

新品 变更

MDH2412028



产品规格书

SPECIFICATION FOR APPROVAL

产品名称 石英晶体谐振器
Product Name: Quartz crystal unit

产品型号 SMD3225
Product Type:

标称频率 24.000000 MHz
Nominal Freq:

明德亨料号 2.3.3.240001234B
MDH P/N:

客户料号
Customer P/N:

客户承认
Approved By Customer

签章
Signature:

日期
Date:

Date: 2024年12月16日

批准	审核	拟制
Accepted	Checked	Issued
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MSL:Level 1

RoHS Compliant

Revision Record

[illegible]

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

1.1 电气特性 / Electrical Specifications

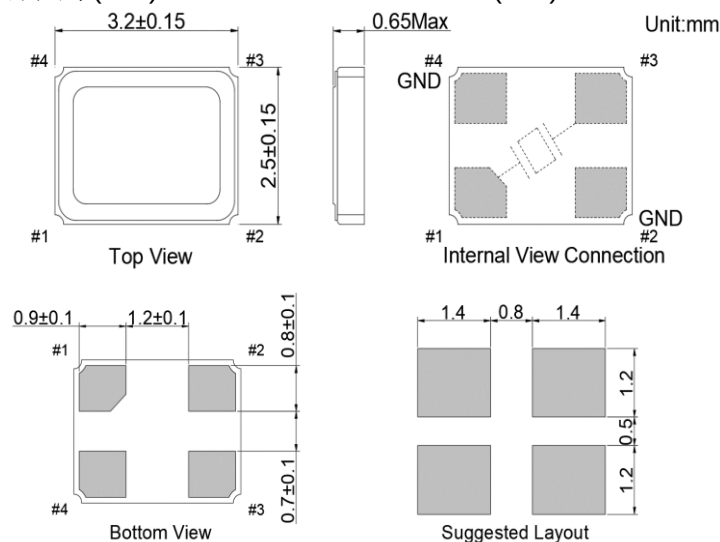
Electrical Characteristics measured by S&A250B or equivalent.

Parameters	Electrical spec.			Unit	Notes
	Min.	Typ.	Max.		
1.Frequency(FL)	24.000000			MHz	-
2.Mode of oscillation	Fundamental			-	-
3.Crystal Cutting Type	AT-CUT			-	-
4.Frequency tolerance ($\Delta F/F_0$)	-10	~	10	ppm	At 25°C±3°C
5.Loading capacitance(CL)	12			pF	-
6.Equivalent Series resistance (ESR)	-	-	30	Ω	-
7.Drive Level(DL)	0.01	100	150	uW	-
8.Storage temperature range	-55	~	125	°C	-
9.Operating temperature range	-30	~	85	°C	Ref. to 25°C
10.Temperature stability (over operating temperature)	-10	~	10	ppm	Ref. to 25°C
11.Shut Capacitance(C0)	-	-	3	pF	-
12.Aging	-	±3	-	ppm/Year	1st Year
13.SPDB	-	-	-3	dB	-200 ~ +400kHz / 20points
14.Insulation Resistance	500	-	-	MΩ	At DC 100±15V

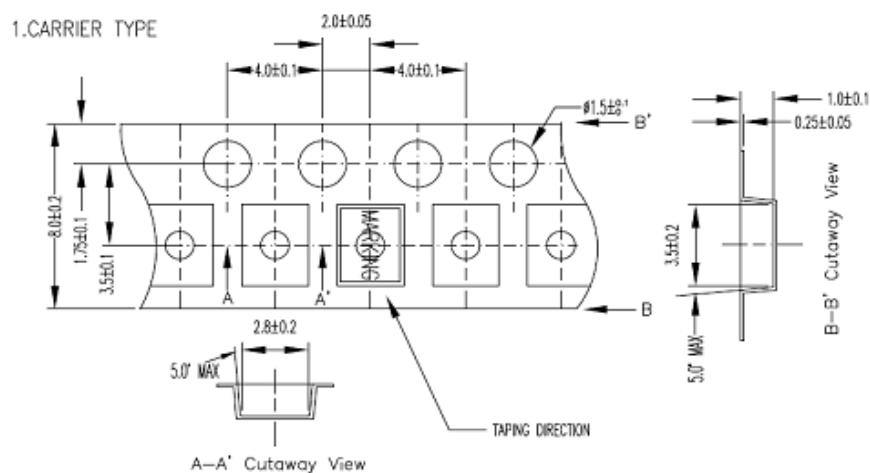
NOTE:Storage Temperature is only for the product itself,the temperature for the packing material is 5~35°C.

2.0 外形尺寸、外观 / Outline dimensions、Appearances

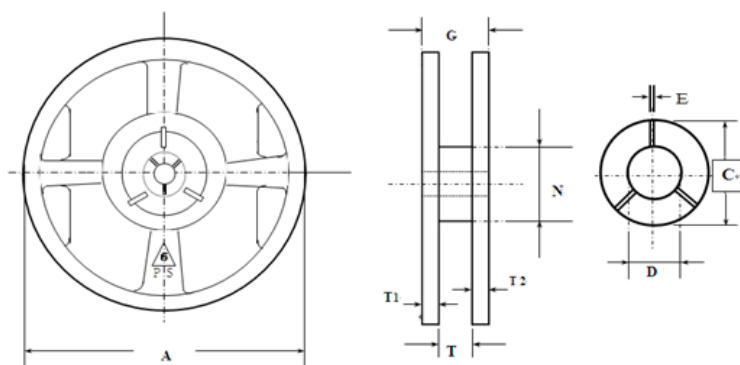
2.1 产品外形尺寸(mm)/ Product outline dimension(mm)



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



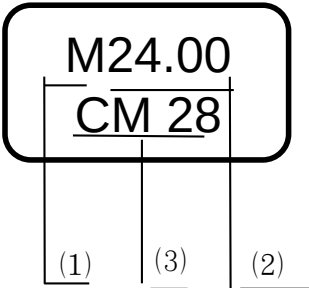
2.3 编带盘外形尺寸图(mm) /Reel Dimensional Drawing (mm)



☆图示尺寸及公差 (mm) :

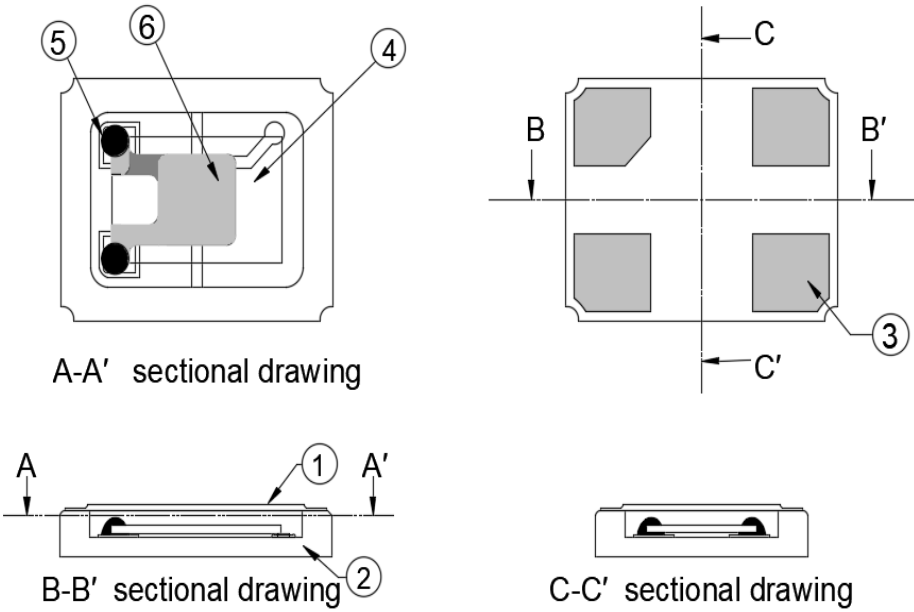
部位	A	T	T1, T2	N	C	D	E	G
尺寸	178	9.0	1.4	60.2	20.2	13.2	2.5	11.5
公差	±2.0	±0.5	±0.2	±0.5	±1.0	±0.5	±0.5	±1.4

2.4 印字 / Marking



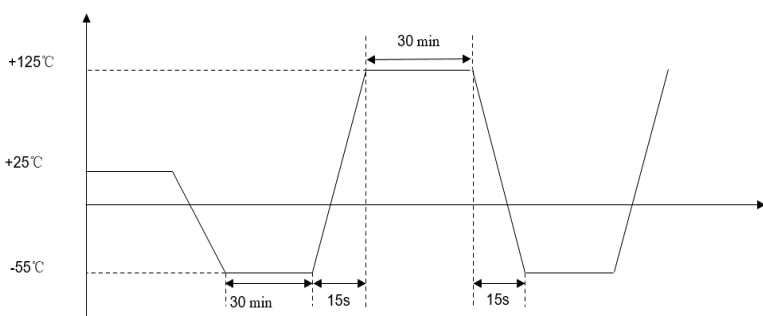
- (1) 代表公司 Logo Company Logo
- (2) 代表标称频率 Nominal Freq
- (3) 代表批次号 Batch number

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 ₂ O 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）	(I)
	Stored at $-55\pm 2^{\circ}\text{C}$ for 500 ± 2 hrs then $25\pm 2^{\circ}\text{C}$ 2 hrs before testing	
A.2	耐高温性（耐热性）测试（Heat resistance）	(I)
	Stored at $125\pm 2^{\circ}\text{C}$ for 500 ± 2 hrs then $25\pm 2^{\circ}\text{C}$ 2 hrs before testing	
A.3	耐湿热性 (Humidity Resistance Result)	(I)
	稳态温度: $85\pm 2^{\circ}\text{C}$; 湿度: $85\pm 3\%\text{RH}$; 时间: 500 ± 2 hrs	
	Steady temperature: $85\pm 2^{\circ}\text{C}$; humidity: $85\pm 3\%\text{RH}$; time: 500 ± 2 hrs	
A.4	老化测试（Aging）	(I)
	Stored at $85\pm 2^{\circ}\text{C}$ for 720 ± 2 Hrs then $25\pm 2^{\circ}\text{C}$ 2 Hrs before testing	
	Stored at $25\pm 2^{\circ}\text{C}$ for 1year	
A.5	气密性 (Leakage)	(IV)
	细漏 Fine leak: Put the product in the Helium pressure tank, 4 ~ 5kgf/cm^2 , 0.5hrs.	
A.6	冷热冲击实验 温度循环（Temperature Cycle）	(I)
	$-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$, Retain 30Min, 100 cycles  温度循环 (Temperature Cycle)	

4.1机械性能 / Mechanism characteristics

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

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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					

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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

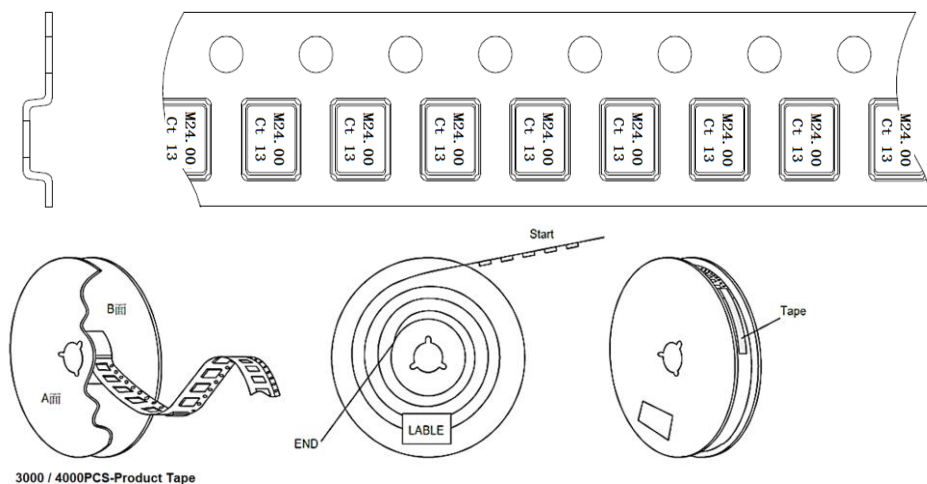
YanTai MDH Technology Co.,Ltd

四川明德亨电子科技有限公司 ☒

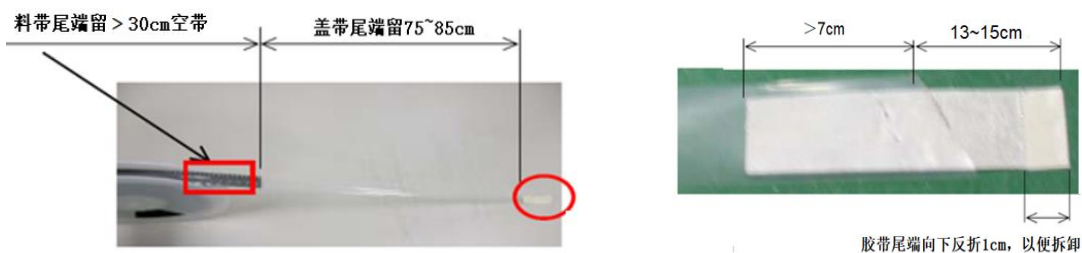
SiChuan MDH Technology Co.,Ltd

5.1 包装规格 / Package specification

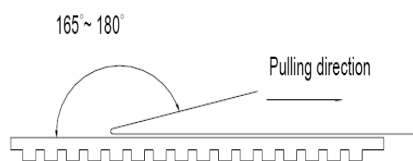
(1)



(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.