

TEST METHODS AND CONDITIONS

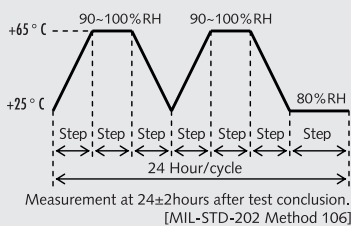
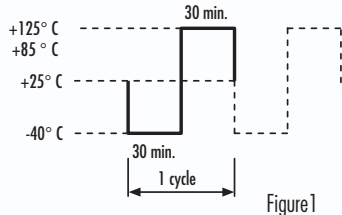
QUARTZ CRYSTALS ACCORDING TO AEC-Q200



ABSTRACT OF QUALIFICATION TEST ITEMS FOR AEC-Q200 COMPLIANT TYPES

LIST OF EXTENDED TEST SPECIFICATIONS FOR QUARTZ CRYSTALS ACCORDING TO AEC-Q200

ELECTRICAL AND MECHANICAL PERFORMANCE

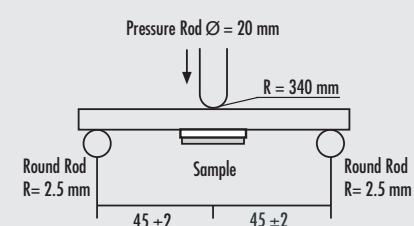
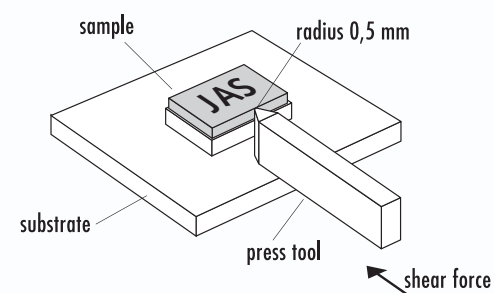
	Items	AEC-Q200 compliant type
1	High temperature storage	Temperature: at rated operating temp.(+85 °C/+125 °C) Time: 1000 h
2	Low temperature storage	Not specified
3	Biased Humidity	Temperature: +85 °C Humidity: 85 % RH Time: 1000 h
4	Moisture Resistance	Time: 24hour/cycle  Measurement at 24±2hours after test conclusion. [MIL-STD-202 Method 106]
5	Temperature Cycling	Temperature/Time: Figure 1 Cycle time: 1000 cycles (-40 °C to +85 °C/+125 °C)  Figure 1
6	Thermal Shock	Temperature: -55 °C/+85 °C or +125 °C Dwell time: 5 minutes each temperature Cycles: 300 cycles Max. transfer time: 20 seconds (according to MIL-STD 202F Method 107 Cond. A)
7	Vibration	Peak acceleration: 5 g Frequency: 10 ~ 2000 Hz Sweep time: 20 minutes Duration: 4 hours each for X, Y, Z axis (according to MIL-STD 202F Method 204)
8	Shock	Peak acceleration: 100 g Pulse: half sine, 6.0 ms Repetition: 3 pulses each for X, Y, Z axis (according to MIL-STD 202F Method 213B, Cond. C)



Test method in accordance with AEC-Q200. Remarks: The tests are performed after the devices have passed the reflow process twice.

1.2 The measurements have been performed after keeping the components for more than 24 hours at room temperature after passing the reflow process.



	Items	AEC-Q200 compliant type
9	Drop test	Not specified for quartz crystals
10	Solderability (according to JESD22-B-102D)	Solder bath temp.: $+257.5 \pm 2.5 \text{ }^\circ\text{C}$ Dip time: $5 \pm 0.5 \text{ s}$ Solder: Sn-Ag-Cu Flux: ROL1 (per J-STD-004) Degree of coverage: $> 95\%$
11	Leakage	Not specified for AEC-Q200 Quartz Crystals
12	Board Flex Test (Terminal Bond Strength Test)	Bending depth: 2 mm Bending duration: 60 seconds  <p>The diagram shows a cross-section of a board flex test. A pressure rod with a diameter of 20 mm is shown bending a substrate with a radius of 340 mm. The substrate is supported by two round rods with a radius of 2.5 mm. The distance between the support rods is 45 ± 2 mm on each side of the sample. The sample is positioned in the center of the bend.</p>
13	Terminal Strength (SMD) (Shear Stress Test)	Force: 18N Duration: 60 seconds  <p>The diagram shows a shear stress test setup. A sample is mounted on a substrate. A press tool is used to apply a shear force to the sample. The radius of the press tool is 0.5 mm. The sample is labeled 'JAS'.</p>

* Test Condition

Mechanical: unchanged appearance

Electrical: max. frequency change ΔF : $\pm 5 \text{ ppm}$;

max. change of series resistance ΔR_s : $\pm 5.0 \text{ Ohm}$ or $\pm 20\%$, whichever is larger