

**SMD CRYSTAL UNIT SPECIFICATIONS**

|                          |                           |
|--------------------------|---------------------------|
| <b>Customer</b>          | 立创                        |
| <b>Customer P/N</b>      |                           |
| <b>Product</b>           | 3225 Seam Sealing Crystal |
| <b>Nominal Frequency</b> | 16.000000MHz              |
| <b>HOSONIC P/N</b>       | E3SB16E000013E            |
| <b>Version</b>           | 10C0                      |
| <b>Issue Date</b>        | 2015/7/14                 |

| <b>HOSONIC</b> |                |                 |
|----------------|----------------|-----------------|
| <b>Drawn</b>   | <b>Checked</b> | <b>Approved</b> |
| <b>LUCY</b>    | <b>ZOE</b>     | <b>JOHN</b>     |

**Approved By Customer :** \_\_\_\_\_



**HOSONIC ELECTRONIC CO., LTD.**



Revised Record

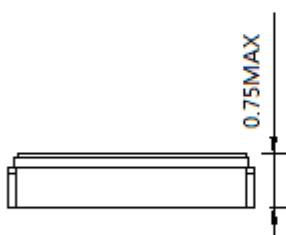
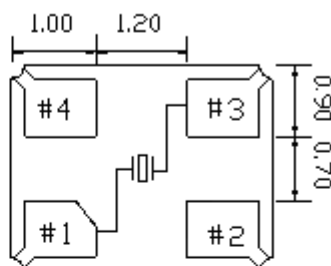
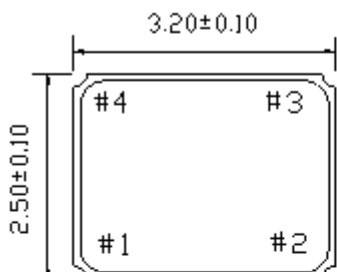
| Rev. | Rev. Date  | Item | Content          | Remark |
|------|------------|------|------------------|--------|
| 1.0  | 2015-07-14 |      | Initial released |        |

• **ELECTRICAL PARAMETERS**

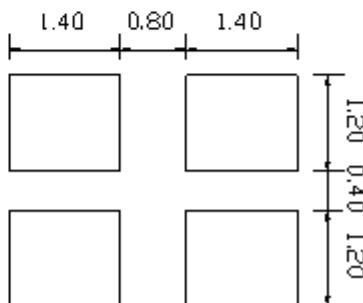
| No | Item  | Symb.            | Electrical Specification |      |      |       | Remark                |
|----|---|------------------|--------------------------|------|------|-------|-----------------------|
|    |   |                  | Min.                     | Typ. | Max. | Units |                       |
| 1  | Nominal Frequency                                   | F0               | 16.000000                |      |      | MHz   |                       |
| 2  | Mode of Vibration                                   |                  | Fundamental              |      |      |       |                       |
| 3  | Frequency Tolerance                                 | $\Delta F/F0$    | -10                      | -    | 10   | ppm   | At 25°C±3°C           |
| 4  | Operating Temperature Range                         | T <sub>OPR</sub> | -30                      | -    | 85   | °C    |                       |
| 5  | Frequency Stability<br>(over operating temperature) | TC               | -10                      | -    | 10   | ppm   | Ref. to 25°C          |
| 6  | Storage Temperature                                 | T <sub>STG</sub> | -55                      | -    | 125  | °C    |                       |
| 7  | Load capacitance                                    | CL               | -                        | 12   | -    | pF    |                       |
| 8  | Equivalent Series Resistance                        | ESR              | -                        | -    | 100  | Ω     |                       |
| 9  | Drive Level   | DL               | -                        | 100  | 200  | μW    |                       |
| 10 | Insulation Resistance                               | IR               | 500                      | -    | -    | MΩ    | At 100V <sub>DC</sub> |
| 11 | Shunt Capacitance                                   | C0               | -                        | -    | 3    | pF    |                       |
| 12 | Aging Per Year                                      | Fa               | -2                       | -    | 2    | ppm   | First Year            |
| 13 | Package type  | HCX-3SB          |                          |      |      |       |                       |

**NOTE: Storage Temperature is only for the product itself, the temperature for the packing material is -4~40°C.**

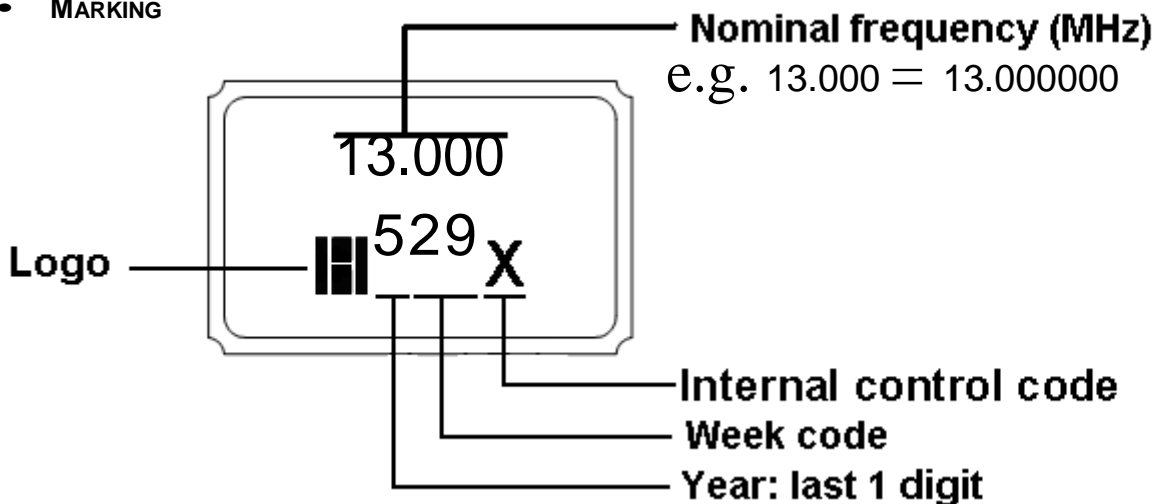
- OUTLINE DIMENSIONS (UNIT: mm)

**Top View**

**Recommended Solder Pattern**

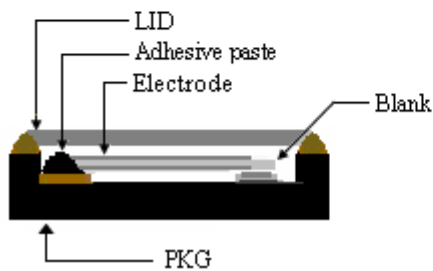
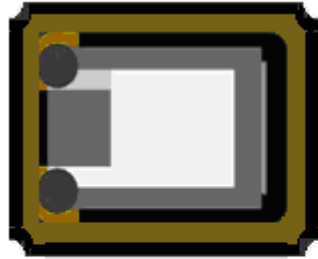
| Pin   | Connection |
|-------|------------|
| #1,#3 | X'tal      |
| #2,#4 | GND        |



- MARKING



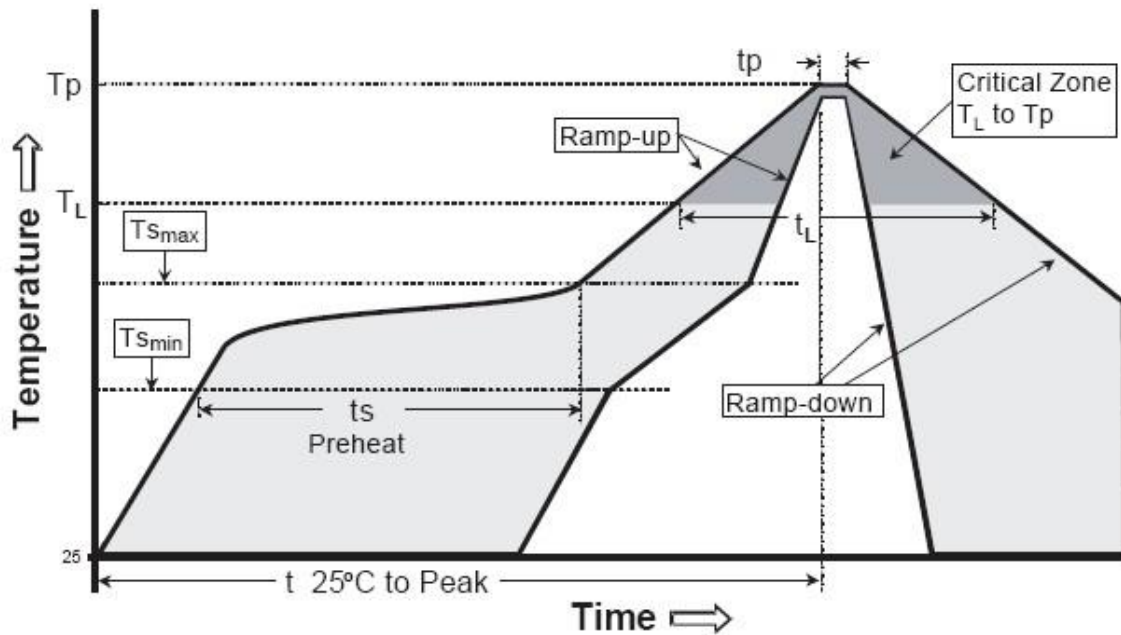
- **PRODUCT LAYOUT**



| NO. | Part           | Material                       | Remark  |
|-----|----------------|--------------------------------|---------|
| 1   | LID            | KOVAR(Fe+Co+Ni alloy)          |         |
| 2   | PKG            | Al <sub>2</sub> O <sub>3</sub> | Base    |
| 3   | Blank          | SiO <sub>2</sub>               | Quartz  |
| 4   | Adhesive paste | Ag/Silicon                     | Support |
| 5   | Electrode      | Noble metal                    |         |

- REFLOW PROFILES

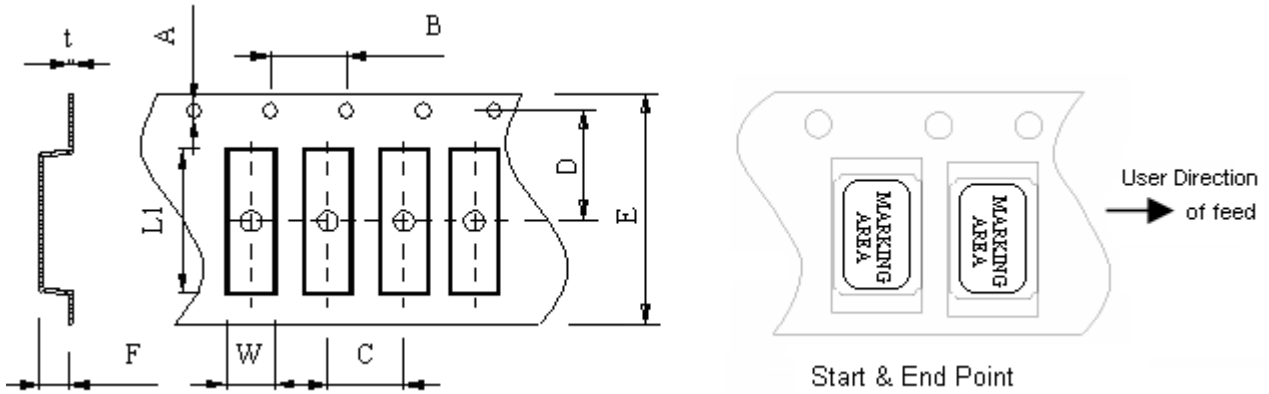
| Profiles Feature  | Pb-Free Assembly                 |
|---|----------------------------------|
| Average Ramp-up Rate (Ts max to Tp)   | 3°C/second max.                  |
| Preheat <ul style="list-style-type: none"> <li>Temperature Min (Ts min)</li> <li>Temperature Max (Ts max)</li> <li>Time (ts min to ts max)</li> </ul> | 125°C<br>200°C<br>60~180 seconds |
| Time maintained above <ul style="list-style-type: none"> <li>Temperature (TL)</li> <li>Time (tL)</li> </ul>   | 217°C<br>60~150 seconds          |
| Peak/Classification Temperature (Tp)  | 260°C                            |
| Time within 5°C of actual Peak Temperature (tp)   | 20~40 seconds                    |
| Ramp-down rate  | 6°C/second max.                  |
| Time 25°C to Peak Temperature   | 8 minutes max.                   |
| <b>Suggest reflow times</b>   | <b>3 Times max</b>               |



**Remark: To reference JEDEC J-STD-020C**

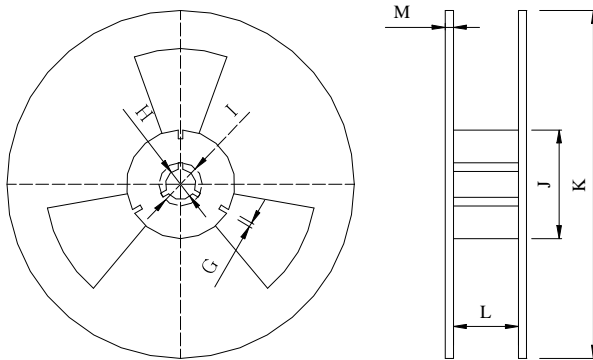
- PACKAGE(reference to EIA-481)

*Tape Dimensions(unit : mm)*



| A    | B   | C   | D   | E   | F   | L1  | W   | t   |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1.50 | 4.0 | 4.0 | 3.5 | 8.0 | 1.0 | 3.4 | 2.7 | 0.3 |

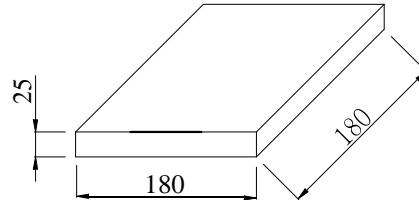
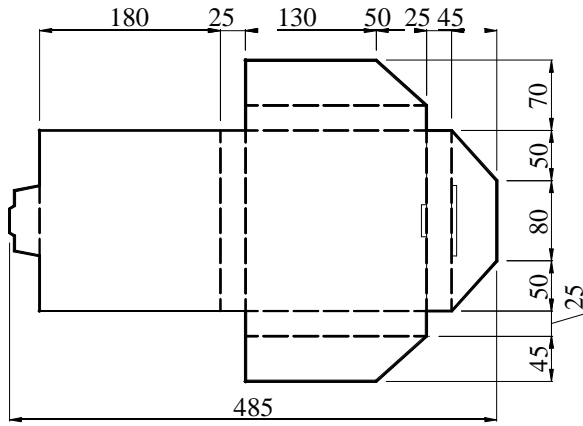
*Reel Dimensions(unit: mm)*



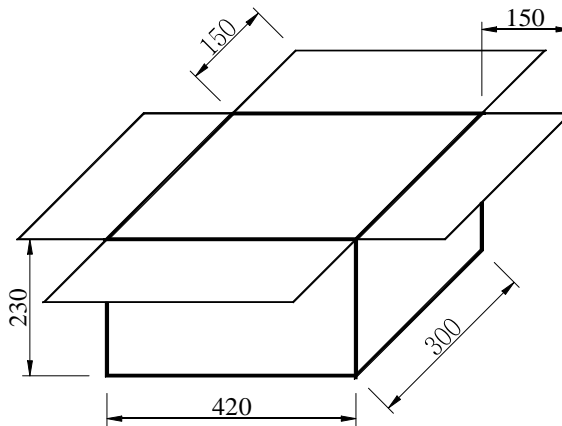
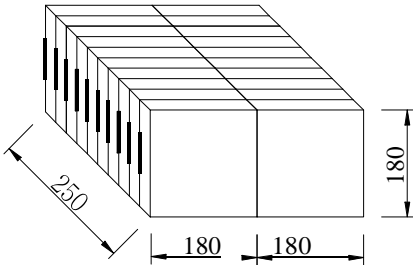
| G   | H    | I    | J    | K   | L   | M   |
|-----|------|------|------|-----|-----|-----|
| 2.5 | 13.5 | 21.6 | 60.0 | 178 | 9.5 | 1.6 |

\*3000pcs/Reel

Carton Dimension (unit : mm)



1 reel = 1 Inner box



20 Inner boxes = 1 Carton

60kpcs = 1 Carton



- RELIABILITY SPECIFICATIONS**

| No. | Test Item                               | Test Conditions  | Reference             |
|-----|---|--|-----------------------|
| 1   | High Temperature Storage                | Temperature: 125°C ±5°C<br>Time: 1000±12 Hours   | MIL-STD-883E-1016     |
| 2   | Temperature Cycle                       | Temperature 1: -55°C ±5°C<br>Temperature 2: 125°C ±5°C<br>Temperature change between T1 and T2 at soonest<br>Run 1000 cycles, maintain T1 and T2 5minutes each in one cycle  | JESD22 Method JA-104  |
| 3   | Solder Heat Resistance                  | Pre-heat: 125°C 60~120 Seconds<br>Solder Temperature: 260°C ±5°C<br>Time: 30 Seconds   | MIL-STD-202F 210 E    |
| 4   | Drop Test                               | 3 Times Free Fall from 75cm height table to 3cm thickness hard wood board  | MIL-STD-202F-203B     |
| 5   | High Temperature, High Humidity Storage | Temperature: 85°C ±5°C<br>Relative Humidity: 80%--85%<br>Time: 250Hours±24 Hours   | MIL-STD-202F-103B     |
| 6   | Steam Aging                             | Temperature: 97°C ±5°C<br>Time: 24 Hours<br>260°C solder pot to check solderability  | MIL-STD-883 C-1008.2B |
| 7   | Solderability                           | Dip in flux 5~10 seconds<br>Temperature: 245°C ±5°C<br>Time: 10 Seconds  | MIL-STD-202F-208H     |
| 8   | Aging                                   | Temperature: 85°C ±5°C<br>Time: 250±12Hours  | MIL-STD-202 F-108A    |
| 9   | Thermal Shock                           | Temperature 1: -55°C ±5°C<br>Temperature 2: 125°C ±5°C<br>Temperature change between T1 and T2: 5 seconds<br>100 cycles, maintain T1 and T2 for 30 minutes each in one cycle | MIL-STD-883E-1011.9B  |
| 10  | Vibration                               | Frequency Range: 10Hz~2000Hz<br>Amplitude: 1.5mm or 20G<br>4Hours in each direction, total 12Hours   | MIL-STD-202F-204D     |