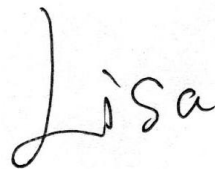


|                 |                     |
|-----------------|---------------------|
| Customer        |                     |
| Production Name | Tuning Fork 3.2*1.5 |
| Customer P/N    | N/A                 |
| TROQ P/N        | RNE32768082         |
| Revision        | B                   |
| Print Date      | 2025/9/15           |

|                                                                                     |                                                                                     |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Drawn                                                                               | Checked                                                                             | Approved                                                                              |
|  |  |  |

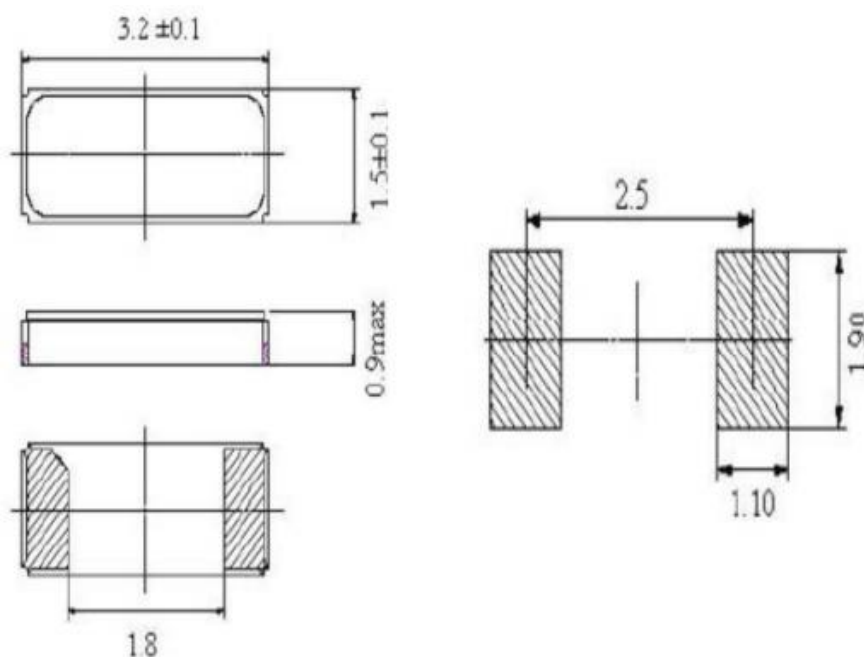


RoHS Compliant

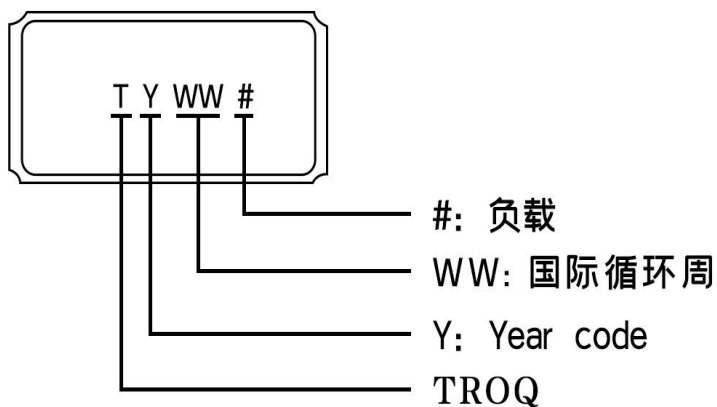
● ELECTRICAL PARAMETERS

| 谐振器产品技术指标                                   | Min                                                 | TYP. | Max | Units                 |
|---------------------------------------------|-----------------------------------------------------|------|-----|-----------------------|
| 1.Holder Type(型号规格)                         | Tuning Fork 3.2*1.5                                 |      |     |                       |
| 2.Mode of Oscillation (振动模式)                | Fundamental                                         |      |     |                       |
| 3. Frequency (标称频率)                         | 32.768000                                           |      |     | KHz                   |
| 4.Load Capacitance (CL) (负载电容)              | 12.5                                                |      |     | pF                    |
| 5.Shunt Capacitance (Co) (静态电容)             | 0                                                   | 2    |     | pF                    |
| 6. Equivalent Resistance (谐振电阻)             |                                                     | 70   |     | kΩ                    |
| 7.Frequency Tolerance at 25℃ (调整频差)         | -10                                                 | 10   |     | ppm                   |
| 8.Temperature Coefficient (K) (温度系数)        | -0.04                                               |      |     | ppm/(△℃) <sup>2</sup> |
| 9.Insulation Resistance (at DC 100V) (绝缘电阻) | 500                                                 |      |     | MΩ                    |
| 10.Drive Level (激励功率)                       |                                                     | 1    |     | uw                    |
| 11.Operating Temperature Range (工作温度范围)     | -40                                                 | 85   |     | ℃                     |
| 12. Storage Temperature Range (储存温度范围)      | -55                                                 | 125  |     | ℃                     |
| 13. Aging (老化率)                             | ± 3                                                 |      |     | ppm/year              |
| Other(其他)                                   | *Note 1: $F(T) = K * (T-t_0) * (T-t_0)$ ; $t_0=25℃$ |      |     |                       |

OUTLINE DIMENSIONS(UNIT:mm) 外形尺寸 (单位: mm)



● Marking (标记)



Year: 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

Code: 1 2 3 4 5 6 7 8 9 0

WW: 国际循环周

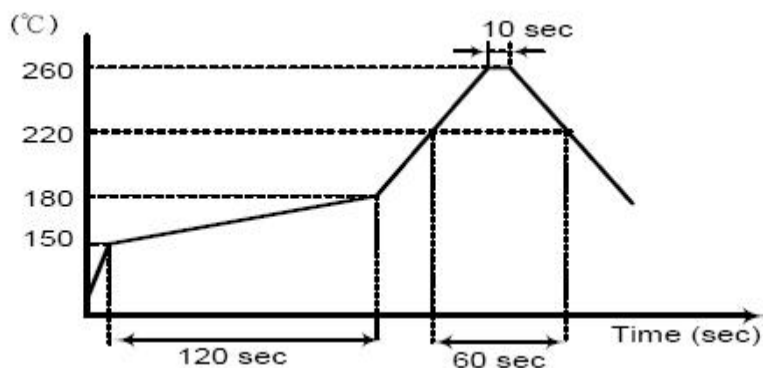
#负载: A → 12.5PF、B → 9PF、C → 7PF、D → 6PF

● SUGGESTED REFLOW PROFILE (回流焊曲线图)

Total time: 200sec. Max. (总时间: 200秒 最大)

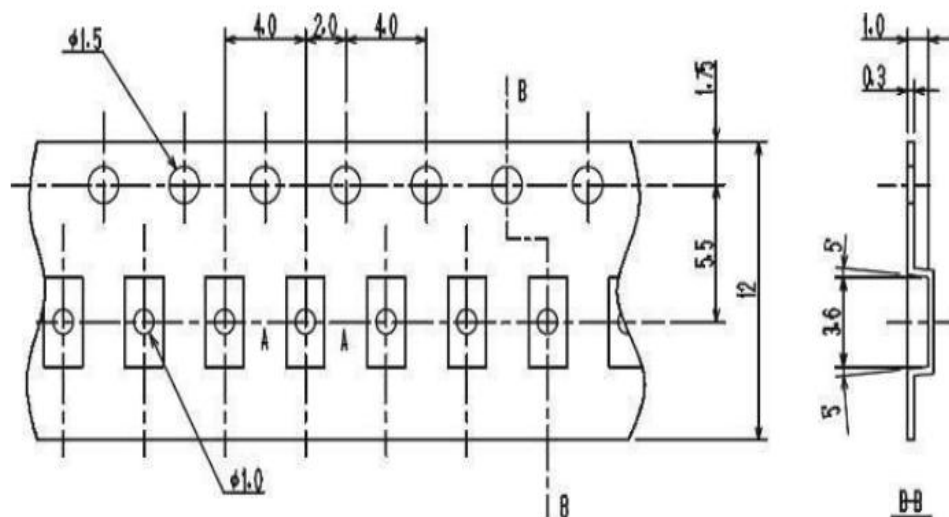
Solder melting point: 220℃ (熔点 220℃)

| Profiles Feature (特性)                         |              | Pb-Free Assembly |
|-----------------------------------------------|--------------|------------------|
| Average Ramp-up Rate(Ts max to Tp)            | 平均升温速度       | 3℃/second Max    |
| Preheat                                       | 预热           |                  |
| ■ Temperature Min (Ts min)                    | 最低温度         | 125℃             |
| ■ Temperature Max (Ts max)                    | 最高温度         | 200℃             |
| ■ Time (ts min to ts max)                     | 从最低到最高时间     | (60~180) seconds |
| Time maintained above                         | 维持上述时间       |                  |
| ■ Temperature(T1)                             | 温度           | 217℃             |
| ■ Time(tp)                                    | 时间           | (60~150) seconds |
| Peak/Classification Temperature(Tp)           | 最高点温度        | 260℃             |
| Time within 5℃ of actual Peak Temperature(tp) | 高温维持时间       | (20~40) seconds  |
| Ramp-down rate                                | 降温速度         | 6℃/second max    |
| Time 25℃ to Peak Temperature                  | 从25℃到最高温度的时间 | 8 minutes max    |
| Suggest reflow times                          | 建议 reflow次数  | 3 Times max      |



● PACKING (包装) 3Kpcs/REEL

## REEL SPECIFICATION

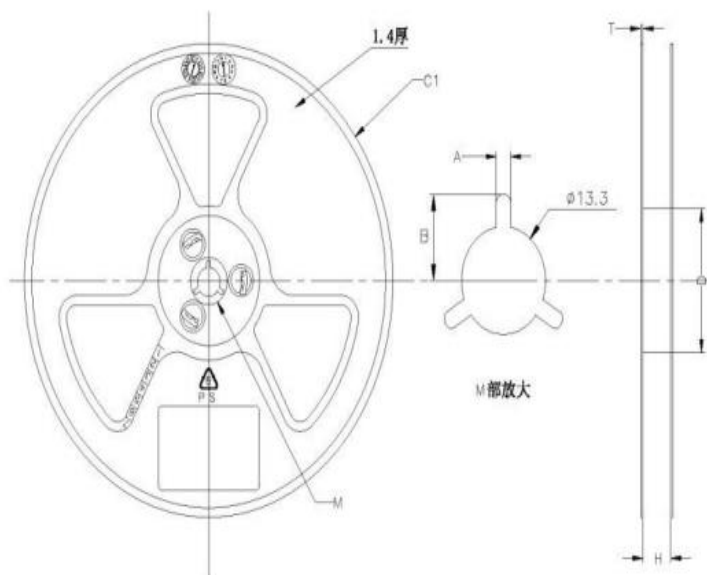
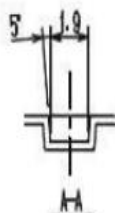


备注:

符合: EIA-481

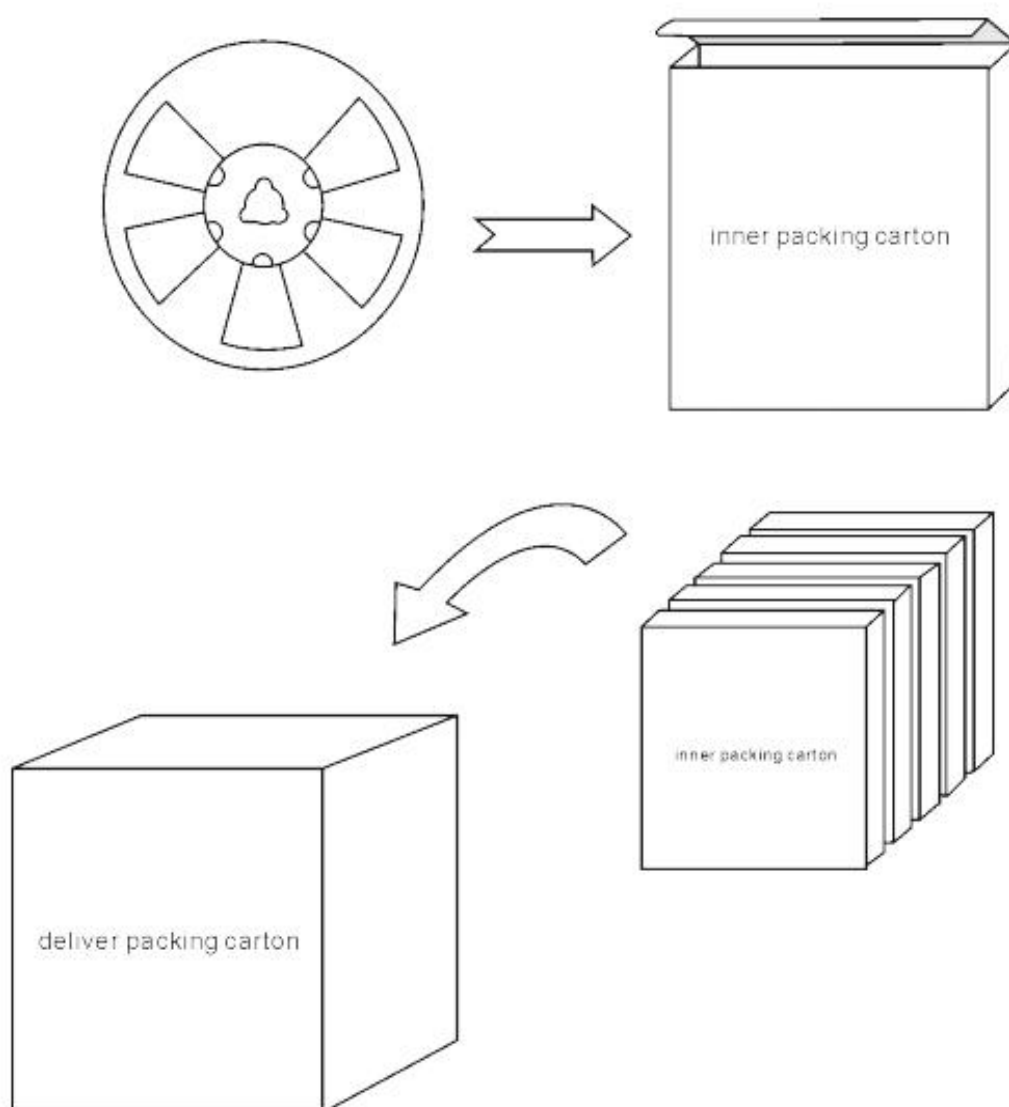
公差:  $\pm 0.2\text{mm}$ 

单位: mm



|      |                |    |
|------|----------------|----|
| 名称   | 规格             | 单位 |
| 材料   | PS             |    |
| 卷边厚T | $1.8 \pm 0.05$ | mm |
| 卷内宽H | $12 \pm 0.5$   | mm |

## PACKING SPECIFICATION



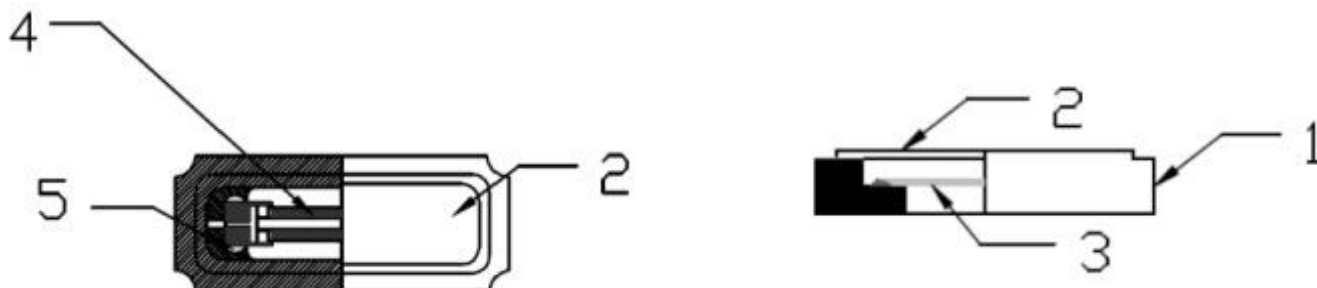
备注：每盘3000pcs

每箱10盘（30000pcs）

产品外箱包装以实际为准。

● BOM List (材质清单)

## INSIDE STRUCTURE



| No. | 组件<br>COMPONENTS     | 材料成份<br>MATERIALS                               |
|-----|----------------------|-------------------------------------------------|
| 1   | 底座<br>Package        | 陶瓷<br>Ceramic (Al <sub>2</sub> O <sub>3</sub> ) |
| 2   | 外壳<br>LID            | KV 合金<br>KV (Fe/Co/Ni)                          |
| 3   | 水晶片<br>Crystal blank | 二氧化硅<br>SiO <sub>2</sub>                        |
| 4   | 电极<br>Electrode      | Au<br>金                                         |
| 5   | 接着剂<br>Adhesive      | 树脂、银粉<br>Resin、Ag                               |

● RELIABILITY SPECIFICATIONS (信赖度试验)

| No | Test Item (测试项目)                                           | Test Conditions (测试条件)                                                                                                                                                                                                       | Reference (参考)                         |
|----|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 1  | High Temperature<br>High Humidity<br>Storage<br>(高温、高湿、储存) | Temperature: 85°C±3°C<br>温度: 85°C±3°C<br>Relative Humidity: 85%RH<br>相对湿度: 85%RH<br>Time: 96 Hours<br>时间: 96小时                                                                                                               | JIS C5023                              |
| 2  | High Temperature<br>Storage<br>(高温储存)                      | Temperature: 125°C±3°C<br>温度: 125°C±3°C<br>Time: 96 Hours<br>时间: 96小时                                                                                                                                                        | MIL-STD-883E<br>Method 1005.8          |
| 3  | Low Temperature<br>Storage<br>(低温储存)                       | Temperature: -40°C±3°C<br>温度: -40°C±3°C<br>Time: 96Hours<br>时间: 96小时                                                                                                                                                         | MIL-STD-883E<br>Method 1013            |
| 4  | Thermal Shock<br>(温度冲击)                                    | Temperature1: -55°C±5°C<br>温度1: -55°C±5°C<br>Temperature2: 85°C±5°C<br>温度2: 85°C±5°C<br>Temperature change between T1 and T2 5 min<br>T1和T2温度在5分钟内改变<br>10cycles maintain T1 and T2 for 30 minutes each mone<br>每次循环30分钟共10次 | MIL-STD-202F<br>Method 107 Condition A |
| 5  | RESISTANCE TO<br>SOLDER HEAT<br>(耐焊接热)                     | Solder Temperature: 265°C±5°C<br>焊槽温度: 265°C±5°C<br>Time: 10±1 Seconds<br>时间: 10±1秒                                                                                                                                          | MIL-STD-202F<br>Method 210E            |
| 6  | Solderability(可焊性)                                         | The solder pot temperature is 245±5°C , dwell time<br>245±5°C焊锡槽浸润5±0.5秒                                                                                                                                                     | J-STD-002B                             |
| 7  | Drop Test<br>(落下试验)                                        | 3 Times Free Fall from 50cm height table to 3cm<br>thickness hard wood board<br>从50cm高度3次跌落到3cm厚硬质木板上                                                                                                                        | JIS C6701                              |
| 8  | MECHANICAL<br>SHOCK<br>(机械冲击)                              | Half sine wave, 1000 G<br>半正弦波, 加速度1000G<br>3 Times for all 3 directions<br>X、Y、Z 三个相互垂直方向各三次                                                                                                                                | MIL-STD-202F<br>Method 213B            |
| 9  | Vibration<br>(机械振动)                                        | Frequency Range: 10Hz~55Hz<br>频率范围: 10Hz~55Hz<br>Amplitude: 0.75mm<br>振幅: 0.75mm<br>2 Hours in each direction, total 6 Hours<br>X、Y、Z 三个相互垂直方向各振动2小时                                                                         | MIL-STD-883E<br>Method 2007.3          |
| 10 | Leakage Test<br>(气密性)                                      | Take measurements with a helium<br>Leakage detector<br>氦质检漏<br>Leakage Rate ≤ 1×10 <sup>-3</sup> Pa cm <sup>3</sup> /s<br>漏率 ≤ 1×10 <sup>-3</sup> Pa cm <sup>3</sup> /s                                                      | MIL-STD-883E                           |