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| 编号 | SCTF2021T611 |
| 日期 | 2021-9-30 |
| 版本 | B01 |

承认书

SPECIFICATION FOR APPROVAL

| | |
|-----------------------|----------------------------|
| 客户名称 Customer Name: | 0 |
| 供应商物料名称 Part Name: | 石英晶体谐振器 |
| 产品描述 Description: | HC-49US-SMD 12.000MHz/20PF |
| 供应商物料料号 Part NO.: | SXMH12.000F2020F30 |
| 供应商名称 Supplier Name : | 深圳市星通时频电子有限公司 |

PLEASE CONFIRM OUR SPECIFICATION. 敬请确认规格书之内容。

| CUSTOMER APPROVAL 客户审批 | | |
|----------------------------|---------|---------|
| 物料代号 PART NO. _____ | | |
| 使用于机型 USED IN MODEL: _____ | | |
| 工程 部 | 品质 部 | 采购 部 |
| | | |

(敬请承认后返回一份, 谢谢!)

| SUPPLIER APPROVAL 供应商审批 | | |
|-------------------------|---------|-------------|
| DGN. 制表人 | CKD. 校对 | APPD. 审核、签章 |
| 陈雪清 | 李霞 | 胡华才 |

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RoHS Compliant

| Revision Record | | | | |
|-----------------|--------------------|--|-------------------|----------------|
| Rev. | Revise page 修订页 | Revise contents 修订内容 | Rev. Date 修订日期 | Reviser 修订人 |
| A02 | N/A | Initial released. | 2013-1-1 | Martin.Hu |
| A03 | N/A | The version is upgraded and the content remains unchanged. | 2018-2-25 | Martin.Hu |
| B01 | Page2 | The version is upgraded and add revision record page. | 2021-2-24 | Martin.Hu |
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| SHENZHEN SCTF ELECTRONICS CO. , LTD | | |
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■ QUARTZ CRYSTAL UNIT SPECIFICATION

1. Crystal Unit Spec:

| N0. | Item | Symb. | Electrical spec. | Notes |
|-----|-------------------------------------|--|--------------------|---|
| 1 | Nominal Frequency 标称频率 | f | 12.000000 MHz | |
| 2 | Oscillation Mode 振荡模式 | | AT Fundamental | |
| 3 | Holder Type 封装 | | HC-49US-SMD | |
| 4 | Frequency Tolerance 常温频差 | $\Delta f/f$ | $\pm 20\text{PPM}$ | at 25°C $\pm 2^\circ\text{C}$ |
| 5 | Drive Level 激励功率 | DL | 100 μW | See the 2.1 |
| 6 | Load Capacitance 负载电容 | CL | 20PF | See the 2.2 |
| 7 | Effective Resistance 谐振电阻 | RR | 30 Ω max. | See the 2.3 |
| 8 | Shunt Capacitance 静电容 | C0 | 5 pF max. | |
| 9 | Drive Level Dependency 2 激励功率依赖性 | DLD2 | 10 Ω max. | Sweep from 100nW to 100uW in 20 steps. |
| 10 | Temperature Drift 温度频差 | f_tem | $\pm 30\text{PPM}$ | Over Operating Temp. Range (Reference 25°C) |
| 11 | Spurious response 寄生响应 | SPDB | -3dB max. | Start -1000ppm stop 5000ppm 30 steps power applied: 10dBm |
| 12 | Operating Temperature 工作温度范围 | T_use | -40~85°C | |
| 13 | Storage Temperature Range 存储温度 | T_stg | -55~125°C | |
| 14 | Insulation Resistance 绝缘阻抗 | IR | 500 M Ω | at DC 100V |
| 15 | Aging 年老化率 | f_age | ± 3 ppm | 1st Year |
| 16 | Measurement Condition 测量条件 | Measured by S&A250B or equivalent, TA=25°C $\pm 2^\circ\text{C}$, RH=40%~70%. | | |

2. Circuit Conditions Spec:

2.1 Drive Level (DL) 500 μW max.

(If Drive Level is too high, that may cause crystal resonator abnormal oscillation or damaged the main body of quartz.)

2.2 Loading capacitance (CL) : 20PF

(The total circuit load capacitance should be equal to the crystal (CL) values, too large or too small will result in frequency drift.)

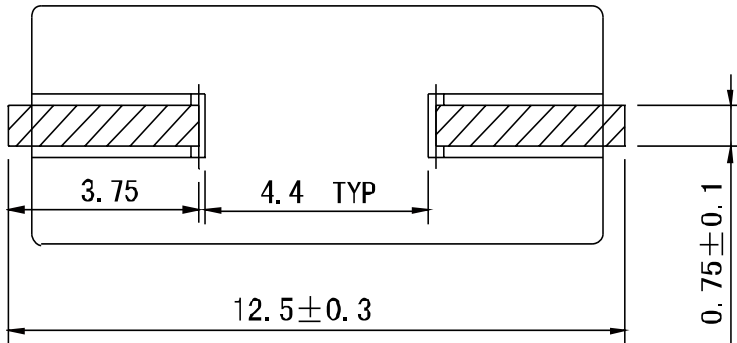
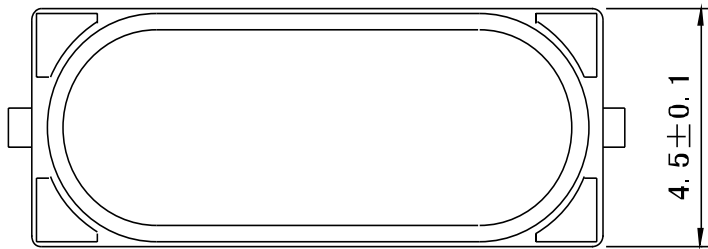
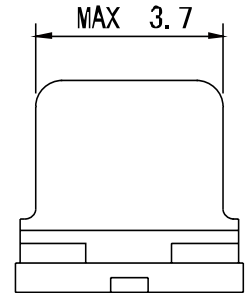
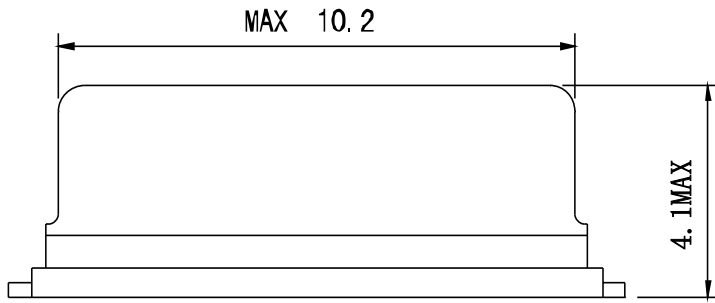
2.3 Negative Resistance (-R) $\geq 150\Omega$

(If -R more than ESR spec of 5 times will be better. If Negative Resistance is too low, that may cause resonator stop oscillation or not easy to oscillate)

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DIMENSIONS

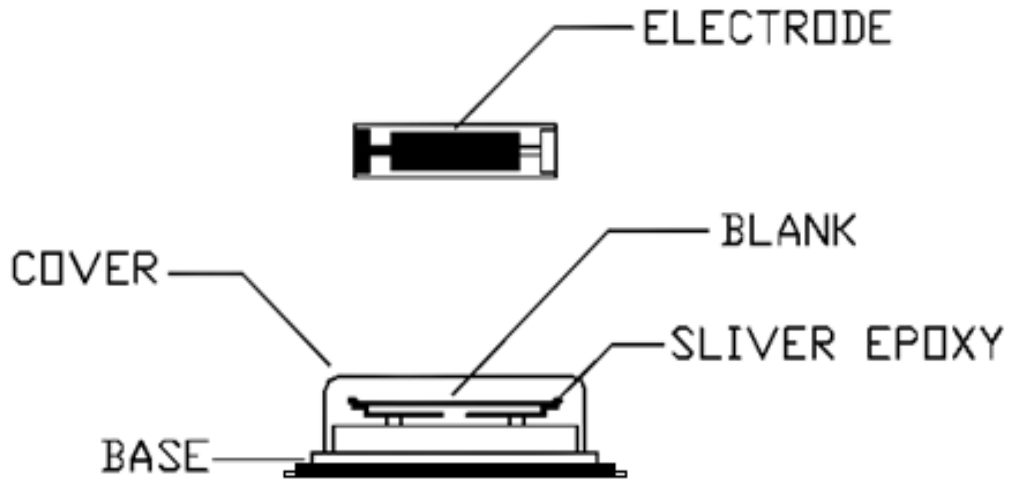
Units (单位): mm(毫米)



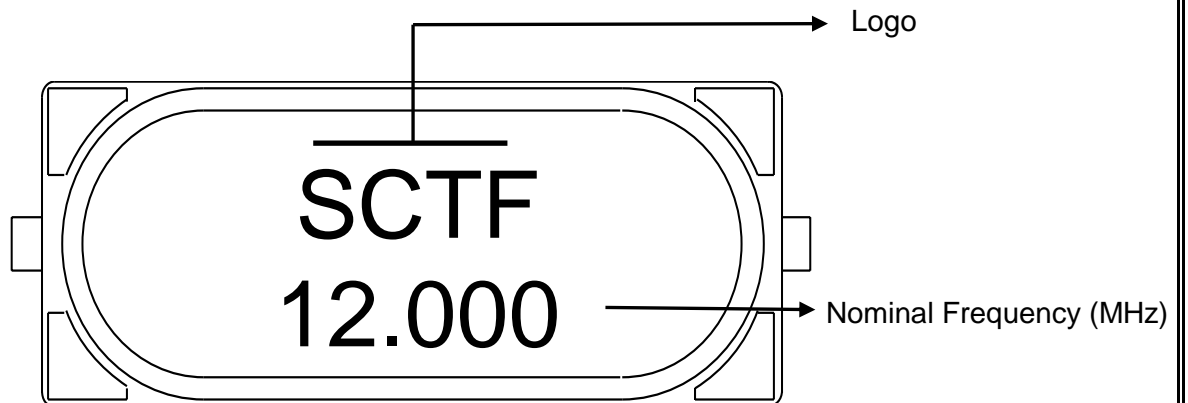
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■ PRODUCT STRUCTURE & MARKING

◆ Product Structure 产品规格



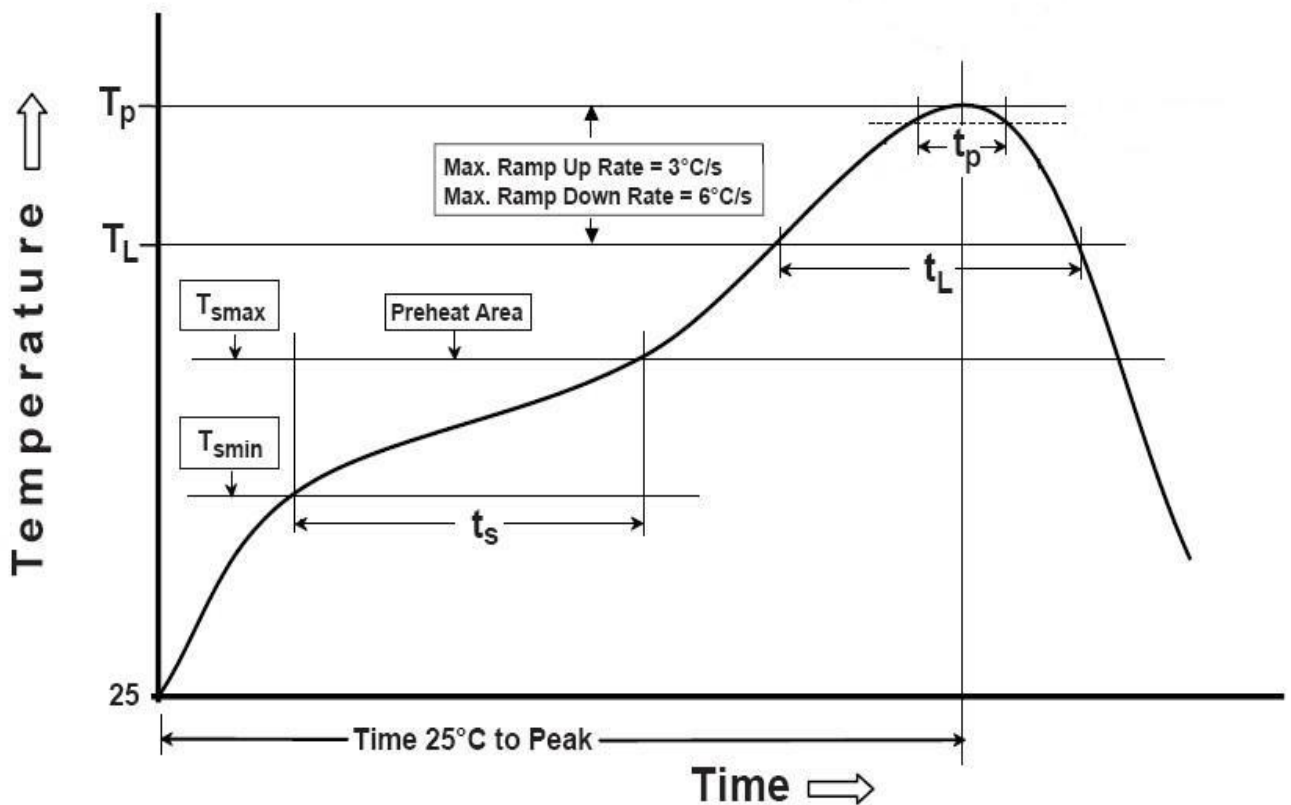
◆ Marking 印字



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REFLOW PROFILES

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|-------------------------|------------------|
| Preheat/Soak | | |
| ● Temperature Min (T_s min) | 100 °C | 150 °C |
| ● Temperature Max (T_s max) | 150 °C | 200 °C |
| ● Time (T_s min to T_s max) | 60-120 seconds | 60-120 seconds |
| Ramp-up rate (T_L to T_p) | 3 °C/second max. | 3 °C/second max. |
| Time maintained above | | |
| ● Liquidous temperature (T_L) | 183 °C | 217 °C |
| ● Time (t_L) maintained above T_L | 60-150 seconds | 60-150 seconds |
| Peak package body temperature (T_p) | 235 °C | 260 °C |
| Time within 5 °C of the specified classification temperature (T_p) | 20 seconds | 30 seconds |
| Ramp-down rate (T_p to T_L) | 6 °C/second max. | 6 °C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |
| Suggest reflow times | 2 Times max. | |



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■ RELIABILITY SPECIFICATION

| 序号 NO. | 项目 ITEM | 条件 CONDITIONS | 合格标准 BASIS OF VERDICT |
|-----------|---------------------------|--|---|
| 1 | 跌落 DROP | 100 cm高处自由跌落到3cm厚木板上,3次 High: 100 cm;Thickness:3cm;3 times. | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 2 | 振动 VIBRATION | 频率 Frequency:10~57.7Hz;幅度 Amplitude: $\pm 0.75 \text{mm}$ 频率Frequency:57.7Hz~500Hz;加速度幅度acceleration rate:98m/s ² 周期 Cycle time:10-500-10Hz: 15min 振动方向 Direction:X,Y, Z 振动时间 Duration: 每个方向2小时 2 h/direction. | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 3 | 温度变化 TEMPERATURE SHOCK | -40°C $\pm 2^\circ\text{C}$ (30min) \leftrightarrow 85°C $\pm 2^\circ\text{C}$ (30min);循环10次 -40°C $\pm 2^\circ\text{C}$ (30min) \leftrightarrow 85°C $\pm 2^\circ\text{C}$ (30min);For 10 cycles | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 4 | 湿热 HUMIDITY | 温度:40°C $\pm 2^\circ\text{C}$;湿度90-95%;时间:96小时 Temp:40°C $\pm 2^\circ\text{C}$;Humidity:90-95%;Times:96h | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 5 | 低温 COLD RESISTANCE | 温度:-40°C $\pm 2^\circ\text{C}$;时间:96小时 Temp:-40°C $\pm 2^\circ\text{C}$;Times:96h | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 6 | 高温1 HEAT RESISTANCE 1 | 温度:100°C $\pm 2^\circ\text{C}$;时间:96小时 Temp:100°C $\pm 2^\circ\text{C}$;Times:96h | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 7 | 高温2 HEAT RESISTANCE 2 | 温度:155°C $\pm 2^\circ\text{C}$;时间:2小时 Temp:155°C $\pm 2^\circ\text{C}$;Times:2h | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 8 | 回流焊 REFLOW | 150°C $\pm 5^\circ\text{C}$ 保持120s后升到270°C $\pm 5^\circ\text{C}$ 保持10s, 升温 and 保温时间小于200s, 常温放置1~2h后测定 Keep 150 °C \pm 5 °C 120s and then rose to 270 °C \pm 5 °C for 10s, warming and holding time is less than the 200s, placed at room temperature 1 ~ 2h after test | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 9 | 盐雾 SALT SPRAY | 盐雾浓度:5%;温度:35°C;时间:8小时 Salt density:5%;Temp:35°C;Times:8h | 目测无明显腐蚀现象 Visual no significant corrosion. |
| 10 | 老化 AGING | 温度:85°C;时间:30天 Temp:85°C;Times:30days | $\Delta FL \leq \pm 5 \text{ppm}$ $\Delta RR \leq RR(\text{max}) * 10\%$ |
| 11 | 气密性 LEAKAGE | 氦气(0.6~0.65MPa):10分钟 He(0.6~0.65MPa):10min | $\leq 3 * 10^{-9} \text{Pa} \cdot \text{m}^3/\text{s}$ |
| 12 | 焊接 SOLDER | 温度:260°C $\pm 5^\circ\text{C}$ Temp:260°C $\pm 5^\circ\text{C}$ | 浸锡率大于90% Soldering tin rate greater than 90% |

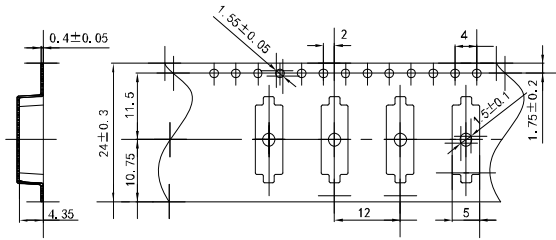
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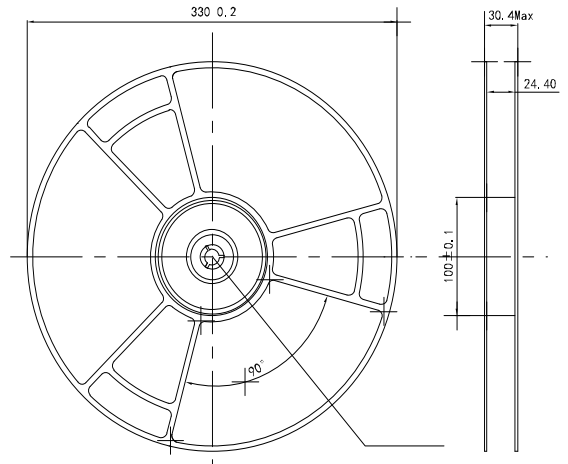
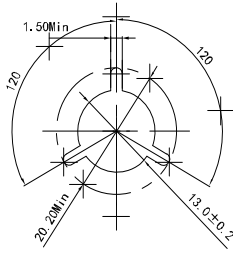
PACKAGE

◆ Taping Specifications 编带规格

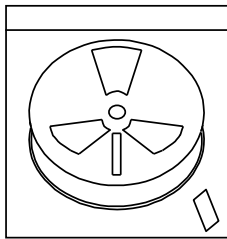
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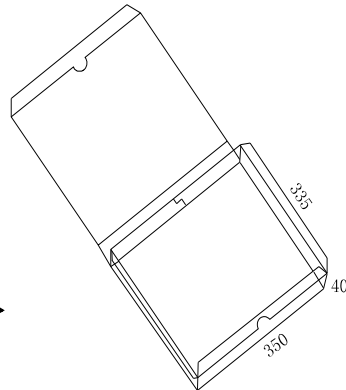
A局部视图



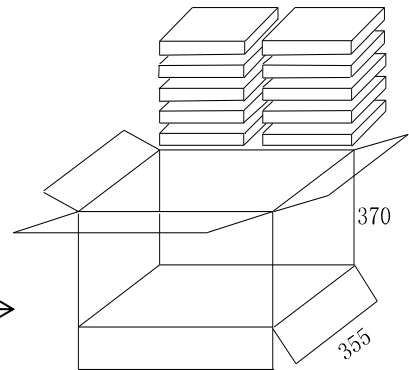
◆ Packaging specifications 包装规格



自封袋(Bag)
1000只 = 1 轮
1000pcs = 1 Reel



内包装(Inside package)
1 轮=1 盒
1 Reel=1 box



外包装(Outside Package)
10 盒=1 箱
10 box=1 carton

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