General Specifications





GENERAL DESCRIPTION

With increased requirements from the automotive industry for additional component robustness, KYOCERA AVX recognized the need to produce a MLCC with enhanced mechanical strength. It was noted that many components may be subject to severe flexing and vibration when used in various under the hood automotive and other harsh environment applications.

To satisfy the requirement for enhanced mechanical strength, KYOCERA AVX had to find a way of ensuring electrical integrity is maintained whilst external forces are being applied to the component. It was found that the structure of the termination needed to be flexible and after much research and development, KYOCERA AVX launched FLEXITERM®. FLEXITERM® is designed to enhance the mechanical flexure and temperature cycling performance of a standard ceramic capacitor with an X7R dielectric. The industry standard for flexure is 2mm minimum. Using FLEXITERM®, KYOCERA AVX provides up to 5mm of flexure without internal cracks. Beyond 5mm, the capacitor will generally fail "open".

As well as for automotive applications FLEXITERM® will provide Design Engineers with a satisfactory solution when designing PCB's which may be subject to high levels of board flexure.

PRODUCT ADVANTAGES

- High mechanical performance able to withstand, 5mm bend test guaranteed
- Increased temperature cycling performance, 3000 cycles and beyond
- Flexible termination system
- Reduction in circuit board flex failures
- Base metal electrode system
- Automotive or commercial grade products available
- AECQ200 Qualified
- Approved to VW 80808 Specification

APPLICATIONS

High Flexure Stress Circuit Boards

· e.g. Depanelization: Components near edges of board.

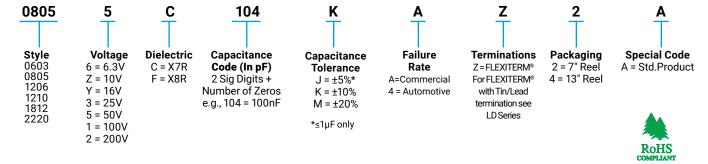
Variable Temperature Applications

- · Soft termination offers improved reliability performance in applications where there is temperature variation.
- · e.g. All kind of engine sensors: Direct connection to battery rail.

Automotive Applications

- Improved reliability.
- Excellent mechanical performance and thermo mechanical performance.

HOW TO ORDER



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

Specifications and Test Methods

KYOCERa

PERFORMANCE TESTING

AEC-0200 Qualification:

Created by the Automotive Electronics

Specification defining stress test qualification for passive components

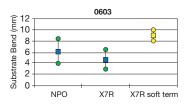
Testing:

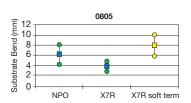
Key tests used to compare soft termination to AEC-Q200 qualification:

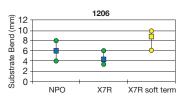
- **Bend Test**
- Temperature Cycle Test

BOARD BEND TEST RESULTS

AEC-Q200 Vrs FLEXITERM® Bend Test







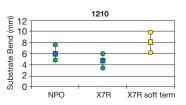


TABLE SUMMARY

Typical bend test results are shown below:

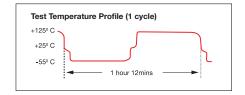
Style	Conventional Termination	FLEXITERM
0603	>2mm	>5mm
0805	>2mm	>5mm
1206	>2mm	>5mm

TEMPERATURE CYCLE TEST PROCEDURE

Test Procedure as per AEC-Q200:

The test is conducted to determine the resistance of the component when it is exposed to extremes of alternating high and low temperatures.

- Sample lot size quantity 77 pieces
- TC chamber cycle from -55°C to +125°C for 1000 cycles
- Interim electrical measurements at 250, 500, 1000 cycles
- Measure parameter capacitance dissipation factor, insulation resistance



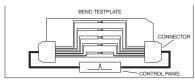
BOARD BEND TEST PROCEDURE

According to AEC-Q200

Test Procedure as per AEC-Q200: Sample size: 20 components

Span: 90mm Minimum deflection spec: 2 mm

- Components soldered onto FR4 PCB (Figure 1)
- Board connected electrically to the test equipment



MOUNTING 41110

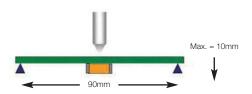
Fig 1 - PCB layout with electrical connections

Fig 2 - Board Bend test equipment

ENHANCED SOFT TERMINATION BEND TEST PROCEDURE

Bend Test

The capacitor is soldered to the printed circuit board as shown and is bent up to 10mm at 1mm per second:



- · The board is placed on 2 supports 90mm apart (capacitor side down)
- The row of capacitors is aligned with the load stressing knife

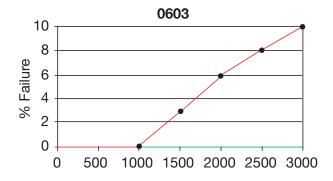


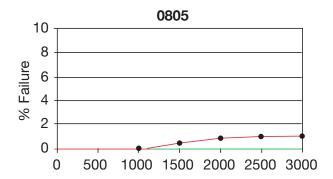
- · The load is applied and the deflection where the part starts to crack is recorded (Note: Equipment detects the start of the crack using a highly sensitive current detection circuit)
- The maximum deflection capability is 10mm

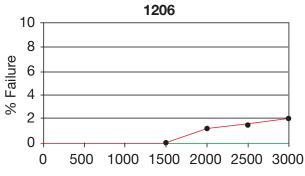
Specifications and Test Methods

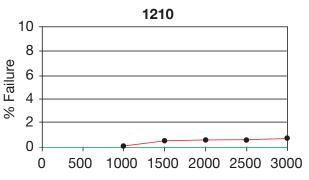


BEYOND 1000 CYCLES: TEMPERATURE CYCLE TEST RESULTS









Green = Soft Term MLCC (Flexiterm) Red = Standard MLCC

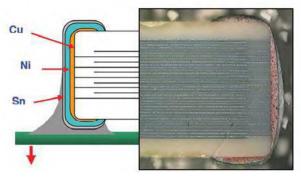
Soft Term - No Defects up to 3000 cycles

AEC-Q200 specification states 1000 cycles compared to 3000 temperature cycles.

FLEXITERM® TEST SUMMARY

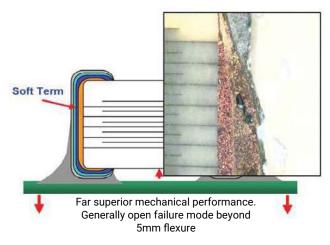
- · Qualified to AEC-Q200 test/specification with the exception of using 3000 temperature cycles (up to +150°C bend test guaranteed greater than 5mm).
- · FLEXITERM® provides improved performance compared to standard termination systems.
- Board bend test improvement by a factor of 2 to 4 times.
- Temperature Cycling:
 - 0% Failure up to 3000 cycles
 - No ESR change up to 3000 cycle

WITHOUT SOFT TERMINATION



Major fear is of latent board flex failures.

WITH SOFT TERMINATION



KYDEER3 | The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.



Capacitance Range X8R Dielectric

	SIZE	06	03	08	305	1206					
S	oldering										
	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				
332 392	3300 3900	G G	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	Ĵ	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	М	М				
683	0.068	G		N	N	М	M				
823	0.082			N	N	M	M				
104 124	0.1 0.12			N N	N N	M M	M M				
154	0.12			N N	N N	M	M				
184	0.15			N N	IN	M	M				
224	0.18			N N		M	M				
274	0.22			14		M	M				
334	0.33					M	M				
394	0.39					M					
474	0.47										
684	0.68										
824	0.82										
105	1										
	SIZE	06	03	ns	l 805	120	16				

Letter	Α	С	Е	G	J	K	М	N	Р	Q	Χ	Υ	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					` ′	EMBO	SSED		· ·	

TS 16949, ISO 9001Certified



Capacitance Range X7R Dielectric

271 (pF) 331 331 3391 4771 5661 5881 5221 1002 11882 1 2222 2 2 2 2 2 3 3472 4 4 103 Cap (1123 (µF) 0. 153 0. 183 0. 223 0. 223 0. 223 0.			C C C		10V	16V	25V	50V		200V	250V	16V	25V		100 V	1200V	2501/	161/	locv/	F0) (120		0501	E00\/	4614	12		1001/		12	251/	2220	
WVDC 271 (pF) 271 (pF) 331 391 471 471 561 581 102 1 182 1 182 1 222 2 2 3 3 3 3472 4 103 Cap (Cap (pF) (pF) (pF) (pF) (pF) (pF) (pF) (pF	220 270 330 390 470 560 680 820	0000	C C C	C C	10V	16V	25V	50V	100 V	200V	250V	16V	25V	50V	100 V	1200V	2501/	161/	051/	E01/	4001	10001	0501	E001/	4611	05)/	LEOV	1001/	EOV/	100 1/	251/	E01/	
221 Cap 271 (pF) 331 391 391 471 471 561 581 521 102 1182 1222 2332 33 472 4103 Cap 103 Cap 10213 (µF) 103 Cap 1023 (µF) 103 Cap 103 Cap 104 105 0.0. 1083 0.0. 1083 0.0.	220 270 330 390 470 560 680 820	0000	C C C	C C				001	100 1	2001	2001										1100 V	1200V	1250V	SUUV	ThVI	25V						50V	ا 100 <i>ا</i>
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182 1 222 2 332 3 472 4 103 Cap (123 (μF) 0. 153 0. 183 0. 223 0. 223 0. 223 0. 333 0.	1000	С	С	С																													
222 2 332 3 472 4 103 Cap (123 (μF) 0. 153 0. 153 0. 223 0. 273 0.	1000	С	С	С	\Box	G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	N	N			
332 3472 4 103 Cap (123 (μF) 0.153 0.183 0.223 0.223 0.333 0.3432 0.3432 0.3333 0.34472 0.344	1800	С	С	С		G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	N	N			
472	2200	С	С	С		G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	N	N			
103 Cap (123 (μF) 0.153 0.183 0.223 0.273 0.333 0.	3300	C	C	С		G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	7	J	J	٦	K	K	K	K	Ν	N			
123 (μF) 0. 153 0. 183 0. 223 0. 273 0. 333 0.	4700	С	С	С		G	G	G	G	G	G	J	J	J	J	J	J	J	J	J	J	J	J	J	K	K	K	K	N	N			
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183 0. 223 0. 273 0. 333 0.	0.012	С				G	G	G				J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	N	N			
223 0. 273 0. 333 0.	0.015	С				G	G	G				J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	N	N			
273 0. 333 0.	0.018	С				G	G	G				J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	N	N			
333 0.	0.022	С			ــــــا	G	G	G	<u> </u>			J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	N	N			
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	0.033	С				G	G	G				J	J	J	N	N	N	J	J	J	J	J	J		K	K	K	K	N	N			
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Letter	Α	С	E	G	J	K	М	N	Р	Q	X	Υ	Z	7
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	3.30
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)	(0.130)
						EMBOSSEL								