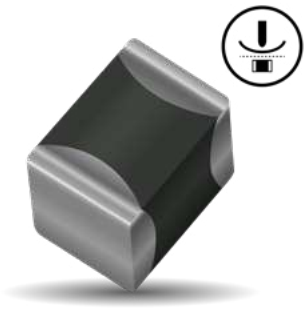
Multilayer Varistor with FLEXITERM®

General Specifications



GENERAL DESCRIPTION

With increased requirements from the automotive industry for additional component robustness, KYOCERA AVX recognized the need to product a MLV with enhancedmechanical strength. It was noted that many components may be subject to severe flexing and vibration when used 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 maitaied whilst external forces are being applied to the component. It was found that the structure of the termination needed to be flexible and after uch research and development, KYOCERA AVX launched FLEXITERM®, multilayer varistor. The industry standard for flexure is 2mm miimum. Using FLEXITERM®, KYOCERA AVX provides up to 5mm of flexure without internal cracking.

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

PRODUCT ADVANTAGES

- Operating Temperature Range: -55°C to +125/150°C
- Qualified in 0603, 0805, 1206, and 1210 Case Sizes
- High Mechanical Performance Guaranteed to withstand 5mm Bend Test
- Increased Temperature Cycling Performance ≥ 3000 Cycles
- Flexible Termination System
- Reduction in Circuit Board Flex Failures
- Reduction in Circuit Board Flex Failures
- AEC-Q200 Qualified or Commercial Grade Products Available

APPLICATIONS

High Flexure Stress

- e.g. Depanelization: Components Near Edges of Board

Variable Temperature Applications

- Soft Termination Offers Improved Reliability Performance in Applications Where There is a Large Termperature Variation
- e.eg. Engine Sensors: Direct Connection to Battery Rail

Automotive Applications

- Improved Reliability
- Excellent Mechanical and Thermo-Mechanical Performance

HOW TO ORDER

VC	AS	0805	18	A	400	R	Z
Varistor Chip VC = Varistor Chip VT = Varistor Temp Rated	**Automotive Series** AS = 125℃ A3 = 150℃	**Size** 0603 0805 1206 1210	**Working Voltage** 05 = 5.6V_{dc} 14 = 14V_{dc} 18 = 18V_{dc} 26 = 26V_{dc} 30 = 30V_{dc}	**Energy Rating** A = 0.1J C = 0.3J D = 0.4J J = 1.5J	**Clamping Voltage** 150= 18V 300 = 32V 390 = 42V 400 = 42V 580 = 60V 650 = 67V	**Packaging** D = 7" (1000)* R = 7" (4000)* T = 13" (1000)	**Terminations** Z = FLEXITERM®

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

RoHS COMPLIANT

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.

PERFORMANCE TESTING

AEC-Q200 Qualification

- Created by the Automotive Electronics Council
- Specification defining stress test qualification for passive components

Testing

- Key tests used to compare soft termination to AEC-Q200 qualifications:
- Bend Test
- Temperature Cycle Test



BOARD BEND TEST RESULTS

AEC-Q200 Vrs KYOCERA AVX FLEXITERM® Bend Test

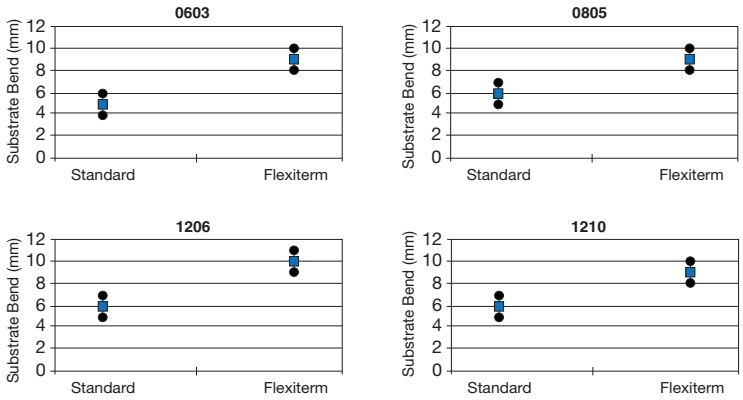


TABLE SUMMARY

Typical bend test results are show below:

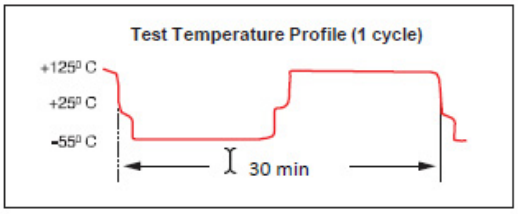
Style	Conventional Termination	FLEXTERM
0603	>2mm	>5mm
0805	>2mm	>5mm
1206	>2mm	>5mm
1210	>2mm	>5mm

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 toextremes 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 leakage current, breakdown voltage



BOARD BEND TEST PROCEDURE

According to AEC-Q200

Test Procedure as per AEC-Q200:

Sample Size: 20 components

Span: 90mm Minimum deflection spec: 2mm

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

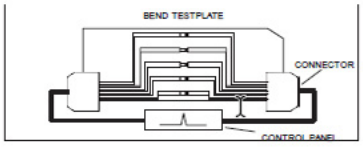


Fig 1 - PCB layout with electrical connections

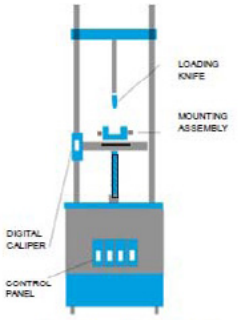
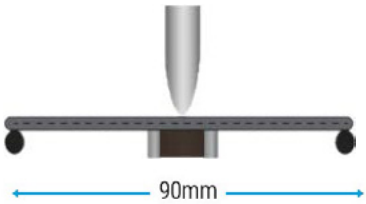


Fig 2 - Board Bend test equipment

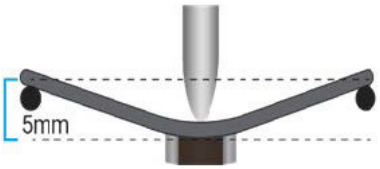
KYOCERA AVX ENHANCED SOFT TERMINATION BEND TEST PROCEDURE

Bend Test

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

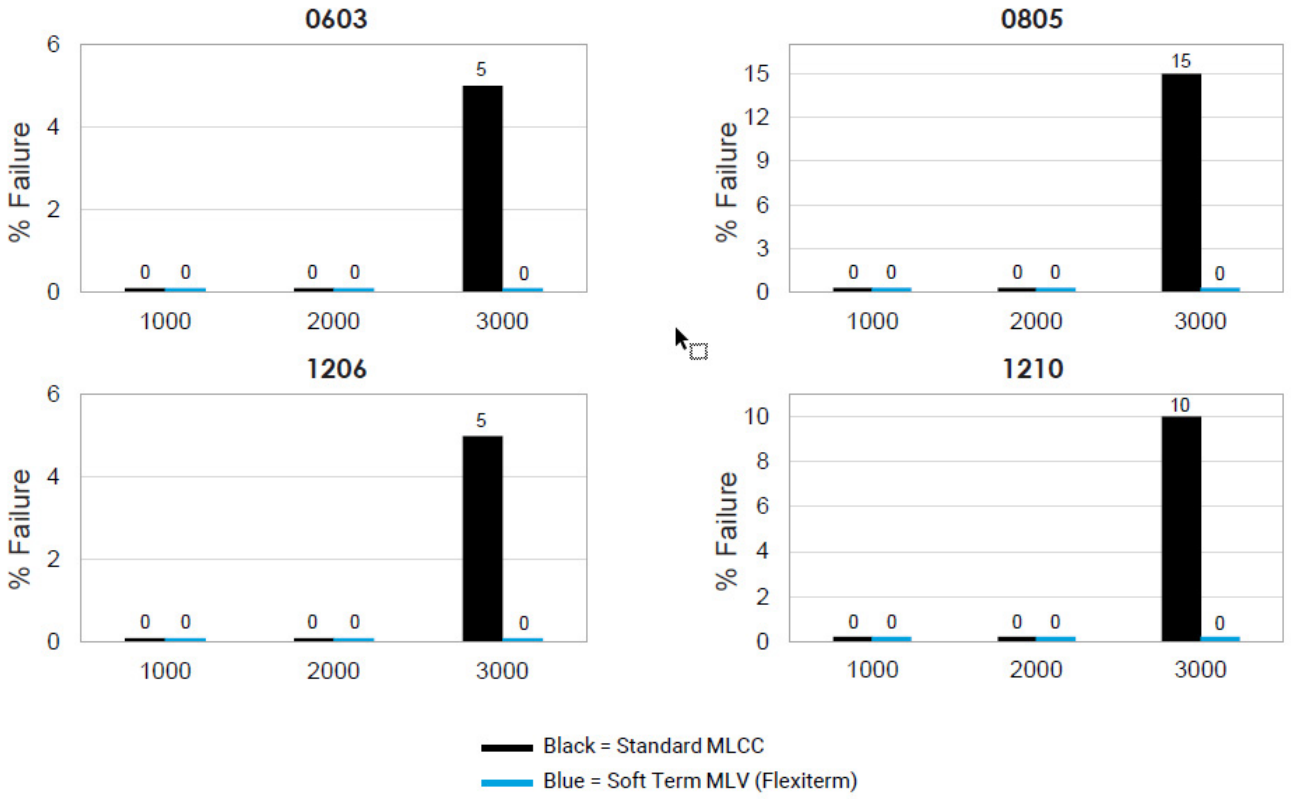


- The board is placed on 2 supports 90mm apart (varistor side down)
- The row of capacitors is aligned with the load stressing knife



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

BEYOND 1000 CYCLES: TEMPERATURE CYCLE TEST



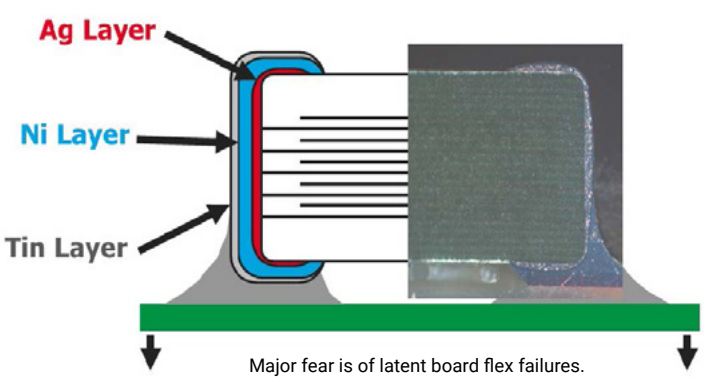
Soft Term - No Defects up to 3000 Cycles

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

FLEXITERM® TEST SUMMARY

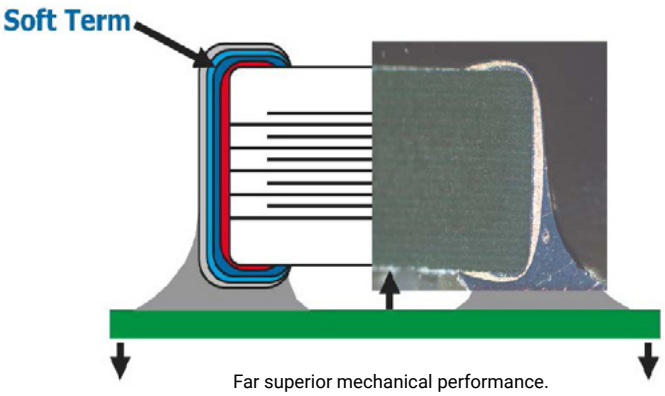
- Qualified to AEC-Q200 test/specification with the exceptionof using KAVX 3000 temperature cycles (up to +150°C bend test guarenteed greater than 5mm).
- FLEXITERM provides performance compared to standardtermination systems.
- Board bend test improvement by a factor of 2 or 4 times.
- Temperature Cycling:
- 0% Failure up to 3000 cycles
- o sigificant change in electrical characteristics up to 3000 cycles

WITHOUT SOFT TERMINATION



Major fear is of latent board flex failures.

WITH SOFT TERMINATION



Far superior mechanical performance.
Generally open failure mode beyond 5mm flexure.

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