



STANDARD SPECIFICATION

管理号: D-01

产品规格书

客户 Customer:

客户料号 Customer P/N NO.:

产品描述 Product Description: M6-32.768-12.5-20

TKD 料号 TKD P/N. NO.: CS12K032768ADCBGE

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

批准 APPROVED	审核 CHECK	制作 DESIGNER
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REV.	Description of Revision History 版本修定记录	Date 时间	Engineer 工程师	Reviewer 审核人
A	The latest revision 最新修订	2023 年 10 月 30 日	JIN LONG TENG 金龙腾	LIU LI 刘莉



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 (振荡模式): 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)	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Operating Temperature Range (工作温度范围)	Topt	-40		85	°C	
Storage Temperature Range (物料储存温度范围)	Tstg	-55		125	°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)	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Tolerance (公差)	dF/Fo	-20		20	ppm	Refer to Center Frequency@25±3°C
Stability Over Temperature (温度稳定性)	dF/F25		-0.036		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)

[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			65	KΩ	@Series
Shunt Capacitance (分流电容)	C0			3	pF	
Insulation Resistance (绝缘电阻)	IR	500			MΩ	@DC 100 Volt, Between terminal # 1 and terminal # 4 在 1#和 4#终端之间

7. Wording (印字): Laser (激光)

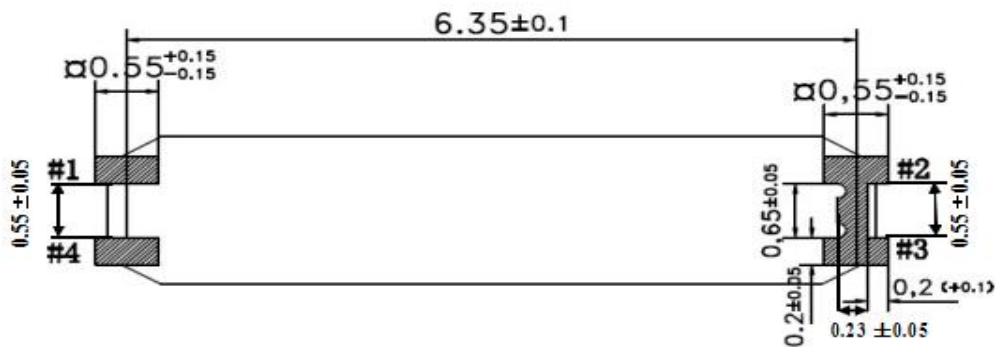
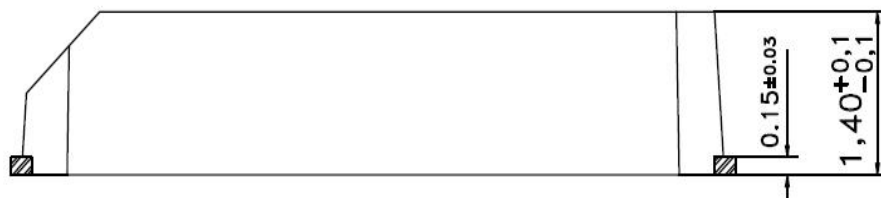
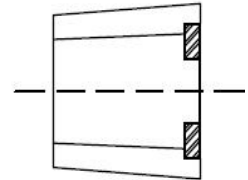
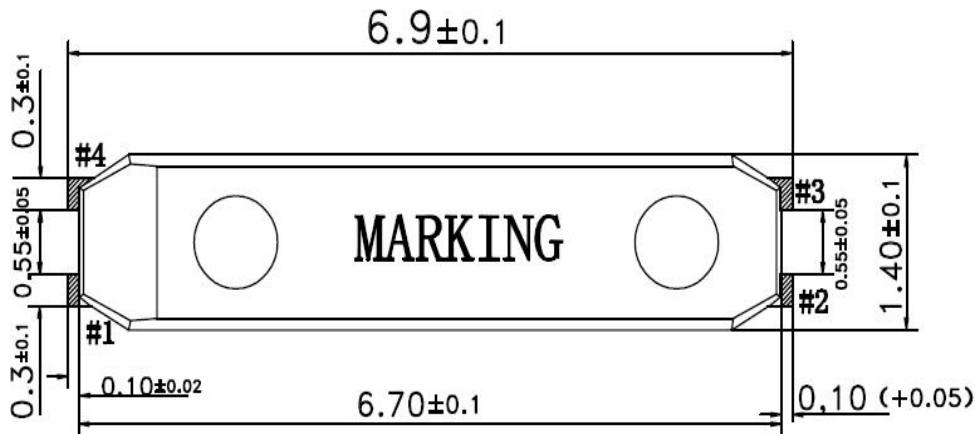
Marking Generally 32.768. Refer to with Customer' s requirement.通常标记为 32.768

请参考客户要求

32.768

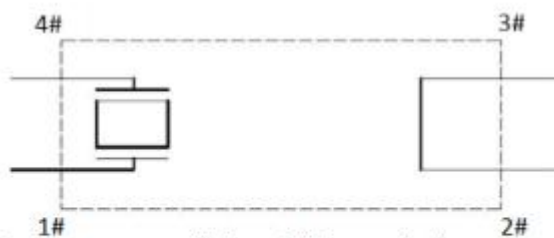
8. Outline drawing (外形图) (unit: mm)

8.1 Dimension (尺寸)

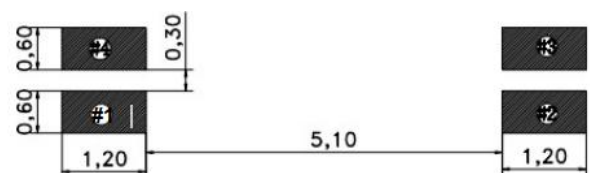


Internal connection

Recommended soldering pattern

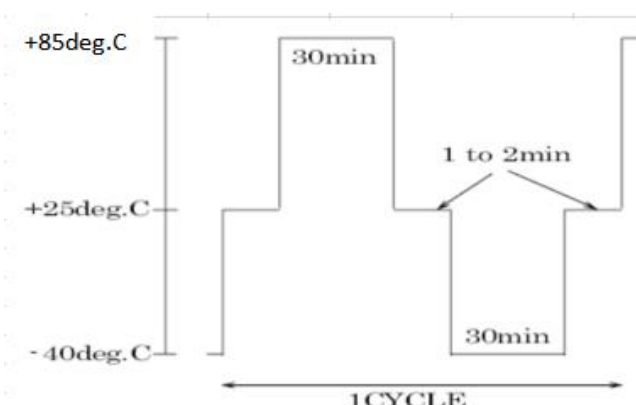


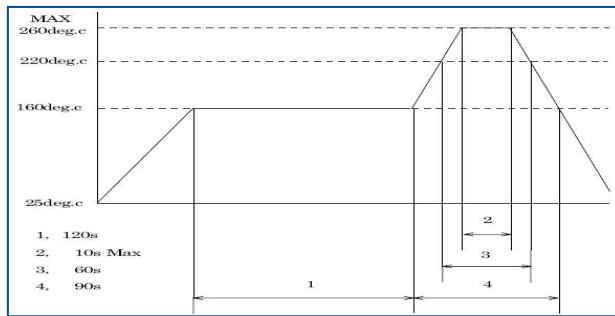
Do not connect #2 and #3 terminals to any external circuits (including GND). 不要将 #2和 #3端子连接到任何外部电路 (包括GND)。





9. 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): ± 10 ppm Max. Resistance Change (电阻变化): 10kohm Max.
Shock (跌落冲击试验)	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): ± 10 ppm Max. Resistance Change (电阻变化): 15kohm Max.
Hermetic seal (气密性测试)	Helium leak detector Checked:before the molded crystal units	less than 1×10^{-7} mbar.l/sec.
Weldability (可焊性)	Dip the leads of crystal units into the solution (7-10%) of rosin 3 ± 1 s, then dip into tank $5 \sim 10$ S. Temperature of solder melted tank is $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 将晶体单元的引线浸入松香的溶液(7-10%)中 3 ± 1 s, 然后浸入焊锡至引线根部 $2 \sim 3$ mm 处, 5 ± 1 S 后提起。 焊料熔化罐的温度: $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$	The dipped surface of the leads should be at least 95% covered with continuous new solder coating 引脚的浸涂表面应至少覆盖 95% 的连续新焊料涂层。
High temperature (高温测试)	96 hours at $125^{\circ}\text{C} \pm 2^{\circ}\text{C}$ (置于 $125^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 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): ± 20 ppm Max. Resistance Change (电阻变化): 10kohm Max.
Low temperature (低温测试)	96 hours at $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ (置于 $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 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): ± 10 ppm Max. Resistance Change (电阻变化): 10kohm Max.
High temperature and humidity (高温高湿)	96 hours at $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$, relative humidity 90-100% (置于 $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 下 96 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): ± 20 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): ± 10 ppm Max. Resistance Change (电阻变化): 10kohm Max.

Reflow soldering
(回流焊)

After 24h past from frequency test,
Frequency Change: ± 20 ppm Max.
Resistance Change: 20kohm Max.

Notice:

- 1、Using the infrared lamp at soldering process may cause uneven temperature rise on plastic surface of the parts, so that please keep the package temperature within left conditions.
- 2、DO NOT dip the plastic part into solder

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。

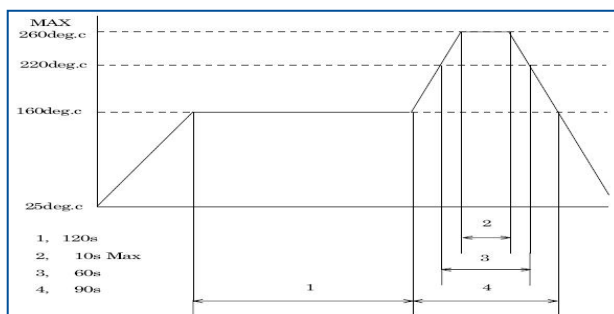
10.3. Solder heat resistance 焊锡耐热性

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 260°C within 10sec

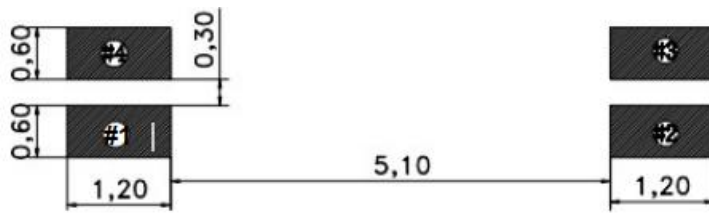
我们的焊接条件为低于 260°C 时间不超过 10 秒。



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. Recommended size of solder plate as shown below.

当需要放置晶振时，请将其固定在 PCB 上，推荐焊盘尺寸如下图；



10.5 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. 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。

10.6. Drive level 激励功率

Applying excessive drive level to the crystal units may cause deterioration of characteristics or damage. Less than $1.0\mu\text{W}$ is recommended to this products. More than $2.0\mu\text{W}$ 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 $1.0\mu\text{W}$ ，超过 $2.0\mu\text{W}$ 激励功率我司无法保证晶体品质稳定。

10.7. Solder paste should be more than $150\mu\text{m}$ thickness.

焊膏厚度应不低于 $150\mu\text{m}$ 。

10.8. Storage environment

储存环境

10.8.1 To storage the reel at $+15^{\circ}\text{C}$ to $+35^{\circ}\text{C}$, 25%RH to 65%RH of Humidity.

温度 $+15^{\circ}\text{C} \sim +35^{\circ}\text{C}$ ，湿度 25%Rh~65%Rh 的环境下储存物料。

10.9.2 To open the packing just before using.

使用前请打开包装；

10.9.3 Not to expose the sun.

请勿暴晒

10.9.4 Not to storage with some erosive chemicals.

请勿与腐蚀化学物质储存在一起。

10.9.5 Nothing is allowed to put on the reel or carton to prevent mechanical damage.

为了防止机械损坏，禁止将任何东西放在料盘或纸箱上。

11. Packing Description (包装)

