

**Date: 09/28/2023**

# APPROVAL SHEET

Customer: \_\_\_\_\_

Description: \_\_\_\_\_

Part No.: TKK-49SMD-13.560M-20-1-20

Application: \_\_\_\_\_

Approved by:	Checked by :	Issued by : <b>Sam xi</b>
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**Date: Sep 28th, 2023**

TKK Crystal Industrial (Hong Kong) Co., Limited

Room 1311, Block B, Senyagu, Line 3 City Apartments, Heao,Henggang, Longgang District,  
Shenzhen City, China. post: 518115

**SPECIFICATION FOR SMD QUARTZ CRYSTAL UNIT.****Part Number: TKK-49SMD-13.560M-20-1-20****1. SCOPE.**

This specification shall cover the characteristics of the Quartz Crystal with XXX MHz

**ELECTRICAL CHARACTERISTICS**

Item		Requirement	Note
Holder Type		HC- 49SMD	
Nominal frequency	Fo	13.560MHz	
Operation Mode	Mn	Fundamental, AT-Cut	
Operating temperature	To	-20~+70 °C	
Store temperature	Ts	-55~+125 °C	
Shunt capacitance	Co	7.0pF Max	
Freq. Tolerance	$\Delta f/f$	$\pm 20$ ppm	25°C
Freq. Vs temp.		$\pm 30$ ppm	-20~+70 °C
Load capacitance	CL	20PF	
Motional resistance	$\Omega$	40 $\Omega$ Max	
Drive level	DL	1mW	
Insulation resistance	SR	500M $\Omega$ Min	(DC100 $\pm$ 10V)
Aging	$\Delta f_A$	$\pm 3$ ppm/year	

**■ MEASUREMENT**

item	REQUIREMENT
<b>Test instrument</b>	It shall be measured by S&A 150D
<b>Measurement</b>	Standard condition: (1) Temperature $25 \pm 3^{\circ}\text{C}$ (2) Relative humidity $60 \pm 10\%$ R.H
<b>Condition</b>	The measurement shall be in the temperature range of $5^{\circ}\text{C}$ to $35^{\circ}\text{C}$ and relative humidify range of 45% to 85% when there are no faults

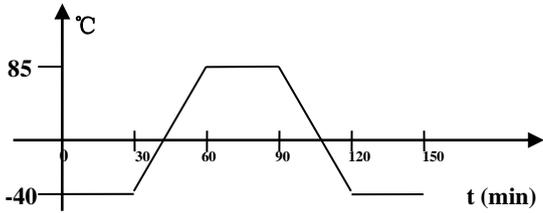
This standard is defined in accordance with IEC1178-1: 1993.OC6800000 and GB/T12273-1996.

## ■ PHYSICAL CHARACTERISTICS

Test Item	Condition of test	Performance Requirements
<b>Shock</b> (Destructive)	Resonator shall be tested after 3 times random drops from the height of 20-70 cm onto hard wooden board of thickness more than 30 mm.	No visible damage, and measured Values shall meet Table 1.
<b>Vibration</b> (Destructive)	Subject resonator to following vibration Frequency: 10-55Hz Amplitude: 0.75mm Cycle time: 1~2min(10-55-10Hz) Duration: 3 mutually perpendicular Planes in each 2 hours Direction: X, Y, Z	No visible damage, and measured values shall meet Table 1.
<b>Terminal Strength</b> (Destructive)	Pulling: body of resonator shall be fixed, and 1kg of tension weight shall be supplied gradually to axial direction of lead terminals for 30 seconds Bending: body of resonator shall be fixed, And $90^{\circ}$ bending at a distance of $2.5 \pm 0.5$ mm from crystal main body shall be given being supplied 450g tension weight. after that, lead terminals shall be straightened gradually. Then, the same bending and straightening shall be supplied to the opposite direction in the same axial.	,Frequency value shall meet Table1 and $C.I < 2\Omega$ , The lead shall not be broken.
<b>Solder Heating</b> (Destructive)	Each lead terminals shall be dipped into the solder melted tank at $350 \pm 10^{\circ}\text{C}$ for $3 \pm 1$ seconds to 2mm from the root of the resonator ,and at $260 \pm 10^{\circ}\text{C}$ for $10 \pm 1$ seconds by the same way.	No visible damage, and measured Values shall meet Table 1.
<b>Solder DIP.</b> (Destructive)	Dip the lead in liquid solder for 5 seconds, At $230 \pm 5^{\circ}\text{C}$ and 2.0mm from the root , after this dipping , 90% min of dipped parts shall be covered with solder.	No visible damage, and measured Values shall meet Table 1.

<b>Leakage</b> (non-destructive)	The resonator is to be soaked in the alcohol and enforced with the pressure of 25N/cm <sup>2</sup> for 5 minutes Next , the resonator shall be tested after being taken out and dried with a dryer.	The Ir between the wire and the shell must be more than 500M $\Omega$ .
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## ■ ENVIRONMENT ENDURANCE:

Test Item	Condition of test	Performance Requirements
<b>Heat Resistance</b> (non-destructive)	Subject resonator to 85 $\pm$ 5 $^{\circ}$ C for 16 hours, then place the resonator in natural condition for 1 hour.	No visible damage, measured Values shall meet Table1.
<b>Cold Resistance</b> (non-destructive)	Subject resonator to -40 $\pm$ 5 $^{\circ}$ C for 2 hours, then, place the resonator in natural condition for 1 hour.	No visible damage, measured Values shall meet Table 1.
<b>Humidity</b>	Keep the resonator at 40 $\pm$ 2 $^{\circ}$ C and 90-95% R.H. for 96 hours. Then place it in natural condition for 1 hour.	The freq. meet $ \Delta f  \leq 5$ ppm and C.I. $\leq 5\Omega$
<b>Temperature shock</b>	Temperature shaft from low to high, high to low For 3 times. And then put the resonator in natural Condition for 1 hour.  	No visible damage, measured Values shall meet Table 1..

## ■ CHANGE OF CHARACTERISTICS

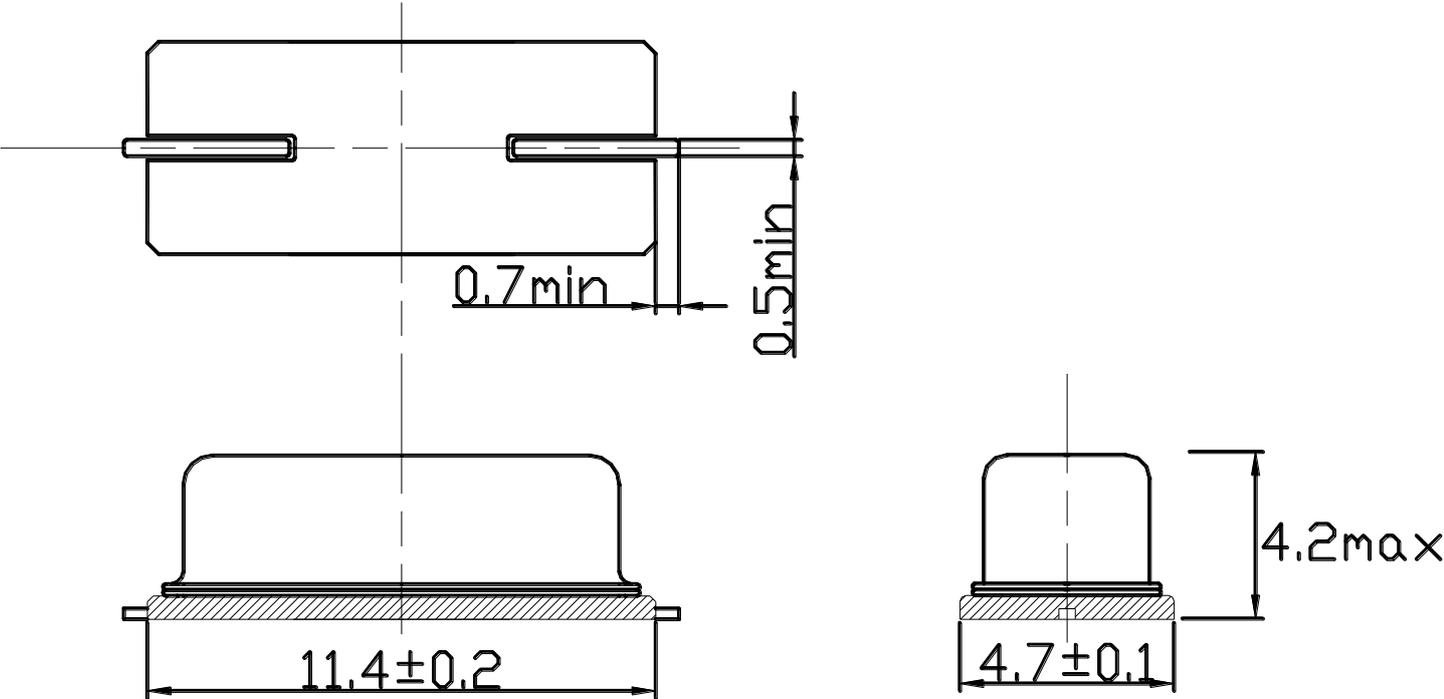
Table 1

Test Item	Specification	Note
<b>Frequency change</b> ( $ \Delta f/f_0 $ )	No more than 10ppm	
<b>C.I. (R)</b>	No more than 15%	Reference to the initial value

## ■ REVIEW OF SPECIFICATIONS

When something gets doubtful with these specifications, we shall jointly work to get an agreement.

■ DIMENSIONS: (UNIT: mm)



HC-49SM