

新品 变更



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:	SMD2016
标称频率 Frequency:	40.000000 MHz
明德亨料号 MDH P/N:	2.D.1.400001512
客户料号 Customer P/N:	

客户承认 Approved By Customer	
签章 Signature:	日期 Date:

Date: 2025年9月25日

批准 Accept	审核 Check	拟制 Issue
徐法锋	乔润国	岳坤

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RoHS Compliant

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

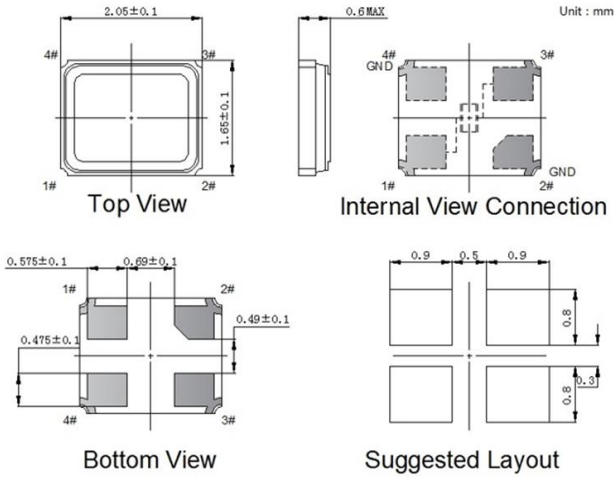
1.1 一般特性 / General characteristics

Items	Electrical spec.			Unit	Notes
	Min.	Typ.	Max.		
1.Frequency(FL)	40.000000			MHz	-
2.Mode of oscillation	Fundamental			-	-
3.Crystal Cut Mode	AT-CUT			-	Thickness shear mode
4.Frequency tolerance	-10	~	10	ppm	At 25°C ±3°C
5.Loading capacitance(CL)	15			pF	-
6.Equivalent resistance(RR)	-	-	30	Ω	Series(ESR)
7.Drive Level (DL)	0.01	10	100	uW	-
8.Temperature stability	-25	~	25	ppm	Ref. to 25°C
9.Operating temperature range	-40	~	105	°C	-
10.Storage temperature range	-55	~	125	°C	-
11.Shunt Capacitance(C0)	-	-	3	pF	-
12.Motional Capacitance (C1)	-	-	-	fF	-
13.Spurious	-	-	-3	dB	SPDB
14.Aging	-3	-	3	ppm/Year	-
15. Insulation Resistance	500	-	-	MΩ	DC 100±10V

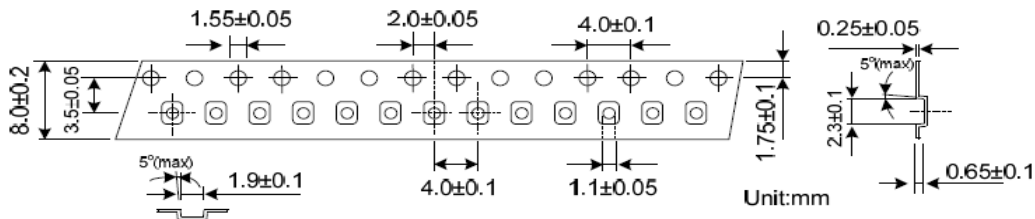
2.0 外形尺寸、外观 / Outline dimensions、Appearances

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

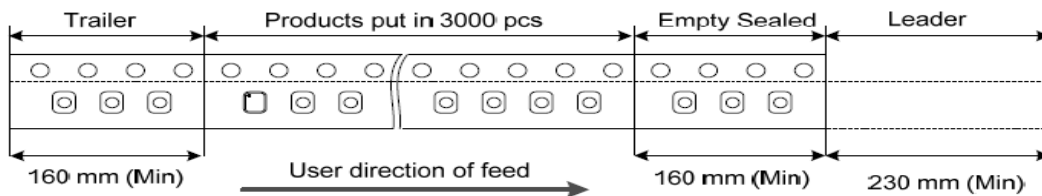
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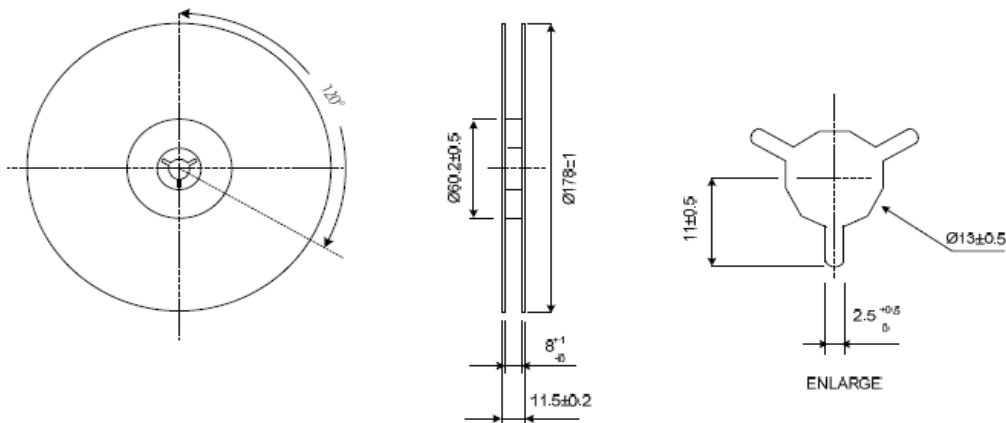
2.2 载带外形尺寸图(mm)/Carrier Dimensional Drawing (mm)



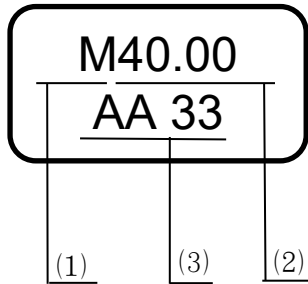
REMARK :



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

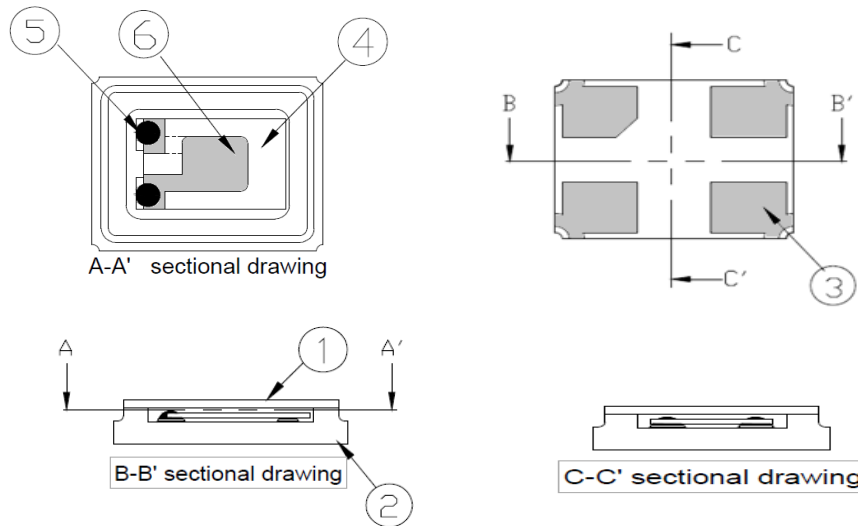


2.4 印字 Marking



- (1) 代表公司Logo
- (2) 代表标称频率
- (3) 代表批次号

3.0 内部构造图 / Product internal structure



质量 (参考值) : 0.006g/pcs

NO.	COMPONENETS	MATERIALS	SPECIFICATIONS
1	LID	Kovar (Fe/Co/Ni)	-
2	Package	Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+ Au/Ni	Color Black
3	Pad	Au	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 $-40\pm 2^{\circ}\text{C}$ 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: $85\pm 3\%RH$; 时间: 500 ± 2 hrs Steady temperature: $85\pm 2^{\circ}\text{C}$; humidity: $85\pm 3\%RH$; 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	
A.5	气密性 (Leakage)	(IV)
	细漏 Fine leak: Put the product in the Helium pressure tank, $4 \sim 5\text{kgf/cm}^2$, 0.5hrs.	
A.6	冷热冲击实验 温度循环 (Temperature Cycle)	(I)
	<p>$-55^{\circ}\text{C} \sim 125^{\circ}\text{C}$, Retain 30Min, 100 cycles</p> <p>温度循环 (Temperature Cycle)</p>	

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 20mm thickness stainless plate executing 3 times of random drops.	(I)
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°C 2 hrs before testing	(I)
B.3	可焊性试验 (Solderability) 245±5°C, 5±1s	(III)
B.4	耐焊接热 (Reflow) Resistance to soldering heat (Reflow) 参考曲线图 (Reference Curve) :	(I)
<p>The graph shows a reflow temperature profile. The y-axis is labeled 'TEMP. (°C)' and ranges from 50 to 300. The x-axis is labeled 'TIME (sec)'. The profile starts at approximately 25°C, rises to 180°C, and then to a peak of 260±5°C. The time to reach the peak is 90-120s. The peak temperature is maintained for 10~20s. The cooling rate is such that the temperature reaches 180±10°C after a time interval of ≥40s. A secondary temperature level of 230±5°C is also indicated on the graph.</p>		

项目 Item	结果编号Result NO.	规格要求 Specification Requirements
1	(I)	频率变化 $<\pm 10\text{ppm}$ ；电阻变化 $<\pm 5\Omega$ 或规格电阻的 $\pm 15\%$ ，取大者 Frequency variation $<\pm 10\text{ppm}$; Resistance variation $<\pm 5\Omega$ or $\pm 15\%$ of RR spec., select the bigger value.
2	(II)	频率变化 $<\pm 10\text{ppm}$ ；电阻变化 $<\pm 10\Omega$ 或规格电阻的 $\pm 20\%$ ，取大者 Frequency variation $<\pm 10\text{ppm}$; Resistance variation $<\pm 10\Omega$ or $\pm 20\%$ 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)	$<1 \cdot 10^{-9}\text{Pa}\cdot\text{m}^3/\text{s}$ Max

SMD2016

QUARTZ CRYSTAL UNIT

MDH P/N

2.D.1.400001512

REV.

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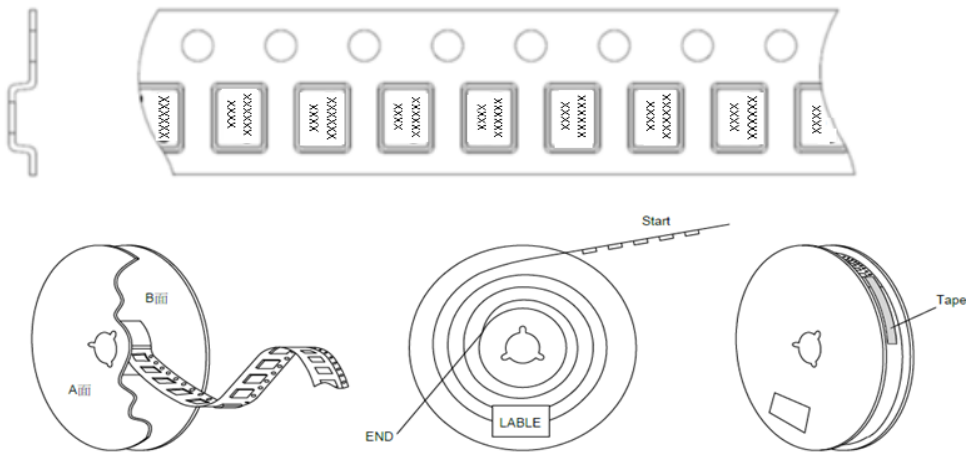
10/10

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

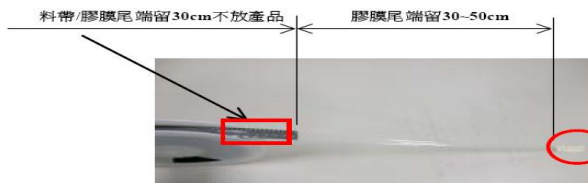
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SiChuan MDH Technology Co.,Ltd

5.1 包装规格 Package specification

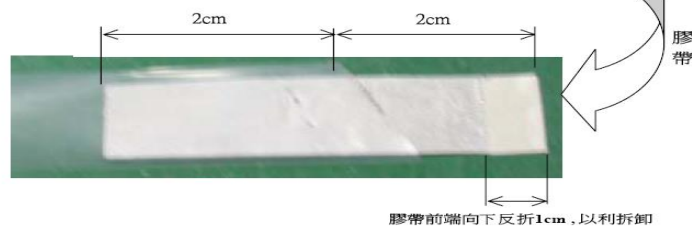


Standard Reel Quantity is 3,000 pcs per reel

(2)



(3)



165° ~ 180°

