



深圳市晶光华电子有限公司
ShenZhen JingGuangHua Electronic Co., Ltd



SPECIFICATION FOR APPROVAL

承 认 书

客户名称Customer : _____

货 名Description : SMD 3215 (TUNING FORK) 音叉石英晶体谐振器

客户料号Part No : _____

物料编号Code No: S3132768092070

频 率Frequency : 32.768KHZ

日 期Date: 2023-05-24

备 注Note: RoHS compliance with Directive (EU) 2015/863

制作(Prepare by)	检查(Check by)	批准 (Approve by)
吴爱国	甘 瑛	邓 攀

客户批准 Approve by customer	
批准日期 Approval date	

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Add: 7 P Sangda Yayuan Huafa North Road, Futian District, Shenzhen, Guangdong

Sales Tel: 86-755-83048260 ; Fax: 86-755-83048280 ; Url: www.jghcorp.com



规范修订记录表 SPECIFICATION REVISION RECORD SHEET

修改版本 Revise	修改页面 Revise page	修改内容 Revise Contents	修改时间 Revise Date	修改记录 Revise No.	修改人 Revision Person
C/0	N/A	最新版本 latest version	2023年4月28日	最新版本 latest version	WuAiGuo

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1. 产品描述 PRODUCT DESCRIPTION

1.1 标准大气条件 Standard atmospheric conditions

除非另有规定。进行测量和试验的大气条件的标准范围如下：

Unless otherwise specified. The standard range of atmospheric conditions for which measurements and tests are carried out is as follows:

环境温度 Ambient temperature: $25 \pm 2^{\circ}\text{C}$

相对湿度 Relative humidity: 40%~70%

1.2 电性能指标 Electrical specifications

编号 NO.	项目 Item	代 码 Symbol	电 气 参 数Electrical Spec				备 注 Notes
			下限 MIN	中心 TYPE	上限 MAX	单位 UNITS	
1	规格型号Holder Type		SMD 3215				
2	标称频率 Nominal Frequency	FL	32.768			KHZ	
3	负载电容Load Capacitance	CL	9			pF	
4	调整频差Frequency Tolerance at 25℃		-20		+20	ppm	At 25℃±2℃
5	静 电 容 Shunt capacitance	C0	-	-	5	pF	
6	等效电阻Equivalent Series Resistance	ESR	-	-	70	KΩ	
7	激励功率Drive Level	DL		0.1	1.0	μw	
8	温度频差 Temperature Frequency Stability	TC	-0.02		-0.04	ppm/℃²	Over Operating Temp. Range (Reference 25℃)
9	工作温度 Operating Temperature Range		-40		+85	℃	
10	贮存温度Storage Temperature Range		-40		+125	℃	
11	绝缘阻抗 Insulation Resistance	IR	500	-	-	MΩ	At DC 100V±15V
12	年老化率 Aging		-3		+3		1st Year
13	静 电 容 Shunt capacitance	C0		1.1		pF	
14	动态电容 Motional Capacitance	C1		4.1		fF	
15	测试仪器 Test machine		S&A 250B				
16	湿气敏感性等级 Moisture Sensitivity Level MSL		LEVEL 1				
17	印字 Marking	T Y(年份) WW（国际循环周）#（负载）					

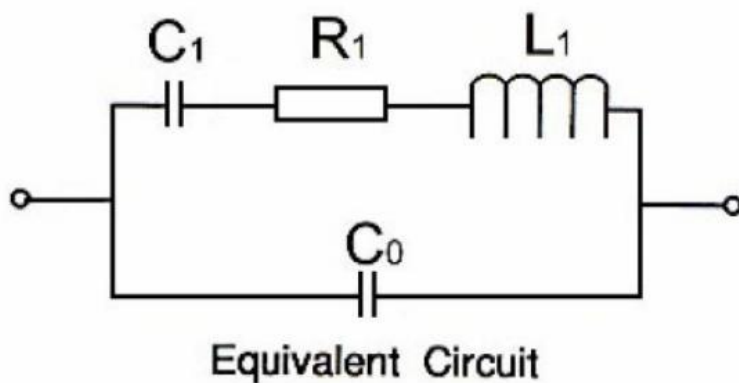
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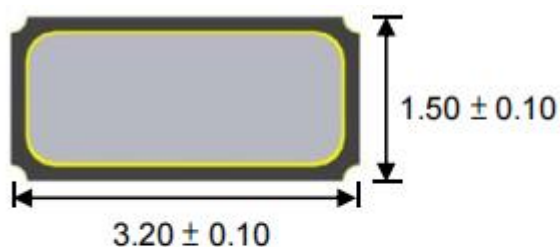


2. 等效电路图 EQUIVALENT CIRCUIT

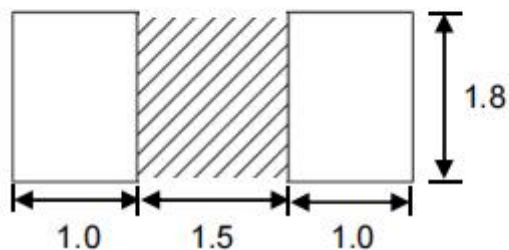
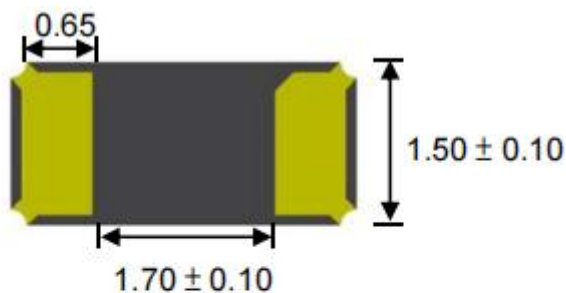


3. 产品图纸 DIMENSIONS (Unit:mm)

3.1 尺寸 Dimension



3.2 推荐的焊盘 Recommended Solder Pad



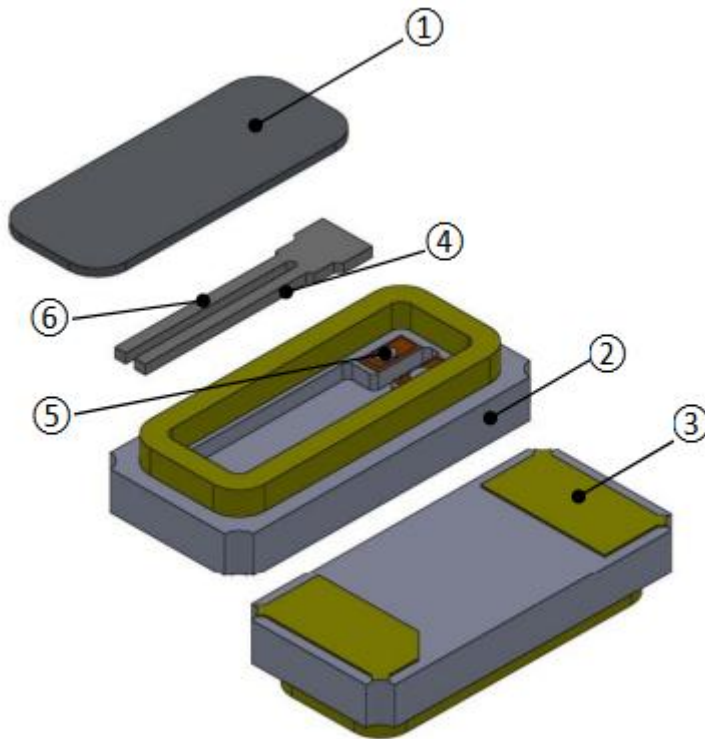
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4. 内部结构产品图纸 INSIDE STRUCTURE



编号 NO.	组件 COMPONENTS	材料成份 MATERIALS
1	上盖 Lid	KV 合金 Kovar(Fe/Co/Ni)
2	基座 Base(Package)	陶瓷 Ceramic (Al ₂ O ₃)
3	焊接区 PAD(Package)	金 Au
4	水晶片 Crystal Blank	二氧化硅 SiO ₂
5	导电胶 Conductive Adhesive	树脂、银粉 Resin、Ag
6	电极 Electrode	贵金属(银) Noble Metal (Ag)

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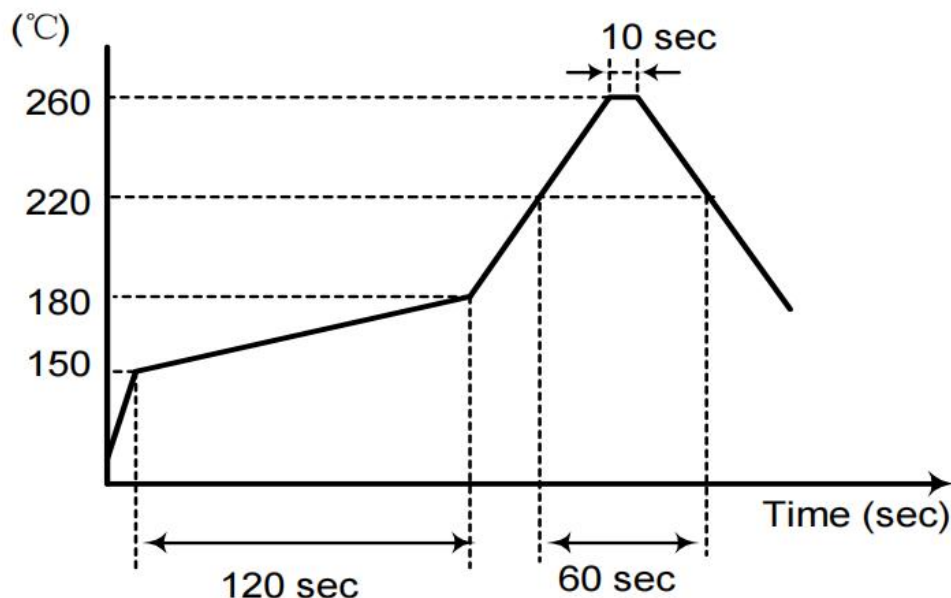
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5. 回流焊温度曲线 SUGGESTED REFLOW PROFILE

Solder melting point : $220\pm 10^{\circ}\text{C}$, 60 sec. Min.

Peak Temperature: $260\pm 5^{\circ}\text{C}$, 10 sec. Max.



备注 Notes:

1. 超声波清洗 Ultrasonic cleaning

一般的清洁液或超声波清洗方法可以用来清洗我们的产品。但是，在某些情况下，超声波清洗机在我们产品的振荡频率上会产生共振，从而使器件的电气特性恶化，甚至损坏器件的整体结构。因此，建议超声波清洗前进行验证测试。

General cleaning solutions or ultrasonic cleaning method may be used to clean our products. However, under certain circumstances, ultrasonic cleaning machine could generate resonance at the oscillation frequency of our products and thus deteriorate the electrical characteristics in devices, and even damage the overall structure of devices. Therefore, verification test is recommended before cleaning.

2. 超声波焊接 Ultrasonic welding

避免使用超声波焊接进行安装和加工，这种方法有可能使晶体产品内部产生过大的振动扩散，成为特性退化而不振动的的原因。

Avoid mounting and processing by Ultrasonic welding this method has a possibility of an excessive vibration spreading inside the crystal products and becoming the cause of characteristic deterioration and not oscillating.

3. 储存温度说明 Storage temperature description

储存温度仅适用于产品，而包装材料储存温度 $5^{\circ}\text{C}\sim 40^{\circ}\text{C}$ 。

Storage Temperature is only for the product itself, the temperature for the packing material is $5^{\circ}\text{C}\sim 40^{\circ}\text{C}$.

4. 手工焊建议条件 Recommended conditions for manual welding

温度: $350\pm 10^{\circ}\text{C}$ 、时间: 3 秒 Max、次数: 2 次 Max、

Temperature: $350\pm 10^{\circ}\text{C}$ 、Time: 3 sec max、Re-solder times: twice max.

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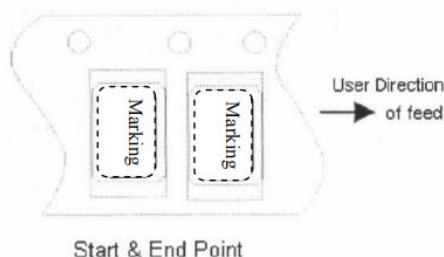
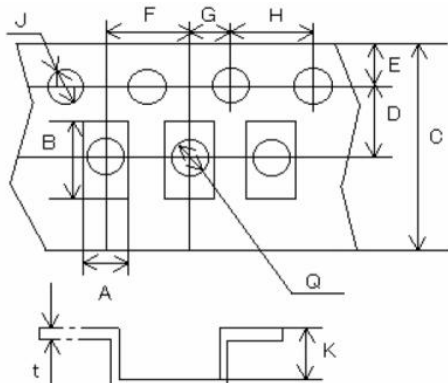
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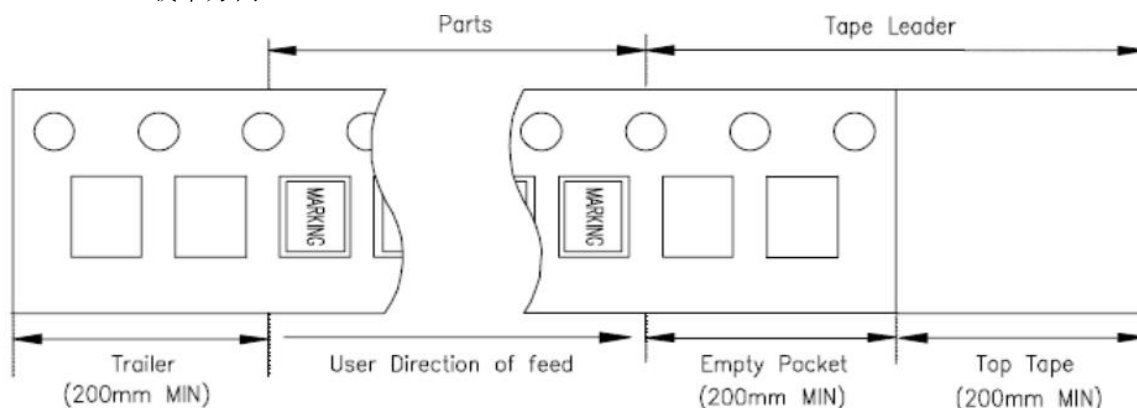
6. 包装 PACKING(Units:mm)

1.1 载带 TAPE (CARRIER) DIMENSIONS

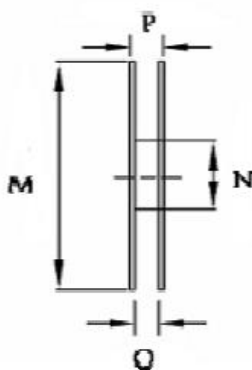
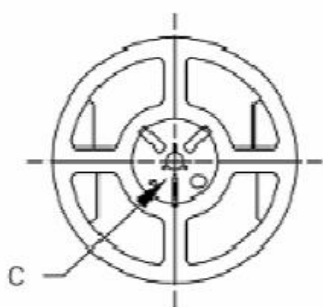


A	B	C	D	E	F	G	H	J	K	t
1.75	3.45	12.0	5.5	1.75	4.0	2.0	4.0	1.5	1.0	0.25

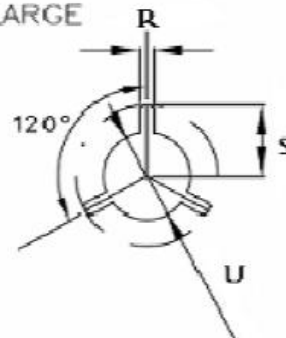
1.2 载带方向 THE DIRECTION OF PACKING



1.3 圆盘 REEL DIMENSIONS(3000 PCS/Reel)



C.ENLARGE



M	N	P	Q	R	S	U
180	60	15.4	13.0	2.5	10.5	13.0

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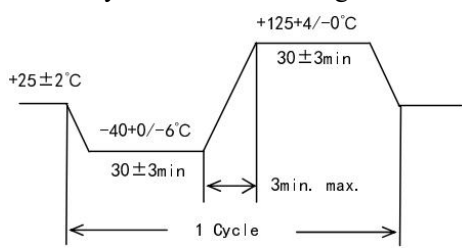
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7. 可靠性试验 RELIABILITY SPECIFICATION

7.1 机械可靠性 MECHANICAL ENDURANCE

No.	试验项目 Test Item	测试条件 CONDITIONS	测试标准 Test Criteria
1	跌落 Drop Test	从100cm位置高度,自由跌落在木板上,连续3次 From a height of 100cm, free fall on the board for 3 consecutive times	B、 C
2	振动 Vibration	振动频率: 10~55 Hz, 振幅: 1.5mm±15%, 时间: 每个方位三面 (X、Y、Z) 各振动2小时 Frequency: 10~55Hz Amplitude (total excursion): 1.5mm±15%, Sweep time: Each azimuth three sides (X, Y, Z) vibrate for 2 hours	A 、 C
3	冷热冲击 Temperature Cycle	冷热冲击共100次循环 Total 100 cycles of the following Thermal Shock : 	A、 C 、 G
4	气密性(微漏) Fine Leak	氦气压力标准: 5.0~5.5Kg/cm ² , 加压时间: 2 小时 Helium bombing 5.0~5.5 Kgf / cm ² , For 2 Hours	E
5	可焊性 Solderability	温度: 260±5℃, 浸锡时间: 2±0.6 秒 Temperature: 260±5℃, Immersion time: 2±0.6 Sec .	F
6	耐焊接热性 Welding Heat Resistance	过回流焊, 最高温度: 260℃±5℃, 时间: 10±1Sec, 常温(25±2℃)放置4小时, 测量仪器: 250B Reflow welding, Max Temperature: 260℃±5℃, time: 10±1Sec, Ambient temperature(25±2℃)for 4 hours, Test machine: S&A250B	B、 C 、 D
7	高温度存储 High Temp Storage	高温温度: 125±3℃, 时间: 500±12 个小时 High Temp: + 125 °C ± 3 °C , Time: 500 ± 12 Hrs	A、 C、 G
8	高温高湿 High Temp & Humidity	温度: 85±3℃, 湿度: 85%, 保持时间: 500个小时 Temperature : 85°C ± 3°C , RH: 85% , Holding time: 500 Hrs	A、 C、 D、 G
9	低温存储 Low Temperature	低温温度: -40±3℃, 时间: 500±12 个小时 Low Temp: -40±3°C, Time: 500±12Hrs. 如果客户的温度要求是低于标准,则必须根据客户的要求测试 If the customer's temperature requirement is below standard, it must be tested according to the customer's requiremen	A、 C、 G
9	折板弯曲试验 Board Flex	持续时间: 60秒, 偏差: 3mm Duration Time: 60 sec, Deviation: 3mm	H

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7.2 可靠性规范 RELIABILITY SPECIFICATIONS

Specifications 规范	
A	频率变化:±10ppm以内或按客户要求 Frequency change: Within ±10ppm or in customer's specification.
B	频率变化:±20ppm以内或按客户要求 Frequency change: Within ±20ppm or in customer's specification.
C	等效串联电阻(E.S.R)变化:±20%以内或5KΩ(较大值)。 Equivalent series resistance(E.S.R) change: Within ±20% or 5KΩ(larger value).
D	绝缘电阻 Insulation resistance > 500MΩ
F	新的均匀的焊料涂层应覆盖至少95%的表面 A new uniform coating of solder shall cover a minmumt 95% of the surface
E	泄漏率小于 Leakage rate less than $<1*1E-9 \text{ Pa} \cdot \text{m}^3/\text{sec}$
G	实验完成后, 在常温(25±3℃)下静置超过2小时后测试 After conditioning , After standing at room temperature (25±3℃) for more than 2 hours, the test was carried out
H	焊接部位不剥落 No peeling-off at a soldered part

测量条件 Measurement condition

- ※ 每个测试独立完成 Each test done independently
- ※ 用S&A250B或同等仪器测量电气特性 Electrical characteristics measured by S&A250B or equivalent.

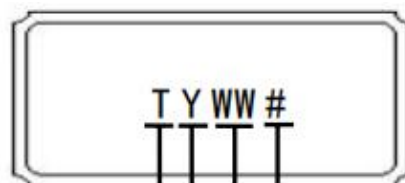
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8. 丝印说明 MARKING



: 负载
WW: 国际循环周
Y : Year code
T : 32.768KHZ

T : 32.768KHZ

Year : 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

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

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