



HOSONIC ELECTRONIC CO., LTD.



SMD CRYSTAL UNIT SPECIFICATIONS

| | |
|--------------------------|---------------------------|
| Customer | |
| Customer P/N | |
| Product | 2016 Seam Sealing Crystal |
| Nominal Frequency | 16.000000MHz |
| HOSONIC P/N | E1SB16E000007E |
| Version | 10C0 |
| Issue Date | 2018/1/9 |

| HOSONIC | | |
|----------------|----------------|-----------------|
| Drawn | Checked | Approved |
| LUCY | ZOE | JOHN |

Approved By Customer : _____



HOSONIC ELECTRONIC CO., LTD.



Revised Record

| Rev. | Rev. Date | Item | Content | Remark |
|------|------------|------|------------------|--------|
| 1.0 | 2018-01-09 | | Initial released | |

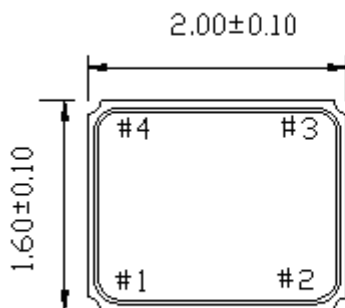
I ELECTRICAL PARAMETERS

Electrical characteristics measured by S&A250B or equivalent.

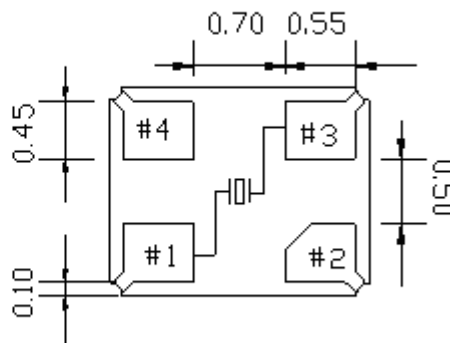
| No. | Item | Symb. | Electrical Specification | | | | Remark | |
|-----|--|------------------|--------------------------|------|------|-------|-----------------------|--|
| | | | Min. | Typ. | Max. | Units | | |
| 1 | Nominal Frequency | F0 | 16.000000 | | | MHz | | |
| 2 | Mode of Vibration | | Fundamental | | | | | |
| 3 | Frequency Tolerance | $\Delta F/F0$ | -10 | - | 10 | ppm | At 25°C±3°C | |
| 4 | Operating Temperature Range | T _{OPR} | -40 | - | 85 | °C | | |
| 5 | Frequency Stability (over operating temperature) | TC | -15 | - | 15 | ppm | Ref. to 25°C | |
| 6 | Storage Temperature | T _{STG} | -55 | - | 125 | °C | | |
| 7 | Load capacitance | CL | - | 9 | - | pF | | |
| 8 | Equivalent Series Resistance | ESR | - | - | 150 | Ω | | |
| 9 | Drive Level | DL | - | 50 | 100 | μW | | |
| 10 | Insulation Resistance | IR | 500 | - | - | MΩ | At 100V _{DC} | |
| 11 | Shunt Capacitance | C0 | - | - | 3 | pF | | |
| 12 | Aging Per Year | Fa | -2 | - | 2 | ppm | First Year | |
| 13 | Package type | E1SB | | | | | | |

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

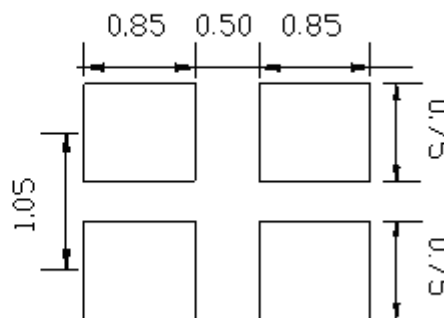
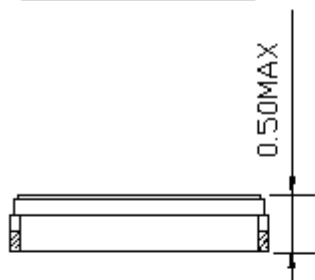
I OUTLINE DIMENSIONS (UNIT: mm)



Top View

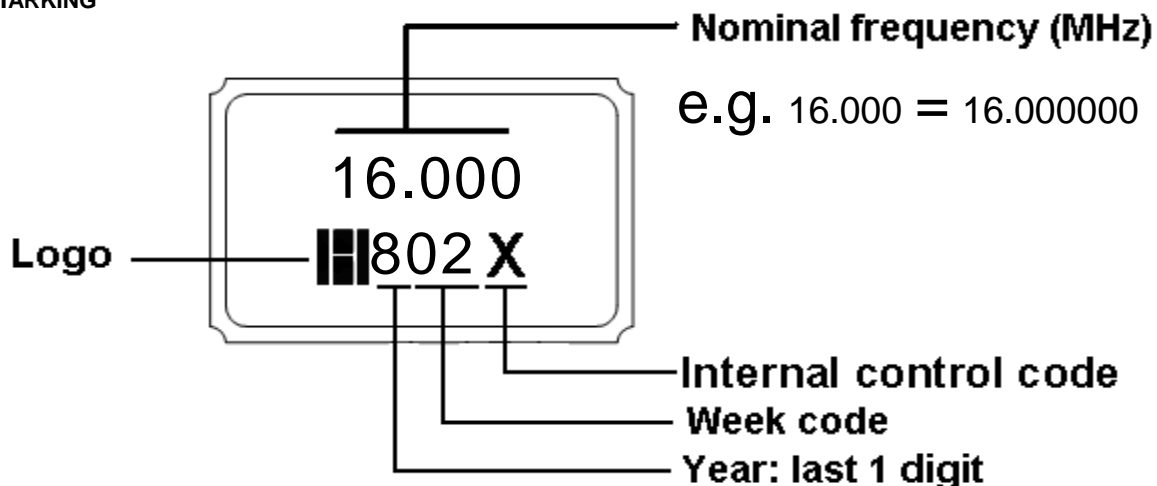


Recommended Solder Pattern

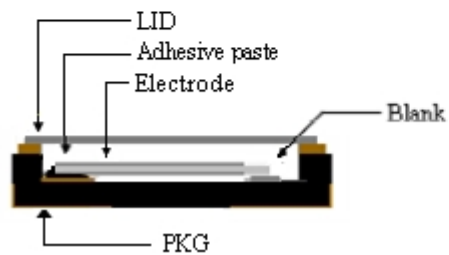
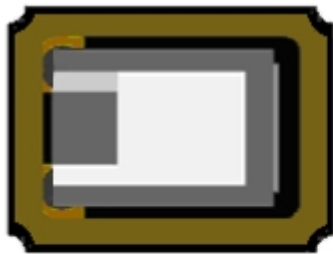


| Pin | Connection |
|-------|------------|
| #1,#3 | X'tal |
| #2,#4 | GND |

I MARKING



NOTE: The internal control code maybe blank.

I PRODUCT LAYOUT


| NO. | PART | MATERIAL | REMARK |
|-----|----------------|--------------------------------|---------|
| 1 | LID | KOVAR(Fe+Co+Ni alloy) | |
| 2 | PKG | Al ₂ O ₃ | Base |
| 3 | Blank | SiO ₂ | Quartz |
| 4 | Adhesive paste | Ag/Silicon | Support |
| 5 | Electrode | Noble metal | |

I REFLOW PROFILES

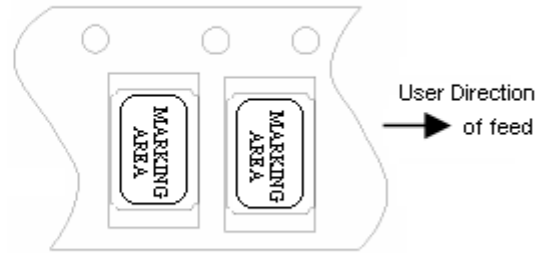
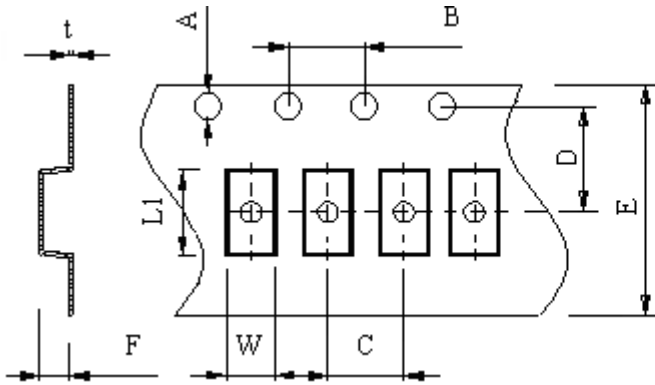
| Profiles Feature | Pb-Free Assembly |
|---|----------------------------------|
| Average Ramp-up Rate (Ts max to Tp) | 3°C/second max. |
| Preheat <ul style="list-style-type: none"> ■ Temperature Min (Ts min) ■ Temperature Max (Ts max) ■ Time (ts min to ts max) | 125°C 200°C 60~180 seconds |
| Time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



Remark: To reference JEDEC J-STD-020C

I PACKAGE(reference to EIA-481)

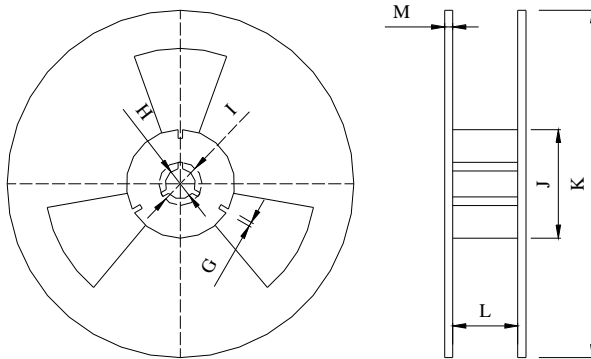
Tape Dimensions(unit : mm)



Start & End Point

| A | B | C | D | E | F | L1 | W | t |
|------|-----|-----|-----|-----|------|------|------|-----|
| 1.50 | 4.0 | 4.0 | 3.5 | 8.0 | 0.65 | 2.25 | 1.85 | 0.2 |

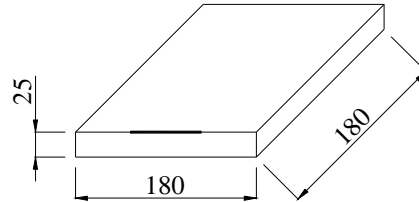
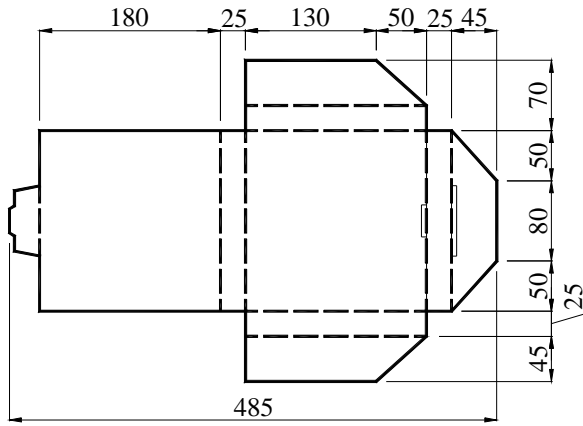
Reel Dimensions(unit: mm)



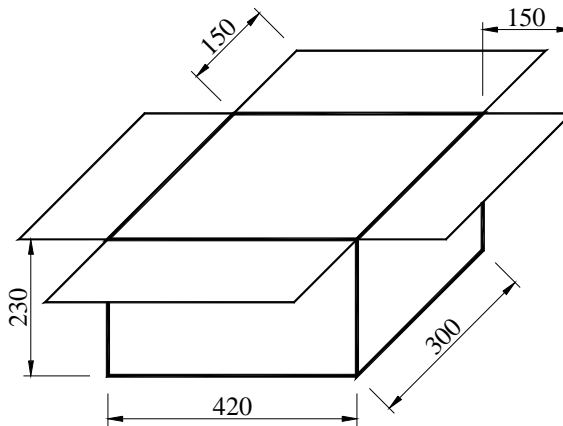
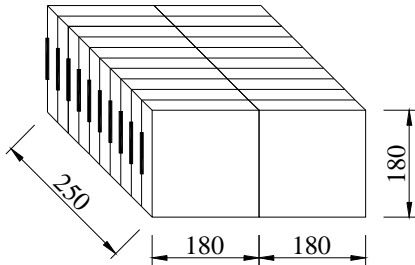
| G | H | I | J | K | L | M |
|-----|------|------|------|-----|-----|-----|
| 2.5 | 13.5 | 21.6 | 60.0 | 178 | 9.5 | 1.6 |

*3000pcs/Reel

Carton Dimension (unit : mm)



1 reel = 1 Inner box



20 Inner boxes = 1 Carton

60kpcs = 1 Carton

I RELIABILITY SPECIFICATIONS

| No. | Test Item | Test Conditions | Reference |
|-----|---|--|-----------------------|
| 1 | High Temperature Storage | Temperature: $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Time: 1000 ± 12 Hours | MIL-STD-883E-1016 |
| 2 | Temperature Cycle | Temperature 1: $-55^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Temperature 2: $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Temperature change between T1 and T2 at soonest 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 Solder Temperature: $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 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: $85^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Relative Humidity: 80%~85% Time: 250Hours \pm 24 Hours | MIL-STD-202F-103B |
| 6 | Steam Aging | Temperature: $97^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Time: 24 Hours 260°C solder pot to check solderability | MIL-STD-883 C-1008.2B |
| 7 | Solderability | Dip in flux 5~10 seconds Temperature: $245^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Time: 10 Seconds | MIL-STD-202F-208H |
| 8 | Aging | Temperature: $85^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Time: 250 ± 12 Hours | MIL-STD-202 F-108A |
| 9 | Thermal Shock | Temperature 1: $-55^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Temperature 2: $125^{\circ}\text{C} \pm 5^{\circ}\text{C}$ Temperature change between T1 and T2: 5 seconds 100 cycles, maintain T1 and T2 for 30 minutes each in one cycle | MIL-STD-883E-1011.9B |
| 10 | Vibration | Frequency Range: 10Hz~2000Hz Amplitude: 1.5mm or 20G 4Hours in each direction, total 12Hours | MIL-STD-202F-204D |

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