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|----|---------------|
| 编号 | SCTF202304386 |
| 日期 | 2023/4/18     |
| 版本 | B01           |



# 承认书

## SPECIFICATION FOR APPROVAL

|                       |                       |
|-----------------------|-----------------------|
| 客户名称 Customer Name:   | Customer              |
| 供应商物料名称 Part Name:    | 石英晶体谐振器               |
| 产品描述 Description:     | SMD2520 16.000MHz/9pF |
| 供应商物料料号 Part NO.:     | SX2B16.000F0910F30    |
| 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 |
| 吴丽红                     | 李霞      | 胡华才         |



# ■ QUARTZ CRYSTAL UNIT SPECIFICATION

## 1. Crystal Unit Spec:

| N0. | Item                              | Symb.   | Electrical Spec.               | Notes  |
|-----|-----------------------------------|---|--------------------------------|--|
| 1   | Nominal Frequency<br>标称频率         | f   | 16.000000 MHz                  |  |
| 2   | Oscillation Mode<br>振荡模式          |   | AT Fundamental                 |  |
| 3   | Holder Type<br>封装                 |   | SMD2520                        |  |
| 4   | Frequency Tolerance<br>常温频差       | $\Delta f/f$  | $\pm 10\text{ppm}$             | at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$                |
| 5   | Drive Level<br>激励功率               | DL  | 10 $\mu\text{W}$ Typical       | See the 2.1  |
| 6   | Load Capacitance<br>负载电容          | CL  | 9pF                            | See the 2.2  |
| 7   | Effective Resistance<br>谐振电阻      | RR  | 80 $\Omega$ max.               | See the 2.3  |
| 8   | Shunt Capacitance<br>静电容          | C0  | 3 pF Max.                      |  |
| 9   | Drive Level Dependency<br>激励功率依赖性 | DLD2  | 20 $\Omega$ max.               | Sweep from 100nW to 100uW in 20 steps.                       |
| 10  | Temperature Drift<br>温度频差         | f_tem   | $\pm 30\text{ppm}$             | Over Operating Temp. Range (Reference $25^{\circ}\text{C}$ ) |
| 11  | Spurious response<br>寄生响应         | SPDB  | -3dB max.                      | Start -1000ppm stop 5000ppm 30 steps power applied: 10dBm    |
| 12  | Operating Temperature<br>工作温度范围   | T_use   | $-40 \sim 85^{\circ}\text{C}$  |  |
| 13  | Storage Temperature Range<br>存储温度 | T_stg   | $-40 \sim 105^{\circ}\text{C}$ |  |
| 14  | Insulation Resistance<br>绝缘阻抗     | IR  | 500 M $\Omega$                 | at DC 100V   |
| 15  | Aging<br>老化率                      | f_age   | $\pm 3\text{ppm}$              | 1st Year   |
| 16  | Measurement Condition<br>测量条件     | Measured by S&A250B or equivalent, $T_A = 25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , $RH = 40\% \sim 70\%$ . |                                |  |

## 2. Circuit Conditions Spec:

2.1 Drive Level (DL) 100 $\mu\text{W}$  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) : 9pF

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

2.3 Negative Resistance (-R)  $\geq 400\Omega$

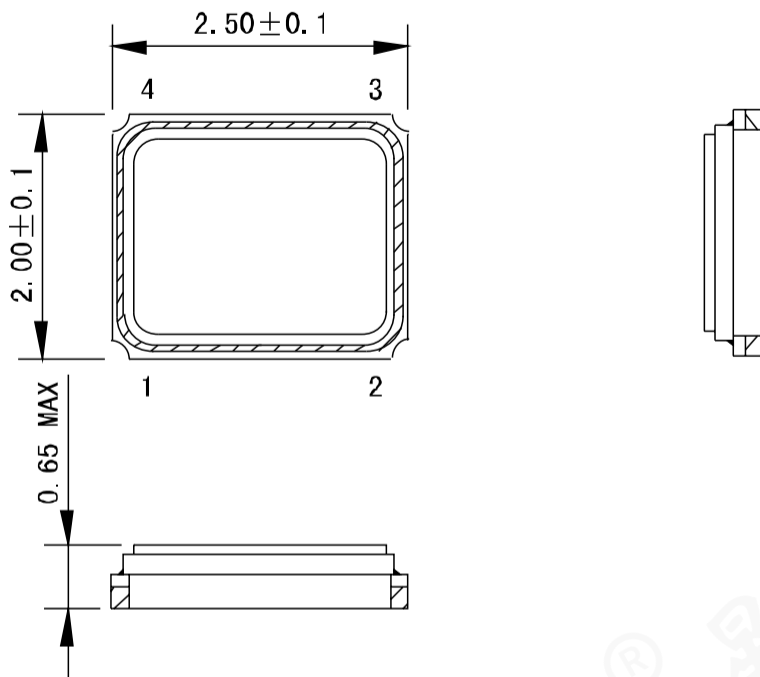
(If -R more than ESR spec of 5 times will be better. If Negative Resistance is too low, that may cause crystal resonator stop oscillation or not easy to oscillate)

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| DATE                                | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
| 2023/4/18                           | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 3     |

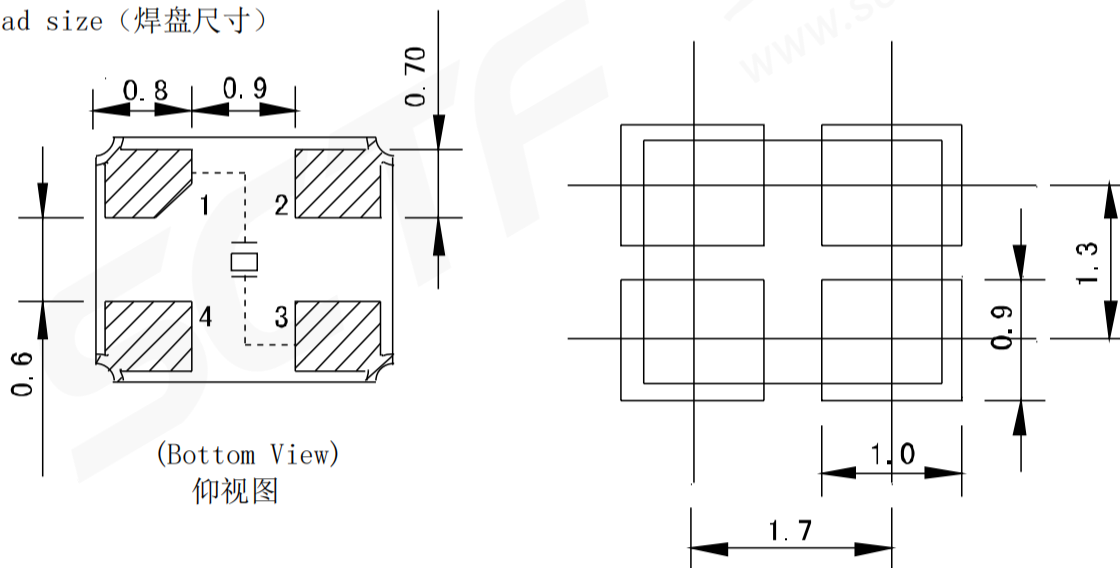
## DIMENSIONS

Product size (产品尺寸)

Units (单位): mm(毫米)



Pad size (焊盘尺寸)



(Bottom View)  
仰视图

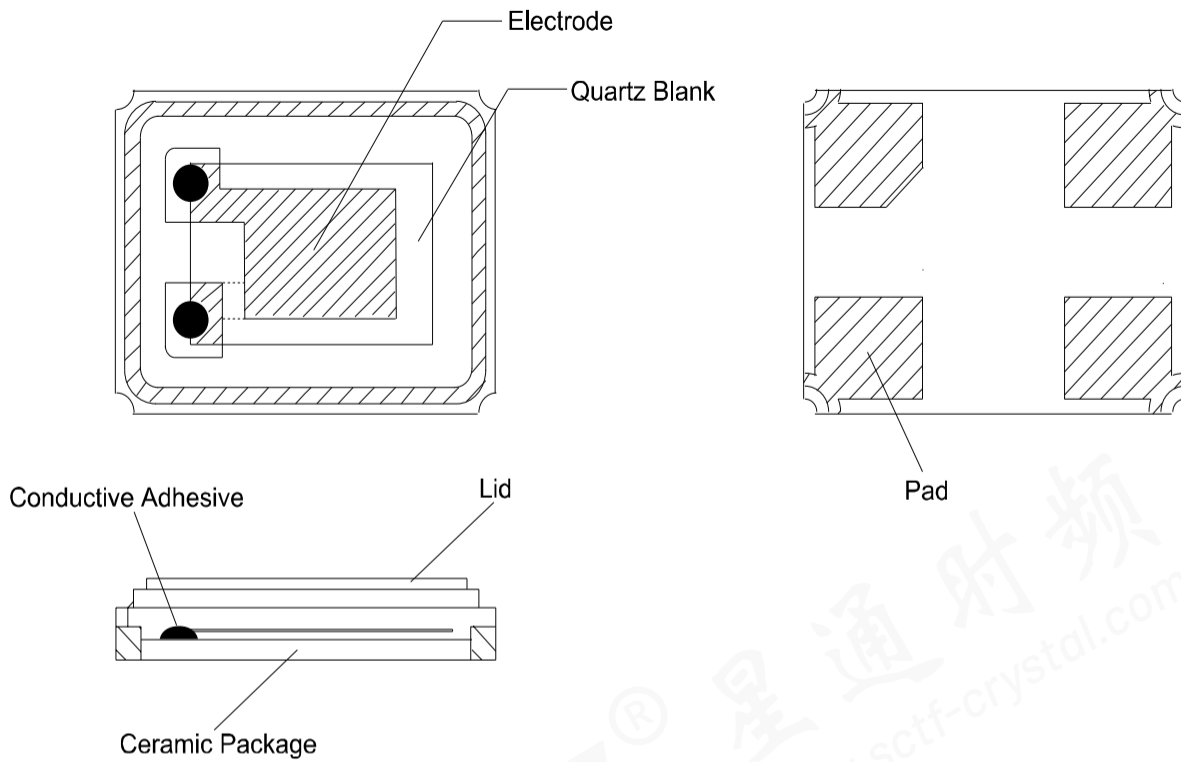
suggested solder pad layout

Note: #2, #4 is connected with a cover  
(Please connect with GND or floating.)

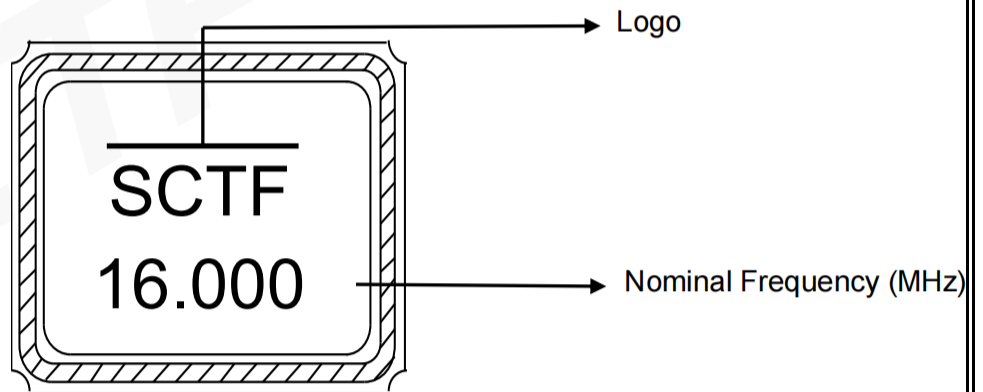
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|-------------------------------------|--|-------|
| DATE                                | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
| 2023/4/18                           | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 4     |

## ■ PRODUCT STRUCTURE & MARKING

### ◆ Product Structure 产品结构



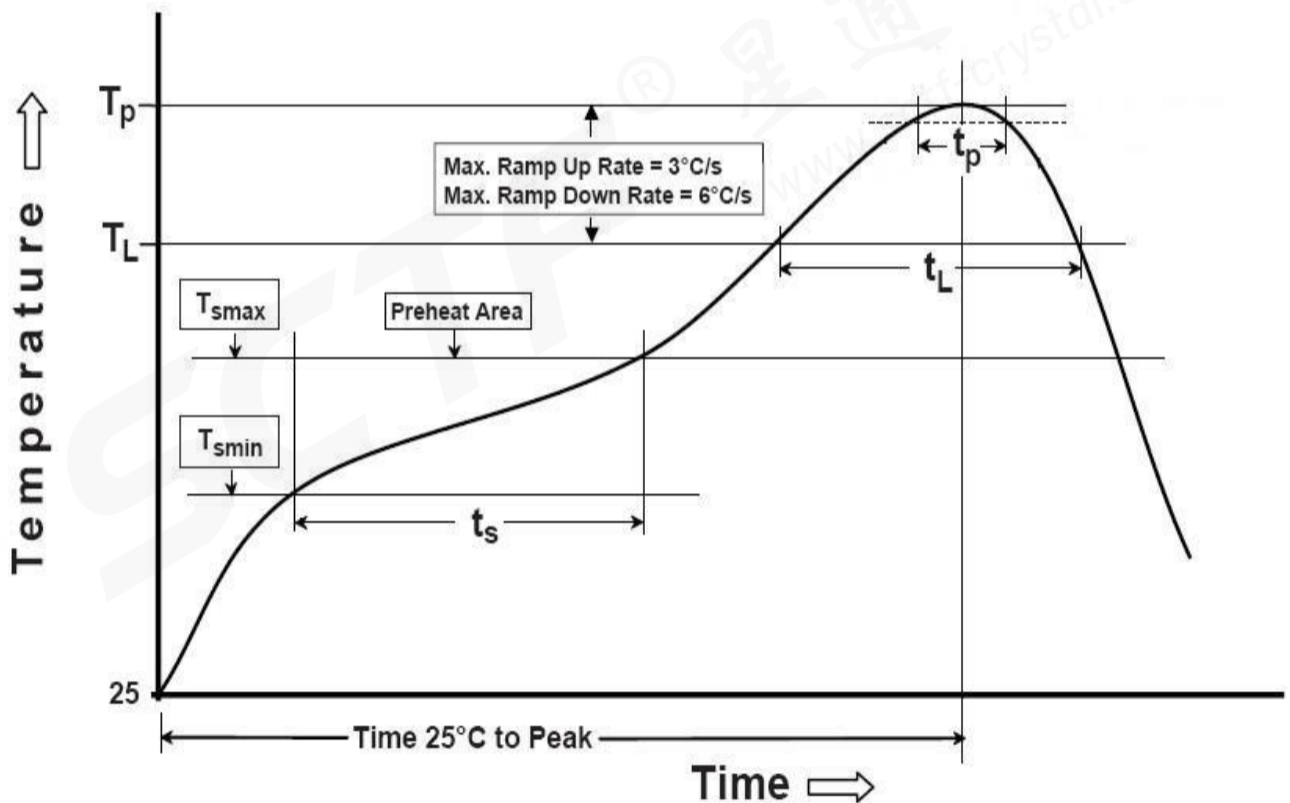
### ◆ Marking 印字



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| DATE                                | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
| 2023/4/18                           | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 5     |

## 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.   |
| <b>Suggest reflow times</b>  | <b>3 Times max.</b>     |                  |



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| DATE                                | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
| 2023/4/18                           | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 6     |

## ■ RELIABILITY SPECIFICATION

| 序号<br>NO. | 项目<br>ITEM                | 条件<br>CONDITIONS   | 合格标准<br>BASIS OF VERDICT  |
|-----------|---------------------------|--|---|
| 1         | 跌落<br>DROP                | 100cm高处自由跌落到3cm厚木板上,3次<br>High:100cm;Thickness:3cm;3 times.  | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 2         | 振动<br>VIBRATION           | 频率 Frequency:10~57.7Hz:幅度 Amplitude: $\pm 0.75 \text{mm}$<br>频率Frequency:57.7Hz~500Hz:加速度幅度acceleration<br>rate:98m/s <sup>2</sup><br>周期 Cycle time:10-500-10Hz: 15min<br>振动方向 Direction:X,Y, Z<br>振动时间 Duration: 每个方向2小时 2 h/direction.   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 3         | 温度变化<br>TEMPERATURE SHOCK | -40℃ $\pm 2^\circ\text{C}$ (30min) $\leftrightarrow$ 85℃ $\pm 2^\circ\text{C}$ (30min);循环10次<br>-40℃ $\pm 2^\circ\text{C}$ (30min) $\leftrightarrow$ 85℃ $\pm 2^\circ\text{C}$ (30min);For 10<br>cycles  | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 4         | 湿热<br>HUMIDITY            | 温度:40℃ $\pm 2^\circ\text{C}$ ;湿度90-95%;时间:96小时<br>Temp:40℃ $\pm 2^\circ\text{C}$ ;Humidity:90-95%;Times:96h  | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 5         | 低温<br>COLD RESISTANCE     | 温度:-40℃ $\pm 2^\circ\text{C}$ ;时间:96小时<br>Temp:-40℃ $\pm 2^\circ\text{C}$ ;Times:96h   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 6         | 高温1<br>HEAT RESISTANCE 1  | 温度:100℃ $\pm 2^\circ\text{C}$ ;时间:96小时<br>Temp:100℃ $\pm 2^\circ\text{C}$ ;Times:96h   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 7         | 高温2<br>HEAT RESISTANCE 2  | 温度:155℃ $\pm 2^\circ\text{C}$ ;时间:2小时<br>Temp:155℃ $\pm 2^\circ\text{C}$ ;Times:2h   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 8         | 高温3<br>HEAT RESISTANCE 3  | 温度:85℃ $\pm 2^\circ\text{C}$ ;电压:3.3V/5.0V;时间:96小时<br>Temp:85℃ $\pm 2^\circ\text{C}$ ;Voltage:3.3V/5.0V;Times:96h  | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 9         | 回流焊<br>REFLOW             | 150℃ $\pm 5^\circ\text{C}$ 保持120s后升到270℃ $\pm 5^\circ\text{C}$ 保持10s, 升温 and 保<br>温时间小于200s, 常温放置1~2h后测定<br>Keep 150 °C $\pm$ 5 °C 120s and then rose to 270 °C $\pm$ 5 °C for<br>10s, warming and holding time is less than the 200s,<br>placed at room temperature 1 ~ 2h after test | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 10        | 盐雾<br>SALT SPRAY          | 盐雾浓度:5%;温度:35℃;时间:24小时<br>Salt density:5%;Temp:35℃;Times:24h   | 目测无明显腐蚀现象<br>Visual no significant<br>corrosion.                            |
| 11        | 老化<br>AGING               | 温度:85℃;时间:30天<br>Temp:85℃;Times:30days   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 12        | 气密性<br>LEAKAGE            | 氦气(0.6~0.65MPa):10分钟<br>He(0.6~0.65MPa):10min  | $\leq 3 * 10^{-9} \text{Pa} \cdot \text{m}^3 / \text{s}$                    |
| 13        | 焊接<br>SOLDER              | 温度:260℃ $\pm 5^\circ\text{C}$<br>Temp:260℃ $\pm 5^\circ\text{C}$   | 浸锡率大于90%<br>Soldering tin rate<br>greater than 90%                          |

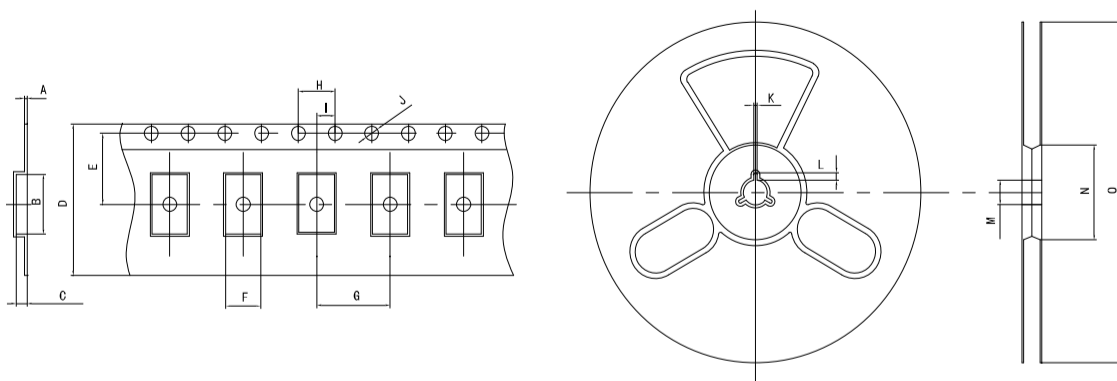
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| DATE      | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
|-----------|--|-------|
| 2023/4/18 | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 7     |

# PACKAGE

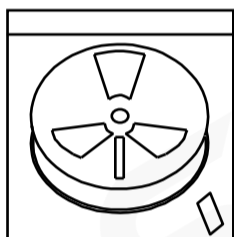
## ◆ Taping Specifications 编带规格

UNIT(单位) :mm (毫米)

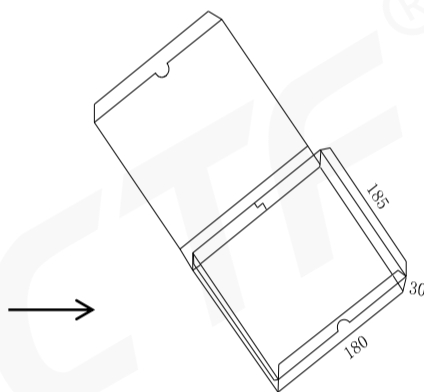


| TEYE        | A    | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M     | N     | O      |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|--------|
| 2.5×2.0 SMD | 0.30 | 2.80 | 0.75 | 8.00 | 3.50 | 2.30 | 4.00 | 4.00 | 2.00 | 1.50 | 2.00 | 4.00 | 13.00 | 60.00 | 180.00 |

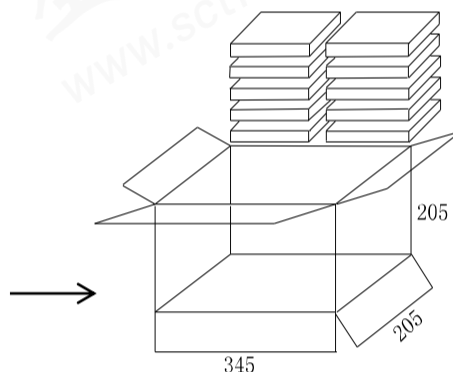
## ◆ Packaging specifications 包装规格



自封袋(Bag)  
3000只 = 1 轮  
3000pcs = 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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|-------------------------------------|--|-------|
| DATE                                | Specification of quartz crystal<br>石英晶体谐振器规格书      | Page: |
| 2023/4/18                           | P/N: SX2B16.000F0910F30<br>Spec.NO.: SCTF202304386 | 8     |



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[>>SCTF\(星通时频\)](#)