

CRYSTAL SPECIFICATION



Customer : \_\_\_\_\_  
Customer P/N : \_\_\_\_\_  
Agent : \_\_\_\_\_  
Agent Code : \_\_\_\_\_  
SIWARD P/N : XTL571200-K114-002

Customer Approval :

**希華晶體科技股份有限公司**  
SIWARD CRYSTAL TECHNOLOGY CO., LTD.

業務部/ SALE DEPARTMENT  
TEL: (04)25347909  
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URL HTTP://www.siward.com.tw

DATE : 2012/11/01

Approved By : Steve Chen

品質保證部/ QUALITY ASSURANCE DEPT.  
TEL: (04)25347909 EXT 1340/1341

Checked By : Tom Tang

研發部/R & D DEPT.  
TEL: (04)25347909 EXT 1521

Designer : \_\_\_\_\_

Address: 1-1, LANE 111, JUNG-SHAN RD., SEC.3, TANTZU HSING, TAICHUNG 427, TAIWAN, R.O.C.

| Rev. | Description of Revision History  | Date       | Designer   | Checked By |
|------|--|------------|------------|------------|
| 1    | New Publication  | 2007/05/31 | Sally Lin  | Tom Tang   |
| 2    | Tolerance 、 Stability Over Temperature Befoer Changed:<br>+/- 15 PPM ; RLD2 、 Equivalent Series Resistance : 200 Ω.<br>(K0706-009) | 2007/06/22 | Eliza Laio | Tom Tang   |
| 3    | Drawing No Before Changed : SXD-00213.(K1011-006)  | 2010/11/09 | Eliza Laio | Tom Tang   |

## CRYSTAL SPECIFICATION

- 1. Description : Quartz Crystal
  - 2. Nominal Frequency : 12.000000 MHz
  - 3. Center Frequency : 12.000000 MHz
  - 4. Dimension & Drawing No. : SX-3225 ; SXD-00306
  - 5. Oscillation Mode : Fundamental
  - 6. Cutting Mode : AT cut
  - 7. Packing Style : TP-094
  - 8. Measurement Instrument : S&A 250B(Measured FL)
  - 9. Electrical Characteristics :
- [1] Operating Conditions :

| Item                        | Symbol | MIN. | TYP. | MAX. | Unit | Condition |
|-----------------------------|--------|------|------|------|------|-----------|
| Operating Temperature Range | Topt   | -40  |      | 85   | °C   |           |
| Storage Temperature Range   | Tstg   | -40  |      | 90   | °C   |           |
| Load Capacitance            | CL     |      | 10   |      | pF   |           |
| Drive Level                 | DL     |      |      | 100  | μW   |           |

[2] Frequency Stability :

| Item                       | Symbol | MIN. | TYP. | MAX. | Unit | Condition                         |
|----------------------------|--------|------|------|------|------|-----------------------------------|
| Tolerance                  | dF/Fo  | -10  |      | 10   | ppm  | Refer to Center Frequency @25±3°C |
| Stability Over Temperature | dF/F25 | -20  |      | 20   | ppm  | Refer to Operating Temperature    |
| Aging                      | dF/F25 | -2   |      | 2    | 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    |      |      | 110  | $\Omega$   | @Series      |
| Shunt Capacitance            | C0     |      |      | 5    | pF         |              |
| Insulation Resistance        | IR     | 500  |      |      | M $\Omega$ | @DC 100 Volt |

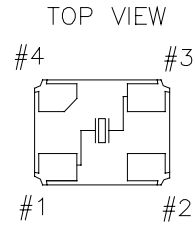
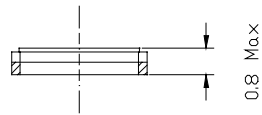
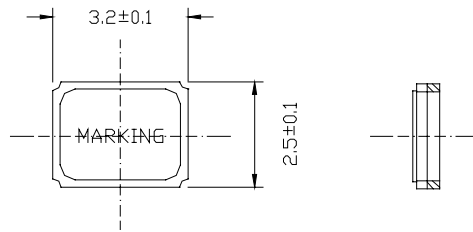
10. Marking : Laser

|  |  |
|--|--|
| <p>*MARKING : D -&gt;YEAR C -&gt; MONTH<br/>         YEAR : 1 2 3 4 5 6 7 8 9 0<br/>         CODE : A B C D E F G H J K<br/>         MONTH: 1 2 3 4 5 6 7 8 9 10 11 12<br/>         CODE : A B C D E F G H J K L M</p> | <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p>12.0</p> <p>S DC</p> </div> |
|--|--|

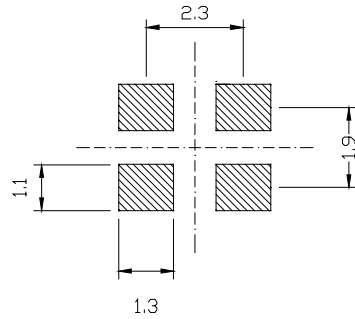
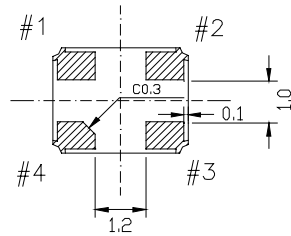
11. Remark :

|                                   |
|-----------------------------------|
| <p>*Lead Free, RoHS compliant</p> |
|-----------------------------------|

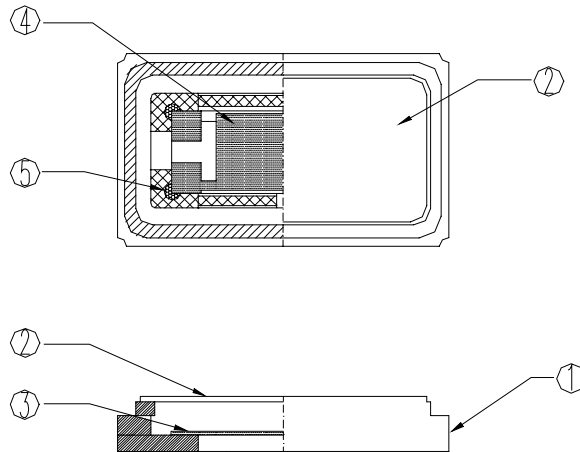
**■ DIMENSIONS**  
 Unit: mm



LAND PATTERN (REFERENCE)



**■ STRUCTURE ILLUSTRATION**



| PART NAME |       | MATERIAL | PART NAME |           | MATERIAL    |
|-----------|-------|----------|-----------|-----------|-------------|
| 1.        | BASE  | CERAMIC  | 4.        | ELECTRODE | Metal       |
| 2.        | LID   | KOVAR    | 5.        | ADHESMES  | SILVER GLUE |
| 3.        | BLANK | QUARTZ   |           |           |             |

■ RELIABILITY SPECIFICATION

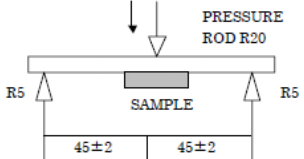
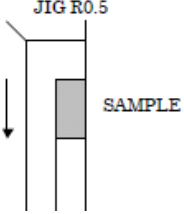
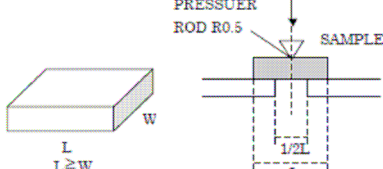
REFER TO JIS C 6701

1. ENVIRONMENTAL PERFORMANCE

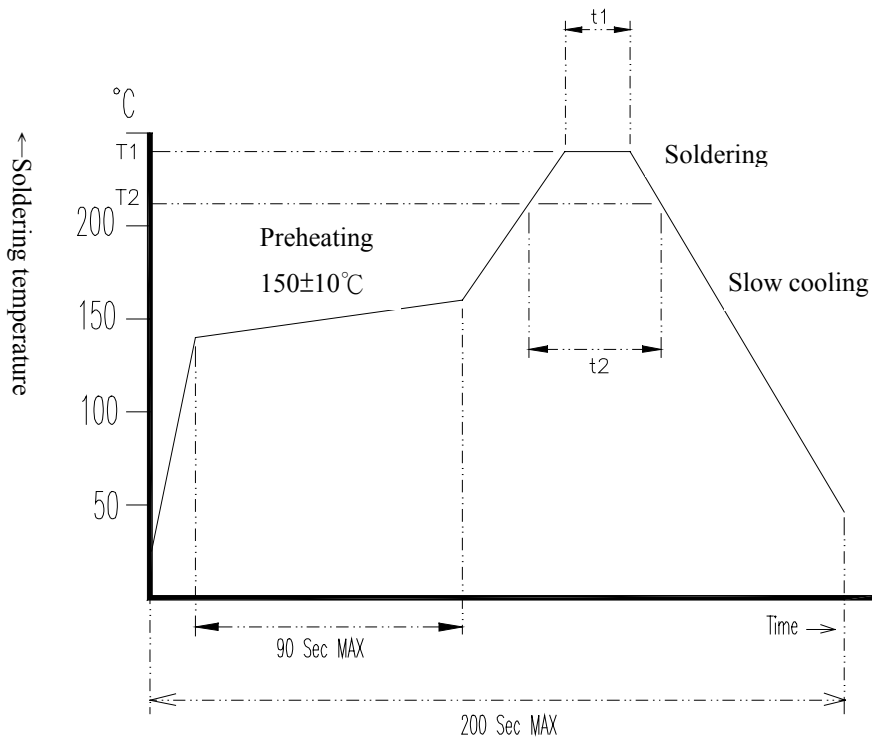
| ITEM                        | CONDITION  |             |          |               |              |             |             |              |               |             |             |
|-----------------------------|--|-------------|----------|---------------|--------------|-------------|-------------|--------------|---------------|-------------|-------------|
| 1. HIGH TEMPERATURE STORAGE | STORED AT 85±2°C FOR 720±12H. ( If Customer's temperature request is higher than the standard, Temperature test must be done for customer requirements. )<br>THEN 25±2°C OVER 2H BEFORE TESTING.   |             |          |               |              |             |             |              |               |             |             |
| 2. LOW TEMPERATURE STORAGE  | STORED AT -40±2°C FOR 500±12H. ( If Customer's temperature request is lower than the standard, Temperature test must be done for customer requirements. )<br>THEN 25±2°C OVER 2H BEFORE TESTING.   |             |          |               |              |             |             |              |               |             |             |
| 3. HIGH TEMP. & HUMIDITY    | STORED AT 60±2°C AND HUMIDITY 90~95% FOR 500±12 H.<br>THEN 25±2°C OVER 2H BEFORE TESTING.  |             |          |               |              |             |             |              |               |             |             |
| 4. TEMPERATURE CYCLE        | THE CRYSTAL UNIT SHALL BE SUBJECTED TO 100 SUCCESSIVE CHANGE OF TEMPERATURE CYCLES, THEN 25 ±2°C OVER 2 H BEFORE TESTING, EACH CYCLE AS BELLOW :<br><br><table border="0" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: left;">TEMPERATURE</th> <th style="text-align: left;">DURATION</th> </tr> </thead> <tbody> <tr> <td>1. -40+0/-6°C</td> <td>30±3 MINUTES</td> </tr> <tr> <td>2. 25°C±2°C</td> <td>2~3 MINUTES</td> </tr> <tr> <td>3. 85+4/-0°C</td> <td>30 ±3 MINUTES</td> </tr> <tr> <td>4. 25°C±2°C</td> <td>2~3 MINUTES</td> </tr> </tbody> </table> | TEMPERATURE | DURATION | 1. -40+0/-6°C | 30±3 MINUTES | 2. 25°C±2°C | 2~3 MINUTES | 3. 85+4/-0°C | 30 ±3 MINUTES | 4. 25°C±2°C | 2~3 MINUTES |
| TEMPERATURE                 | DURATION   |             |          |               |              |             |             |              |               |             |             |
| 1. -40+0/-6°C               | 30±3 MINUTES   |             |          |               |              |             |             |              |               |             |             |
| 2. 25°C±2°C                 | 2~3 MINUTES  |             |          |               |              |             |             |              |               |             |             |
| 3. 85+4/-0°C                | 30 ±3 MINUTES  |             |          |               |              |             |             |              |               |             |             |
| 4. 25°C±2°C                 | 2~3 MINUTES  |             |          |               |              |             |             |              |               |             |             |

2. MECHANICAL PERFORMANCE

| ITEM                            | CONDITION   |
|---------------------------------|---|
| 5. SOLDERABILITY                | THE LEAD IS IMMersed IN A 260±5°C SOLDER BATH WITHIN 2±0.6 SECONDS.   |
| 6. RESISTANCE TO SOLDERING HEAT | REFLOW CHART AS ATTACH SHEET. TWICE PASS.   |
| 7. FREE FALL                    | FREE DROPPING FROM 75 cm HEIGHT 3 TIMES ON A HARD WOODEN BOARD.   |
| 8. VIBRATION                    | FREQUENCY : 10~55Hz,<br>AMPLITUDE (TOTAL EXCURSION) : 1.5mm±15%,<br>SWEEP TIME : 1MIN, 3 DIRECTION(X, Y, Z) EACH FOR 2 Hrs. |
| 9. GROSS LEAK                   | STANDARD SAMPLE FOR AUTOMATIC GROSS LEAK DETECTOR,<br>TEST PRESSURE: 0.2 Mpa  |
| 10. FINE LEAK                   | HELIUM BOMBING 5.0~5.5 Kgf / cm <sup>2</sup><br>FOR 2 HOURS.  |

|                                      |   |
|--------------------------------------|---|
| <p>11. TERMINAL STRENGTH</p>         | <p>SHALL BE PRESSURIZED AT A SPEED OF APPROX.0.5mm/sec IN THE DIRECTION INDICATED BY THE ARROW UNTIL THE BENDING WIDTH REACHES 3mm AND HELD FOR 5 SECONDS.</p>  |
| <p>12. STICKING TENDENCY</p>         | <p>A R0.5 JIG SHALL BE USED TO APPLY A 10N DEAD LOAD IN THE DIRECTION INDICATED BY THE ARROW TO THE ELEMENT AND RETAIN IT FOR 10 SECONDS.</p>                   |
| <p>13. ELEMENT ASSEMBLY STRENGTH</p> | <p>A R0.5 PRESSURIZED BAR SHALL BE USED TO APPLY A 10N LOAD IN THE CENTER OF ELEMENT AND RETAIN IT FOR 10 SECONDS.</p>   |

■ SUGGESTED REFLOW PROFILE

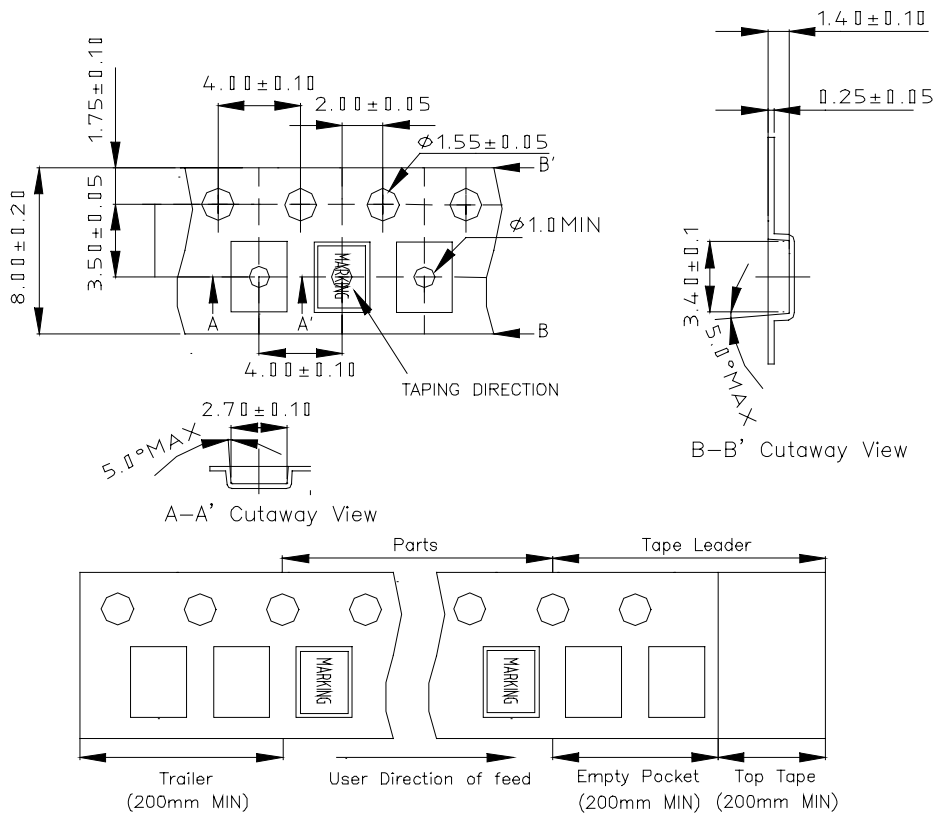


| Application\Temperature Time | T1 / t1              | T2 / t2             |
|------------------------------|----------------------|---------------------|
| Lead Free                    | 260±5°C / 10 Sec Max | 225Min / 60 Sec Max |
| Non Lead Free                | 240±5°C / 10 Sec Max | 200Min / 40 Sec Max |

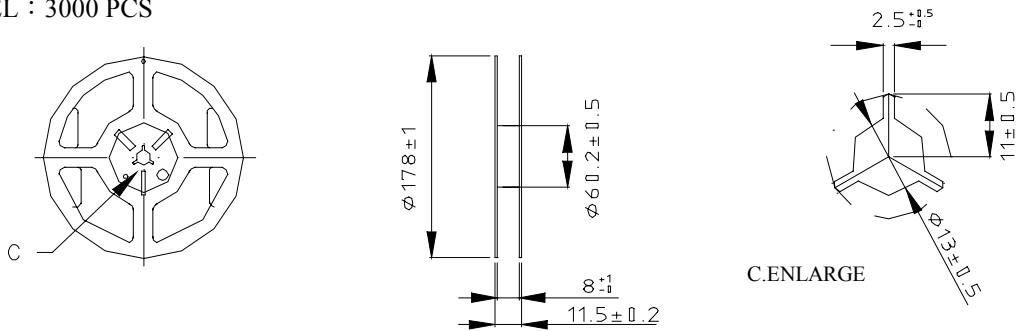
■ PACKING

Unit: mm

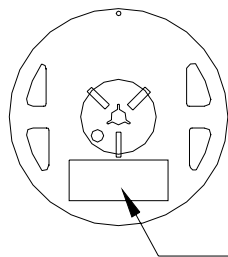
1. CARRIER TYPE



2. REEL : 3000 PCS



3. LABEL



|            |         |
|------------|---------|
| CUSTOMER : |         |
| P.O.# :    |         |
| CUST.P/N : |         |
| MFG.P/N :  |         |
| FREQ. :    | MHZ     |
|            | MHZ     |
| TYPE :     | D.C. :  |
| Q'TY. :    | SPEC. : |
| LOT NO :   |         |
| REMARK 1 : |         |
| REMARK 2 : |         |





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