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|----|---------------|
| 编号 | SCTF202304351 |
| 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:     | HC-49US-SMD 3.579545MHz/20pF |
| 供应商物料料号 Part NO.:     | SXMH3.579545F2020F30         |
| 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         |

## RoHS Compliant

| Revision Record |                    |  |                   |                |
|-----------------|--------------------|--|-------------------|----------------|
| Rev.            | Revise page<br>修订页 | Revise contents<br>修订内容                                    | Rev. Date<br>修订日期 | Reviser<br>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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# ■ QUARTZ CRYSTAL UNIT SPECIFICATION

## 1. Crystal Unit Spec:

| N0. | Item                                | Symb.  | Electrical spec.   | Notes   |
|-----|-------------------------------------|--|--------------------|---|
| 1   | Nominal Frequency<br>标称频率           | f  | 3.579545 MHz       |   |
| 2   | Oscillation Mode<br>振荡模式            |  | AT Fundamental     |   |
| 3   | Holder Type<br>封装                   |  | HC-49US-SMD        |   |
| 4   | Frequency Tolerance<br>常温频差         | $\Delta f/f$   | $\pm 20\text{ppm}$ | at 25°C $\pm 2^\circ\text{C}$                             |
| 5   | Drive Level<br>激励功率                 | DL   | 100 $\mu\text{W}$  | See the 2.1   |
| 6   | Load Capacitance<br>负载电容            | CL   | 20pF               | See the 2.2   |
| 7   | Effective Resistance<br>谐振电阻        | RR   | 120 $\Omega$ max.  | See the 2.3   |
| 8   | Shunt Capacitance<br>静电容            | C0   | 5 pF max.          |   |
| 9   | Drive Level Dependency 2<br>激励功率依赖性 | DLD2   | 30 $\Omega$ 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°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  | -40~85°C           |   |
| 13  | Storage Temperature Range<br>存储温度   | T_stg  | -40~105°C          |   |
| 14  | Insulation Resistance<br>绝缘阻抗       | IR   | 500 M $\Omega$     | at DC 100V  |
| 15  | Aging<br>老化率                        | f_age  | $\pm 3$ ppm        | 1st Year  |
| 16  | Measurement Condition<br>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 $\mu\text{W}$  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) : 20pF

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

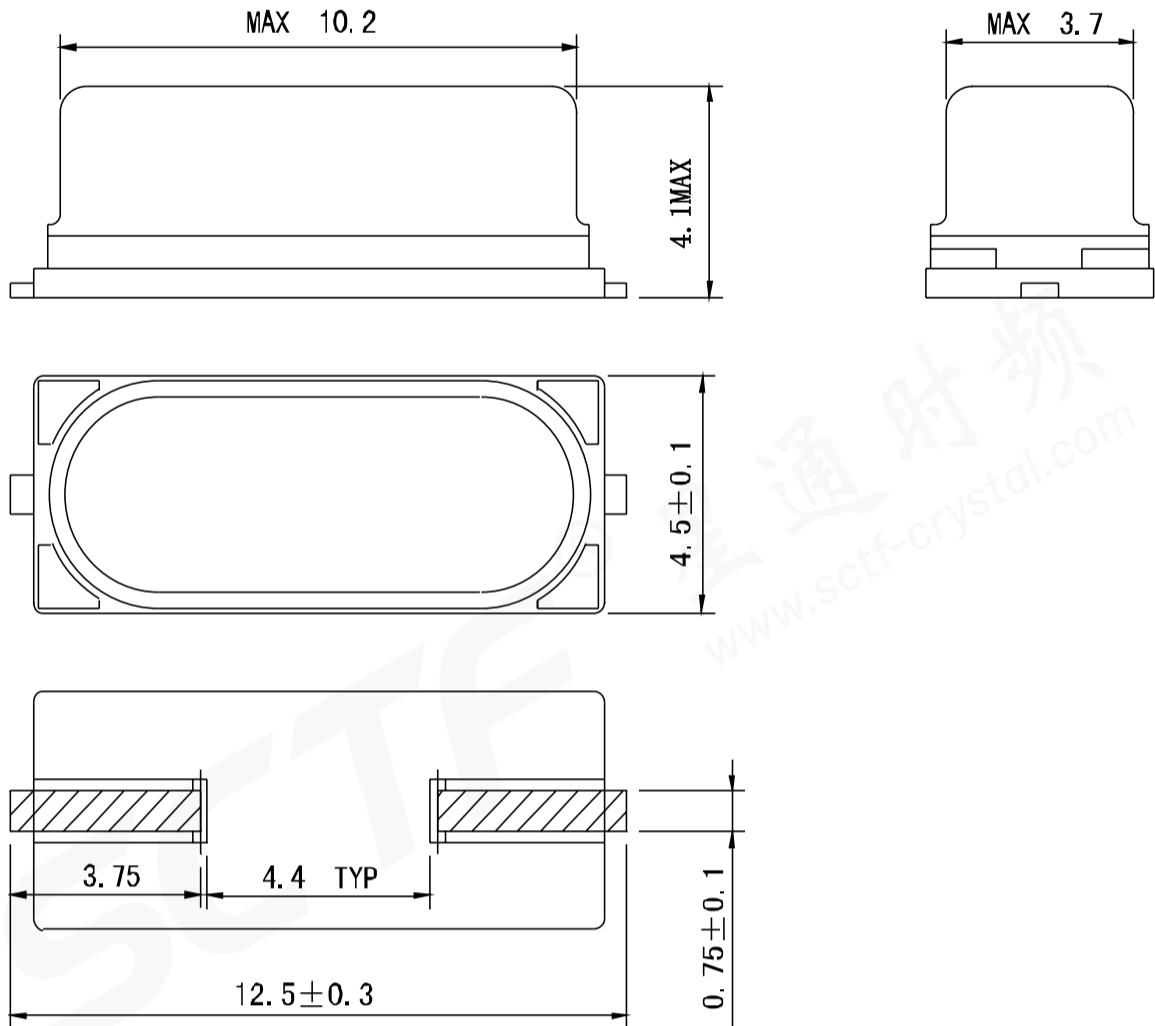
2.3 Negative Resistance (-R)  $\geq 600\Omega$

(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

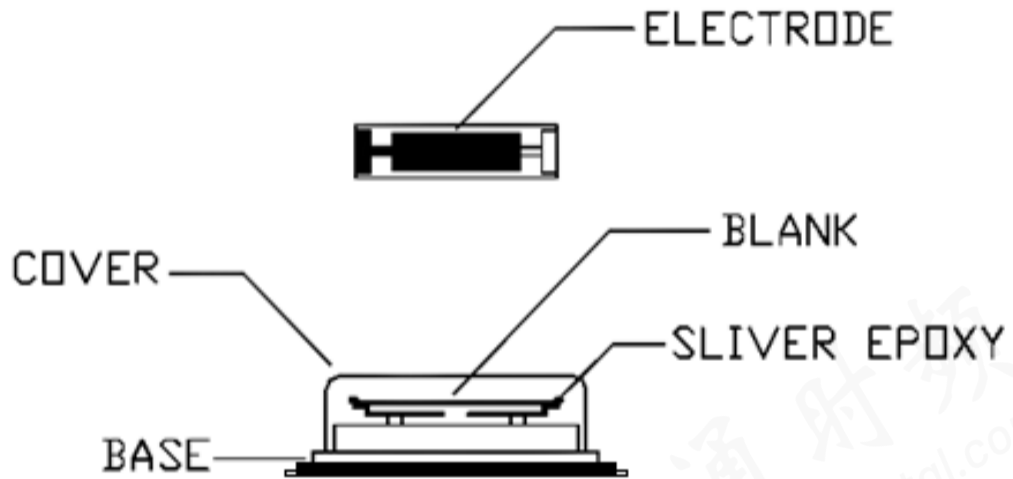
Units (单位): mm(毫米)



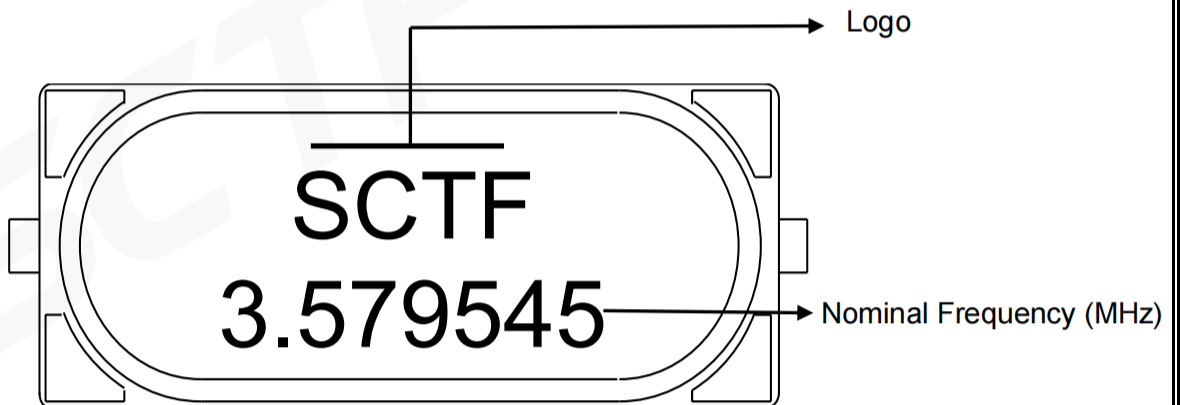
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## ■ PRODUCT STRUCTURE & MARKING

### ◆ Product Structure 产品规格



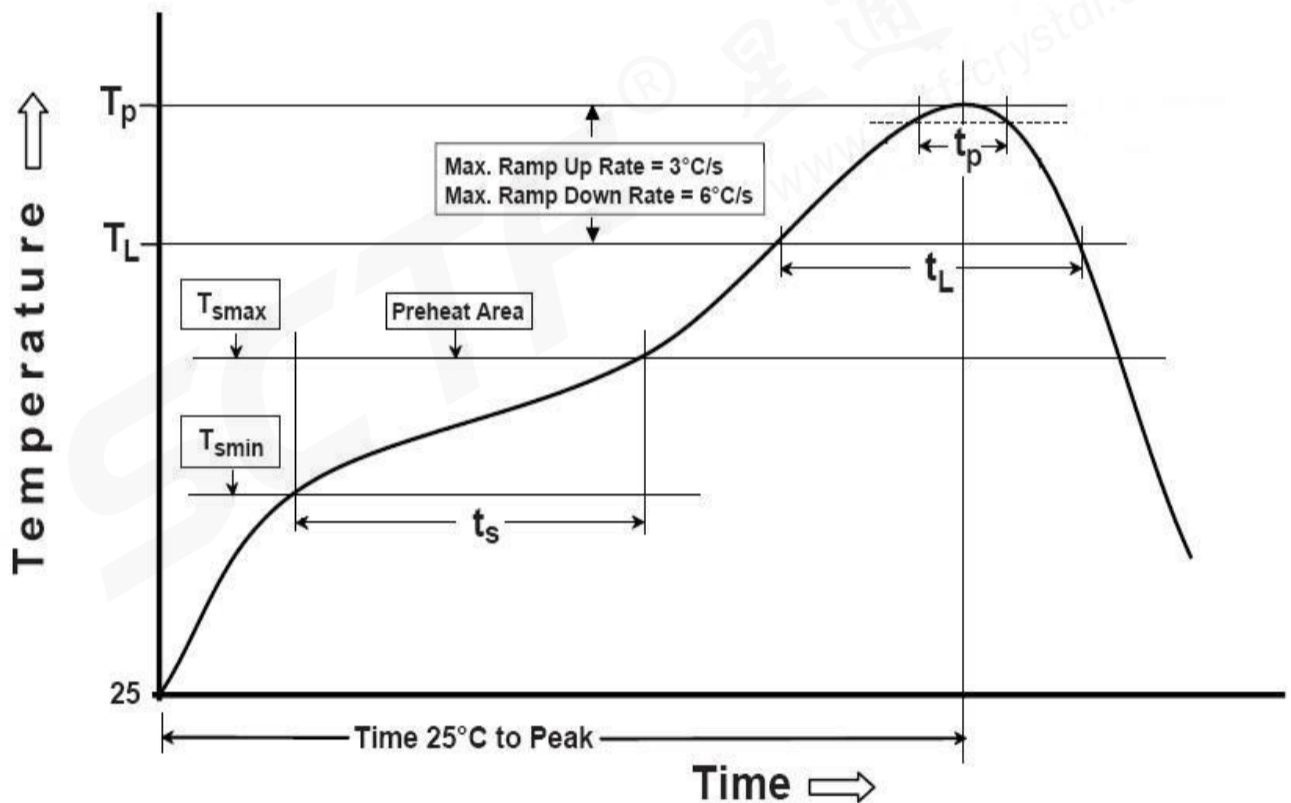
### ◆ Marking 印字



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## REFLOW PROFILES

| Profile Feature   | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|-------------------------|------------------|
| Preheat/Soak  |                         |                  |
| ● Temperature Min (Ts min)  | 100 °C                  | 150 °C           |
| ● Temperature Max (Ts max)  | 150 °C                  | 200 °C           |
| ● Time (Ts min to Ts max)   | 60-120 seconds          | 60-120 seconds   |
| Ramp-up rate (TL to Tp)   | 3 °C/second max.        | 3 °C/second max. |
| Time maintained above   |                         |                  |
| ● Liquidous temperature (TL)                                      | 183 °C                  | 217 °C           |
| ● Time (tL) maintained above TL                                   | 60-150 seconds          | 60-150 seconds   |
| Peak package body temperature (Tp)                                | 235 °C                  | 260 °C           |
| Time within 5 °C of the specified classification temperature (Tp) | 20 seconds              | 30 seconds       |
| Ramp-down rate (Tp to TL)   | 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>2 Times max.</b>     |                  |



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## 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                   | 100 cm高处自由跌落到3cm厚木板上,3次<br>High: 100 cm;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/s2<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<br>SHOCK | -40°C $\pm 2^\circ\text{C}$ (30min) $\leftrightarrow$ 85°C $\pm 2^\circ\text{C}$ (30min);循环10次<br>-40°C $\pm 2^\circ\text{C}$ (30min) $\leftrightarrow$ 85°C $\pm 2^\circ\text{C}$ (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°C $\pm 2^\circ\text{C}$ ;湿度90-95%;时间:96小时<br>Temp:40°C $\pm 2^\circ\text{C}$ ;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°C $\pm 2^\circ\text{C}$ ;时间:96小时<br>Temp:-40°C $\pm 2^\circ\text{C}$ ;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°C $\pm 2^\circ\text{C}$ ;时间:96小时<br>Temp:100°C $\pm 2^\circ\text{C}$ ;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°C $\pm 2^\circ\text{C}$ ;时间:2小时<br>Temp:155°C $\pm 2^\circ\text{C}$ ;Times:2h   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 8         | 回流焊<br>REFLOW                | 150°C $\pm 5^\circ\text{C}$ 保持120s后升到270°C $\pm 5^\circ\text{C}$ 保持10s, 升温和保<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<br>for 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>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 9         | 盐雾<br>SALT SPRAY             | 盐雾浓度:5%;温度:35°C;时间:8小时<br>Salt density:5%;Temp:35°C;Times:8h   | 目测无明显腐蚀现象<br>Visual no significant<br>corrosion.                            |
| 10        | 老化<br>AGING                  | 温度:85°C;时间:30天<br>Temp:85°C;Times:30days   | $\Delta FL \leq \pm 5 \text{ppm}$<br>$\Delta RR \leq RR(\text{max}) * 10\%$ |
| 11        | 气密性<br>LEAKAGE               | 氦气(0.6~0.65MPa):10分钟<br>He(0.6~0.65MPa):10min  | $\leq 3 * 10^{-9} \text{Pa} \cdot \text{m}^3 / \text{s}$                    |
| 12        | 焊接<br>SOLDER                 | 温度:260°C $\pm 5^\circ\text{C}$<br>Temp:260°C $\pm 5^\circ\text{C}$   | 浸锡率大于90%<br>Soldering tin rate<br>greater than 90%                          |

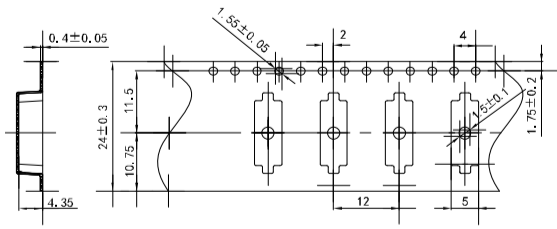
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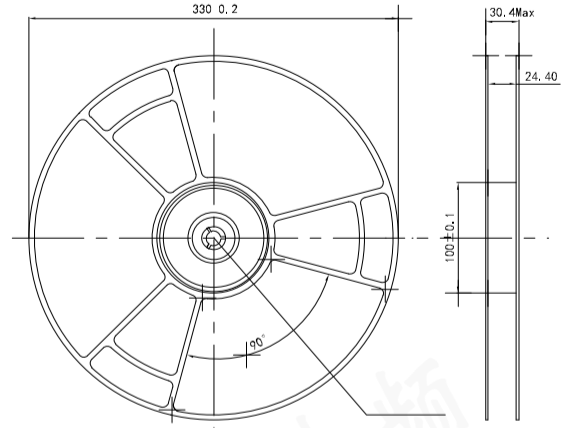
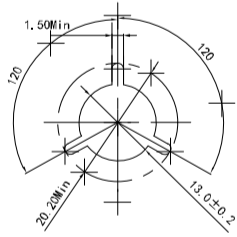
# PACKAGE

## ◆ Taping Specifications 编带规格

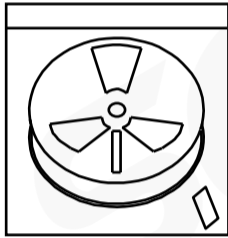
UNIT(单位):mm(毫米)



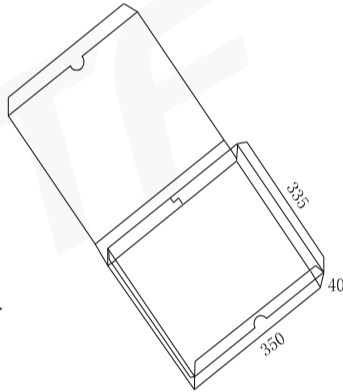
A局部视图



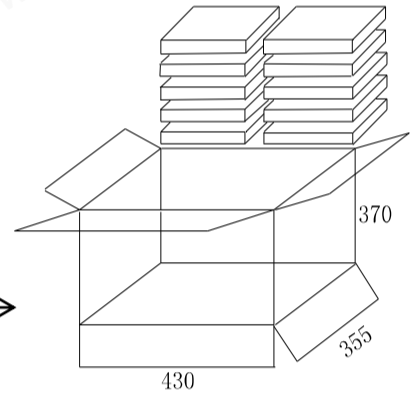
## ◆ Packaging specifications 包装规格



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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[>>SCTF\(星通时频\)](#)