

新品 变更



## 产 品 规 格 书

## SPECIFICATION FOR APPROVAL

|                       |                               |
|-----------------------|-------------------------------|
| 产品名称<br>Product Name: | 石英晶体谐振器<br>Quart crystal unit |
| 产品型号<br>Product Type: | SMD2016                       |
| 标称频率<br>Nominal Freq: | 40.000000 MHz                 |
| 明德亨料号<br>MDH P/N:     | 2.D.1.400001010               |
| 客户料号<br>Customer P/N: |                               |

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

Date: 2023年12月5日

|                |               |              |
|----------------|---------------|--------------|
| 批准<br>Accepted | 审核<br>Checked | 拟制<br>Issued |
| 欧阳林            | 乔润国           | 张 鑫          |

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RoHS Compliant

## Revision Record

[illegible]

|         |                                                       |                     |  |         |                 |      |      |
|---------|-------------------------------------------------------|---------------------|--|---------|-----------------|------|------|
| SMD2016 |                                                       | QUARTZ CRYSTAL UNIT |  | MDH P/N | 2.D.1.400001010 |      |      |
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## 1 石英晶体产品规格及特性 / Product specification and features

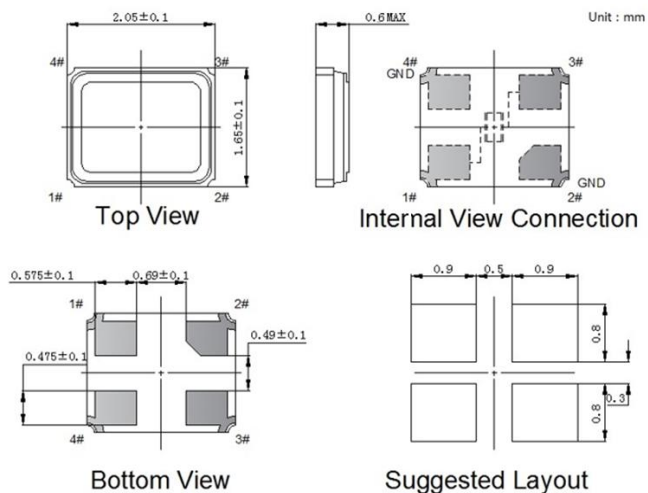
### 1.1 一般特性 / General characteristics

| Items                         | Electrical spec. |      |      | Unit     | Notes                |
|-------------------------------|------------------|------|------|----------|----------------------|
|                               | Min.             | Typ. | Max. |          |                      |
| 1.Frequency(FL)               | 40.000000        |      |      | MHz      | -                    |
| 2.Mode of oscillation         | Fundamental      |      |      | -        | -                    |
| 3.Crystal Cutting Type        | AT-CUT           |      |      | -        | Thickness shear mode |
| 4.Frequency tolerance         | -10              | ~    | 10   | ppm      | At 25°C±3°C          |
| 5.Loading capacitance(CL)     | 10               |      |      | pF       | -                    |
| 6.Equivalent resistance(RR)   | -                | -    | 40   | Ω        | Series(ESR)          |
| 7.Drive Level (DL)            | -                | -    | 100  | uW       | -                    |
| 8.Temperature stability       | -20              | ~    | 20   | ppm      | Ref. to 25°C         |
| 9.Operating temperature range | -40              | ~    | 85   | °C       | -                    |
| 10.Storage temperature range  | -55              | ~    | 125  | °C       | -                    |
| 11.Shut Capacitance(C0)       | -                | -    | 3    | pF       | -                    |
| 12.RLD2                       | -                | -    | 40   | Ω        | -                    |
| 13.SPDB                       | -                | -    | -3   | dB       | -200KHz~+400KHz      |
| 14.Aging                      | -3               | -    | 3    | ppm/Year | -                    |
| 15.Insulation Resistance      | 500              | -    | -    | MΩ       | DC 100±10V           |

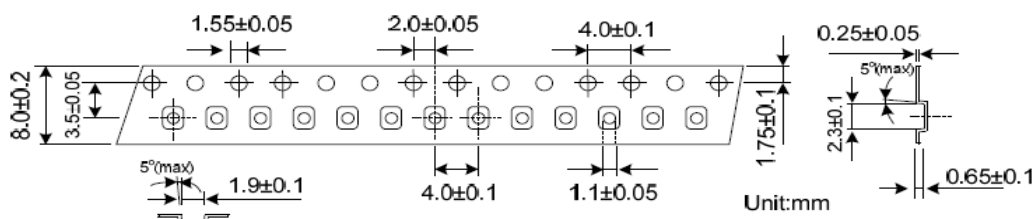
## 2.0 外形尺寸、外观 / Outline dimensions、Appearances

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

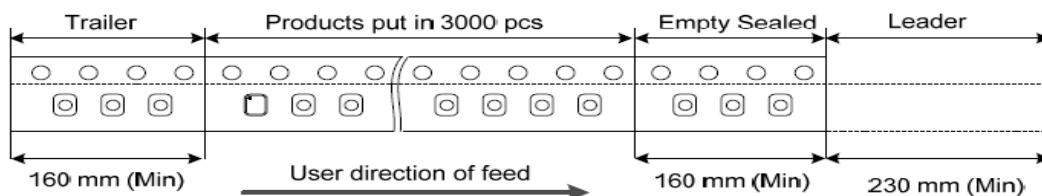
Unit:mm



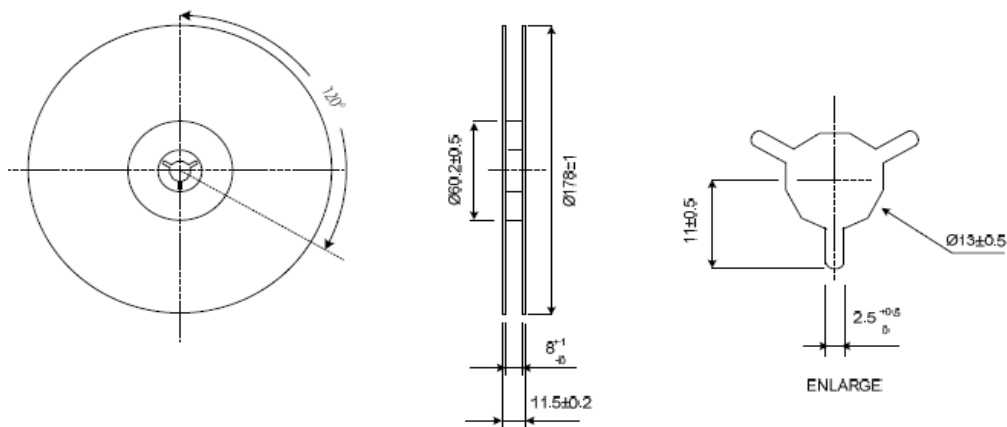
## 2.2 载带外形尺寸图(mm)/Carrier Dimensional Drawing (mm)



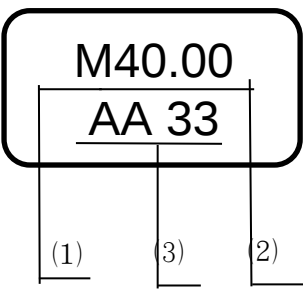
## REMARK :



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

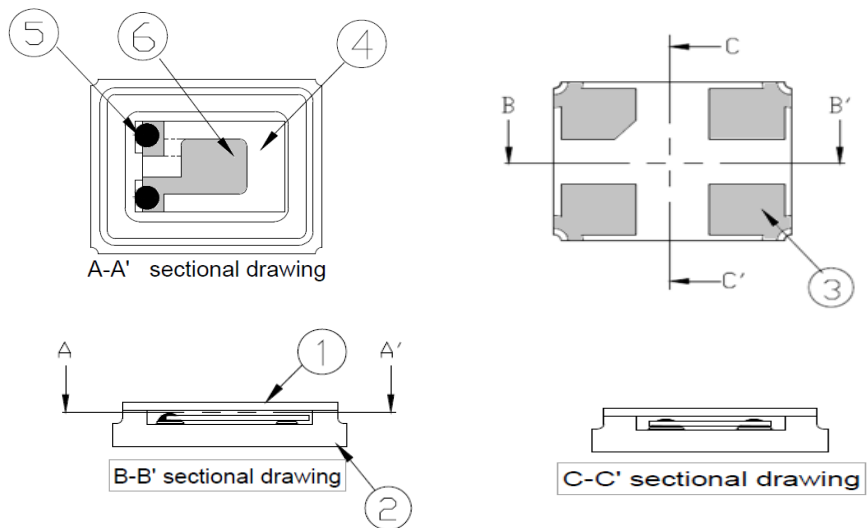


2.4 印字 Marking



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

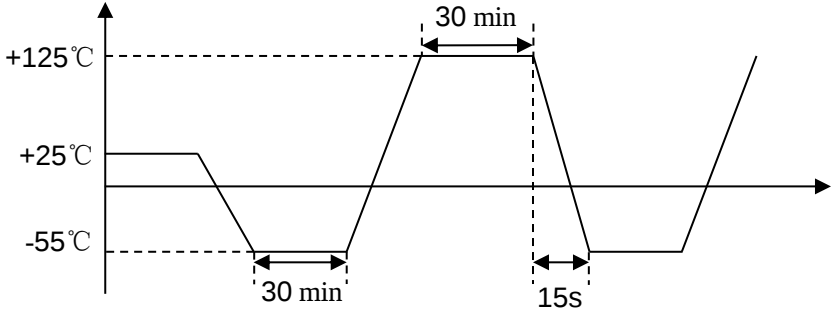
3.0 内部构造图 / Product internal structure



| 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 <sub>2</sub> O <sub>3</sub> ) + Kovar (Fe/Co/Ni)+ Au/Ni | Color Blank                               |
| 3                         | Pad                 | Au                                                                  | Tungsten metalize+ Ni plating+ Au plating |
| 4                         | Crystal blank       | SiO <sub>2</sub>                                                    | -                                         |
| 5                         | Conductive adhesive | Resin+Ag                                                            | Silicon resin                             |
| 6                         | Electrode           | Noble Metal                                                         | -                                         |

|         |                     |         |                 |      |      |
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4.0 石英晶体之可靠性 / Product reliability

| 项 目<br>(Item) | 条 件 (Condition)                                                                                                                                                                                                 | 结 果<br>(Result) |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| A.1           | 耐低温性 (耐寒性) 测试 (Cold resistance)                                                                                                                                                                                 | ( I )           |
|               | Stored at $-40\pm 2^{\circ}\text{C}$ for $500\pm 2$ 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 $500\pm 2$ 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: $500\pm 2$ hrs                                                                                                                                 |                 |
|               | Steady temperature: $85\pm 2^{\circ}\text{C}$ ; humidity: $85\pm 3\%\text{RH}$ ; time: $500\pm 2$ hrs                                                                                                           |                 |
| A.4           | 老化测试 (Aging)                                                                                                                                                                                                    | ( I )           |
|               | Stored at $85\pm 2^{\circ}\text{C}$ for $720\pm 2$ 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><math>-55^{\circ}\text{C} \sim 125^{\circ}\text{C}</math>, 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）                                                                                                          | ( 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）：                                                                                                  |         |

TEMP. ( ° C )

TIME ( sec )



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

