

## CRYSTAL SPECIFICATION

客户 : \_\_\_\_\_

客户料号 : \_\_\_\_\_

泰晶料号 : \_\_\_\_\_ CS12K032768ADE \_\_\_\_\_

产品类别 : \_\_\_\_\_ M6-32.768-12.5-20 \_\_\_\_\_

日期 : \_\_\_\_\_ 2019.3.6 \_\_\_\_\_

### **CUSTOMER'S APPROVAL**

(PLEASE RETURN A COPY WITH APPROVAL)

**Hubei TKD Electronic Technology Co.,LTD**

湖北泰晶电子科技股份有限公司

| <b>APPROVED</b> | <b>DESIGNER</b> |
|-----------------|-----------------|
| 代伟              | 何金玲             |

SALE Department : TEL : 0722-3309660 FAX : 0722-3309768

QCD Department : TEL : 0722-3308231 FAX : 0722-3309768

FAE Department : TEL : 0755-27328651 FAX : 0755-27328001

| REV. | Description of Revision History | Date      | Designer    | Checked By |
|------|---------------------------------|-----------|-------------|------------|
| A    | New revision                    | 2019年3月6日 | HE JIN LING | DAI WEI    |

## CRYSTAL SPECIFICATION

1. Description: Tuning Fork Quartz Crystal
2. Nominal Frequency: 32.768KHz
3. Oscillation Mode: Fundamental
4. Cutting Mode: x-2° cut
5. Measurement Instrument: S&A 250B(Calculated FL)
6. Electrical Characteristics:

[1]Operation Conditions:

| Item                        | Symbol | MIN | TYP  | MAX | Unit | Condition |
|-----------------------------|--------|-----|------|-----|------|-----------|
| Operating Temperature Range | Topt   | -40 |      | 85  | °C   |           |
| Storage Temperature Range   | Tstg   | -55 |      | 125 | °C   |           |
| Load Capacitance            | CL     |     | 12.5 |     | pF   |           |
| Drive Level                 | DL     |     | 0.1  |     | uW   |           |

[2]Frequency Stability:

| Item                       | Symbol | MIN. | TYP.   | MAX. | Unit                | Condition                        |
|----------------------------|--------|------|--------|------|---------------------|----------------------------------|
| Tolerance                  | dF/Fo  | -20  |        | 20   | ppm                 | Refer to Center Frequency@25±3°C |
| Stability Over Temperature | dF/F25 |      | -0.036 |      | ppm/°C <sup>2</sup> | Refer to Operating Temperature   |
| Aging                      | dF/F25 | -5   |        | 5    | ppm                 | Per Year                         |

dF/Fo:Frequency Deviation Refer to Center Frequency

dF/F25:Frequency Deviation Refer to 25°C Frequency

[3]Electrical Performance:

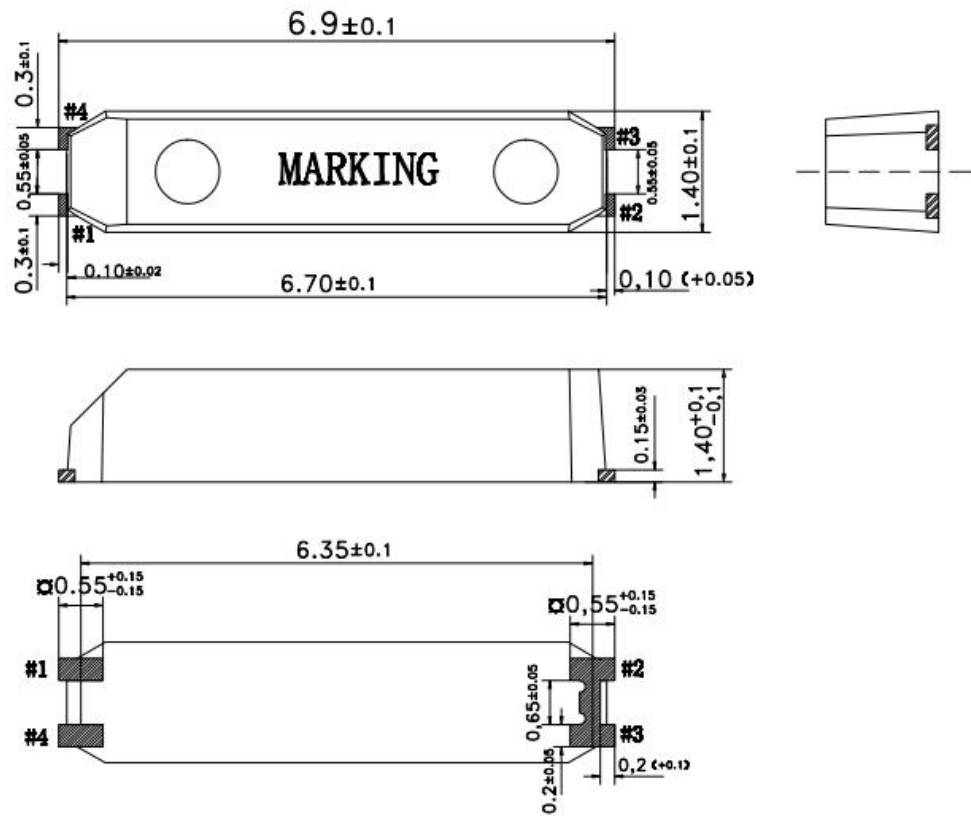
| Item                         | Symbol | MIN. | TYP. | MAX. | Unit | Condition    |
|------------------------------|--------|------|------|------|------|--------------|
| Equivalent Series Resistance | ESR    |      |      | 65   | KΩ   | @Series      |
| Shunt Capacitance            | C0     |      |      | 3    | pF   |              |
| Insulation Resistance        | IR     | 500  |      |      | MΩ   | @DC 100 Volt |

7. Marking:Laser

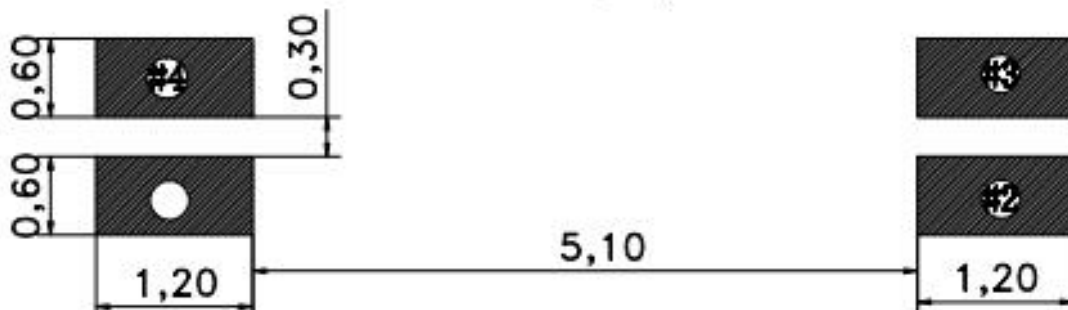
Marking Generally: 32.768. Refer to with Customer's requirement.

32.768

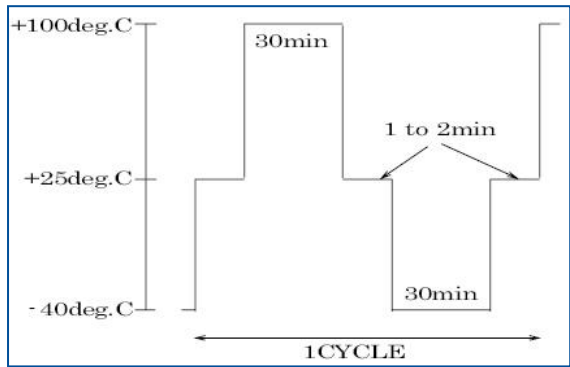
8. Outline drawing (unit: mm)



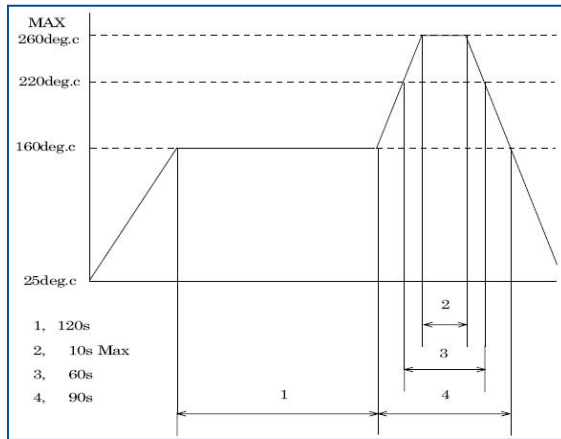
Recommended soldering pattern



### 9. Reliability Specification

| Test Items        | Test Method and Condition   | Requirements  |
|-------------------|---|---|
| Vibration         | (1)Vibration Frequency 10 to 55Hz<br>(2)Vibration Amplitude 1.5mm<br>(3) Cycle Time 1-2min(10-55-10Hz)<br>(4)Direction X.Y.Z<br>(5)Duration 2h/each direction                                 | Frequency Change:±10ppm Max.<br>Resistance Change:±15% or 5kohm Max.                              |
| Shock             | 3 Times free drop from 75cm height to hard wooden board of thickness more than 30mm   | Frequency Change:±10ppm Max.<br>Resistance Change:±15% or 5kohm Max.                              |
| Hermetic seal     | Helium leak detector<br>Checked:before the molded crystal units   | less than $1 \times 10^{-7}$ mbar.l/sec.  |
| Solder ability    | Dip the leads of crystal units into the solution (7-10%) of rosin 3±0.5s,then dip it into the tank 5-10s.<br>Temperature of solder melted tank is $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$ | The dipped surface of the leads should be at least 95% covered with continuous new solder coating |
| High temperature  | 240 hours at $+85^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br>After 1-2hours past at room temperature from following  | Frequency Change:±10ppm Max.<br>Resistance Change:±25% or 10kohm Max.                             |
| Low temperature   | 240 hours at $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br>After 1-2hours past at room temperature from following test.  | Frequency Change:±10ppm Max.<br>Resistance Change:±15% or 5kohm Max.                              |
| Humidity          | 240 hours at $+40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ,relative humidity 90-95%<br>After 1-2hours past at room temperature from following  | Frequency Change:±10ppm Max.<br>Resistance Change:±25% or 10kohm Max.                             |
| Temperature cycle | After supplying the following temperature cycle (50cycles)<br>   | Frequency Change:±10ppm Max.<br>Resistance Change:±25% or 10kohm Max.                             |

Reflow soldering



After 24h past from frequency test,  
Frequency Change:  $\pm 10$ ppm Max.  
Resistance Change:  $\pm 25\%$  or 10kohm Max.

Notice:

1、 Using the infrared lamp at soldering process may cause uneven temperature rise on plastic surface of the parts,so that

please keep the package temperature within left conditions.

2、 DO NOT dip the plastic part into solder

## 10. Handling Notice for Standard Tuning Fork Crystal (Cylindrical Type)

### 10.1. Shock resistance

It may deteriorate the characteristics or cause of no oscillation if excess physical shock given. Please be careful not to drop. Please use under condition to minimize the shocks as much as possible.

Please review the conditions if it is used by auto mounting or after the conditions are changed.

### 10.2. Heat and humidity resistance in storage

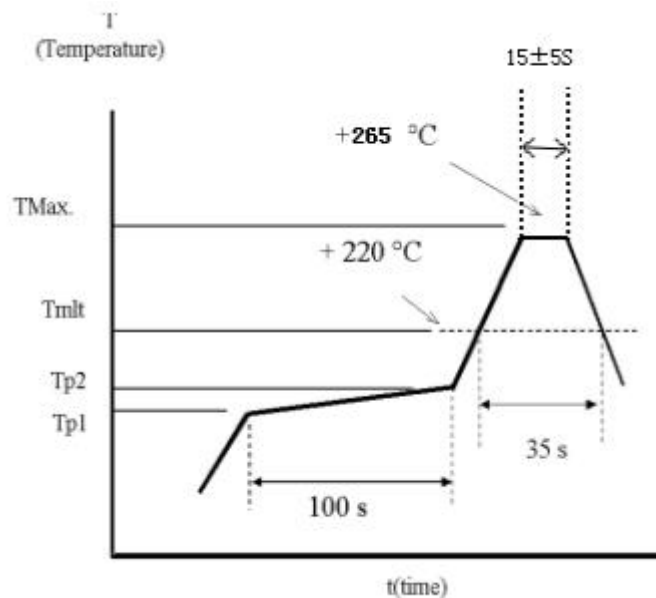
Storing the crystal products under higher or lower temperature or high humidity for a long period may deteriorate the characteristics of crystal units.

Please store and use the crystal products at the normal temperature and humidity.

### 10.3 Solder heat resistance

Please review the condition or consult us about flow solder process.

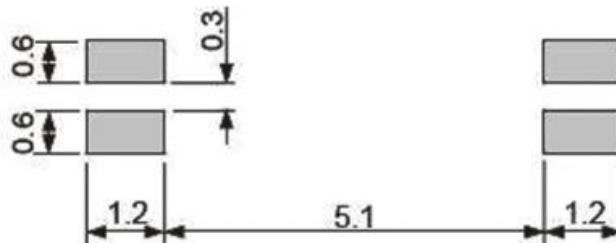
**Our soldering condition is under 260°C within 10sec .**



#### 10.4. Mounting method to PCB

When the crystal products need to be lay down please fix to PCB securely.

If the crystal is used with mechanical vibration location, please put cushion in between PCB or fix with elasticity glue (Silicon etc) as shown in below figure. Please don't gluing hermetic seal grass.



#### 10.5. Lead process

When the lead needs to be cut please maintenance the cutter.

When the lead needs to be bent or repaired please be careful not to giving excess pressure at the root of the lead to avoid crack of the hermetic seal glass. Also please be careful not to giving excess pressure at sealing to avoid sealing tightness deteriorate.

#### 10.6. Ultrasonic cleaning and ultrasonic soldering

Soldered by ultrasonic cannot be guaranteed, because crystal may be sympathetic vibrated and may damage. Please study at your side about ultrasonic cleaning.

#### 10.7. Drive level

Applying excessive drive level to the crystal units may cause deterioration of characteristics or damage. Less than 1.0  $\mu$ W is recommended to this products.

#### 10.8. Solder paste should be more than 150 $\mu$ m thickness.

#### 10.9. Storage environment

10.9.1 To storage the reel at +15 $^{\circ}$ C to +35 $^{\circ}$ C, 25%RH to 65%RH of Humidity.

10.9.2 To open the packing just before using.

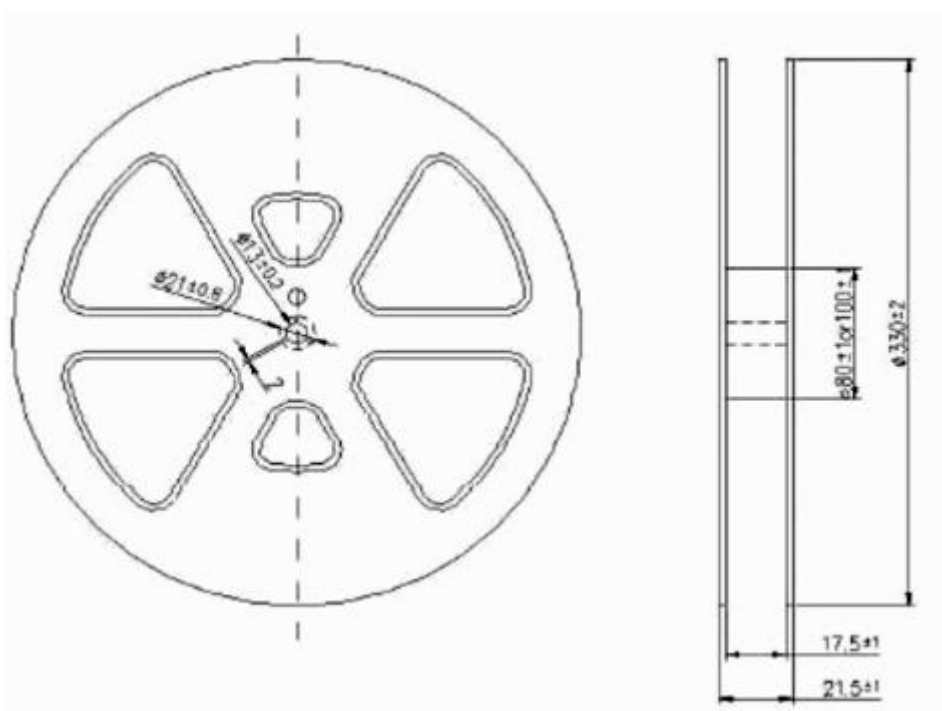
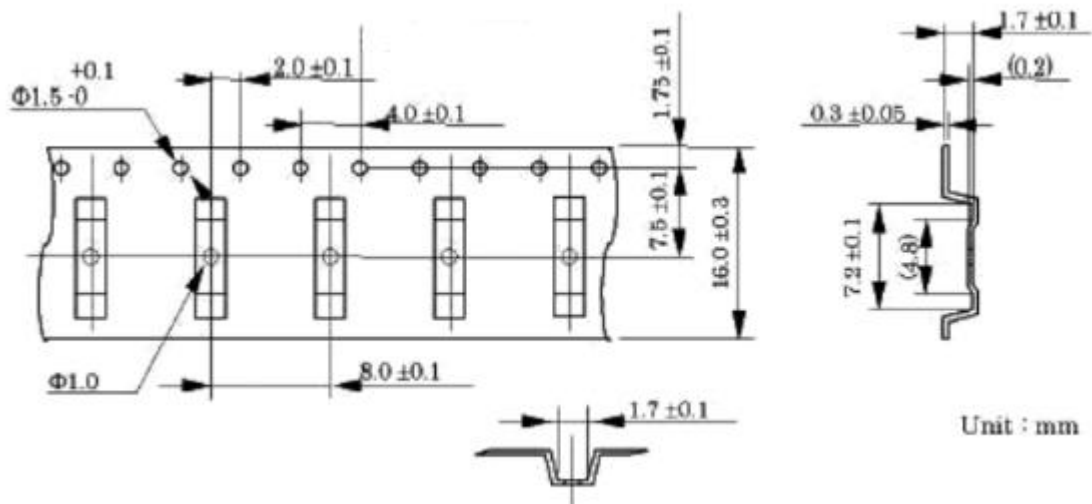
10.9.3 Not to expose the sun.

10.9.4 Not to storage with some erosive chemicals.

10.9.5 Nothing is allowed to put on the reel or carton to prevent mechanical damage.



### 11.PACKING



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