

## RELIABILITY TEST PROCEDURES FOR QUARTZ CRYSTALS

NO.	TEST NAME	TEST PROCEDURES	REQUIREMENTS
1	SHOCK	Drop 3 times from the height of 100 cm onto hard wooden board.	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
2	VIBRATION	Vibration Frequency: 10 to 55 Hz, 1.5 mm, full wave Cycle: 2 min. Direction: X.Y.Z. Time: 2 hours in each direction	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
3	SOLDERABILITY	After applying ROSIN flux, dip in solder Dipping Time: 3 ±0.5 sec. Soldering Temperature: +230 ±5 °C Dipping Depth: 2 mm from the edge of terminals/lead-wires of specimen.	Over 90% of terminals/lead-wires dipped is covered by solder.
4	RESISTANCE TO SOLDERING HEAT	Dipping in solder <b>Dipping Time:</b> 10 ±1 sec. <b>Soldering Temperature:</b> +260 ±5 °C <b>Dipping Depth:</b> 2 mm from the edge of terminals/lead-wires of specimen.	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
5	STORAGE IN HIGH TEMPERATURE	+85 $\pm$ 2 $^{\circ}C$ for 500 hours.	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
6	STORAGE IN LOW TEMPERATURE	-40 $\pm$ 2 °C for 500 hours.	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
7	HUMIDITY	+60 ± 2 °C in humidity 95% for 500 hours.	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
8	THERMAL SHOCK	Supply 500 cycles as follows: Temperature shift shall be done within 30 sec. $-55 \pm 2^{\circ}C$ $+125 \pm 2^{\circ}C$ (30 min) (30 min)	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.
9	TEMPERATURE CYCLE	Supply 100 cycles as follows: $+125 + 5 - 2^{\circ}C$ 30 min. $+25 \pm 5^{\circ}C$ $+25 \pm 5^{\circ}C$ 10 min. 10 min. $-55 + 3 - 5^{\circ}C$ 30 min. 1 Cycle	Frequency Drift ±5 PPM Max. Resistance Drift ±15% Max.

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10	STRENGTH OF TERMINALS/ LEAD WIRES	<b>1) Lead Pull</b> Weight: 1 kg Time: 30 sec.	There are no visual abnormalities.
		2) Lead Bend Weight: 225 g Bending Angle: 90 degrees Bending Count: 2 times	There are no visual abnormalities.
11	SEALING TIGHTNESS MIL-STD 202F METHOD 112D TEST C AND D	<ul> <li>1) Dipping in Florinert at:</li> <li>+125 ±5°C for 5 min.</li> <li>(Gross Leak)</li> </ul>	There are no gas bubbles.
		2) Leak rate shall be measured by using: Helium Leak Detector (Fine Leak)	Leak rate: 1x10 <sup>-6</sup> atm <sup>*</sup> CC/sec. Max.

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