



STANDARD SPECIFICATION

管理号: D-03

产品规格书

客户 Customer:

客户料号 Customer P/N NO.:

产品描述 Product Description: 8233-32.768-12.5-20

TKD 料号 TKD P/N. NO.: CS04K032768AEPCAEAE

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

批准 APPROVED	审核 CHECK	制作 DESIGNER
夏丹丹	卢海龙	张 瑞

[illegible]



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):

Item (项目)	Symbol	MIN	TYP	MAX	Unit	Condition
Operating Temperature Range (工作温度范围)	Topt	-40		85	°C	
Storage Temperature Range (储存温度范围)	Tstg	-40		85	°C	
Load Capacitance (负载电容)	CL		12.5		pF	
Tolerance (公差)	dF/Fo	-20		+20	ppm	Refer to Center Frequency@25±3°C
Drive Level (激励功率)	DL		0.1	1	uW	
Equivalent Series Resistance (等效串联电阻)	ESR			40	KΩ	@Series
Shunt Capacitance (分流电容)	CO		1.9	3	pF	
Insulation Resistance (绝缘电阻)	IR	500			MΩ	@DC 100 Volt
Slope of temperature curve (温度曲线斜率)	dF/F25	-0.049	-0.034	-0.019	ppm/°C ²	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)

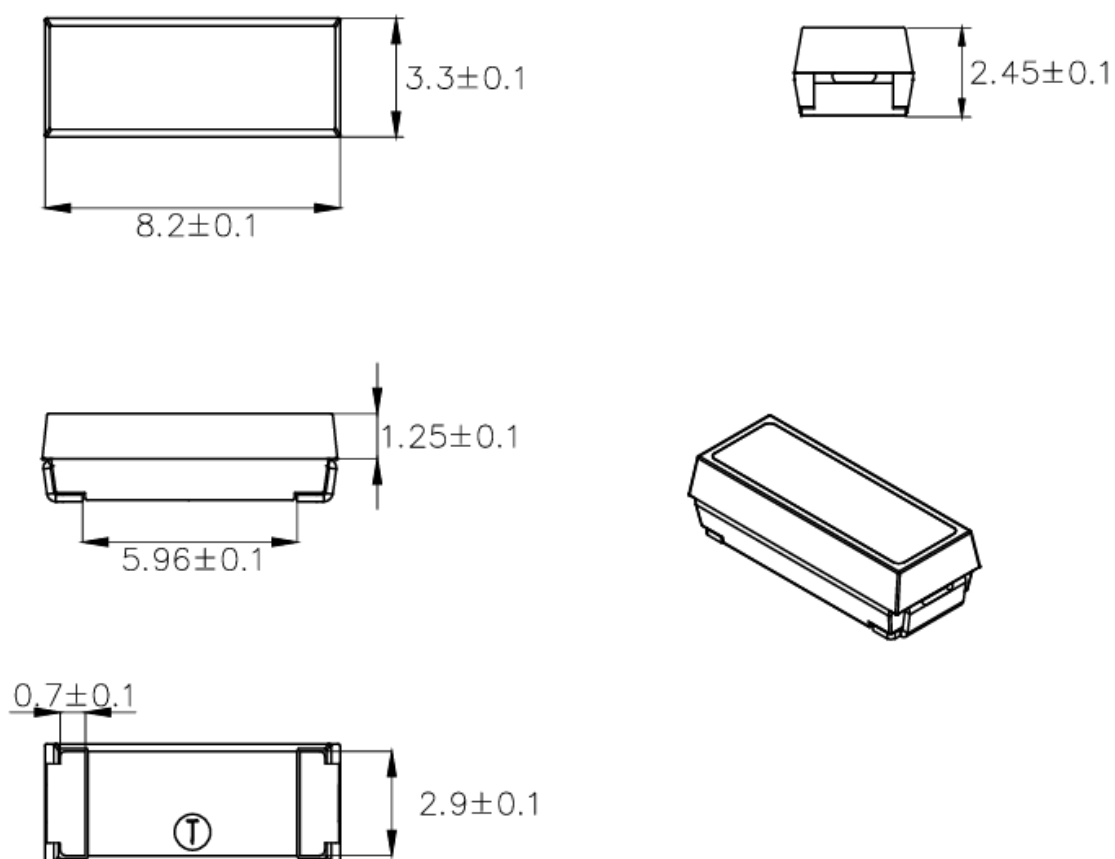
7、Marking (印字)

Marking Generally for empty. Refer to with Customer' s requirement.

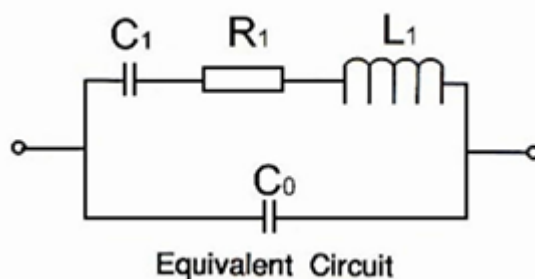
通常标记为空。请参考客户要求。



8、Outline Drawing (外形图) (unit: mm)



9、Equivalent Circuit (等效电路图)

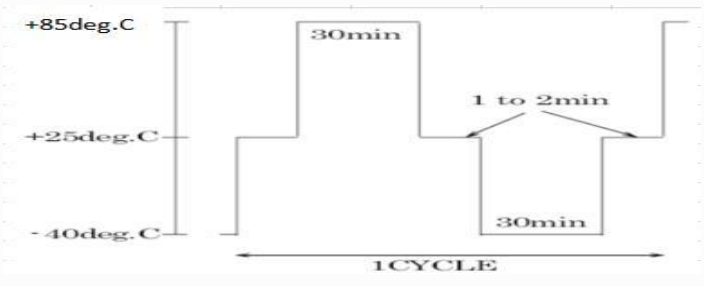
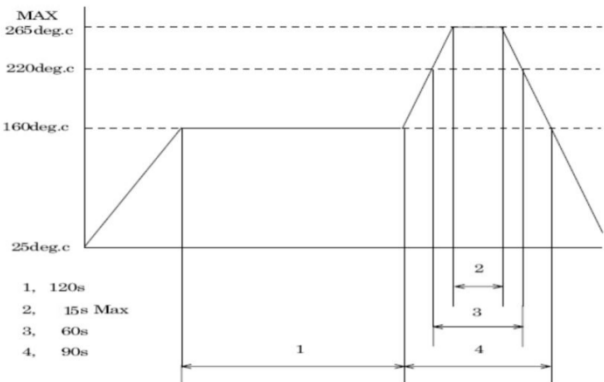




10、Reliability Specification (可靠性试验)

Test Items (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 (2)Vibration Amplitude (震动幅度) 1.5mm (3) Cycle Time (循环时间) 1-2min(10-55-10Hz) (4)Direction (震动方向) X.Y.Z (5)Duration (持续时长) 2h/each direction	Frequency Change (频率变化): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 5kohm Max.
Drop test (跌落试验)	3 Times free drop from 75cm height to hard wooden board of thickness more than 30mm (从 75cm 高度自由下落 3 次至厚度大于 30mm 的硬木板上)	Frequency Change (频率变化): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 5kohm Max.
Air tightness test (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)	No necrosis AC=0、RE=1 无坏死不良
Weldability (可焊性)	The lead is immersed in a $245\pm 5^{\circ}\text{C}$ solder bath within 3 ± 1 seconds 将引脚浸入 $245\pm 5^{\circ}\text{C}$ 的焊料浴中 3 ± 1 秒	At least 90% of the lead surface should be covered with a new solder coating. 至少 90% 的引脚表面应覆盖新的焊料涂层
High temperature (高温测试)	96 hours at $100\pm 3^{\circ}\text{C}$ (置于 $100\pm 3^{\circ}\text{C}$ 下 96 小时) 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): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 10kohm Max.
Low temperature (低温测试)	48 hours at $-40\pm 3^{\circ}\text{C}$ (置于 $-40\pm 3^{\circ}\text{C}$ 下 48 小时) 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): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 5kohm Max.



High temperature and humidity (高温高湿)	48 hours at $60\pm3^{\circ}\text{C}$, relative humidity 90-100% (置于 $60\pm3^{\circ}\text{C}$ 下 48 小时, 相对湿度 90-100%) 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): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 10kohm Max
Temperature cycle (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)) 	Frequency Change (频率变化): $\pm 10\text{ppm Max.}$ Resistance Change (电阻变化): 10kohm Max.
Reflow soldering (回流焊)		After 24h past from frequency test, 频率测试 24h 后, Frequency Change ((频率变化)): $\pm 10\text{ppm Max.}$ Resistance Change: $\pm 25\%$ or 10kohm Max. 电阻变化: $\pm 25\%$ 或最大 10kohm Notice (请注意): 1、Using the infrared lamp at soldering process may cause uneven temperature rise on plastic surface of the parts. So that. Please keep the temperature within the allowable range 在焊接时使用红外线灯可能会导致零件塑料表面温度升高不均匀, 请将温度控制在允许范围以内。 2、DO NOT dip the plastic part into solder 不要将塑料部分浸入焊料中



11、Handling Notice for Standard Tuning Fork Crystal 标准音叉类晶振注意事项

11.1. 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。

11.2. Heat and humidity resistance in storage 储存中的耐湿热性

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。

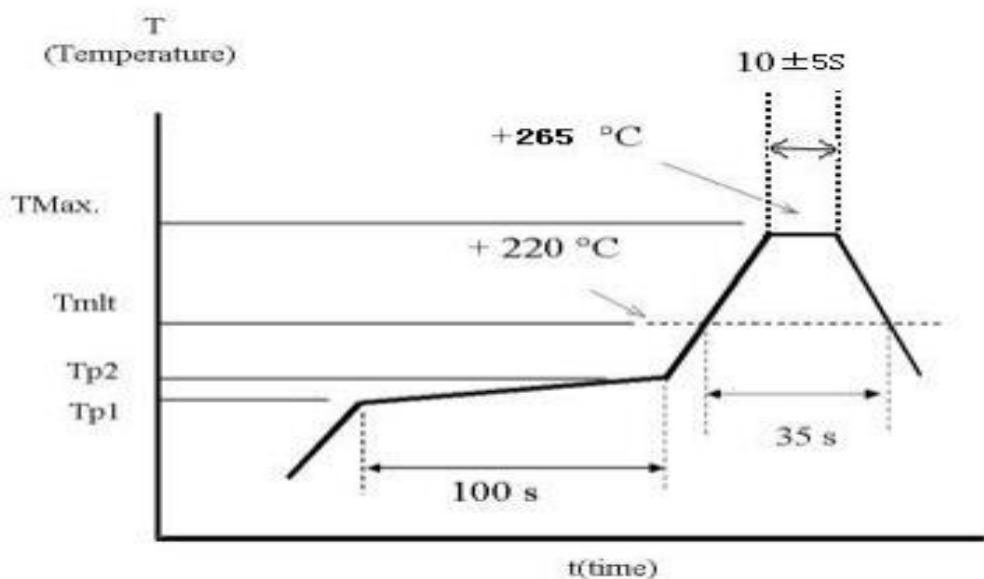
11.3. Reflow soldering 回流焊

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

请查阅有关流动焊接工艺的条件或咨询我们。

Our soldering condition is under 265°C within 15sec.

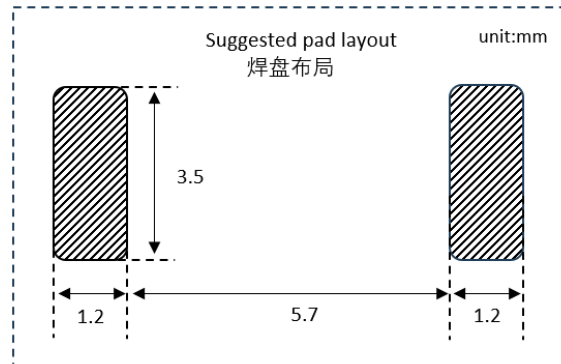
我们的焊接条件：最高 265°C，时间 15 秒内。



11.4 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. Recommended size of solder plate as shown below.

当需要放置晶振时，请将其牢牢固定在 PCB 上，推荐焊盘尺寸如下图；



11.5 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.

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。

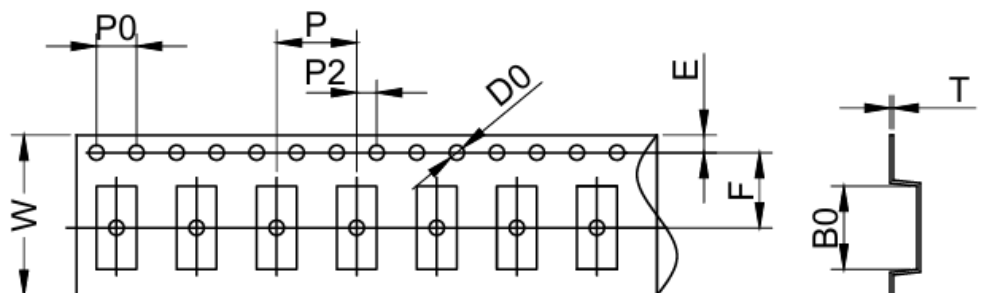
11.6. Drive level 激励功率

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

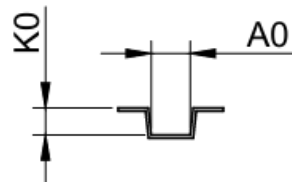
对晶体施加较大的激励功率会导致晶体的性能恶化或者损坏。我司推荐晶体激励功率小于 1.0 μ W，超过 2.0 μ W 激励功率，我司无法保证晶体品质稳定。

12、Packing (包装)

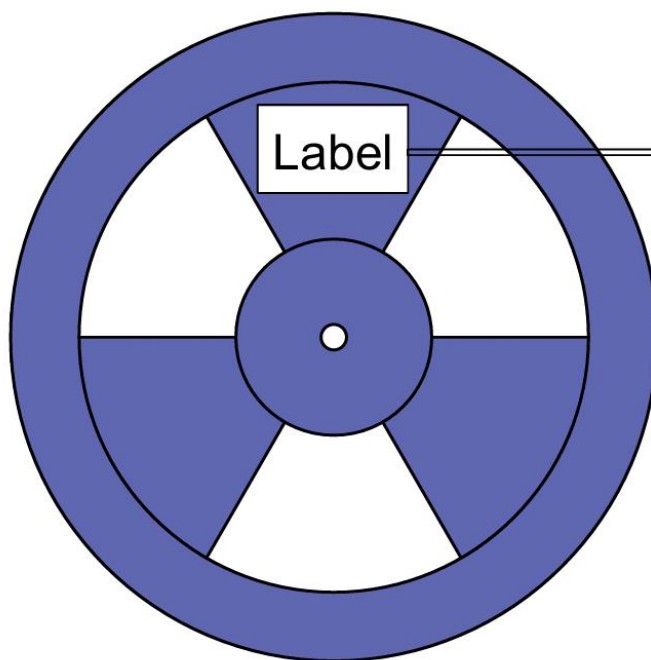
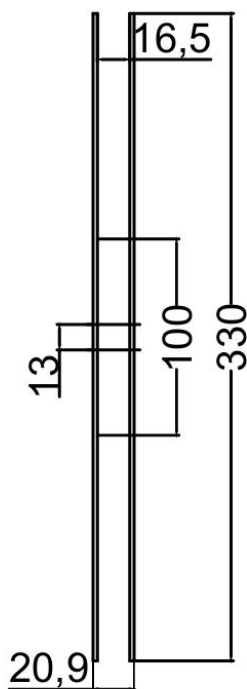
12.1 CARRIER TYPE (载体类型) (UNIT: mm)



Symbol	Spec	Symbol	Spec
W	16.00±0.3	A0	3.90+0.1/-0
E	1.75±0.1	B0	8.30+0.1/-0
F	7.50±0.1	K0	2.70+0.1/-0
D0	1.50±0.1		
P	8.00±0.1		
P0	4.00±0.1		
P2	2.00±0.1		
T	0.30±0.05		



12.2 REEL (卷数): 3000 PCS



TKD	泰晶科技
品名	
规格	
数量	
日期	
检验	
印字	