

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 Quart crystal unit
产品型号 Product Type:	SMD2016
标称频率 Nominal Freq:	32.000000 MHz
明德亨料号 MDH P/N:	2.D.1.320001012
客户料号 Customer P/N:	

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

Date: 2024年10月10日

批准 Accepted	审核 Checked	拟制 Issued
张圣亮	乔润国	岳坤

烟台明德亨电子科技有限公司
YanTai MDH Technology Co.,Ltd
ADD.: 中国山东烟台开发区黑龙江路6号
No.6 Heilongjiang Road Yantai Development Zone,
Shandong, China
TEL: 86-535-6372640 FAX: 86-535-6394876
E-Mail: dynamic@public.ytpptt.sd.cn

四川明德亨电子科技有限公司
SiChuan MDH Technology Co.,Ltd
ADD.: 中国四川泸州纳溪区东兴路1号
No.1 Dongxing Road Naxi Zone, Luzhou,
Sichuan,China
TEL: 86-830-2800890
<http://www.mingdeheng.com>

RoHS Compliant

Revision Record

[illegible]

SMD2016 QUARTZ CRYSTAL UNIT		MDH P/N 2.D.1.320001012	
		REV. 01	PAGE 3/10
CONTENT			
N0.	ITEM	PAGE	
1	石英晶体一般规格及特性 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

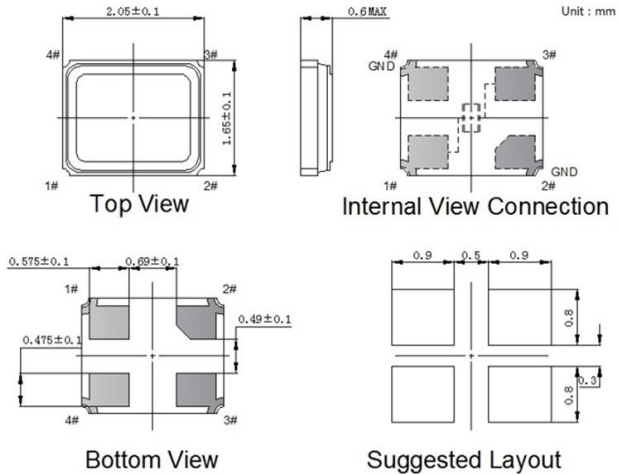
1.1 一般特性 / General characteristics

Items	Electrical spec.			Unit	Notes
	Min.	Typ.	Max.		
1.Frequency(FL)	32.000000			MHz	-
2.Mode of oscillation	Fundamental			-	-
3.Crystal Cutting Type	AT-CUT			-	Thickness shear mode
4.Frequency tolerance	-10	~	10	ppm	At 25℃±3℃
5.Loading capacitance(CL)	10			pF	-
6.Equivalent resistance(RR)	-	-	40	Ω	Series(ESR)
7.Drive Level (DL)	0.01	10	100	uW	-
8.Temperature stability	-20	~	20	ppm	Ref. to 25℃
9.Operating temperature range	-40	~	85	℃	-
10.Storage temperature range	-55	~	125	℃	-
11.Shut Capacitance(C0)	-	-	3	pF	-
12.Motional Capacitance (C1)	-	-	-	fF	-
13.SPDB	-	-	-3	dB	-
14.Aging	-3	-	3	ppm/Year	-
15.Insulation Resistance	500	-	-	MΩ	DC 100±10V

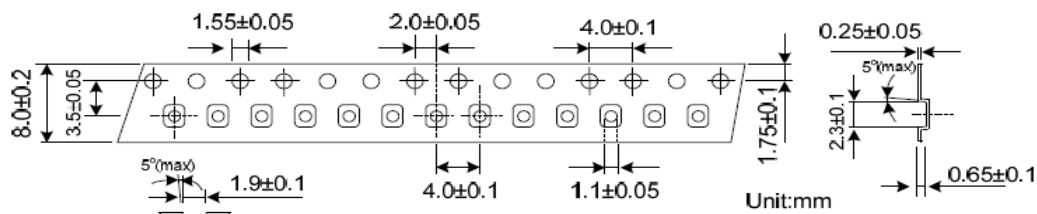
2.0 外形尺寸、外观 / Outline dimensions、Appearances

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

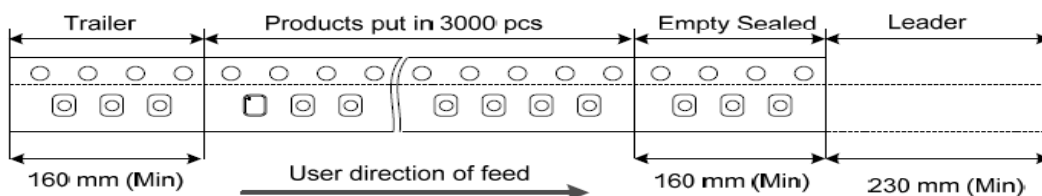
Unit:mm



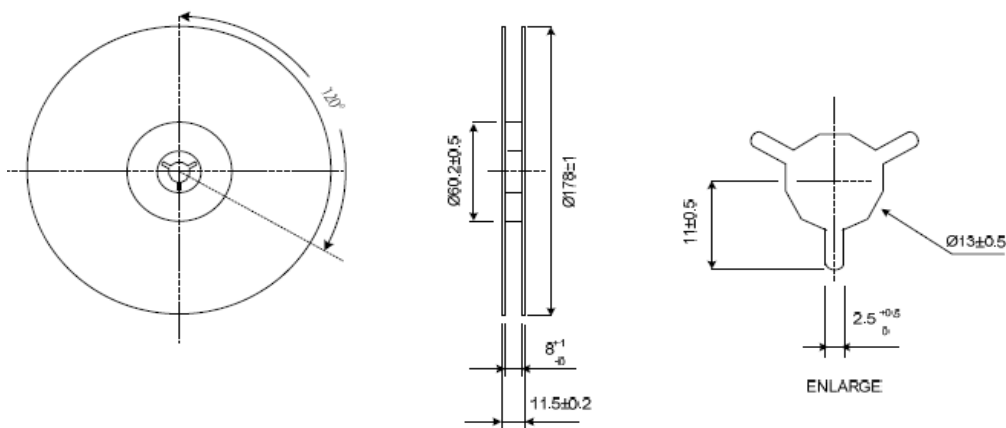
2.2 载带外形尺寸图(mm)/Carrier Dimensional Drawing (mm)



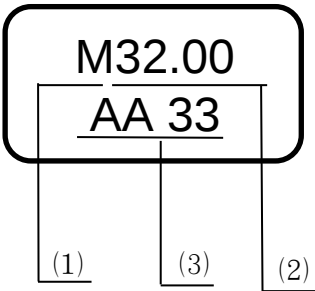
REMARK :



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

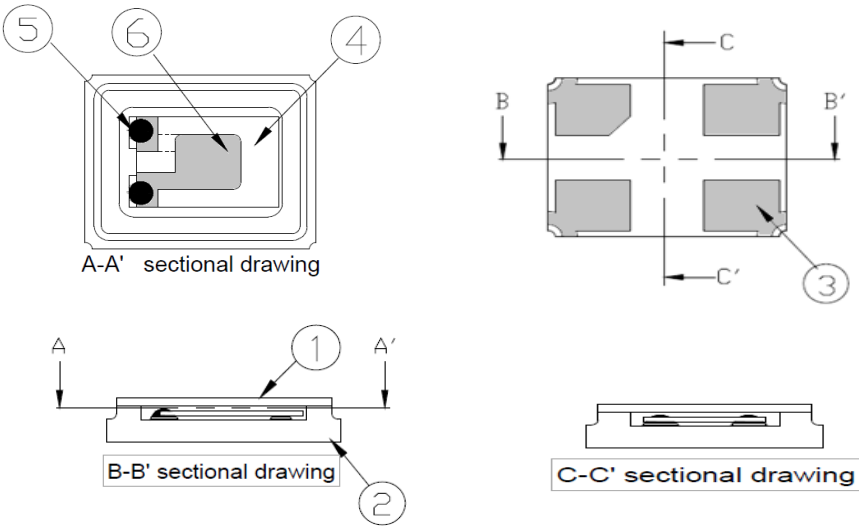


2.4 印字 Marking



- (1) 代表公司Logo
(2) 代表标称频率
(3) 代表批次号

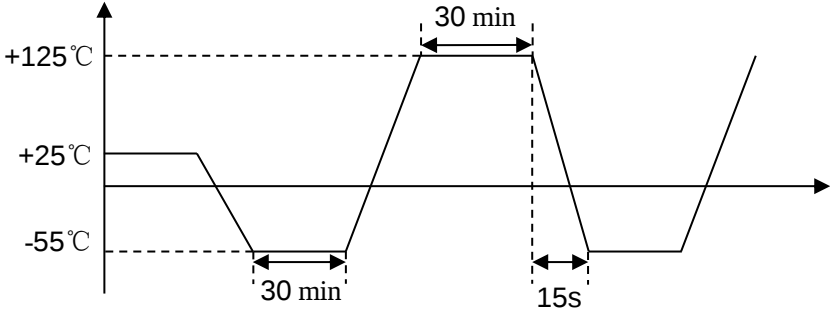
3.0 内部构造图 / Product internal structure



质量（参考值）：0.005±0.002 g/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 Blank
3	Pad	Au	Tungsten metalize+ Ni plating+ Au plating
4	Crystal blank	SiO ₂	-
5	Conductive adhesive	Resin+Ag	Silicon resin
6	Electrode	Noble Metal	-

SMD2016	QUARTZ CRYSTAL UNIT	MDH P/N	2.D.1.320001012		
		REV.	01	PAGE	7/10

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±2℃ for 500±2 hrs then 25±2℃ 2 hrs before testing	
A.2	耐高温性（耐热性）测试（Heat resistance）	(I)
	Stored at 125±2℃ for 500±2 hrs then 25±2℃ 2 hrs before testing	
A.3	耐湿热性 (Humidity Resistance Result)	(I)
	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	
A.4	老化测试（Aging）	(I)
	Stored at 85±2℃ for 720±2Hrs then 25±2℃ 2 Hrs before testing	
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℃ ~ 125℃，Retain 30Min， 100 cycles  温度循环（Temperature Cycle）	

4.1机械性能 / Mechanism characteristics

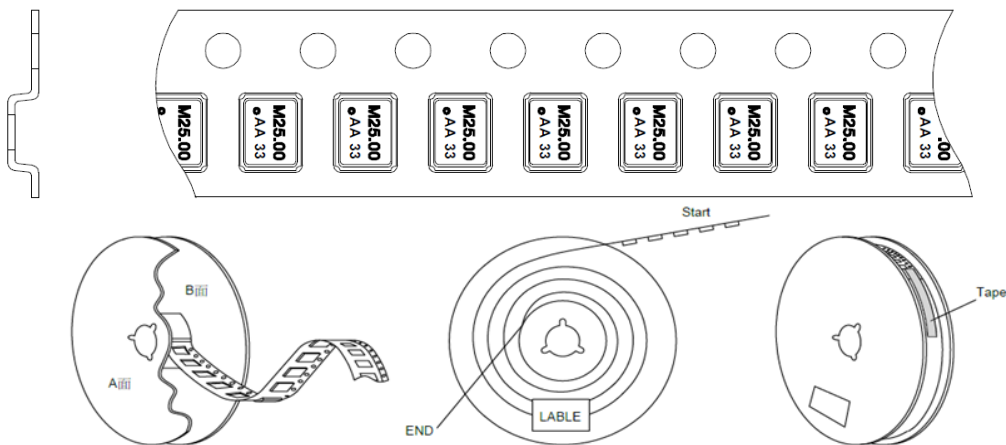
B.1	跌落测试 (Drop Test)	(I)
	Device are dropped from a height of 150 cm onto 20mm thickness stainless plate executing 3 times of random drops.	
B.2	耐振性 (Resistance of Vibration)	(I)
	Frequency: 10~55Hz, amplitude(total excursion): 1.5mm±15%,3 direction (X,Y,Z) each 2 hrs then 25±2℃ 2 hrs before testing	
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)	(I)
	参考曲线图 (Reference Curve) :	

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

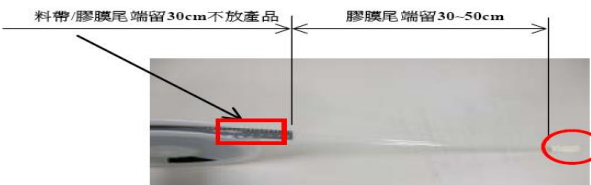
四川明德亨电子科技有限公司
SiChuan MDH Technology Co.,Ltd

5.1 包装规格 Package specification

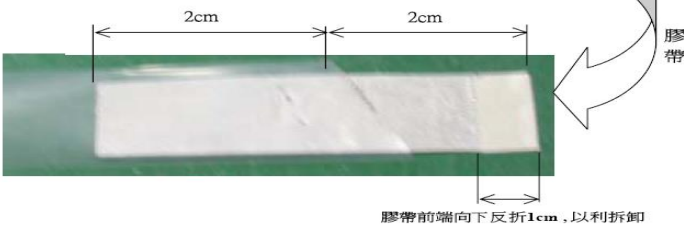


Standard Reel Quantity is 3,000 pcs per reel

(2)



(3)



165°~180°

