SPECIFICATION FOR APPROVAL
规格书

NO 编号：LM20180605-13

CUSTOMER 客 户：佳世达

PRODUCT 产 品：CRYSTAL RESONATOR

P/N 料 号：8B.31200.70B

MODEL NO 型 号：49SMD1-12.000000-12-30-30U

PREPARED 编 制：王红传 CHECKED 审 核：张高磊

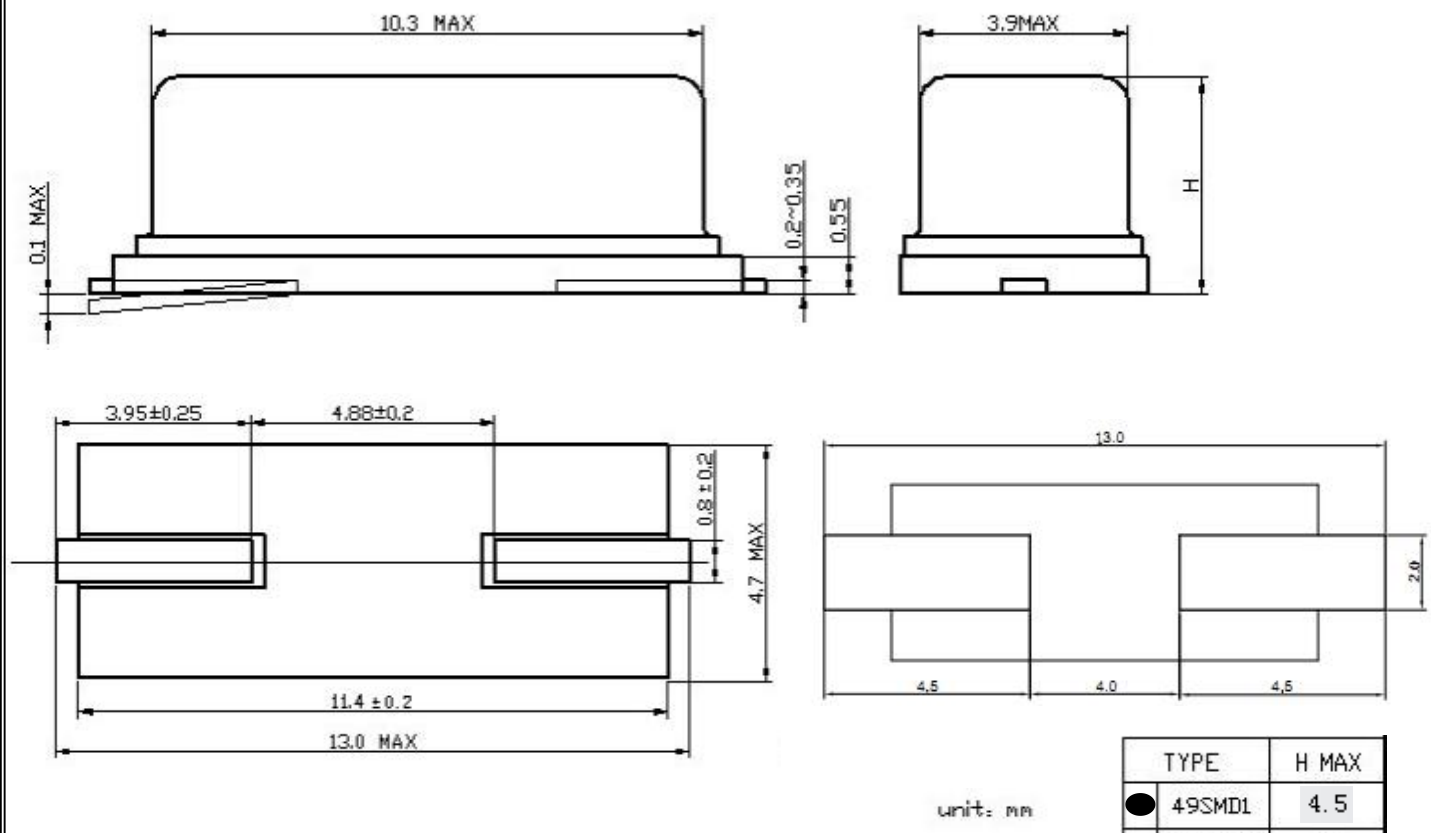
APPROVED 批 准：张俊鹏 D A T E 日 期：2018-06-05

CUSTOMER 客户确认意见：	
CHECKED 审 核：	
APPROVED 批 准：	
D A T E 日 期：	

GENERAL SPECIFICATIONS（电气特性）:

1.Holder type: （型号）	HC-49SMD1	
2.Normal Frequency: （标称频率）	12.000000 MHz	
3.Oscillation Mode: （振动模式）	AT-Fundamental	
4.Load Capacitance(CL): （负载电容）	12 PF ± 0.2PF	
5.Frequency Tolerance 25±3℃: （频率偏差 25±3℃）	± 30PPM	
6.Effective Series Resistance: （等效电阻）	≤ 40Ω	
7.DLD2 （不同功率下之最大与最小阻抗差值）	≤ 9Ω	0.01 uW~100 uW 10 steps
8.RLD2 （不同功率下之最大阻抗值）	≤ 40Ω	0.01 uW~100 uW 10 steps
9.FDLD (不同功率下之最大与最小 FR 差值)	≤ 8 PPM	0.01 uW~100 uW 10 steps
10.Shunt Capacitance(C0): （静态电容）	≤ 7 PF	
11. Typical drive level: （激励功率）	0.01 ~100 uW	
12.Operation Temperature Range: （工作温度范围）	-10℃ to +70℃	
13.Stability Over Temperature Range: （工作温度频率偏差）	±30 PPM at -10℃ to+70℃	
14.Insulation Resistance:（绝缘阻抗）	≥500 MΩ at DC 100V	
15.Aging:（老化率）	±5 PPM/Year	
16.Storage Temperature:（存储温度）	-50℃ to +105℃	
17.Test circuit（测试仪器）	S&A 250B Pi-Network Crystal Measurement System	
Remark（备注）:		

DIMENSIONS SPECIFICATIONS（外形尺寸）



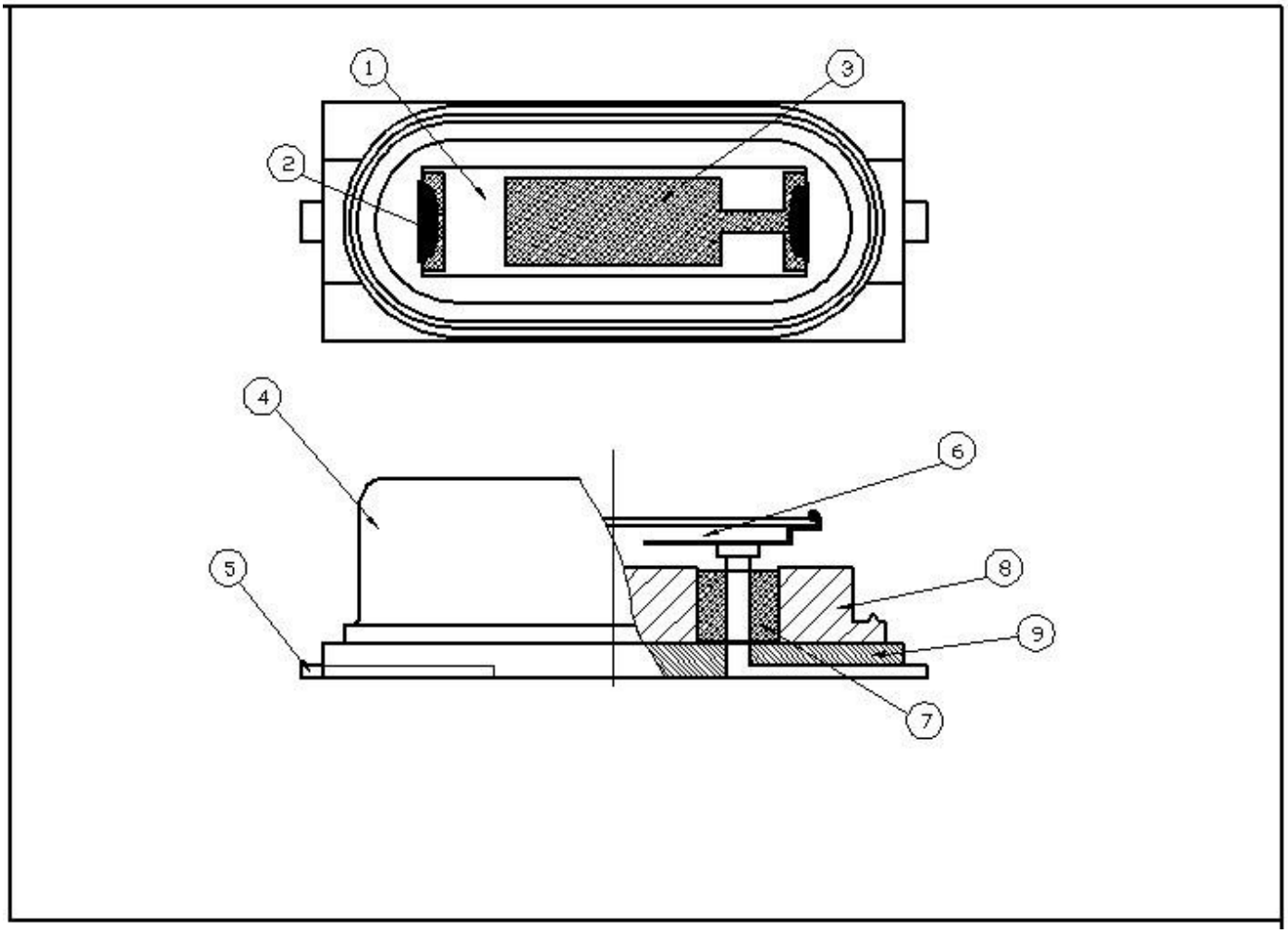
unit: mm

TYPE	H MAX
49SMD1	4.5
49SMD2	3.2
49SMD3	3.0
49SMD4	2.7

LASER MARKING（激光印字）

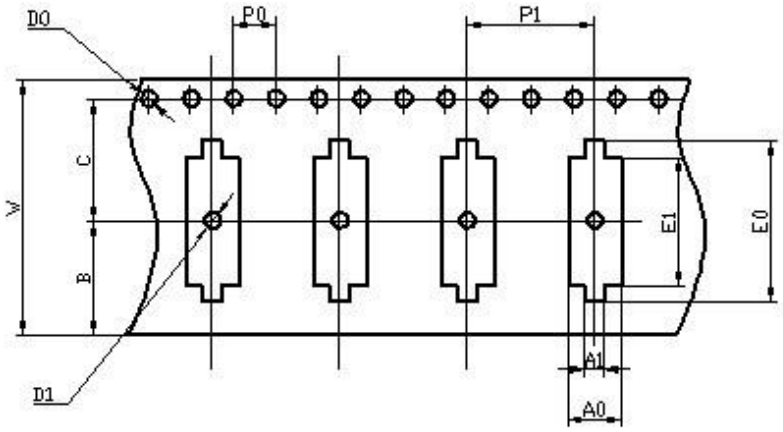
LM12.000

Report of bills of materials and suppliers（物料清单及供应商）



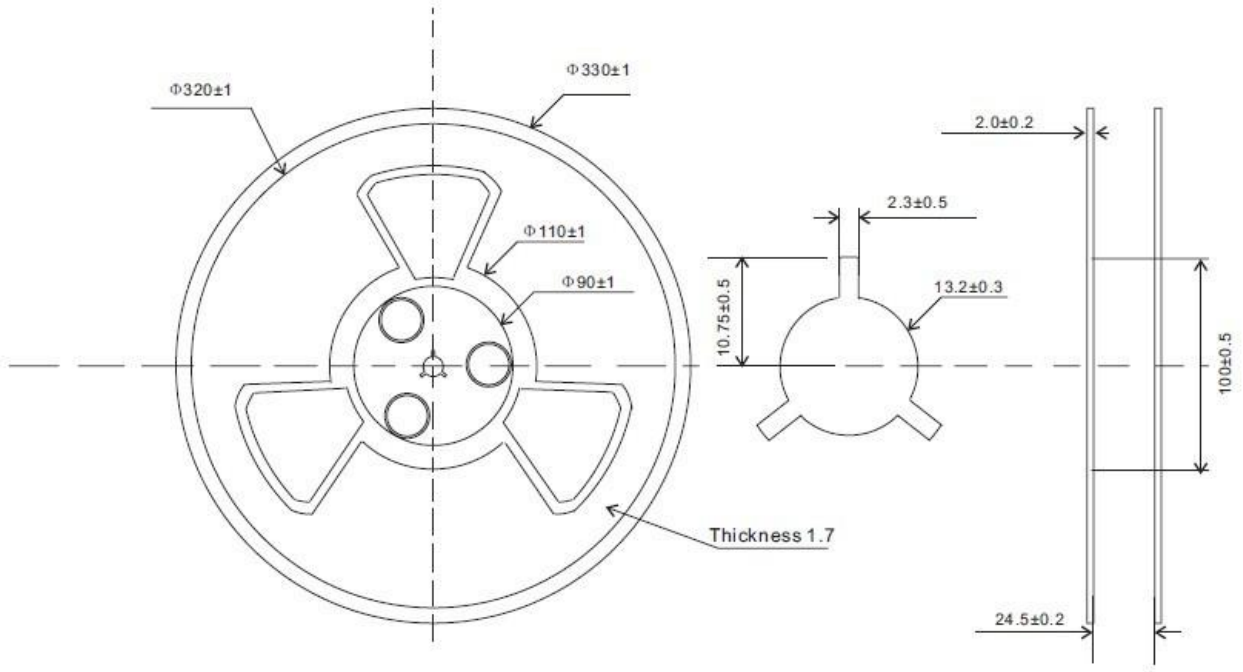
NO.	Product name 部件名称	QTY 数量	Supplier 供应商
1	Blank 晶片	1	DeYangHuiYuan 德阳惠源
2	Silver paste 导电胶	2	THREE BOND 三键
3	Silver 电极	2	GuangYang 光洋
4	Cover 外壳	1	TongLingJingSai 铜陵晶赛
5	Lead 引线	2	RiZhaoRongDa 日照荣达
6	Pin 簧片	2	RiZhaoRongDa 日照荣达
7	GLASS 玻璃珠	2	RiZhaoRongDa 日照荣达
8	Base 底板	1	RiZhaoRongDa 日照荣达
9	Insulation 垫片	1	TeFuLong 特富隆

Carrier rype（载带类型）



	Symbol / Dimensions	A0	A1	B	C	D0	D1	E0	E1	K	P0	P1	T	W
	P8-4.35	5.0 ±0.1	1.8 ±0.1	10.7 ±0.2	11.5 ±0.2	Φ1.5 ±0.1	Φ1.5 ±0.1	15.0 ±0.1	12.0 ±0.2	4.35 ±0.1	4.0 ±0.1	8 ±0.1	0.4 ±0.05	24 ±0.5
	P8-3.40	5.0 ±0.1	1.8 ±0.1	10.7 ±0.2	11.5 ±0.2	Φ1.5 ±0.1	Φ1.5 ±0.1	15.0 ±0.1	12.0 ±0.2	3.40 ±0.1	4.0 ±0.1	8 ±0.1	0.4 ±0.05	24 ±0.5
●	P12-4.35	5.0 ±0.1	1.8 ±0.1	10.7 ±0.2	11.5 ±0.2	Φ1.5 ±0.1	Φ1.5 ±0.1	15.0 ±0.1	12.0 ±0.2	4.35 ±0.1	4.0 ±0.1	12 ±0.1	0.4 ±0.05	24 ±0.5
	P12-3.40	5.0 ±0.1	1.8 ±0.1	10.7 ±0.2	11.5 ±0.2	Φ1.5 ±0.1	Φ1.5 ±0.1	15.0 ±0.1	12.0 ±0.2	3.40 ±0.1	4.0 ±0.1	12 ±0.1	0.4 ±0.05	24 ±0.5

Reel（载盘）



PACKING METHOD(包装样式）

1、Packed 1000 pcs in per reel.

1000pcs一卷盘

2、Packed 1 reel in 1 box,Size of carton:340mm*335mm*35mm

1卷盘装一盒，纸盒尺寸：340mm*335mm*35mm

3、Packed 10 box in 1 carton

10盒一箱

4、There are 10000 pcs in 1 carton

总计10000pcs 一箱

5、Size of carton:360mm*360mm*410mm

外箱尺寸：360mm*360mm*410mm

6、Label mode

标签样式

A: Part NO.

B: Holder Type

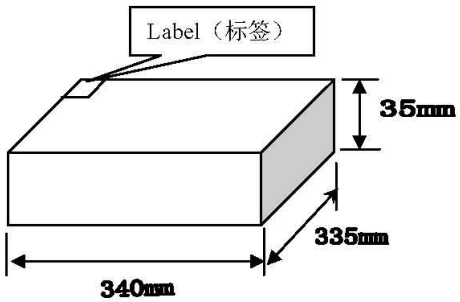
C: Frequency

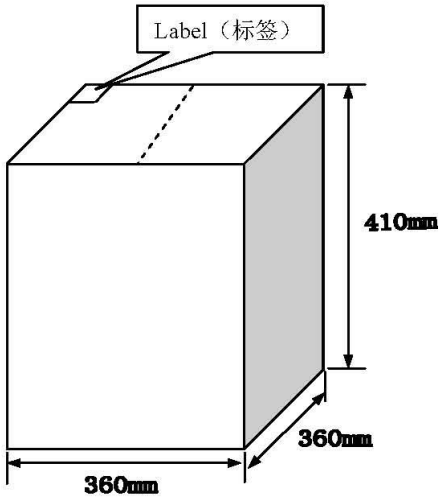
D: CL

E: △f1/f0

F: ESR

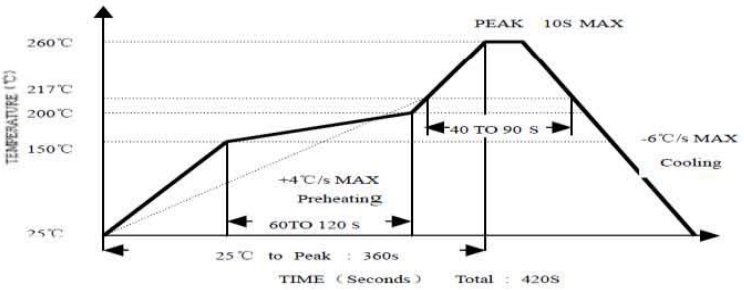
G: Quantity





RELIABILITY SPECIFICATIONS 可靠性测试标准

<table>
<tr><th>NO.</th><th>ITEMS
项目</th><th>CONDITIONS
条件</th><th>SPECIFICATION 规格</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Lead Bend
端子强度</td><td>a)Pulling：According to experiment of IEC 68-2-21 Ua1 experiment,pull 10N.</td><td rowspan="4">B</td></tr>
<tr><td>a)拉力：按IEC 68-2-21中试验Ua1进行，拉力10N。</td></tr>
<tr><td>b)Bending:According to experiment of IEC 68-2-21 method Ub.Add the burthen of 5N to lead,and 2.5±0.5mm refer to the base for 3 times .</td></tr>
<tr><td>b)弯曲强度：按IEC 68-2-21中试验Ub进行，负荷应限制在距晶体元件本体2.5±0.5mm处开始弯曲，所加质量负荷为5N，弯曲次数为3次。</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Solderability
可焊性</td><td>According to experiment of IEC 68-2-20 Ta method 1 ,Solder temperature is 235℃.</td><td rowspan="2">C</td></tr>
<tr><td>按IEC 68-2-20中试验Ta的方法1进行， 焊接温度235℃。</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Solder heat resistance
耐焊接热</td><td>According to experiment of IEC 68-2-20 method Tb 1A:solder slit method.Solder temperature:260±5℃,dip time 5±1s。</td><td rowspan="2">A</td></tr>
<tr><td>按IEC 68-2-20试验Tb方法1A：焊锡槽方法进行。
焊接温度：260±5℃，浸入时间：5±1秒。</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">Vibration
耐振性</td><td>According to experiment of 68-2-6 method Fc ,The entire frequency range,from 10Hz to 55Hz and return to 10Hz,and shall be transferred in 1 min.Amplitude(total excursion):1.5mm Durtion=2 hours for each of the main axes(x,y,z).</td><td rowspan="2">A</td></tr>
<tr><td>按IEC 68-2-6试验Fc进行，振动频率在1分钟内从10～55Hz，再回到10Hz，振幅1.5mm，X、Y、Z三个方向各2小时。</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Shock
耐冲击性</td><td>According to experiment of IEC 68-2-27 method Ea,the biggest acceleration :981m/s2(100g),work time :6ms,and 6 surfaces , and 3 directions for each surface,and shall be Shocked 18 times in total.</td><td rowspan="2">AB</td></tr>
<tr><td>按IEC 68-2-27试验Ea进行，最大加速度：981m/s2（100g),作用时间：6ms，6面，每面三个方向，共18次。</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Cold
耐寒性</td><td>According to experiment of IEC 68-2-1 method Aa, The quartz crystal unit should be stored at a temperature -40±3℃ for 2 hours,and then it shall be subjected to standard atmospheric conditions for 1 hour,after which measurement shall be made.</td><td rowspan="2">A</td></tr>
<tr><td>按IEC 68-2-1试验Aa进行，晶体在温度-40±3℃中放置2小时后，在常温常湿状态下放置1小时后测试。</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Dry Heat
干 热</td><td>According to experiment of IEC 68-2-2 Ba,quartz crystal unit should be stored at a temperature 85±2℃ for 16 hours.Then it shall be subjected to standard atmospheric conditions for 1 hour ,after which measurement shall be made.</td><td rowspan="2">A</td></tr>
<tr><td>按IEC 68-2-2试验Ba进行，晶体在温度85±2℃中放置16小时后，在常温常湿状态下放置1小时后测试。</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">High heat and high humidity 稳态湿热</td><td>According to experiment of IEC 68-2-3 method Ca,quartz crystal unit shoud be stored at a temperature 40±2℃ and at humidity 90~95% for 96 hours.Then it shall be subjected to standard atmospheric conditions for 1 hour.</td><td rowspan="2">A</td></tr>
<tr><td>按IEC 68-2-3试验Ca进行，晶体在温度40±2℃，湿度90~95%中放置96小时后，在常温常湿状态下放置1小时后测试。</td></tr>
<tr><td rowspan="7">9</td><td rowspan="7">Temperature Cycling 温度变化</td><td>According to experiment of IEC 68-2-14 method Na,quartz crystal unit shall be made 5 temperature cycles ,and then it shall be subjetced to standard atmospheric conditions for 1 hour.</td><td rowspan="7">A</td></tr>
<tr><td>按IEC 68-2-14试验Na进行，晶体按下表做5个温度循环后，在常温常湿状态下放置1小时后测试。</td></tr>
<tr><td>
<table>
<tr><th></th><th>TEMPERATURE
温度</th><th>STORE TIME
放置时间</th></tr>
<tr><td>1</td><td>-40±3℃</td><td>30min</td></tr>
<tr><td>2</td><td>Normal Temp(常温)</td><td>30sec</td></tr>
<tr><td>3</td><td>100±3℃</td><td>30min</td></tr>
<tr><td>4</td><td>Normal Temp(常温)</td><td>30sec</td></tr>
</table>
</td></tr>
</table>

10	Drop 跌落	According to experiment of IEC 68-2-32 method Ed,quartz crystal unit shall be dropped from 75cm height on 3cm hard board for 3 times. 按IEC 68-2-32试验Ed进行，晶体从75厘米高度自由下落至3厘米硬木板，重复3次。	AB
11	Reflow 回流焊	Reflow soldering cure see the chart. 回流焊曲线见下图。 	A
12	Leakage 气密性	Alcohol press method:quartz crystal unit shall be immerged in the can,and pressed by0.5kg press for 30min;Then put away press ,and dry it.Quartz crystal unit shall be test insulation resistance by 100V volts d.c . 酒精加压法：晶体浸入酒精罐中，加压（压力0.5kg，时间30分钟）；撤去压力后，晾干晶体，测量引线与外壳之间绝缘电阻（100V直流电压）。	D
13	Aging 老化	Quartz crystal unit shall be stored at a temperature 85±2℃ for 720±12 hours(30days),and then it shall be subjected to standard atmospheric conditions for 1 hour. 晶体在温度85±2℃中放置720小时（30天）±12小时后，在常温常湿状态下放置1小时后测试。	A

Accept Level:
判定标准:

No.	specification 标准
A	Satisfying the electric characteristic; Frequency change is at the range of 5PPM and resistance change is at the range of 5Ω. 电气性能可满足要求：频率变化量在5ppm以内,电阻变化量在5Ω以内。
B	After each test,no visible damage shall be manifested,nor shall the hermetic seal break down 试验后，无机械损伤
C	Dipping in 3 sec.A new uniform coating of solder shall covera minimum of 95% of the surface being immersed. 浸锡时间3秒以内，引线挂锡面积95%以上。
D	Insulation resistance of leads shall be more than 500MΩ(100V DC). 端子之间的绝缘电阻≥500MΩ(100V DC)。