

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:	M518
标称频率 Nominal Freq:	32.768 KHz
明德电波料号 MDF P/N:	2.C.1.32768C516
客户料号 Customer P/N:	

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

Date: 2025年11月24日

批准 Accepted	审核 Checked	拟制 Issued
邱振波	邱振波	余东灿

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)	32.768			KHz	-
2.Mode of oscillation	Fundamental			-	-
3.Frequency tolerance	-20	~	20	ppm	At 25°C±3°C
4.Loading capacitance(CL)	12.5			pF	-
5.Equivalent resistance(RR)	-	-	70	KΩ	Series(ESR)
6.Drive Level (DL)	-	-	1	uW	-
7.Parabolic Coefficient	(-0.035±0.006)			PPM/°C^2	Measure this coefficient at 3 points of 10°C, 25°C, and 40°C using C-MOS circuit.
8. Turnover Temperature	25°C±5°C				
9.Operating temperature range	-40	~	85	°C	-
10.Storage temperature range	-55	~	125	°C	-
11.Shunt Capacitance(C0)	-	1.5	-	pF	-
12.Aging	-3	-	3	ppm/Year	1st year

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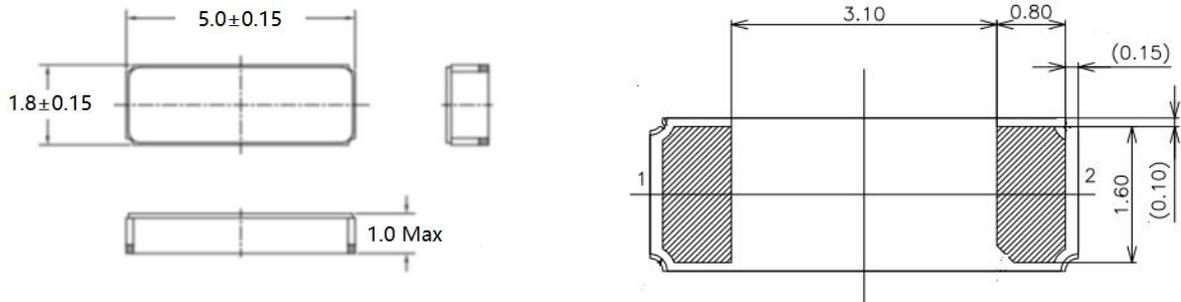
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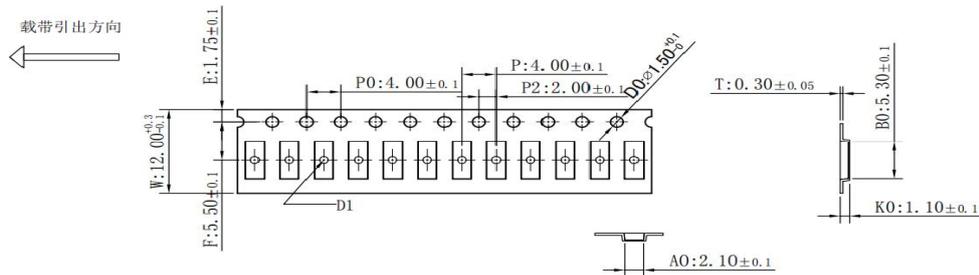
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2.0 外形尺寸、外观 / Outline dimensions、Appearances

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

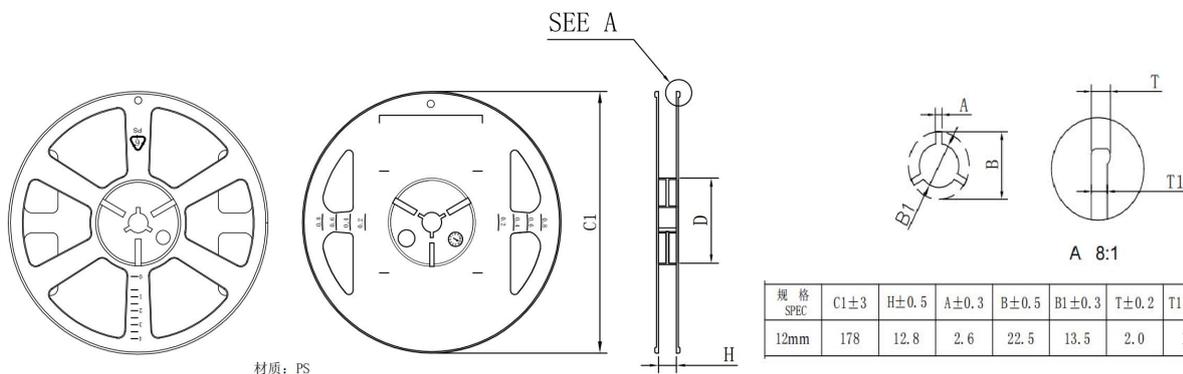


2.2 载带外形尺寸图 (mm) /Carrier Dimensional Drawing (mm)



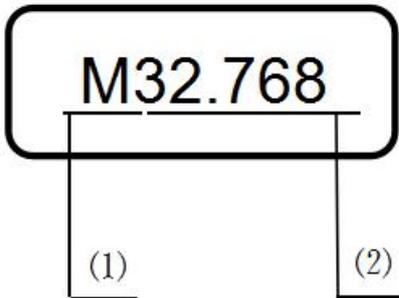
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A	+0.30	+0.05	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10
T	-0.10	-0.05	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.00	-0.00
A	W	T	P	A0	B0	K0	K1	E	F	P0	P2	Do	D1

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



规格 SPEC	C1±3	H±0.5	A±0.3	B±0.5	B1±0.3	T±0.2	T1±0.2	D±0.5
12mm	178	12.8	2.6	22.5	13.5	2.0	1.6	60.0

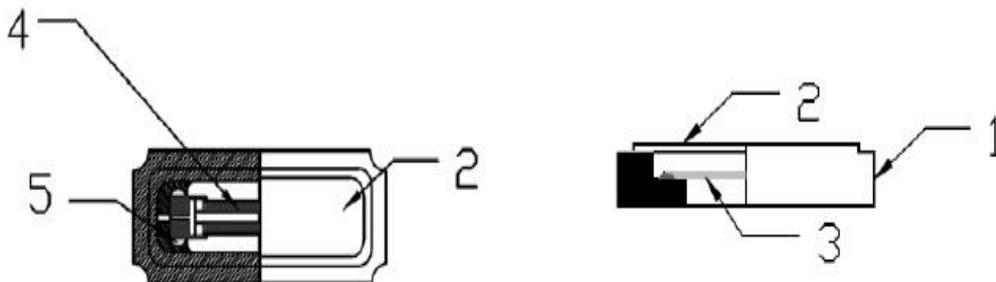
3.0 印字 Marking



(1) 代表公司Logo

(2) 代表标称频率

3.1 内部构造图 / Product internal structure



NO.	组件 COMPONENTS	材料成份 MATERIALS
1	基座 Package	陶瓷 Ceramic (Al ₂ O ₃)
2	外壳 LID	KV 合金 KV(Fe/Co/Ni)
3	水晶片 Crystal blank	二氧化硅 SiO ₂
4	电极 Electrode	贵金属
5	接着剂 Adhesive	树脂、银粉 Resin、Ag

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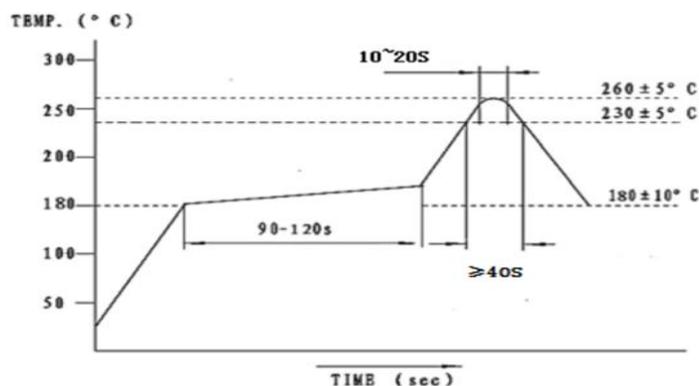
4.0 石英晶体之可靠性 / Product reliability

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: $85\pm 3\% \text{RH}$; 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	
A.5	气密性 (Leakage)	(III)
	细漏 Fine leak: Put the product in the Helium pressure tank, $4 \sim 5 \text{kgf/cm}^2$, 0.5hrs.	

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4.1 机械性能 / Mechanism characteristics

B.1	跌落测试 (Drop Test)	(I)
	Device are dropped from a height of 75 cm onto 30mm thickness wood plate executing 3 times of random drops.	
B.2	耐振性 (Resistance of Vibration)	(I)
	Frequency: 10~55Hz, amplitude(total excursion): $1.5\text{mm}\pm 15\%$, 3 direction (X,Y,Z) each 2 hrs then $25\pm 2^{\circ}\text{C}$ 2 hrs before testing	
B.3	可焊性试验 (Solderability)	(II)
	$245\pm 5^{\circ}\text{C}$, $5\pm 1\text{s}$	
B.4	耐焊接热 (Reflow) Resistance to soldering heat (Reflow)	(I)
	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 $\leq\pm 10\text{ppm}$; 电阻变化 $\leq\pm 5\text{K}\Omega$ 或规格电阻的 $\pm 15\%$, 取大者 Frequency variation $\leq\pm 10\text{ppm}$; Resistance variation $\leq\pm 5\text{K}\Omega$ or $\pm 15\%$ of RR spec., select the bigger value.
2	(II)	上锡覆盖率高于95% The covering rate of Tin-plating is more than 95%.
3	(III)	$< 1 \cdot 10^{-9} \text{Pa} \cdot \text{m}^3/\text{s}$ Max

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

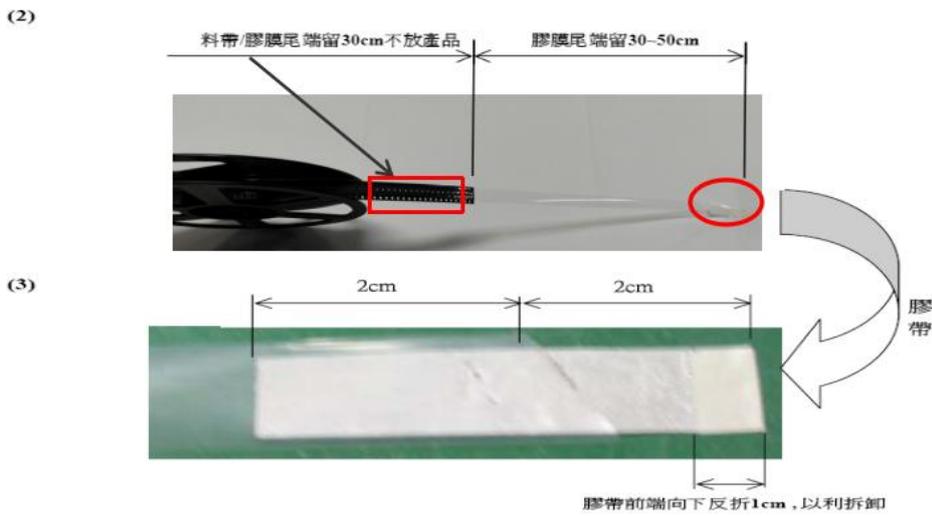
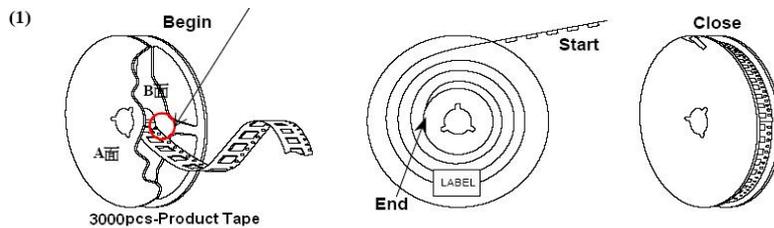
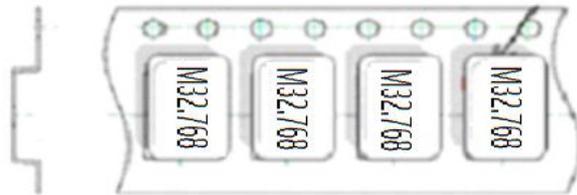
生产商/Manufacturer:

明德电波(四川)科技有限公司

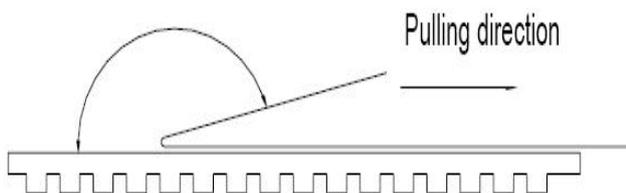


SiChuan MDF Technology Co.,Ltd

5.1 包装规格 Package specification



165°~180°



It has to between 0.2N to 0.75N under following condition.

Pulling direction: 165° to 180°

Pulling Speed : 300mm/min

Otherwise unless specified