	mm (in.)	0.50 ± 0.10 (0.020 ± 0.004)			0.81 ± 0.15 (0.032 ± 0.006)					1.25 ± 0.20 (0.049 ± 0.008)							1.60 ± 0.20 (0.063 ± 0.008)								2.50 ± 0.20 (0.098 ± 0.008)						
Terminal (t)	mm (in.)	0.25 ± 0.15 (0.010 ± 0.006)			0.35 ± 0.15 (0.014 ± 0.006)					0.50 ± 0.25 (0.020 ± 0.010)							0.50 ± 0.25 (0.020 ± 0.010)								0.50 ± 0.25 (0.020 ± 0.010)						
CAP	CAP Code	25	50	100	25	50	100	200	250	25	50	100	200	250	500	630	25	50	100	200	250	500	630	1000	50	100	200	250	500	630	1000
0.5	0R5	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
1	1R0	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
5	5R0	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
10	100	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
12	120	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
15	150	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
18	180	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
22	220	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
27	270	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
33	330	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
39	390	C	C	C	G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
47	470	C	C		G	G	G	G	G	J	J	J	J	J			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
56	560	C	C		G	G	G	G		J	J	J	J	N			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
68	680	C	C		G	G	G	G		J	J	J	J	N			J	J	J	J	J	J	Q	Q	J	J	J	J	J	J	J
82	820	C	C		G	G	G	G		J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	N	N	N	N
100	101	C	C		G	G	G	G		J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	N	N	N	N
120	121				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	P	P	P	X
150	151				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	P	P	P	X
180	181				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	P	P	P	X
220	221				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q	Q	N	N	N	P	P	P	X
270	271				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q		N	N	N	P	P	P	X
330	331				G	G	G			J	J	J	J	N			J	J	J	J	J	J	Q		N	N	N	P	P	P	X
390	391				G	G	G			J	J	J	J				J	J	J	J	J	J	Q		N	N	N	P	P	P	X
430	431				G	G				J	J	J	J				J	J	J	J	J	J	Q		N	N	N	P	P	P	X
470	471				G	G				J	J	J	J				J	J	J	J	J	J	Q		N	N	N	P	P	P	X
560	561				G	G				J	J	J					J	J	J	J	M	Q	Q		N	N	N	P	P	P	
680	681				G	G				J	J	J					J	J	J	J	M	Q	Q		N	N	N	P	P	P	
1,000	102				G	G				J	J	J					J	J	J	J	M	Q	Q		N	N	N	P	P	X	
1,200	122				G	G				J	J						N	N	N	N					N	N	N	P	P		
1,500	152				G	G				J	J						N	N	N	N					N	N	N	P	P		
2,200	222				G					J	J						J	J	J	J	J	J	J		N	N	N	P	K	K	
2,700	272				G												J	J	J	J	J	J	J						K	K	
3,300	332				G												M	M	M	M	M	M	M						K	K	
3,900	392				G												M	M	M	M	M	M	M						M	M	
4,700	472				G												P	P	P	P	P	P	P						M	M	
5,600	562				G																								M	M	
6,800	682				G																								N	N	
8,200	822				G																								P	P	
10,000	103				G																							X	X	X	
12,000	123																											X			
15,000	153																											X			
18,000	183																											X			
22,000	223																											X			
27,000	273																											X			
33,000	333																											X			
39,000	393																														
47,000	473																														
56,000	563																														
68,000	683																														
82,000	823																														
100,000	104																														
CAP	CAP Code	25	50	100	25	50	100	200	250	25	50	100	200	250	500	630	25	50	100	200	250	500	630	1000	50	100	200	250	500	630	1000
Case Size		0402			0603					0805							1206								1210						

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							

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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		6.3V	16V	25V	50V	10V	16V	25V	50V	100V	200V	250V	6.3V	10V	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																																							
221	220		C	C	C	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						
271	270		C	C	C	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						
331	330		C	C	C	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						
391	390		C	C	C	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						
471	470		C	C	C	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						
561	560		C	C	C	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						
681	680		C	C	C	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						
821	820		C	C	C	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						
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	J	J	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	J	J	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	J	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	J	N	N	J	J	J	J	Q	Q		K	K	K	K	M	Q	K	K						
273	0.027		C			G	G	G	G	J					J	J	J	J	N	N	J	J	J	J	Q	Q		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	Q	Q		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	Q	Q		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	Q	Q		K	K	K	K	M	Q	K	K						
563	0.056					G	G	G	G	J					J	J	J	N			J	J	J	M	Q	Q		K	K	K	M	M	Q	K	K						
683	0.068					G	G	G	G	J					J	J	J	N			J	J	J	M	Q	Q		K	K	K	M	M	Q	K	K						
823	0.082					G	G	G	G	J					J	J	J	N			J	J	J	M	Q	Q		K	K	K	M	Q	Q	K	K						
104	0.1					G	G	G	G	J					J	J	J	N			J	J	J	M	Q	Q		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					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	C													N	N	N	N			M	Q	Q	Q				P	Q	Q	Z			X	X		Z	Z	X	X	
155	1.5														N	N	N				Q	Q	Q	Q				P	Q	Z	Z			X	X		Z	Z	Z	Z	
225	2.2														N	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												P	P							Q							Z	Z	Z				Z		Z	Z	Z			
226	22																																		Z						
WVDC		6.3V	16V	25V	50V	10V	16V	25V	50V	100V	200V	250V	6.3V	10V	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							

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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							

Mouser Electronics

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AVX:

08055C473K4T4H 12065C104K4T4H 08055C102K4T4H 06031C471K4T4H 08051C103K4T4H 06031C103K4T4H 08055C683K4T4H 06033C473K4T4H