

## 1. QUARTZ CRYSTAL UNIT SPECIFICATION

Parameter	Specification
1.1 Frequency :	20.000MHz
1.2 Mode of Oscillation :	AT Fundamental
1.3 Holder type :	HC-49/SMD
1.4 Frequency tolerance :	$\pm 30\text{ppm}$ at $25^\circ\text{C} \pm 3^\circ\text{C}$
1.5 Equivalent series resistance (Rr) :	$30\Omega$ Max.
1.6 Operating temperature range :	$-40^\circ\text{C}$ To $+85^\circ\text{C}$
1.7 Storage temperature range :	$-40^\circ\text{C}$ To $+85^\circ\text{C}$
1.8 Frequency stability :	$\pm 35\text{ppm}$ at $-40^\circ\text{C}$ To $+85^\circ\text{C}$
1.9 Loading capacitance (CL) :	20pF
1.10 Drive level (DL) :	100 uW Typical ,500uW Max.
1.11 Shunt Capacitance (C0) :	7.0pF Max.
1.12 Insulation resistance (IR) :	More than 500M ohms at DC 100V
1.13 Circuit :	Measured in S&A 250B
1.14 Aging :	$\pm 5$ ppm Max. ( $+25^\circ\text{C}$ 1 <sup>st</sup> Year)
1.15 Dimensions and marking :	Refer to page.4
1.16 Emboss carrier tape & reel :	Refer to page.5
1.17 Note :	

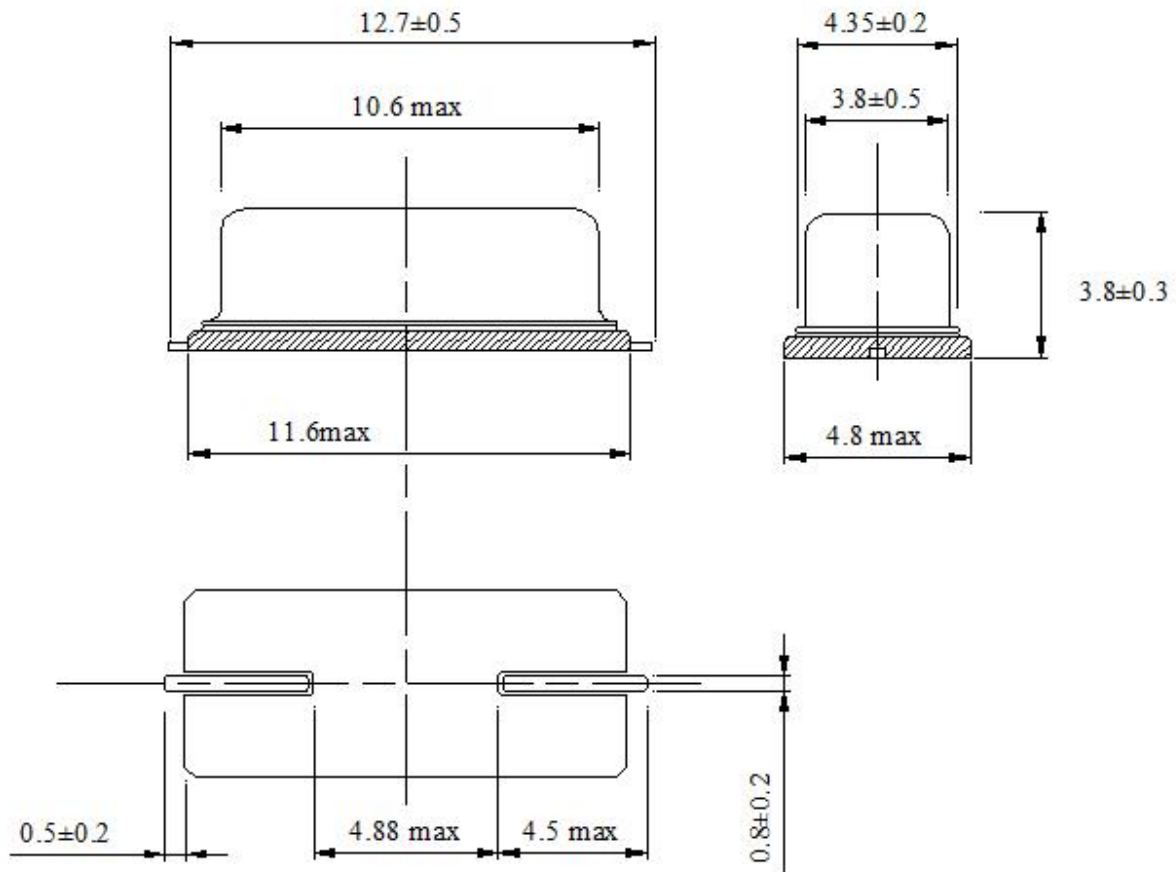
### Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature :  $25\pm 3^\circ\text{C}$

Relative humidity : 40%~70%

## 2. MARKING & DIMENSIONS



\*Marking should be printed as following:

Logo, Nominal Frequency

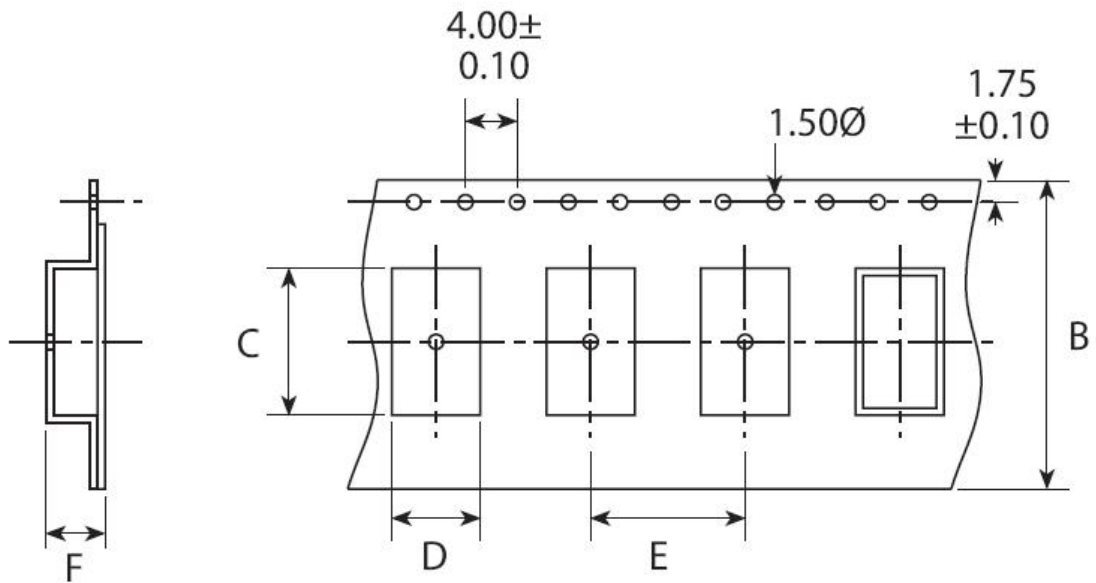
Logo: T

Nominal Frequency: (ex. 8.000 MHz  $\rightarrow$  8.000)

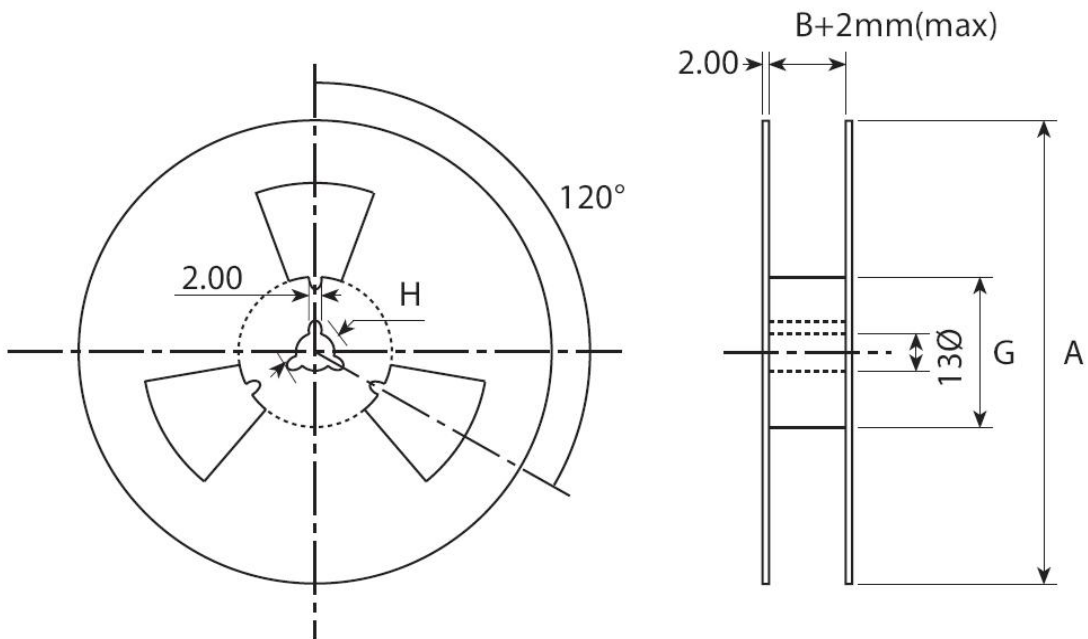
Marking: Laser marking

### 3.CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape

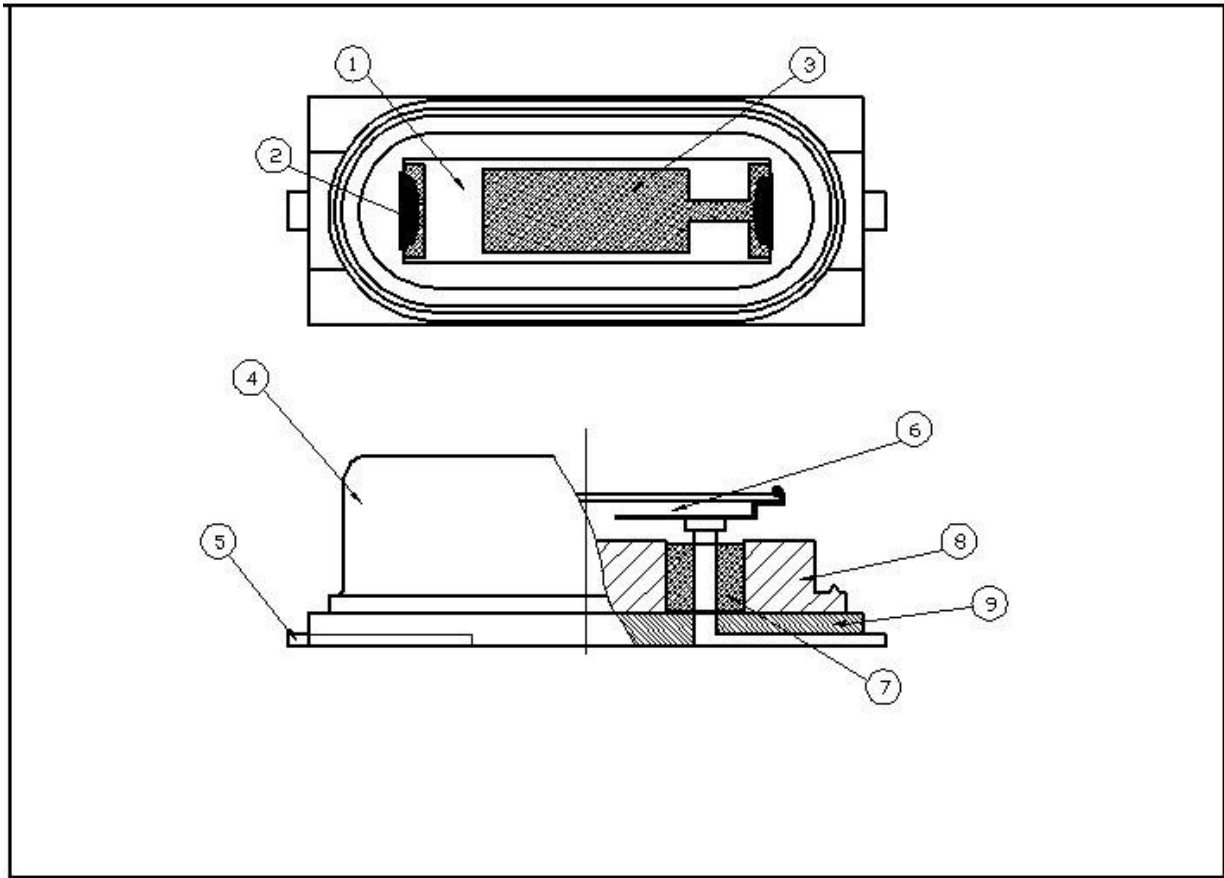


b.) Dimensions of Reel



	A	B	C	D	E	F	G
49SMD	$330 \pm 2.0$	$24 \pm 0.2$	13.9	5.6	12.0	4.8	100
<b>1000 pieces of crystal unit per reel</b>							

## 4. INSIDE STRUCTURE

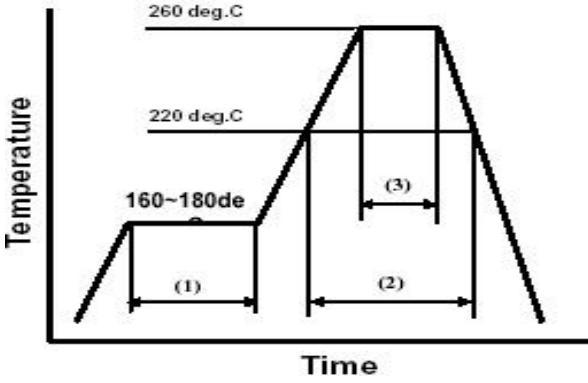


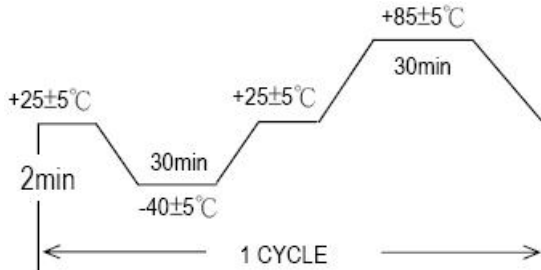
NO.	Product name 部件名称	MATERIALS 材质	QTY 数量
1	Blank 晶片	SIO2	1
2	Silver paste 导电胶	3301F	2
3	Silver 电极	Ag	2
4	Cover 外壳	Au	1
5	Lead 引线	Kovar	2
6	Pin 簧片	C7701	2
7	GLASS 玻璃珠	GLASS	2
8	Base 底板	SPCC-SD	1
9	Insulation 垫片	PPA	1

## 5.MECHANICAL/ENVIRONMENTAL CHARACTERISTICS

NO.	ITEM	CONDITIONS	SPECIFICATIONS
5.1	Leaking Test	Fully immersed into hot water at $90^{\circ}\text{C} \pm 3^{\circ}\text{C}$ for 3 minutes.	no air bubble are visible.
		Take measurements with a helium leakage detector, or measure insulation resistance under pressure.	$1 \times 10^{-8} \text{ Pa.m}^3 / \text{s}$ Max or $IR \geq 500 \text{ M}\Omega$
5.2	Drop Test	Dropping 6 times from the height of 75 cm onto hard wooden board of thickness more than 30mm.	The crystal must meet: $\Delta   f_{\pm}   \leq 5 \text{ ppm}$ $\Delta   R   \leq 15\%$
5.3	Vibration Test	Vibration Frequency: 10~55Hz Cycle: 1.5 Min. Amplitude: 1.5mm P-P. Direction: X.Y.Z Time: 2 Hours / Each Direction	The crystal must meet: $\Delta   f_{\pm}   \leq 5 \text{ ppm}$ $\Delta   R   \leq 15\%$
5.4	Solderability Test	The terminal lead wire is to be soaked in a $230^{\circ}\text{C} \pm 5^{\circ}\text{C}$ tin trough for $5 \pm 0.5$ seconds.	Tin over the wire $\geq 90\%$ The crystal must meet: $\Delta   f_{\pm}   \leq 5 \text{ ppm}$ $\Delta   R   \leq 15\%$
5.5	Low Temperature Enduring	The samples crystal is to be tested after being placed in the environment of $-40 \pm 3^{\circ}\text{C}$ for 96 hours, and recovered to room temperature for 2 hours.	The crystal must meet: $\Delta   f_{\pm}   \leq 5 \text{ ppm}$ $\Delta   R   \leq 15\%$
5.6	High Temperature Enduring	The samples crystal is to be tested after being heated at $+85 \pm 3^{\circ}\text{C}$ for 96 hours, and cooled to room temperature for 2 hours.	The crystal must meet: $\Delta   f_{\pm}   \leq 5 \text{ ppm}$ $\Delta   R   \leq 15\%$

5.7	Humidity	The temperature is at $40 \pm 3^\circ\text{C}$ , and at 93% $\pm 2\%$ RH after 96 hours, and cooled to room temperature for 2 hours.	The crystal must meet: $\Delta f \leq 5\text{ppm}$ $\Delta R \leq 15\%$
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5.8	Resistance to Solder Heat  1) Reflow solder	<p>After resonator is soldered for 1 time in following temperature conditions, and then be placed in natural condition for 24-25 hours. Resonator shall be measured.</p>  <table border="1" data-bbox="510 1064 1069 1198"> <tr> <td>(1)</td> <td>Preheat</td> <td>160~180 deg.C</td> <td>120sec.</td> </tr> <tr> <td>(2)</td> <td>Primary heat</td> <td>220 deg.C</td> <td>60sec.</td> </tr> <tr> <td>(3)</td> <td>Peak</td> <td>260 deg.C</td> <td>10sec. Max.</td> </tr> </table>	(1)	Preheat	160~180 deg.C	120sec.	(2)	Primary heat	220 deg.C	60sec.	(3)	Peak	260 deg.C	10sec. Max.	The crystal must meet: $\Delta f \leq 5\text{ppm}$ $\Delta R \leq 15\%$
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(2)	Primary heat	220 deg.C	60sec.												
(3)	Peak	260 deg.C	10sec. Max.												

5.9	Thermal shock	<p>Should be satisfied after supplying the following temperature cycle ( 10 cycles). (Refer to Fig-4). Temperature shift from low to high, high to low shall be done in <math>1^\circ\text{C}/\text{min}</math>.</p>  <p style="text-align: center;">Fig-4</p>	The crystal must meet: $\Delta f \leq 5\text{ppm}$ $\Delta R \leq 15\%$
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