





| REV. | Description of Revision History | Date              | Designer          | Checked By    |
|------|---------------------------------|-------------------|-------------------|---------------|
| A    | New revision                    | <u>2018-12-28</u> | <u>Sutingting</u> | <u>DaiWei</u> |



## CRYSTAL SPECIFICATION

1. Description: Quartz Crystal
2. Nominal Frequency: 6.000000MHz
3. Oscillation Mode: Fundamental
4. Cutting Mode: AT cut
5. Measurement Instrument: S&A 250B(Measured 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  |      | 105  | °C   |           |
| Load Capacitance            | CL     |      | 20   |      | pF   |           |
| Drive Level                 | DL     | 0.1  |      | 100  | 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 | -30  |      | 30   | ppm  | Refer to Operating Temperature @-40~+85°C |
| Aging                      | dF/F25 | -3   |      | 3    | 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    |      |      | 80   | Ω    | @Series      |
| Shunt Capacitance            | C0     |      |      | 7    | pF   |              |
| Insulation Resistance        | IR     | 500  |      |      | MΩ   | @DC 100 Volt |

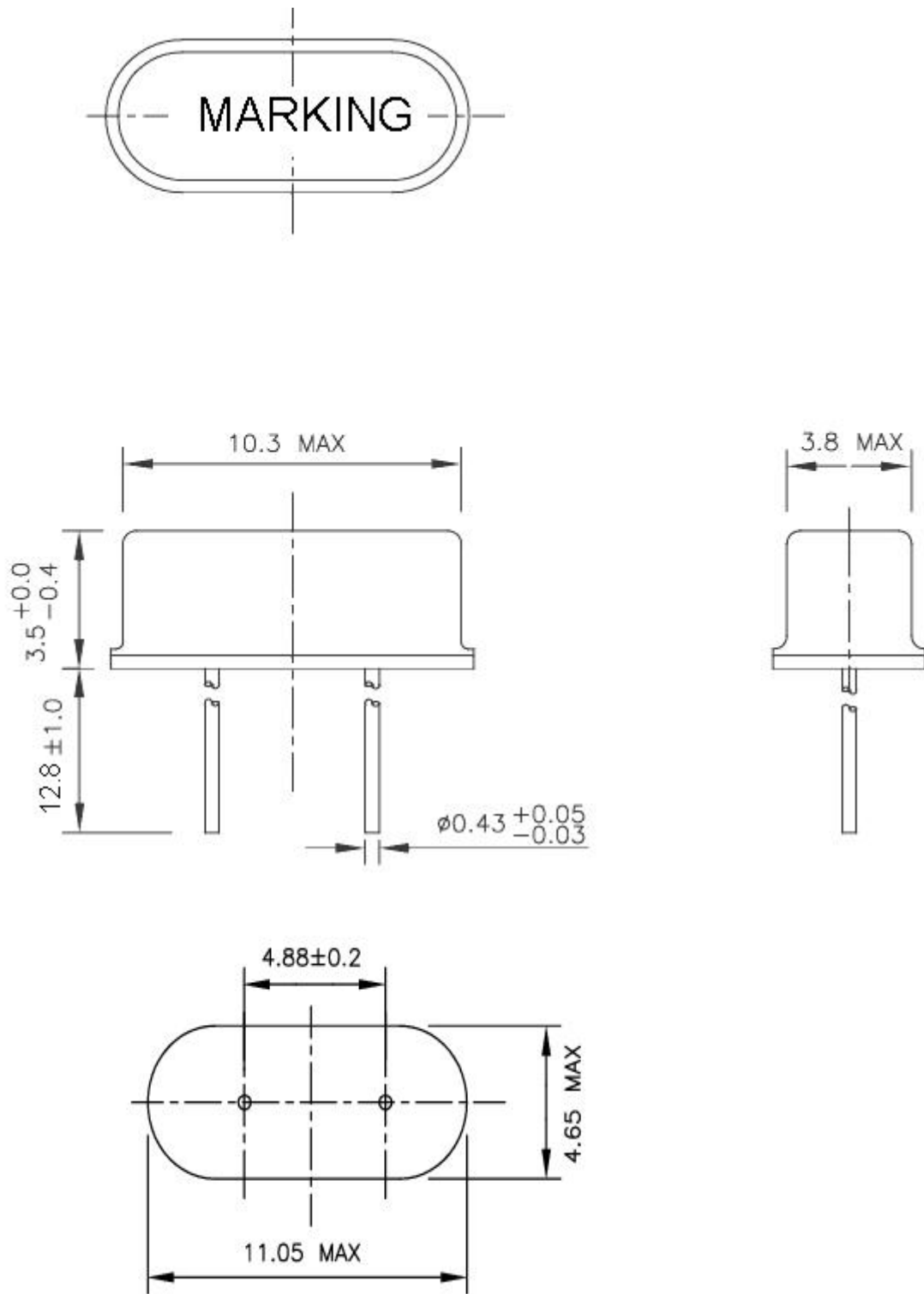
7. Marking:Laser

TKD :Company Logo

6.000:Nominal Frequency

TKD6.000

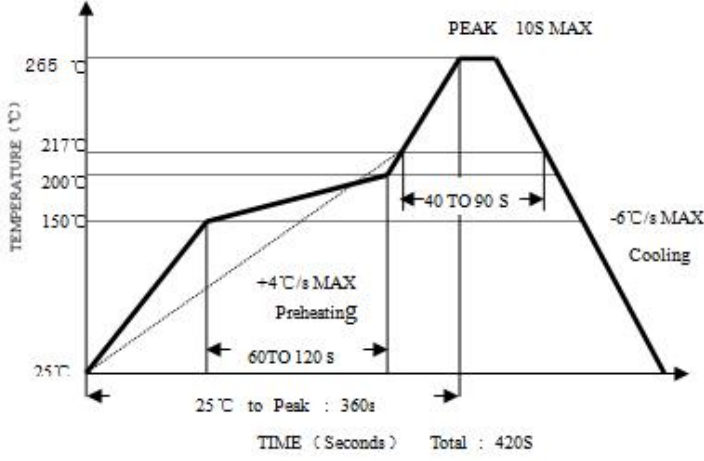
8. Outline drawing (unit: mm)



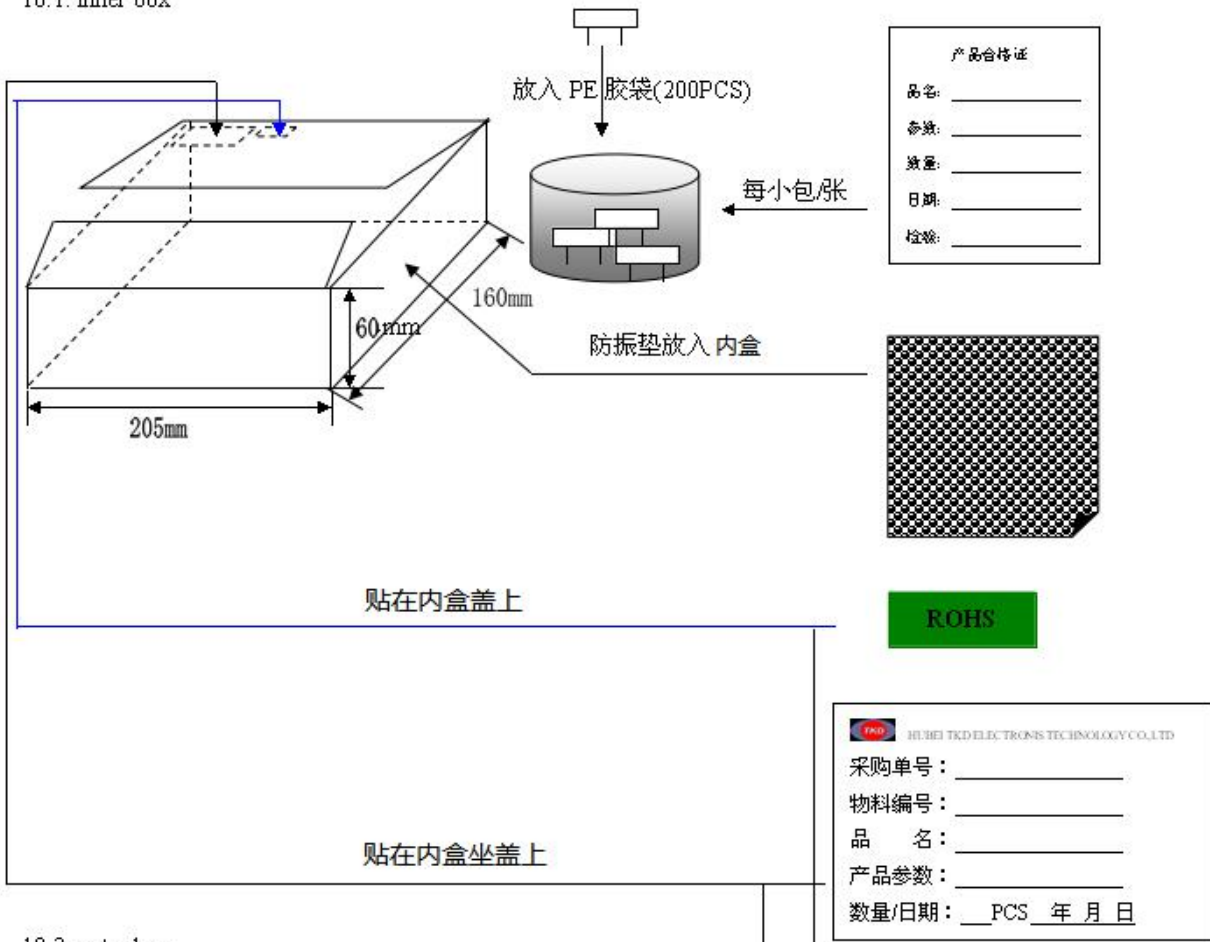


### 9. Reliability Specification

| Test Item                    | Condition of test   | Performance Requirements   |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
|------------------------------|---|--|-------------|----------|---|-----------|-------|---|---------------------------------|------------|---|-----------|-------|---|---------------------------------|------------|--------------------------------|
| Tensile Strength Termination | The unit's lead wire should withstand a tensile force applied to the termination in the direction of its draw-out axis of up to 1000g maintained as is for 10±2s  | There should be no abnormalities detected on the unit                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Solder ability               | The lead is immersed in a 235±5°C solder bath within 2±0.5 seconds.   | A new uniform coating of solder shall cover minimum 95% of the surface being immersed. |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Vibration                    | Endurance condition by a frequency sweep shall be made. The entire frequency range from 10HZ to 50HZ and return to 10HZ, shall be transverse in 1min. Amplitude (total excursion): 1.5mm this motion shall be applied for a period of 2h each of 3 mutually perpendicular axes (a total of 6h)  | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Drop                         | Form 70cm height 3 times on 3cm hard wooden floor   | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Shock                        | Peak acceleration: 981m/s <sup>2</sup> duration of the pulse :6ms three successive shocks shall be applied in both direction of 3 mutually perpendicular axes (a total of 18 shocks)  | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Damp heat                    | The unit shall be stored at a temperature of 40±2°C with relative humidity of 90% to 95% for 48h, then it shall be subjected to standard atmospheric conditions for 1 ~ 2h after which measurement shall be made.   | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Dry heat                     | The unit shall be stored at a temperature of 100°C±5°C for 24h, then it shall be subjected to standard atmospheric conditions for 1~2h after which measurement shall be made.   | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Cold                         | The unit shall be stored at a temperature of -40°C±5°C for 48h, then it shall be subjected to standard atmospheric conditions for 1~2h after which measurement shall be made.   | (1). Frequency Change: ±5ppm<br>(2). Resistance: ±15%                                  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Aging                        | The unit shall be stored at a temperature of 85°C±5°C for 7d then it shall be subjected to standard atmospheric conditions for 1~2h after which measurement shall be made.  | Refer to verdict specification   |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| Temperature cycling          | The unit shall be subjected to 5 successive change of temperature cycles, each as show in table below, then it shall be subjected to standard atmospheric conditions for 1 ~ 2h after which measurement shall be made <table border="1" data-bbox="400 1794 1062 2089" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40°C±3°C</td> <td>30min</td> </tr> <tr> <td>2</td> <td>Standard atmospheric conditions</td> <td>Within 30s</td> </tr> <tr> <td>3</td> <td>100°C±3°C</td> <td>30min</td> </tr> <tr> <td>4</td> <td>Standard atmospheric conditions</td> <td>Within 30s</td> </tr> </tbody> </table> |  | Temperature | Duration | 1 | -40°C±3°C | 30min | 2 | Standard atmospheric conditions | Within 30s | 3 | 100°C±3°C | 30min | 4 | Standard atmospheric conditions | Within 30s | Refer to verdict specification |
|                              | Temperature   | Duration   |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| 1                            | -40°C±3°C   | 30min  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| 2                            | Standard atmospheric conditions   | Within 30s   |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| 3                            | 100°C±3°C   | 30min  |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |
| 4                            | Standard atmospheric conditions   | Within 30s   |             |          |   |           |       |   |                                 |            |   |           |       |   |                                 |            |                                |

| Test Item                    | Condition of test   | Performance Requirements       |
|------------------------------|---|--------------------------------|
| Sealing                      | The crystal filter unit shall be immersed in a industry alcohol for 5±0.5 minutes then 25±3°C 1~2 Hr before testing   | Insulation Resistance>500MΩ    |
| Resistance to soldering heat |  <p>Reflow soldering cure see the chart.<br/>Soldering iron method:<br/>Bit temperature: 350°C±10°C<br/>Application time of soldering iron:5s Max</p> | Refer to verdict specification |

10.1. inner box



10.2. outer box

