新品 变更

MDH2506004

产 品 规 格 书

SPECIFICATION FOR APPROVAL

产品名称 Product Name：	石英晶体谐振器 Quartz crystal unit
产品型号 Product Type：	SMD3225
标称频率 Nominal Freq：	13.521270 MHz
明德亨料号 MDH P/N：	2.3.3.135212003
客户料号 Customer P/N：	

客户承认
Approved By Customer

签章 日期
Signature： Date：

Date: 2025年6月5日

批准	审核	拟制
Accepted	Checked	Issued
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MSL:Level 1

RoHS Compliant

Revision Record

VER	修订页面 Rev.page	变更内容 Revise Contents	修改日期 Revise Date	修订者 Reviser
01	N/A	Initial released	N/A	Li Miaojun

CONTENT

N0.	ITEM	PAGE
1	石英晶体产品规格及特性 Product specification and features	4
2	石英晶体外观尺寸 Product outline dimension	5
3	石英晶体内部结构及印字 Product internal structure and marking	6
4	石英晶体之可靠性 Product reliability	7-9
5	生产商及产地说明 Manufacturer and origin	10

1 石英晶体产品规格及特性 / Product specification and features

1.1 电气特性 / Electrical Specifications

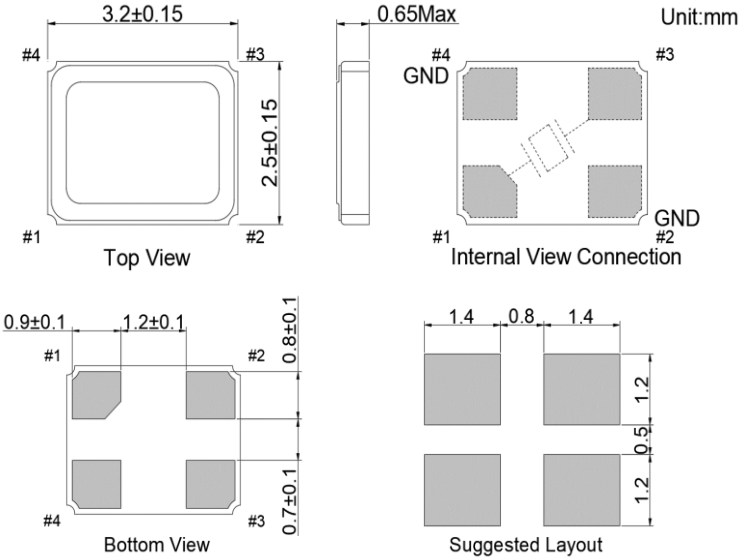
Electrical Characteristics measured by S&A250B or equivalent.

Parametars	Electrical spec.			Unit	Notes
	Min.	Typ.	Max.		
1.Frequency(FL)	13.521270			MHz	-
2.Mode of oscillation	Fundamental			-	-
3.Crystal Cutting Type	AT-CUT			-	-
4.Frequency tolerance (△F/F0)	-10	~	10	ppm	At 25℃±3℃
5.Loading capacitance(CL)	20			pF	-
6.Equivalent Series resistance (ESR)	-	-	70	Ω	-
7.Drive Level(DL)	0.01	100	150	uW	-
8.Storage temperature range	-55	~	125	℃	-
9.Operating temperature range	-40	~	85	℃	Ref. to 25℃
10.Temperature stability (over operating temperature)	-20	~	20	ppm	Ref. to 25℃
11.Shunt Capacitance(C0)	-	-	3	pF	-
12.RLD2	-	-	70	Ω	-
13.Aging	-	±3	-	ppm/Year	1st Year
14.SPDB	-	-	-6	dB	-200 ~ +400kHz / 20points
15.Insulation Resistance	500	-	-	MΩ	At DC 100±15V

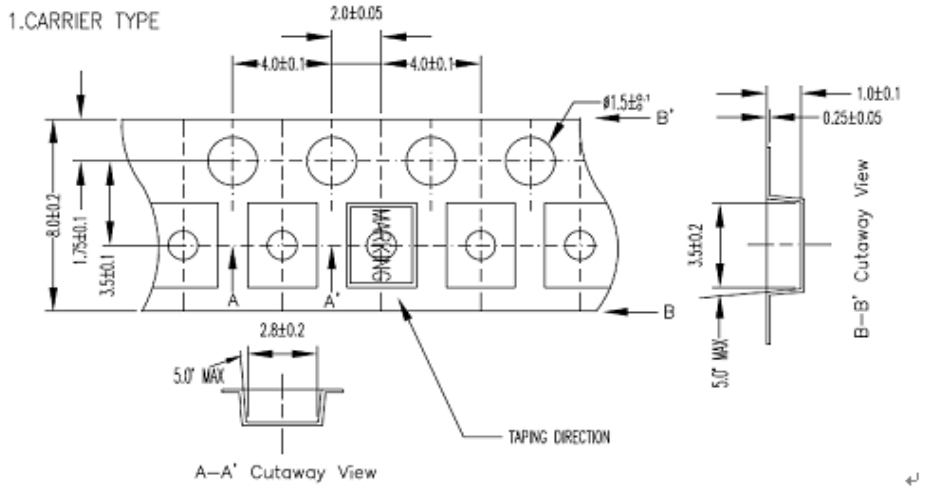
NOTE:Storage Temperature is only for the product itself,the temperature for the packing material is 5~35°C.

2.0 外形尺寸、外观 / Outline dimensions、Appearances

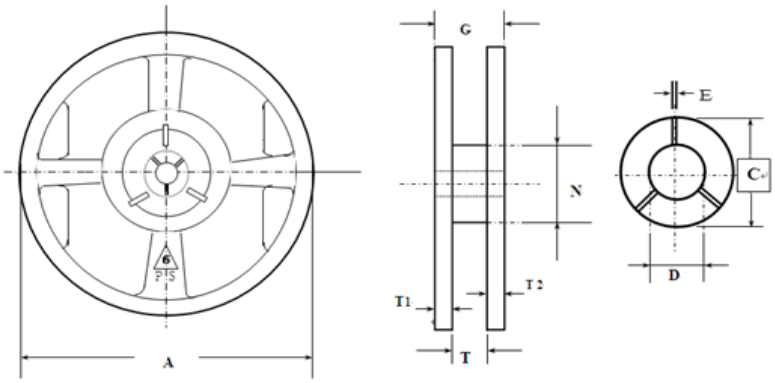
2.1 产品外形尺寸(mm)/ Product outline dimension(mm)



2.2 载带外形尺寸图（mm）/Carrier Dimensional Drawing (mm)



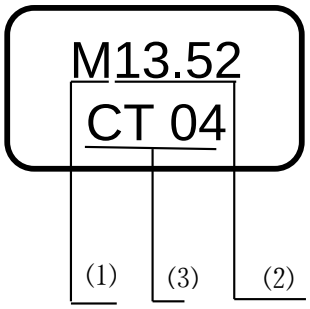
2.3编带盘外形尺寸图(mm) /Reel Dimensional Drawing (mm)



☆图示尺寸及公差（mm）：

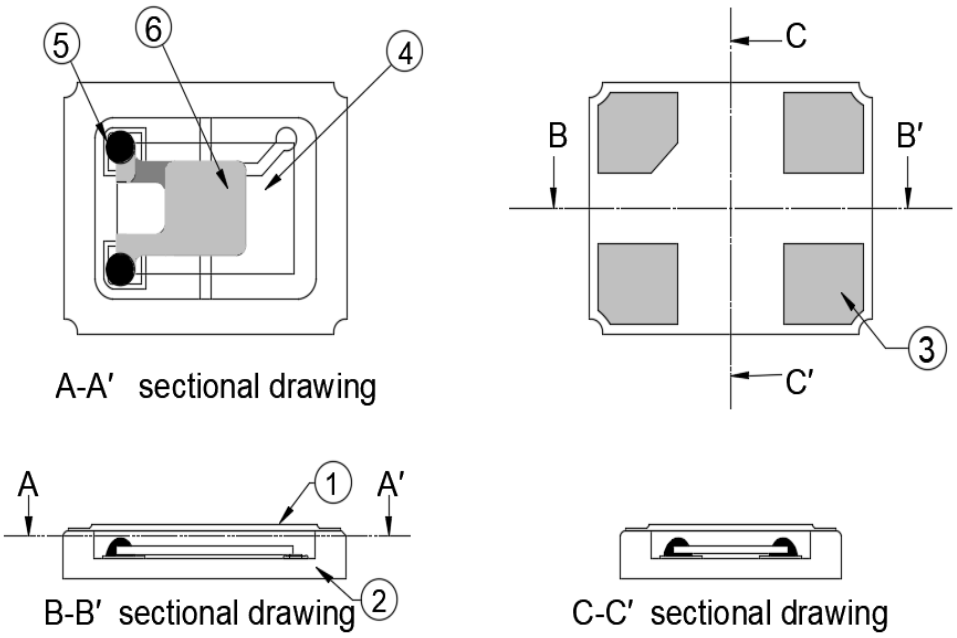
部位	A	T	T1,T2	N	C	D	E	G
尺寸	178	9.0	1.4	60.2	20.2	13.2	2.5	11.5
公差	±2.0	±0.5	±0.2	±0.5	±1.0	±0.5	±0.5	±1.4

2.4 印字 / Marking



(1) 代表公司Logo Company Logo
(2) 代表标称频率 Nominal Freq
(3) 代表批次号 Batch number

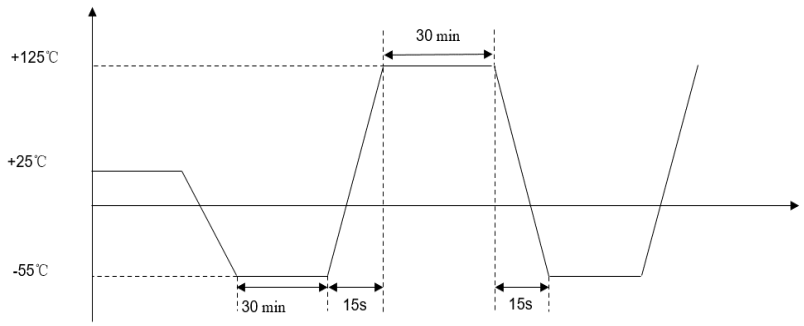
3.0 内部构造图 / Product internal structure



Unit Weight: 0.014±0.002g/pcs

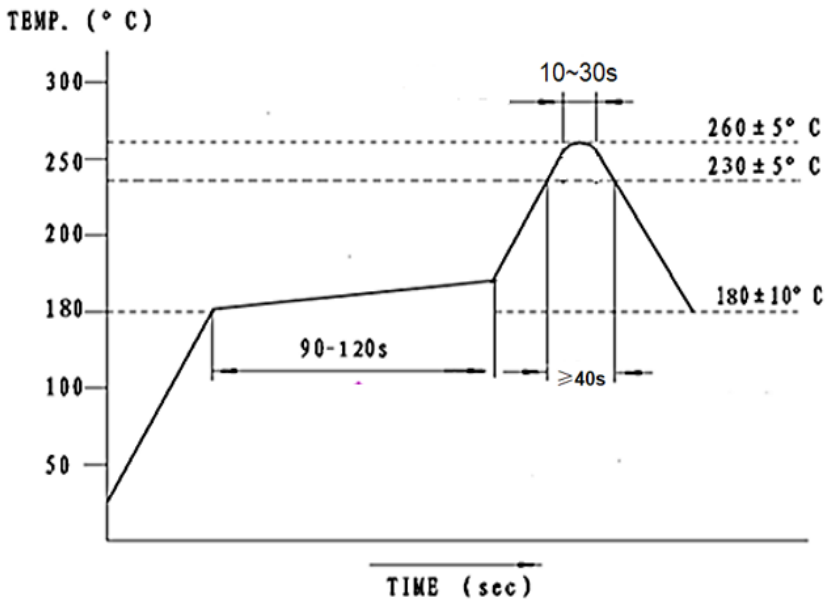
NO.	COMPONENETS	MATERIALS	SPECIFICATIONS
1	LID	Kovar (Fe/Co/Ni)	-
2	Package	Ceramic (Al_2O_3) + Au/Ni	Ni plating + Au plating
3	Pad	Au/Ni/W	Tungsten metalize + Ni plating + Au plating
4	Crystal blank	SiO_2	-
5	Conductive adhesive	Resin+Ag	Silicon resin
6	Electrode	Ag	-

4.0 石英晶体之可靠性 / Product reliability

项 目 (Item)	条 件 (Condition)	结 果 (Result)
A.1	耐低温性（耐寒性）测试 （Cold resistance） Stored at -55±2℃ for 500±2 hrs then 25±2℃ 2 hrs before testing	（Ⅰ）
A.2	耐高温性（耐热性）测试 （Heat resistance） Stored at 125±2℃ for 500±2 hrs then 25±2℃ 2 hrs before testing	（Ⅰ）
A.3	耐湿热性 (Humidity Resistance Result) 稳态温度：85±2℃；湿度：85±3％RH；时间：500±2 hrs Steady temperature: 85±2℃;humidity: 85±3％RH; time:500±2 hrs	（Ⅰ）
A.4	老化测试（Aging） Stored at 85±2℃ for 720±2Hrs then 25±2℃ 2 Hrs before testing Stored at 25±2℃ for 1year	（Ⅰ）
A.5	气密性 (Leakage) 细漏Fine leak: Put the product in the Helium pressure tank, 4 ~ 5kgf/cm^2, 0.5hrs.	（Ⅳ）
A.6	冷热冲击实验 温度循环 （Temperature Cycle） –55℃ ～ 125℃，Retain 30Min， 100 cycles  温度循环（Temperature Cycle）	（Ⅰ）

4.1机械性能 / Mechanism characteristics

B.1	跌落测试（Drop Test） Device are dropped from a height of 150 cm onto 2cm thickness stainless plate executing 3 times of random drops.	（II）
B.2	耐振性（Resistance of Vibration） Frequency：10~55Hz，amplitude(total excursion)：1.5mm±15%,3 direction (X,Y,Z) each 2 hrs then 25±2℃ 2 hrs before testing	（I）
B.3	可焊性试验（Solderability) 245±5℃，5±1s	（III）
B.4	耐焊接热（Reflow）Resistance to soldering heat（Reflow） 参考曲线图（Reference Curve）：	（II）



项目 Item	结果编号 Result NO.	规格要求 Specification Requirements
1	（Ⅰ）	频率变化<±10ppm；电阻变化<±5Ω或规格电阻的15%，取大者 Frequency variation <±10ppm； Resistance variation <±5Ω or ±15% of RR spec., select the bigger value.
2	（Ⅱ）	频率变化<±5ppm；电阻变化<±5Ω或规格电阻的15%，取大者 Frequency variation <±5ppm； Resistance variation <±5Ω or ±15% of RR spec., select the bigger value.
3	（Ⅲ）	上锡覆盖率高于95％ The covering rate of Tin-plating is more than 95%.
4	（Ⅳ）	＜$1*10^{-9}$Pa.m³/s Max

5.0 生产商及产地说明 / Manufacturer and origin

生产商/Manufacturer：烟台明德亨电子科技有限公司 ☐

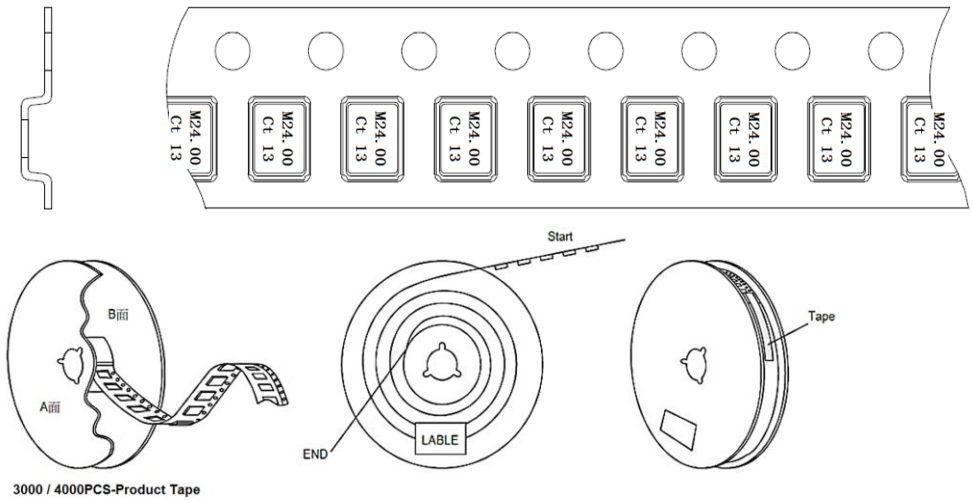
YanTai MDH Technology Co.,Ltd

四川明德亨电子科技有限公司 ☑

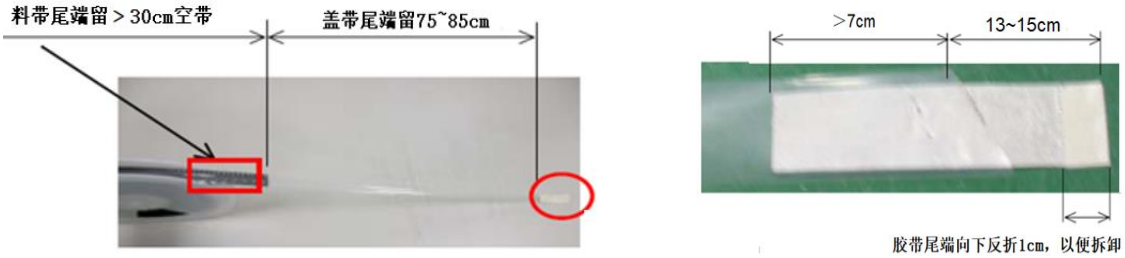
SiChuan MDH Technology Co.,Ltd

5.1包装规格 / Package specification

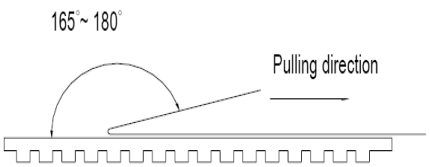
(1)



(2)



(3)



[STORAGE]

1.未开封状态下的贮存期限为交货后12个月，请在期限内使用。如果日期已超，请在使用前对其电气特性再次确认。
The storage period in unopened condition is 12 months after delivery, please use within the period. If the date is over, double-check its electrical characteristics before use.

2.本产品为电子元件，请勿在结露状态下储存和使用。
This product is electronic component. Please do not store and use it in Dewy State.

3.贮存环境温度为5 °C ~35 °C，相对湿度为30% ~ 75% ，无阳光照射。
The storage environment shall be 5°C ~35°C temperature and 30% ~ 75%RH humidity and free from the sun shine.