



# STANDARD SPECIFICATION

管理号: D-02

## 产品规格书

客户 Customer: \_\_\_\_\_

客户料号 Customer P/N NO.: \_\_\_\_\_

产品描述 Product Description: TF308-32.768-12.5-30

TKD 料号 TKD P/N. NO.: CD02K032768AGRBAEAE

**客户批准 Customer Approval :**

(请批准后回签一份 PLEASE RETURN A COPY WITH APPROVAL)

TKD SCIENCE AND TECHNOLOGY Co., LTD

泰晶科技股份有限公司

Shen zhen Tai jing Industry Co., Ltd.

深圳市泰晶实业有限公司

Chongqing Jingxin Frequency Control Electronic Technology Co.,Ltd.

重庆市晶芯频控电子科技有限公司

|                |             |                |
|----------------|-------------|----------------|
| 批准<br>APPROVED | 审核<br>CHECK | 制作<br>DESIGNER |
| 冯闯             | 卢海龙         | 谭明丽            |



| REV. | Description of Revision History<br>版 修定记录 | Date<br>时间  | Engineer<br>工程师     | Reviewer<br>审核人    |
|------|---|-------------|---------------------|--------------------|
| A    | The latest revision<br>最新修订               | 2020年11月27日 | SUN YAN PING<br>谭明丽 | LU HAI LONG<br>卢海龙 |

## CRYSTAL SPECIFICATION

### 晶体规格

1. Description (描述): Tuning Fork Quartz Crystal (音叉类晶振)
2. Nominal Frequency (额定频率): 32.768KHz
3. Oscillation Mode (震荡模式): Fundamental
4. Cutting Mode (切割方式): x +2° cut
5. Measurement Instrument (测量方式): S&A 250B(Calculated FL)
6. Electrical Characteristics (电气特性):

[1]Operation Conditions (工作条件):

| Item (项目)                            | Sy bol | MIN. | TYP. | MAX. | Unit | Condition |
|--------------------------------------|--------|------|------|------|------|-----------|
| Operating Temperature Range (工作温度范围) | Topt   | -20  |      | 70   | °C   |           |
| Storage Temperature Range (物料储存温度范围) | Tstg   | -40  |      | 85   | °C   |           |
| Load Capacitance (负载电容)              | CL     |      | 12.5 |      | pF   |           |
| Drive Level (激励功率)                   | DL     |      | 0.1  |      | uW   |           |

[2]Frequency Stability (频率稳定度):

| Item (项目)                          | Symb l | MIN.   | TYP.   | MAX.   | Unit                | Condition                        |
|------------------------------------|--------|--------|--------|--------|---------------------|----------------------------------|
| Tolerance (公差)                     | dF/Fo  | -30    |        | 30     | ppm                 | Refer to Center Frequency@25±3°C |
| Stability Over Temperature (温度稳定性) | dF/F25 | -0.049 | -0.034 | -0.019 | ppm/°C <sup>2</sup> | Refer to Operating Temperature   |
| Aging (老化)                         | dF/F25 | -5     |        | 5      | ppm                 | Per Year                         |

dF/Fo:Frequency Deviation Refer to Center Frequency (频率偏差指中心频率)

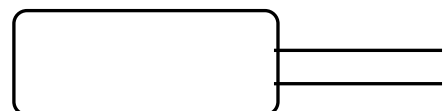
dF/F25:Frequency Deviation Refer to 25°C Frequency (频率偏差指 25°C的频率)

[3]Electrical Performance (电气性能):

| Item (项目)                             | Symbol | MIN. | TYP. | MAX. | Unit | Condition    |
|---------------------------------------|--------|------|------|------|------|--------------|
| Equivalent Series Resistance (等效串联电阻) | ESR    |      |      | 30   | KΩ   | @Series      |
| Shunt Capacitance (分流电容)              | C0     |      | 1.8  | 3    | pF   |              |
| Insulation Resistance (绝缘电阻)          | IR     | 500  |      |      | MΩ   | @DC 100 Volt |

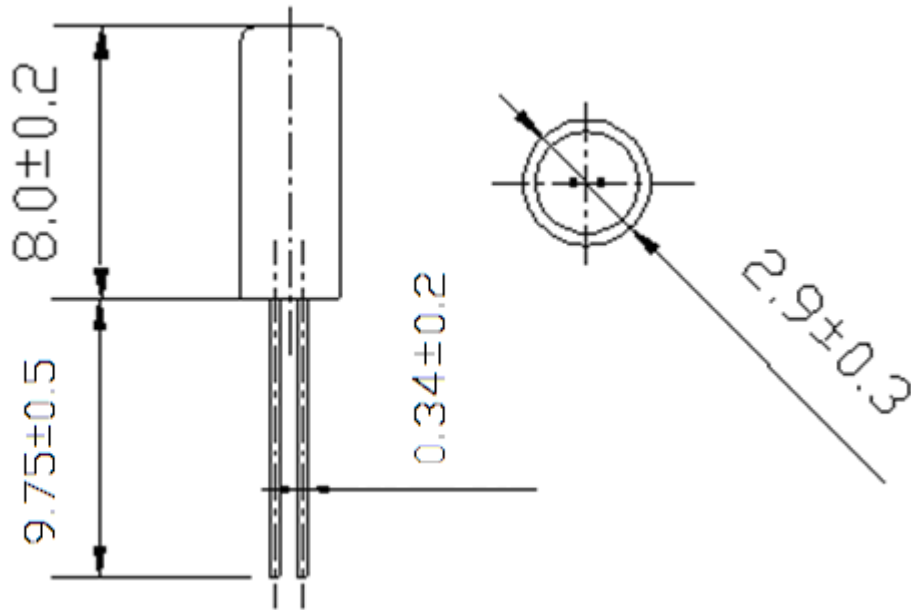
7. Wording (印字): Laser (激光)

Marking Generally for empty. Refer to with Customer' s requirement.通常标记为空。请参考客户要求



## 8. Outline drawing (外形图) (unit: mm)

## 8.1 Dimension (尺寸)

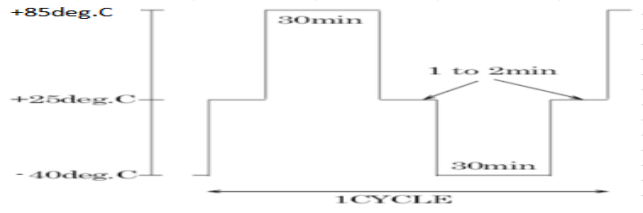


## 8.2 Attention (注意)

8.2.1 Not recommended reflow furnace welding, if it is to be used, the maximum temperature shall not exceed  $230^{\circ}\text{C}$ . (不推荐回流焊, 如要使用回流焊, 最高温度不能超过  $230^{\circ}\text{C}$ )



9. Reliability Specification (可靠性试验)

| Test Items<br>(测试项目)                    | Test Method and Condition (测试方法)   | Requirements (标准)  |
|---|--|--|
| Vibration (震动)                          | (1)Vibration Frequency (震动频率) 10 to 55Hz<br>(2)Vibration Amplitude (震动幅度) 1.5mm<br>(3) Cycle Time (循环时间) 1-2min(10-55-10Hz)<br>(4)Direction (震动方向) X.Y.Z<br>(5)Duration (持续时长) 2h/each direction   | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5k ohm Max.  |
| Drop test<br>(跌落试验)                     | 3 Times free drop from 75cm height to hard wooden board of thickness more than 30mm<br>(从 75cm 高度自由下落 3 次至厚度大于 30cm 的硬木板上)   | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |
| Air tightness test<br>(气密性测试)           | The crystal is put into an alcohol pressure tank, the pressure is increased to 0.4Mpa, and the crystal is taken out after 15min. (晶体放入酒精加压罐中, 压力提升至 0.4Mpa, 保持 15min 取出)<br>Full inspection will be conducted before shipment. (出货前会全检)  | No necrosis AC=0、RE=1<br>无坏死不良   |
| Weldability<br>(焊性)                     | Dip the leads of crystal units into the solution (7-10%) of rosin 3±1s, then dip into solder to 2~3mm at the root of the lead and lift it after 5±1S s.<br>Temperature of solder melted tank is 245°C±10°C<br>将晶体单元的引线浸入松香的溶液(7-10%)中 3±1s, 然后浸入焊锡至引线根部 2~3mm 处, 5±1S 后提起。<br>焊料熔化罐的温度: 245°C±10°C | The dipped surface of the leads should be at least 95% covered with continuous new solder coating 引线的浸涂表面应至少覆盖 95% 的连续新焊料涂层。 |
| High temperature<br>(高温测试)              | 96 hours at 100°C±3°C (置于 100°C±3°C 下 96 小时)<br>After being left at room temperature for 2 hours, the test is carried out. (在室温下放置 2 小时后测试)  | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |
| Low temperature<br>(低温测试)               | 48 hours at -40°C±3°C (置于 -40°C±3°C 下 48 小时)<br>After being left at room temperature for 2 hours, the test is carried out. (在室温下放置 2 小时后测试)  | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |
| High temperature and humidity<br>(高温高湿) | 48 hours at 60°C±3°C, relative humidity 90-100% (置于 60°C±3°C 下 48 小时, 相对湿度 90-100%)<br>After being left at room temperature for 2 hours, the test is carried out. (在室温下放置 2 小时后测试)   | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |
| Temperature cycle<br>(高低温循环测试)          | After supplying the following temperature cycle (100 time) (提供以下温度循环 (100 次))<br>   | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |
| Lead strength<br>(拉力测试)                 | In the lead 1.00 Kg tensile force was applied at the end to keep more than 5 seconds (对引脚部分施持续加 1kg 的拉力 5 秒钟, 测试晶体的变化)   | Frequency Change(频率变化): ±5ppm Max.<br>Resistance Change (电阻变化): 5kohm Max.   |

## 10. Handling Notice for Standard Tuning Fork Crystal (Cylindrical Type) 标准音叉类晶振注意事项(圆柱型)

## 10.1. Shock resistance 跌落

It may deteriorate the characteristics or cause of no oscillation if excess physical shock given. Please be careful not to drop. Please use under condition to minimize the shocks as much as possible.

请不要跌落本产品，晶体受到冲击可能会使之性能恶化或不起振。在使用时，请尽量避免震动。

Please review the conditions if it is used by auto mounting or after the conditions are changed.

请在使用自动焊接设备，或在工作环境改变的情况下，检测本品的性能。

## 10.2. Heat and humidity resistance in storage 储存中得耐湿热性

Storing the crystal products under higher or lower temperature or high humidity for a long period may deteriorate the characteristics of crystal units.

长时间储存在高温，低温或高湿的环境下会使本品性能恶化。

Please store and use the crystal products at the normal temperature and humidity.

请储存在常温常湿的环境中。

## 10.3. Solder heat resistance 焊锡耐热性

Standard type crystal products use Material have a 230°C melting point.

Heating up the package more than 230°C may deteriorate the characteristics or cause of no oscillation the products. If the crystal products need to be soldered at temperature of more than +230°C, please study heat-resistance products or SMD products.

晶体所用金属材质熔点为 230°C，温度超过 230°C 可能会使本产品性能恶化或不起振。如果焊接温度大于 230°C 请使用耐高温或者 SMD 晶振。

Please review the condition or consult us about flow solder process.

回流焊具体情况请与我司工程部进行确认

Our soldering condition is under 280°C within 3sec or 320°C within 2sec for lead parts use the soldering iron .

Please don't solder the crystal unit (case) directly. It may cause of deteriorate the characteristics.

对于使用烙铁的引线部件，我们的焊接条件是 3 秒以内低于 280 摄氏度，或 2 秒以内 320 摄氏度。

请不要直接焊接晶体单元(外壳)。它可能会导致特性恶化。

## 10.4. Mounting method to PCB (PCB 上的焊接方法)

When the crystal products need to be lay down please fix to PCB securely.

当需要放置晶振时，请将其牢牢固定在 PCB 上

If the crystal is used with mechanical vibration location, please put cushion in between PCB or fix with

如果晶体放在震动机械旁边的位置，请在 PCB 之间放置缓冲垫或用弹性胶（如硅胶）如下图所示。

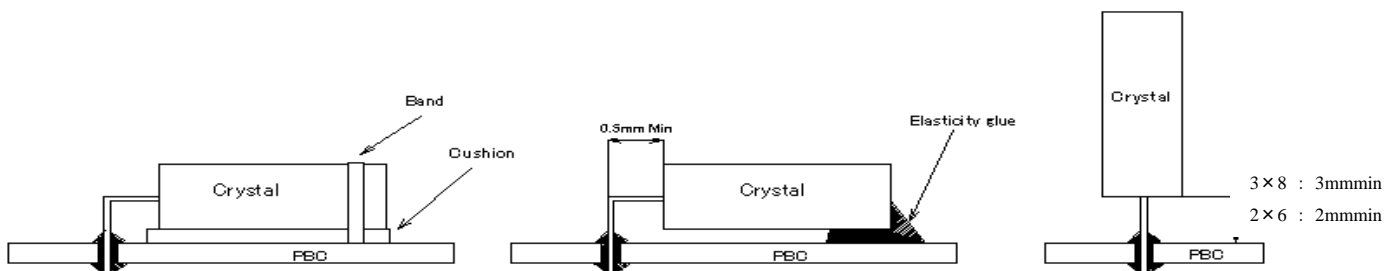
elasticity glue (Silicon etc) as shown in below figure. Please don't gluing hermetic seal grass.

当晶体产品需要垂直安装时，晶体单元与印刷电路板之间的间隙大于 3 毫米。

When the crystal products need to be mounted vertically, gap between crystal units and PCB more than 3mm

for 3x8 type , more than 2mm for 2x6 type is recommended.

3×8 型建议 2×6 型大于 2mm。





#### 10.5. Lead process 引脚工艺

When the lead needs to be cut please maintenance the cutter.

当需要切割引线的时候，请注意维护剪脚设备。

When the lead needs to be bent or repaired please be careful not to giving excess pressure at the root of the lead to avoid crack of the hermetic seal glass. Also please be careful not to giving excess pressure at sealing to avoid sealing tightness deteriorate.

当需要弯曲或修理导线时，请注意不要在导线根部施加过大的压力。

避免密封玻璃破裂。另外，请注意不要在密封处施加过大的压力。以避免密封性恶化。

Leave more than 0.5 mm of lead from the case.

引脚至少保留 0.5mm

#### 10.6 Ultrasonic cleaning and ultrasonic soldering 超声波清洗和超声波焊接

Soldered by ultrasonic cannot be guaranteed, because crystal may be sympathetic vibrated and may damage.

Please study at your side about ultrasonic cleaning.

超声波焊接无法提供品质保证，因为晶体可能会发生共振，并可能损坏。

#### 10.7. Drive level 激励功率

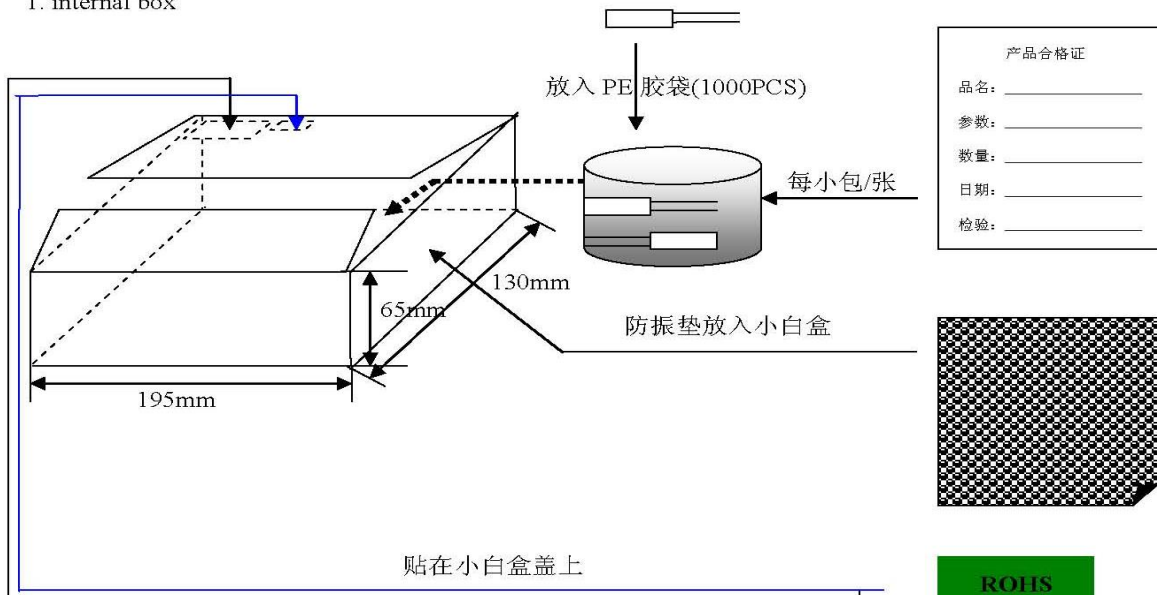
Applying excessive drive level to the crystal units may cause deterioration of characteristics or damage. Less than 1.0 $\mu$ W is recommended to this products. More than 2.0 $\mu$ W cannot be guaranteed.

对晶体施加较大的激励功率会导致晶体的性能恶化或者损坏。我司推荐晶体激励功率小于 1.0 $\mu$ W，超过 2.0 $\mu$ W 激励功率我司无法保证晶体品质稳定。

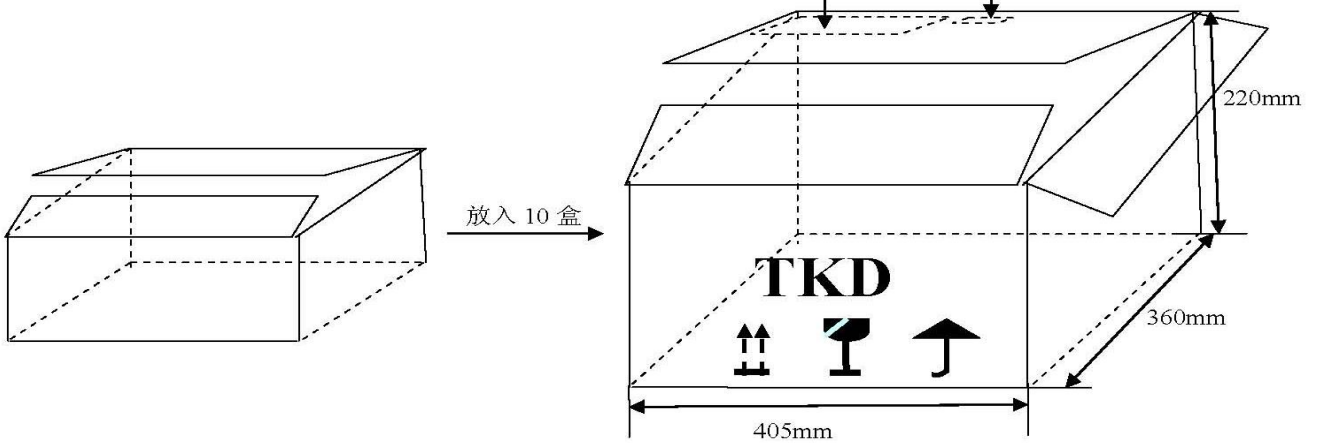


### 11. Packing Description (包装)

#### 1. internal box



#### 2. outer box





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