

# APPROVAL SHEET



**CUSTOMER:** \_\_\_\_\_

**DESCRIPTION:** HC-49/SMD 20.000MHz Quartz Crystal Resonator

**MANUFACTURER PART NO.:** FTX20.000M20SM-30/30B

**CUSTOMER PART NO.:** \_\_\_\_\_

**USED IN MODEL :** \_\_\_\_\_

**REVISION** A1

承 认 <b>APPROVAL</b>		
工程部 TECHNOLOGY DEPT.	品质部 QUALITY DEPT.	采购部 PURCHASING DEPT.

**Date:** September 19, 2017

<u>Rev</u>	<u>Revise page</u>	<u>Revise contents</u>	<u>Date</u>	<u>Ref.No.</u>	<u>Reviser</u>
A1	ALL	Initial released		N/A	DavidJiang

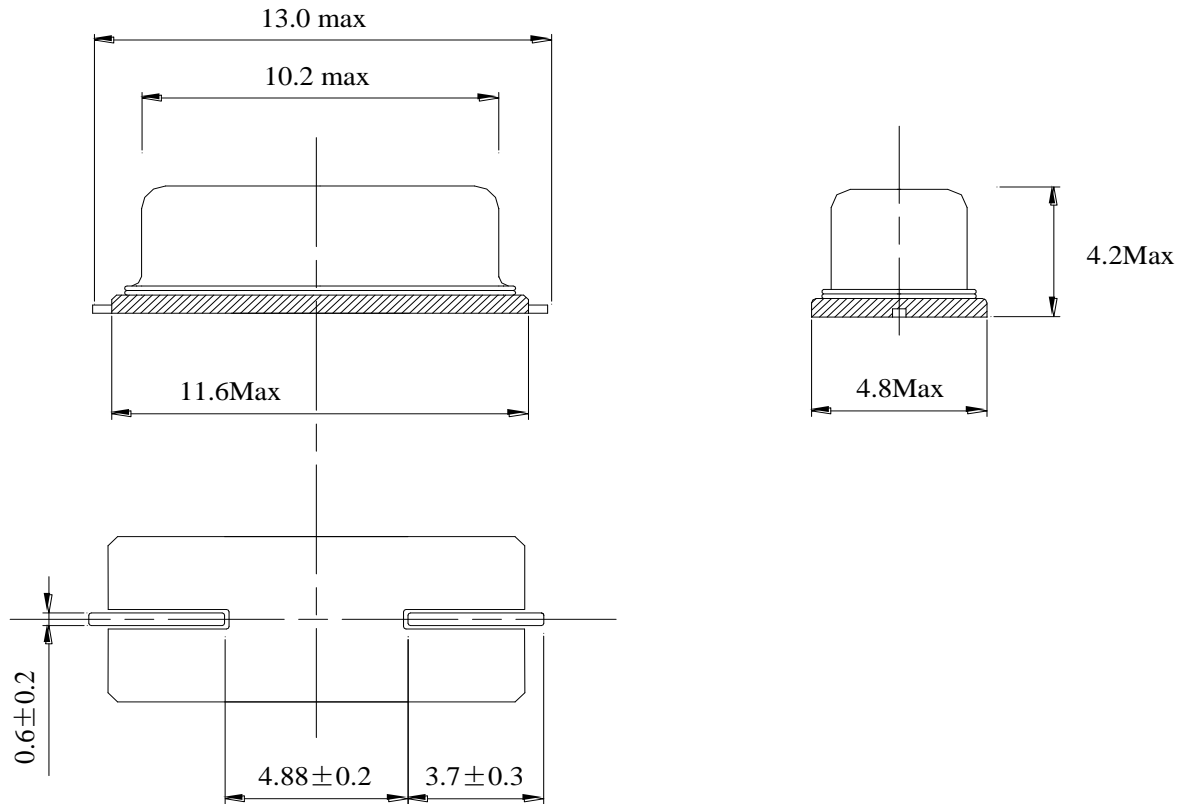
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# 1. QUARTZ CRYSTAL UNIT SPECIFICATION

1.1 Frequency:	20.000MHz
1.2 Mode of Oscillation	AT Fundamental
1.3 Holder type :	HC-49/SMD
1.4 Frequency tolerance:	±30ppm at 25°C
1.5 Equivalent series resistance (Rr):	40Ω Max.
1.6 Operating temperature range:	-20°C To +70°C
1.7 Storage temperature range:	-40°C To +85°C
1.8 Frequency stability:	±30ppm at -20°C To +70°C
1.9 Loading capacitance (CL) :	20.0pF
1.10 Drive level (DL):	100 uW Typical
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:	±5 ppm Max (+25°C 1 <sup>st</sup> Year)
1.15 Dimensions and marking	Refer to page.3
1.16 Emboss carrier tape & reel	Refer to page.4

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## 2. MARKING & DIMENSIONS



\*Marking should be printed as following:

Logo, Nominal Frequency

Logo:

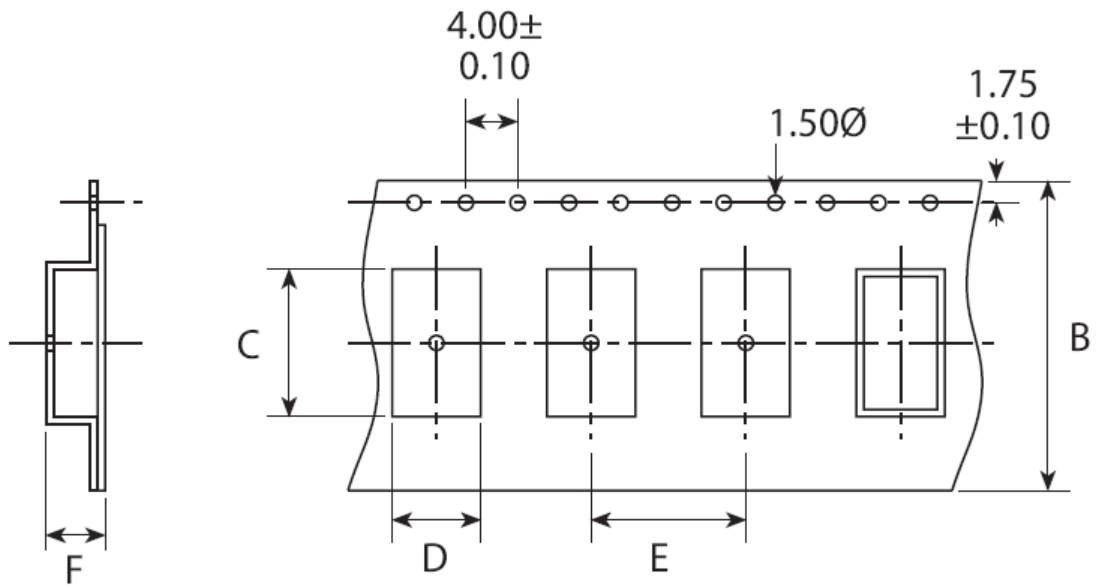
Nominal Frequency: (ex. 8.000 MHz → 8.000)

Marking: Laser marking

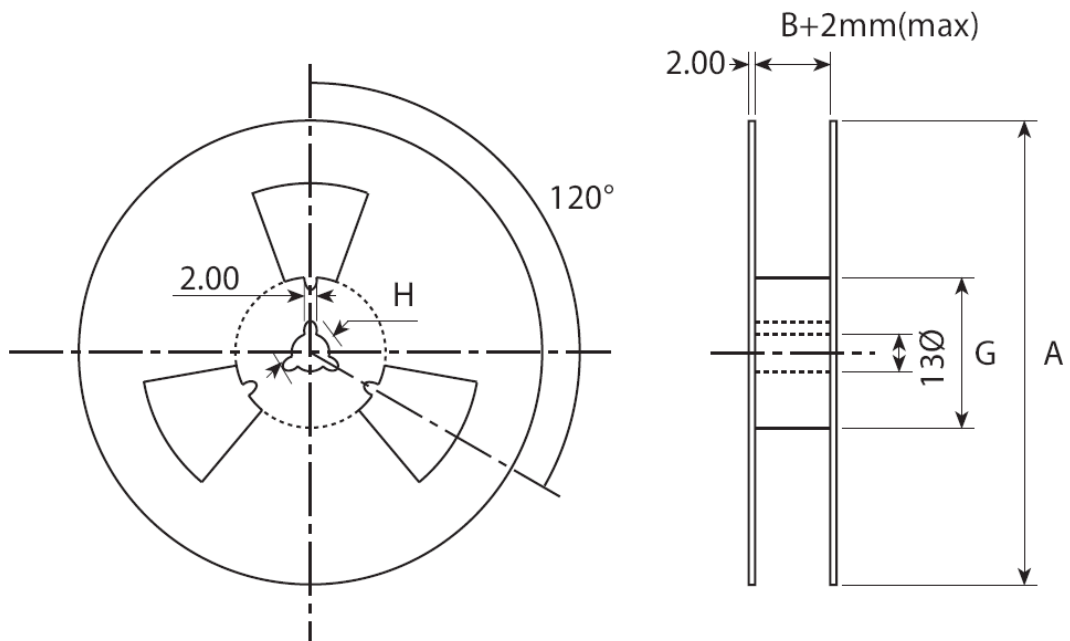
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### 3.CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape



b.) Dimensions of Reel



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

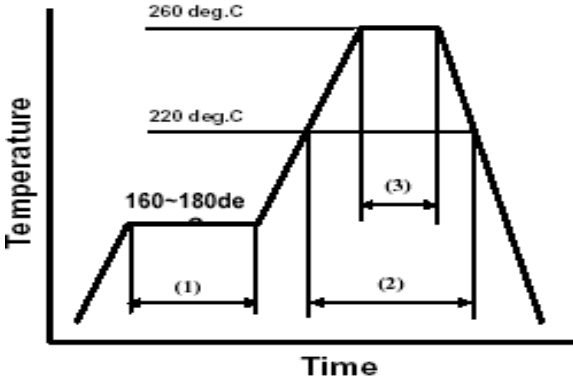
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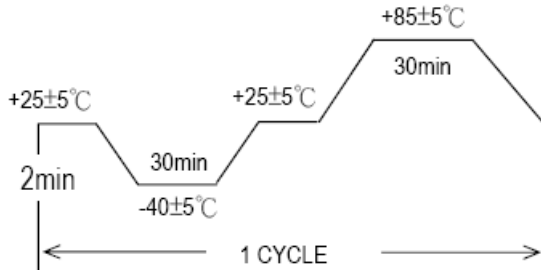
## 4.MECHANICAL/ENVIRONMENTAL CHARACTERISTICS

NO.	项 目 ITEM	条 件 CONDITIONS	规 格 SPECIFICATIONS
4.1	漏气试验 Leaking Test	完全浸入 90±3℃热水中 3 分钟。 Fully immersed into hot water at 90℃±3℃ for 3 minutes.	无气泡存在 no air bubble are visible.
		用氦质谱仪测试或酒精加压法测试绝缘电阻。 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 $IR \geq 500M\Omega$
4.2	跌落试验 Drop Test	高度 75cm, 自由落体于 3cm 木板上, 6 次 Dropping 6 times from the height of 75 cm onto hard wooden board of thickness more than 30mm.	频率变化±5ppm 以内, 电阻变化±15% 以内 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
4.3	振动试验 Vibration Test	频率 10~55Hz, 振幅 1.5mm, 时间 1.5 分钟循环, 在 XYZ 方向各 2 小时。 Vibration Frequency: 10~55Hz Cycle: 1.5 Min. Amplitude: 1.5mm P-P. Direction: X.Y.Z Time: 2 Hours / Each Direction	频率变化±5ppm 以内, 电阻变化±15% 以内 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
4.4	可 焊 性 Solderability Test	从引线末端至距底部 2mm 处放入 230℃±5℃焊槽内,时间: 5±0.5 秒。 The terminal lead wire is to be soaked in a 230℃±5℃ tin trough for 5±0.5 seconds.	沾锡面≥90%.频率变化±5ppm 以内,电阻变化±15% 以内 Tin over the wire ≥90% The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
4.5	耐低温性 Low Temperature Enduring	在-40℃±3℃下放置 96 小时,取出后在常温下恢复 2 小时。 The samples crystal is to be tested after being placed in the environment of -40±3℃ for 96 hours, and recovered to room temperature for 2 hours.	频率变化±5ppm 以内, 电阻变化±15% 以内 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
4.6	耐高温性 High Temperature Enduring	在+85℃±3℃下放置 96 小时,取出后在常温下恢复 2 小时。 The samples crystal is to be tested after being heated at +85±3℃ for 96 hours, and cooled to room temperature for 2 hours.	频率变化±5ppm 以内, 电阻变化±15% 以内 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$

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4.7	恒定湿热 Humidity	在 $40\pm 3^{\circ}\text{C}$ 、RH $93\% \pm 2\%$ 下放置 96 小时,取出后恢复 2 小时。 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.	外观无异常,性能检验同振动 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
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4.8	耐焊接热 Resistance to Solder Heat  回流焊 1)Reflow solder	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.   <table border="1" data-bbox="510 1064 1061 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.	外观无异常,性能检验同振动 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
(1)	Preheat	160~180 deg.C	120sec.												
(2)	Primary heat	220 deg.C	60sec.												
(3)	Peak	260 deg.C	10sec. Max.												

4.9	热冲击 Thermal shock	在 $-40^{\circ}\text{C}$ 保持 30 分钟, $+85^{\circ}\text{C}$ 保持 30 分钟, 循环 10 次。 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 $1^{\circ}\text{C}/\text{min}$ .   <p style="text-align: center;">Fig-4</p>	外观无异常,性能检验同振动 The crystal must meet: $ \Delta f  \leq \pm 5\text{ppm}$ $ \Delta R  \leq 15\%$
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