

深圳市福浪电子有限公司
FRONTER ELECTRONICS CO., LTD

APPROVAL
SHEET



CUSTOMER: TRIATRON LTD

DESCRIPTION: HC-49/SMD 16.000MHz Quartz Crystal Resonator

MANUFACTURER PART NO.: FTX16.000M16SM-30/30DFF

CUSTOMER PART NO:

USED IN MODEL:

REVISION A1

承 认 APPROVAL		
工程部 TECHNOLOGY DEPT.	品质部 QUALITY DEPT.	采购部 PURCHASING DEPT.

Date: August 20, 2024



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<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	2024.08.20	N/A	DavidJiang

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1. QUARTZ CRYSTAL UNIT SPECIFICATION

Parameter	Sign	Specification
1.1 Frequency:	F0	16.000MHz
1.2 Mode of Oscillation		AT Fundamental
1.3 Holder type :		HC-49/SMD
1.4 Frequency tolerance:	ΔF	$\pm 30\text{ppm}$ at 25°C
1.5 Equivalent series resistance :	Rr	40Ω max.
1.6 Operating temperature range:	T _{OPR}	-40°C To +85°C
1.7 Storage temperature range:	T _{STG}	-40°C To +85°C
1.8 Frequency stability:	TC	$\pm 30\text{ppm}$ at -40°C To +85°C
1.9 Loading capacitance :	CL	16pF
1.10 Drive level :	DL	100 uW Typical
1.11 Shunt Capacitance :	C0	7.0pF max.
1.12 Insulation resistance (IR):	IR	More than 500M ohms at DC 100V
1.13 Circuit:		Measured in S&A 250B
1.14 Aging:		$\pm 5\text{ ppm max.}$ (+25°C 1 st Year)
1.15 Dimensions and marking		Refer to page.4
1.16 Emboss carrier tape & reel		Refer to page.5 ~page.6

Standard atmospheric conditions

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

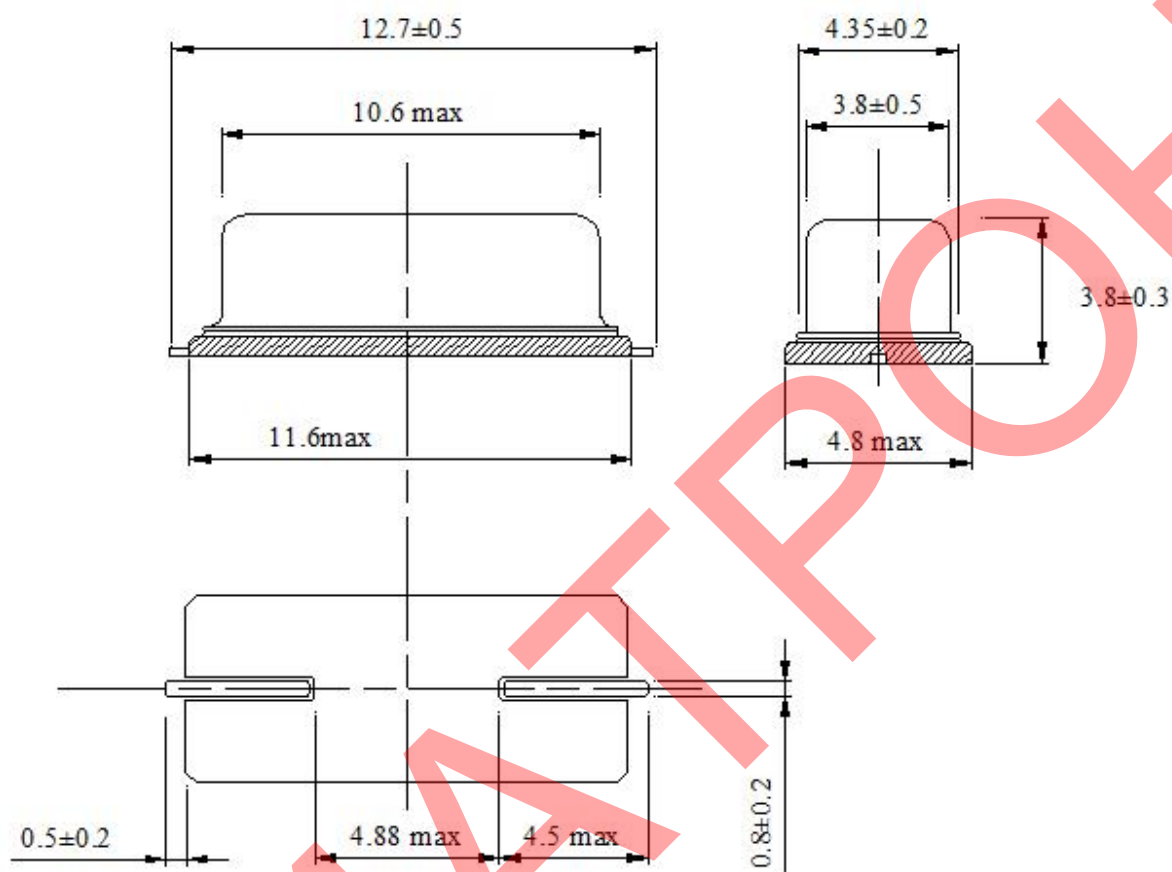
Ambient temperature : 25±3°C

Relative humidity : 40%~70%

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2. MARKING & DIMENSIONS



*Marking should be printed as following:

Logo, Nominal Frequency

Logo: T

Nominal Frequency: (ex. 16.000 MHz → 16.000)

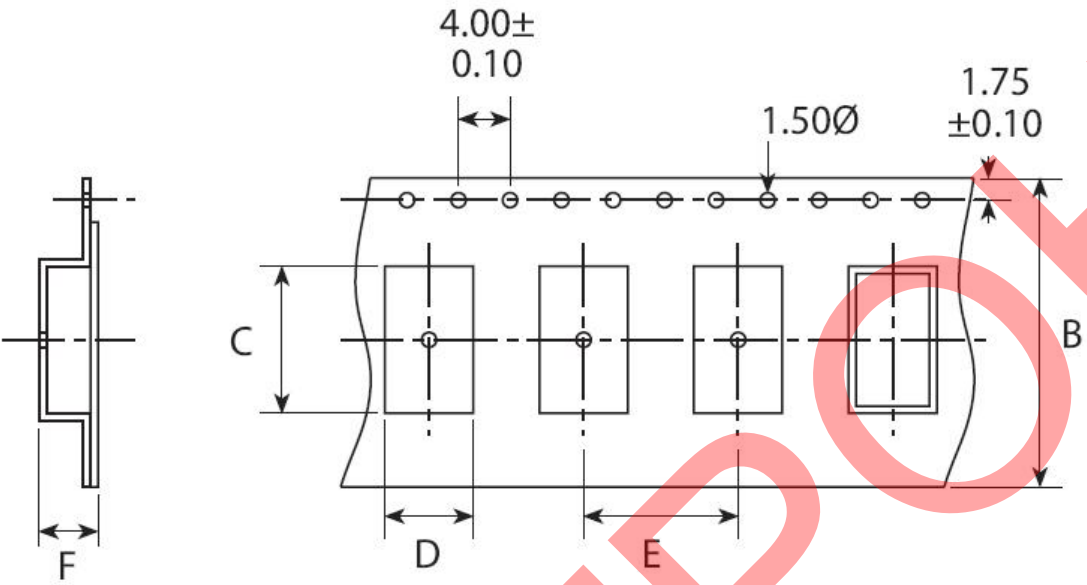
Marking: Laser marking

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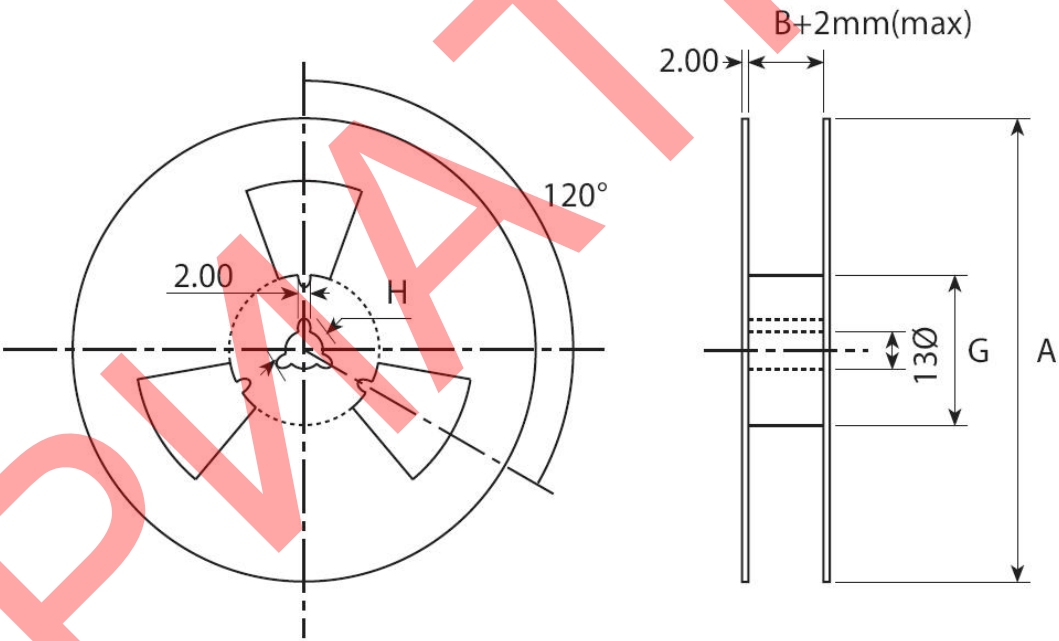
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3.CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape



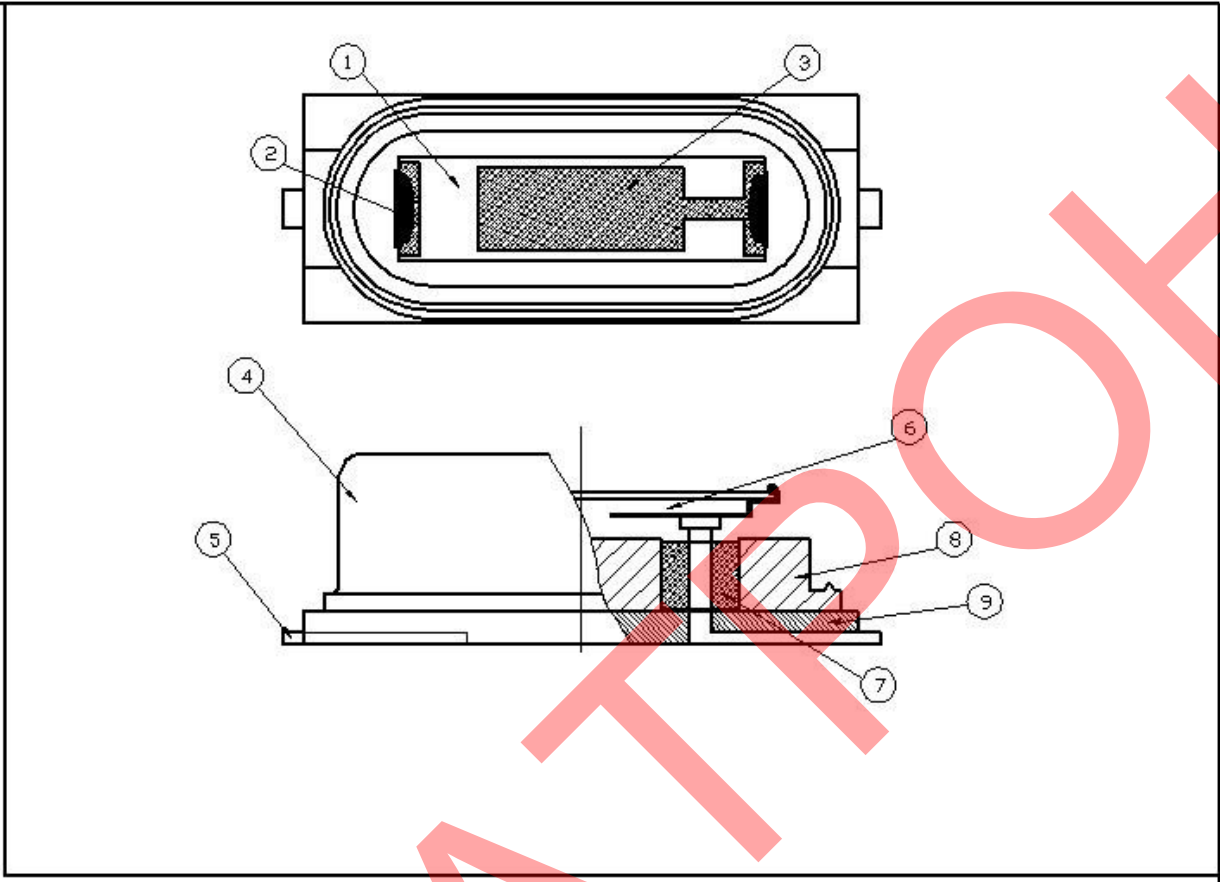
b.) Dimensions of Reel



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

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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

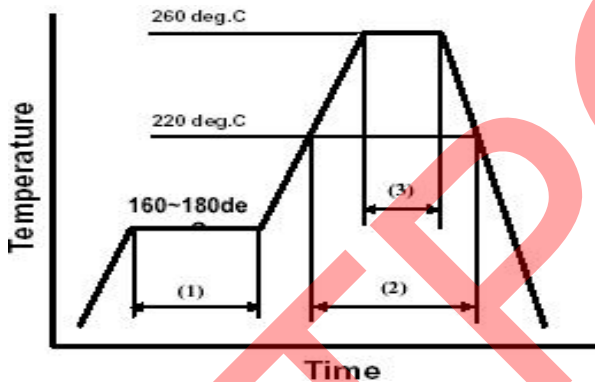
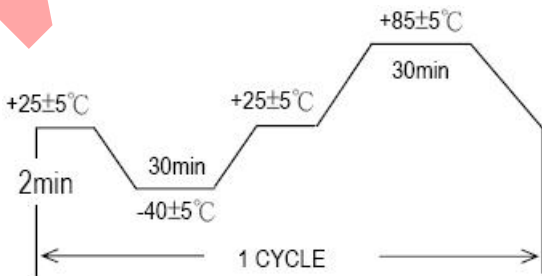
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5.MECHANICAL/ENVIRONMENTAL CHARACTERISTICS

NO.	项 目 ITEM	条 件 CONDITIONS	规 格 SPECIFICATIONS
5.1	漏气试验 Leaking Test	完全浸入 $90 \pm 3^{\circ}\text{C}$ 热水中 3 分钟。 Fully immersed into hot water at $90^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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 $\text{IR} \geq 500\text{M}\Omega$
5.2	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 $\pm 5\text{ppm}$ 以内, 电阻变化 $\pm 15\%$ 以内 The crystal must meet: $ \Delta f \leq \pm 5\text{ppm}$ $ \Delta R \leq 15\%$
5.3	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 $\pm 5\text{ppm}$ 以内, 电阻变化 $\pm 15\%$ 以内 The crystal must meet: $ \Delta f \leq \pm 5\text{ppm}$ $ \Delta R \leq 15\%$
5.4	可 焊 性 Solderability Test	从引线末端至距底部 2mm 处放入 $230^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 焊槽内,时间: 5 ± 0.5 秒。 The terminal lead wire is to be soaked in a $230^{\circ}\text{C} \pm 5^{\circ}\text{C}$ tin trough for 5 ± 0.5 seconds.	沾锡面 $\geq 90\%$.频率变化 $\pm 5\text{ppm}$ 以内, 电阻变化 $\pm 15\%$ 以内 Tin over the wire $\geq 90\%$ The crystal must meet: $ \Delta f \leq \pm 5\text{ppm}$ $ \Delta R \leq 15\%$
5.5	耐低温性 Low Temperature Enduring	在 $-40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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 $-40 \pm 3^{\circ}\text{C}$ for 96 hours, and recovered to room temperature for 2 hours.	频率变化 $\pm 5\text{ppm}$ 以内, 电阻变化 $\pm 15\%$ 以内 The crystal must meet: $ \Delta f \leq \pm 5\text{ppm}$ $ \Delta R \leq 15\%$
5.6	耐高温性 High Temperature Enduring	在 $+85^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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 $+85 \pm 3^{\circ}\text{C}$ for 96 hours, and cooled to room temperature for 2 hours.	频率变化 $\pm 5\text{ppm}$ 以内, 电阻变化 $\pm 15\%$ 以内 The crystal must meet: $ \Delta f \leq \pm 5\text{ppm}$ $ \Delta R \leq 15\%$

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5.7	恒定湿热 Humidity	在 $40\pm3^{\circ}\text{C}$、RH 93%$\pm$2%下放置 96 小时,取出后恢复 2 小时。 The temperature is at $40\pm3^{\circ}\text{C}$, 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: $\Delta f \leq \pm 5\text{ppm}$ $\Delta R \leq 15\%$												
5.8	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="509 1070 1070 1196"> <tbody> <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> </tbody> </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.												
5.9	热冲击 Thermal shock	在 -40°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 $1^{\circ}\text{C}/\text{min}$.  Fig-4	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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