

PSE Technology Corporation

SPECIFICATION FOR APPROVAL

| | |
|-------------------|----------------------------|
| CUSTOMER | |
| NOMINAL FREQUENCY | 32.768 KHz |
| PRODUCT TYPE | TYPE G8 SMD CRYSTAL |
| SPEC. NO. (P/N) | G83270022 |
| CUSTOMER P/N | |
| ISSUE DATE | Jun.16,2016 |
| VERSION | A |

| APPROVED | PREPARED | QA |
|---|--------------|-------------------|
| <i>Brenda</i> | <i>Clair</i> | <i>Song Yang</i> |
| APPROVED BY CUSTOMER : | | AVL Status |
| | | |
| Please return one copy with approval to PSE-TW | | |

PSE Technology Corporation

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*RoHS Compliant

TYPE G8 SMD CRYSTAL

G83270022

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ELECTRICAL SPECIFICATIONS

SRe Part Number : G83270022

| Parameters | Symbol | Specifications | Units | Notes |
|------------------------------|--------|----------------|---------------------|---------------------------|
| Nominal Frequency | Fn | 32.768 | KHz | |
| Frequency Tolerance | FT | ± 10 | ppm | at 25 °C ± 5 °C |
| Load Capacitance | CL | 12.5 | pF | Typ. |
| Drive Level | DL | 0.1 / 0.5 | µW | Typ. / Max. |
| Equivalent Series Resistance | ESR | 70 | KΩ | Max. |
| Temperature Coefficient | K | -0.03 | ppm/°C ² | ± 0.01ppm/°C ² |
| Operating Temperature Range | TR | -40 to 85 | °C | |
| Shunt Capacitance | C0 | 1.5 | pF | Typ. |
| Motional Capacitance | C1 | 6.5 | fF | Typ. |
| Quality Factor | Q | 13 | K | Min. |
| Aging | | ± 3 | ppm | Max. 1st year |
| Storage Temperature Range | | -40 to 85 | °C | |
| Insulation Resistance | | 500 | MΩ | Min. |

Reliability (Mechanical and environmental performances)

| No. | Test Items | Conditions | Requirements |
|-----|--------------------|---|---|
| 1 | Bending test | Apply pressure in the direction of the arrow at a rate of about 0.5mm/s until bent width reaches 5mm, and hold for 30 seconds. | <ul style="list-style-type: none">• Without mechanical damage such as breaks and satisfy sealing specification.• Frequency change: Within ±5ppm• Equivalent series resistance(E.S.R) change: Within 5kΩ |
| 2 | Shear test | Apply 20N(2.04kgf) static load to the core of quartz crystal units in the direction of the arrow using a R0.5 scratch tool, then hold for 5 seconds. | |
| 3 | Core body strength | Apply 10N(1.02kgf) static load to the quartz crystal units center in the direction of the arrow using a R0.5 pushing tool, then hold for 10 seconds. | |
| 4 | Vibration | Frequency sweep method shall be applied as follows. Quartz crystal units shall be vibrated with the sweeping frequency from 10Hz to 55Hz and return to 10Hz in 1 minute, with 1.5mm amplitude. This vibration shall be applied for 2 hours in each 3 perpendicular axes. Other procedures conform to JIS C 60068-2-6. | |
| 5 | Shock | Quartz crystal units shall be accelerated at 9810m/s ² by 1ms pulse duration. This shock shall be applied 3 times in each 3 perpendicular axes. Other procedures conform to JIS C 60068-2-27. | |

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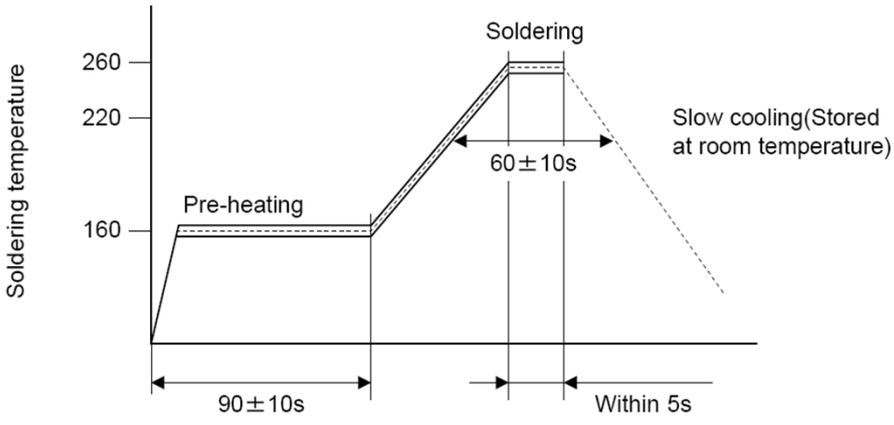
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| 6 | Cold | Quartz crystal units shall be stored in the $-40\pm 3^{\circ}\text{C}$ atmosphere for 1000 hours. Other procedures conform to JIS C 60068-2-1. | <ul style="list-style-type: none"> • Frequency change: Within $\pm 5\text{ppm}$ • Equivalent series resistance(E.S.R) change: Within $5\text{k}\Omega$ | | | | | | | | | | | | | | |
|----|----------------------------|---|--|-------|-------------|------------|---|----------------------------|----------------|---|--------------------|---|---|----------------------------|----------------------------|---|--------------------|
| 7 | Dry heat | Quartz crystal units shall be stored in the $100\pm 2^{\circ}\text{C}$ atmosphere for 100 hours. Other procedures conform to JIS C 60068-2-2. | <ul style="list-style-type: none"> • After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured. | | | | | | | | | | | | | | |
| 8 | Damp heat | Quartz crystal units shall be stored in the $40\pm 2^{\circ}\text{C}$ atmosphere with 90 to 95% relative humidity for 1000 hours. Other procedures conform to JIS C 60068-2-3. | | | | | | | | | | | | | | | |
| 9 | Change of temperature | Quartz crystal units shall be subjected successively 100 cycles of temperature change shown below. Other procedures conform to JIS C 0025. | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th></th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-40\pm 3^{\circ}\text{C}$</td> <td>30min.</td> </tr> <tr> <td>2</td> <td>Normal temperature</td> <td>Within 30 sec.</td> </tr> <tr> <td>3</td> <td>$100\pm 2^{\circ}\text{C}$</td> <td>30min.</td> </tr> <tr> <td>4</td> <td>Normal temperature</td> <td>Within 30 sec.</td> </tr> </tbody> </table> | | | Temperature | Duration | 1 | $-40\pm 3^{\circ}\text{C}$ | 30min. | 2 | Normal temperature | Within 30 sec. | 3 | $100\pm 2^{\circ}\text{C}$ | 30min. | 4 | Normal temperature |
| | Temperature | Duration | | | | | | | | | | | | | | | |
| 1 | $-40\pm 3^{\circ}\text{C}$ | 30min. | | | | | | | | | | | | | | | |
| 2 | Normal temperature | Within 30 sec. | | | | | | | | | | | | | | | |
| 3 | $100\pm 2^{\circ}\text{C}$ | 30min. | | | | | | | | | | | | | | | |
| 4 | Normal temperature | Within 30 sec. | | | | | | | | | | | | | | | |
| 10 | Sealing | Both the test methods specified below shall be applied. | | | | | | | | | | | | | | | |
| | | Quartz crystal units shall be soaked in 90°C or higher temperature hot water for 5 minutes. | <ul style="list-style-type: none"> • Without repetitive leaking bubbles from quartz crystal units. | | | | | | | | | | | | | | |
| | | Quartz crystal units shall be tested by Mass spectrometric leakage detector to measure the leakage rate of helium gas. | <ul style="list-style-type: none"> • $1\times 10^{-9}\text{ Pa}\cdot\text{m}^3/\text{s}$ or less | | | | | | | | | | | | | | |
| 11 | Aging | Quartz crystal units shall be stored in the $85\pm 3^{\circ}\text{C}$ atmosphere for 720 ± 12 hours. | <ul style="list-style-type: none"> • Frequency change: Within $\pm 5\text{ppm}$ • Equivalent series resistance(E.S.R) change: Within $5\text{k}\Omega$ • After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured. | | | | | | | | | | | | | | |
| 12 | Solder-ability | Terminals coated with flux shall be immersed in the solder bath for 3.5 ± 0.5 seconds. | <ul style="list-style-type: none"> • Minimum 95% of immersed terminal shall be covered with new uniform solder. | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th></th> <th>Items</th> <th>Conditions</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Solder</td> <td>Sn-3.0Ag-0.5Cu</td> </tr> <tr> <td>2</td> <td>Flux</td> <td>Approximately 25wt% methanol(JIS K 8891) solution of resin(JIS K 5902).</td> </tr> <tr> <td>3</td> <td>Solder temperature</td> <td>$245\pm 5^{\circ}\text{C}$</td> </tr> </tbody> </table> | | | Items | Conditions | 1 | Solder | Sn-3.0Ag-0.5Cu | 2 | Flux | Approximately 25wt% methanol(JIS K 8891) solution of resin(JIS K 5902). | 3 | Solder temperature | $245\pm 5^{\circ}\text{C}$ | | |
| | | | | Items | Conditions | | | | | | | | | | | | |
| 1 | Solder | Sn-3.0Ag-0.5Cu | | | | | | | | | | | | | | | |
| 2 | Flux | Approximately 25wt% methanol(JIS K 8891) solution of resin(JIS K 5902). | | | | | | | | | | | | | | | |
| 3 | Solder temperature | $245\pm 5^{\circ}\text{C}$ | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

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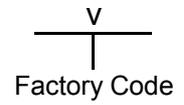
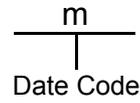
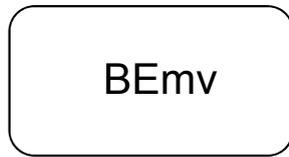
| | | | |
|--|---|--|---|
| <p>13 Resistance to soldering heat</p> | <p>Reflow soldering method</p> | <p>Temperature profile</p>  <p>Peak temperature: $260\pm 5^{\circ}\text{C}$ for within 5seconds. Soldering temperature: 220°C or higher for 60 ± 10 seconds. Pre-heating temperature: $160\pm 10^{\circ}\text{C}$ for 90 ± 10 seconds. Quartz crystal units which is put on PCB shall be through reflow soldering furnace twice with the condition shown above.</p> | <ul style="list-style-type: none"> • Frequency change: Within $\pm 5\text{ppm}$ • Equivalent series resistance (E.S.R) change: Within $10\text{k}\Omega$ • After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured. • Without distinct deformation in appearance. |
| | <p>Hot Air method</p> <p>Apply hot air for 7 ± 0.5seconds, distance 10mm, $300\pm 5^{\circ}\text{C}$, flow 10L/minutes</p> | | <ul style="list-style-type: none"> • Frequency change: Within $\pm 5\text{ppm}$ • Equivalent series resistance(E.S.R) change: Within $5\text{k}\Omega$ • After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured. • Without distinct deformation in appearance. |
| <p>14 Solubility to resistance</p> | <p>Soak cleaning</p> <p>Quartz crystal units shall be soaked in isopropyl alcohol at normal temperature for 90 seconds.</p> | | <ul style="list-style-type: none"> • Without mechanical damage such as breaks and satisfy sealing specification. • Frequency change: Within $\pm 5\text{ppm}$ • Equivalent series resistance(E.S.R) change: Within $5\text{k}\Omega$ • Without distinct deformation in appearance. • Marking shall be legible. |

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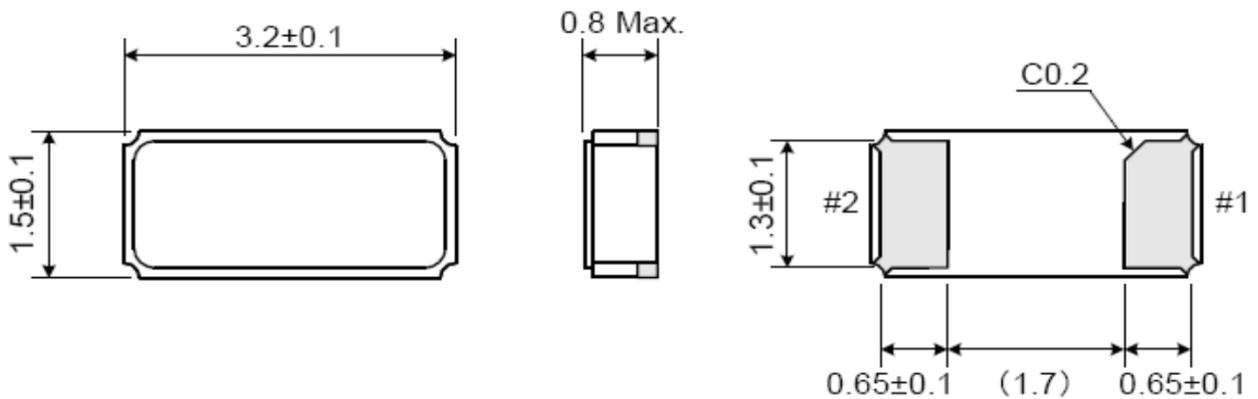
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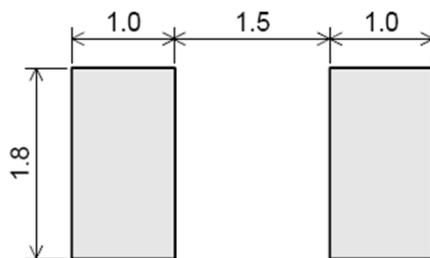
Marking



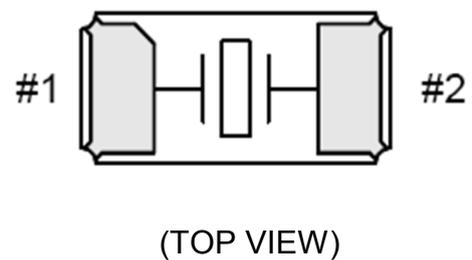
Dimensions (Units: mm)



Recommended Soldering Pattern



Internal connection

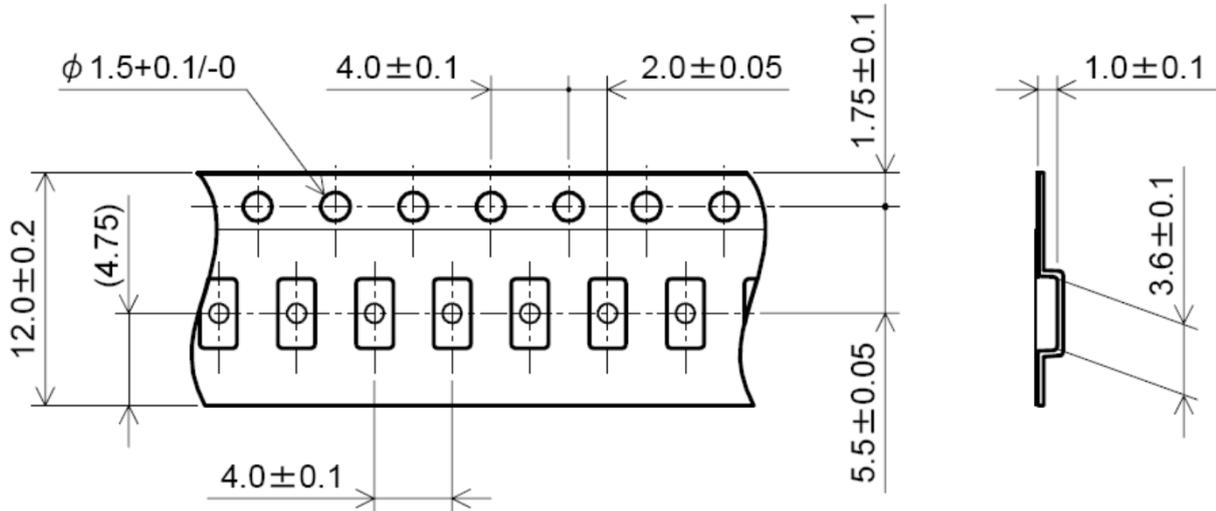


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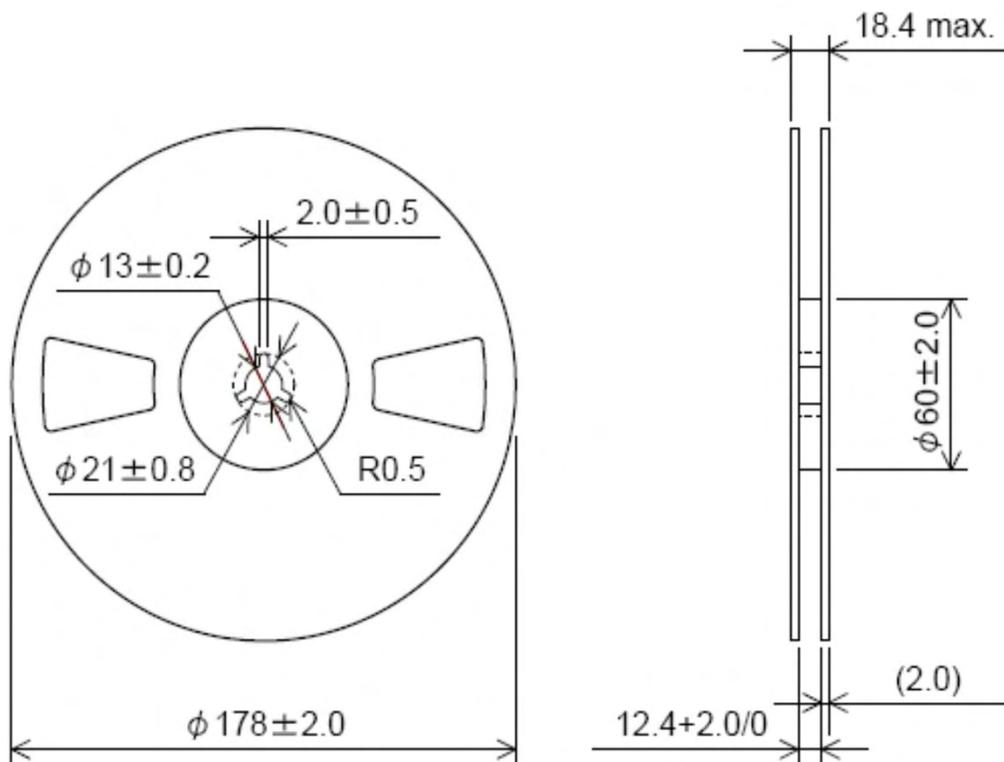
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TAPING (Units: mm)



REEL (Units: mm)



Quantity : 3000pcs / Reel