

# PSE Technology Corporation

## SPECIFICATION FOR APPROVAL

CUSTOMER \_\_\_\_\_

NOMINAL FREQUENCY \_\_\_\_\_ 32.768 KHz \_\_\_\_\_




PRODUCT TYPE \_\_\_\_\_ **TYPE G9 SMD CRYSTAL** \_\_\_\_\_

SPEC. NO. ( P/N ) \_\_\_\_\_ G93270004 \_\_\_\_\_

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE \_\_\_\_\_ Oct.25,2013 \_\_\_\_\_

VERSION \_\_\_\_\_ B \_\_\_\_\_

APPROVED	PREPARED	QA
		
<b>APPROVED BY CUSTOMER :</b>		<b>AVL Status</b>
Please return one copy with approval to PSE-TW		

### PSE Technology Corporation

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# TYPE G9 SMD CRYSTAL

G93270004

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## ELECTRICAL SPECIFICATIONS

SRe Part Number : G93270004

Parameters	Symbol	Specifications	Units	Notes
Nominal Frequency	Fn	32.768	KHz	
Frequency Tolerance	FT	± 20	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	90	KΩ	Max.
Temperature Coefficient	K	-0.03	ppm/°C <sup>2</sup>	Typ.
Operating Temperature Range	TR	-40~85	°C	
Shunt Capacitance	C0	1.3	pF	± 20%
Motional Capacitance	C1	6.4	fF	± 20%
Storage Temperature Range		-55~85	°C	
Aging		± 3	ppm	Max 1st year
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"><li>• Without mechanical damage such as breaks and satisfy sealing specification.</li><li>• Frequency change: Within ±5ppm</li><li>• Equivalent series resistance(E.S.R) change: Within 5kΩ</li></ul>
2	Shear test	A static load of 20N(2.04kgf) using a R0.5 scratch tool, shall be applied on the core of the component and in the direction of the arrow and held for 5 seconds.	
3	Core body strength	A static load of 10N(1.02kgf) using a R0.5 pressure rod shall be applied to the center in the direction of the arrow and held for 10 seconds.	
4	Vibration	Endurance conditioning by a frequency sweep shall be made. The entire frequency range, from 10Hz to 55Hz and return to 10Hz, shall be transversed in 1 minute. Amplitude (total excursion) : 1.5mm, This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular axes (a total of 6 hours). For other procedures, refer to JIS C 60068-2-6.	
5	Shock	Peak acceleration : 9810m/s <sup>2</sup> · Duration of the pulse : 1ms, Three successive shock shall be applied 3 times perpendicular axes. For other procedures, refer to JIS C 60068-2-27.	

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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"> <li>• Frequency change: Within <math>\pm 5\text{ppm}</math></li> <li>• Equivalent series resistance(E.S.R) change: Within <math>5\text{k}\Omega</math></li> <li>• After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured.</li> </ul>														
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.															
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" 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><math>-40\pm 3^{\circ}\text{C}</math></td> <td>30min.</td> </tr> <tr> <td>2</td> <td>Normal temperature</td> <td>Within 30 sec.</td> </tr> <tr> <td>3</td> <td><math>100\pm 2^{\circ}\text{C}</math></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
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4	Normal temperature	Within 30 sec.															
10	Sealing	Both the test methods specified below shall be applied.															
		Quartz crystal units shall be soaked in $90^{\circ}\text{C}$ or higher temperature hot water for 5 minutes.	<ul style="list-style-type: none"> <li>• Without repetitive leaking bubbles from quartz crystal units.</li> </ul>														
		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"> <li>• <math>1\times 10^{-9}\text{ Pa}\cdot\text{m}^3/\text{s}</math> or less</li> </ul>														
11	Aging	Quartz crystal units shall be stored in the $85\pm 3^{\circ}\text{C}$ atmosphere for $720\pm 12$ hours.	<ul style="list-style-type: none"> <li>• Frequency change: Within <math>\pm 5\text{ppm}</math></li> <li>• Equivalent series resistance(E.S.R) change: Within <math>5\text{k}\Omega</math></li> <li>• After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured.</li> </ul>														
12	Solder-ability	Terminals coated with flux shall be immersed in the solder bath for $3.5\pm 0.5$ seconds.	<ul style="list-style-type: none"> <li>• Minimum 95% of immersed terminal shall be covered with new uniform solder.</li> </ul>														
		<table border="1" style="margin-left: auto; margin-right: auto;"> <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><math>255\pm 5^{\circ}\text{C}</math></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	$255\pm 5^{\circ}\text{C}$		
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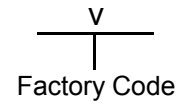
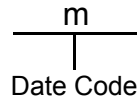
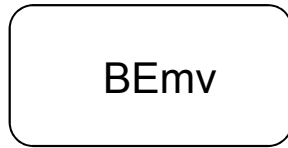
<p>13</p>	<p>Resistance to soldering heat</p>	<p>Reflow soldering method</p> <p>温度プロファイル Temperature profile</p> <p>Peak temperature: <math>260\pm 5^{\circ}\text{C}</math> for within 5seconds. Soldering temperature: <math>220^{\circ}\text{C}</math> or higher for <math>60\pm 10</math> seconds. Pre-heating temperature: <math>160\pm 10^{\circ}\text{C}</math> for <math>90\pm 10</math> 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"> <li>• Frequency change: Within <math>\pm 5\text{ppm}</math></li> <li>• Equivalent series resistance (E.S.R) change: Within <math>10\text{k}\Omega</math></li> <li>• After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured.</li> <li>• Without distinct deformation in appearance.</li> </ul>
		<p>Soldering iron method</p> <p>Terminals shall be applied <math>400\pm 10^{\circ}\text{C}</math> soldering iron heat for <math>3.5\pm 0.5</math> seconds twice.</p>	<ul style="list-style-type: none"> <li>• Frequency change: Within <math>\pm 5\text{ppm}</math></li> <li>• Equivalent series resistance(E.S.R) change: Within <math>5\text{k}\Omega</math></li> <li>• After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured.</li> <li>• Without distinct deformation in appearance.</li> </ul>
<p>14</p>	<p>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"> <li>• Without mechanical damage such as breaks and satisfy sealing specification.</li> <li>• Frequency change: Within <math>\pm 5\text{ppm}</math></li> <li>• Equivalent series resistance(E.S.R) change: Within <math>5\text{k}\Omega</math></li> <li>• Without distinct deformation in appearance.</li> <li>• Marking shall be legible.</li> </ul>

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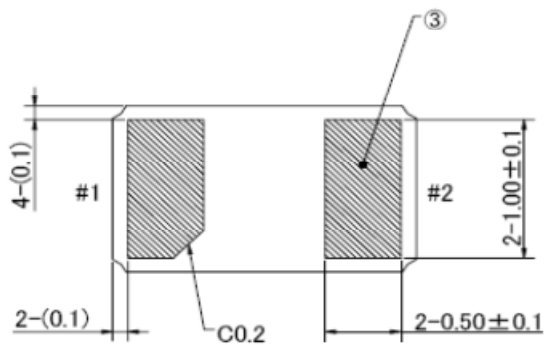
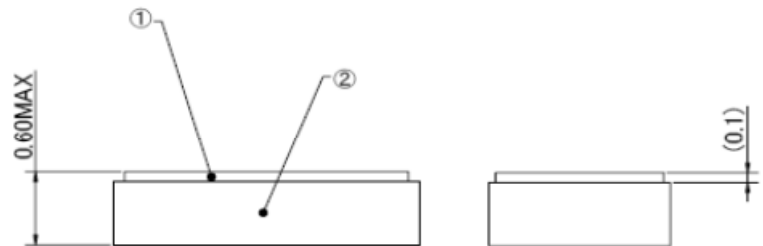
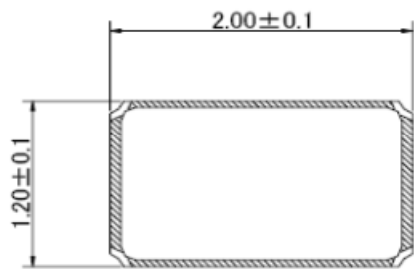
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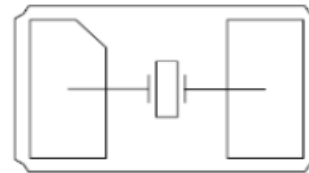
## Marking



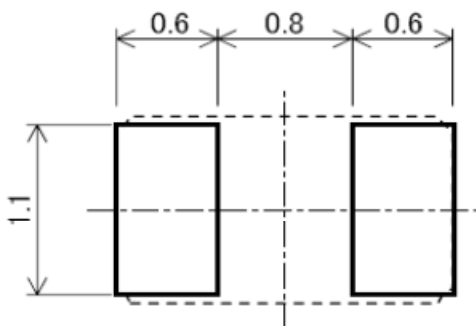
## Dimensions (Units: mm)



内部接続図  
Internal connection



## Land dimensions(unit: mm)

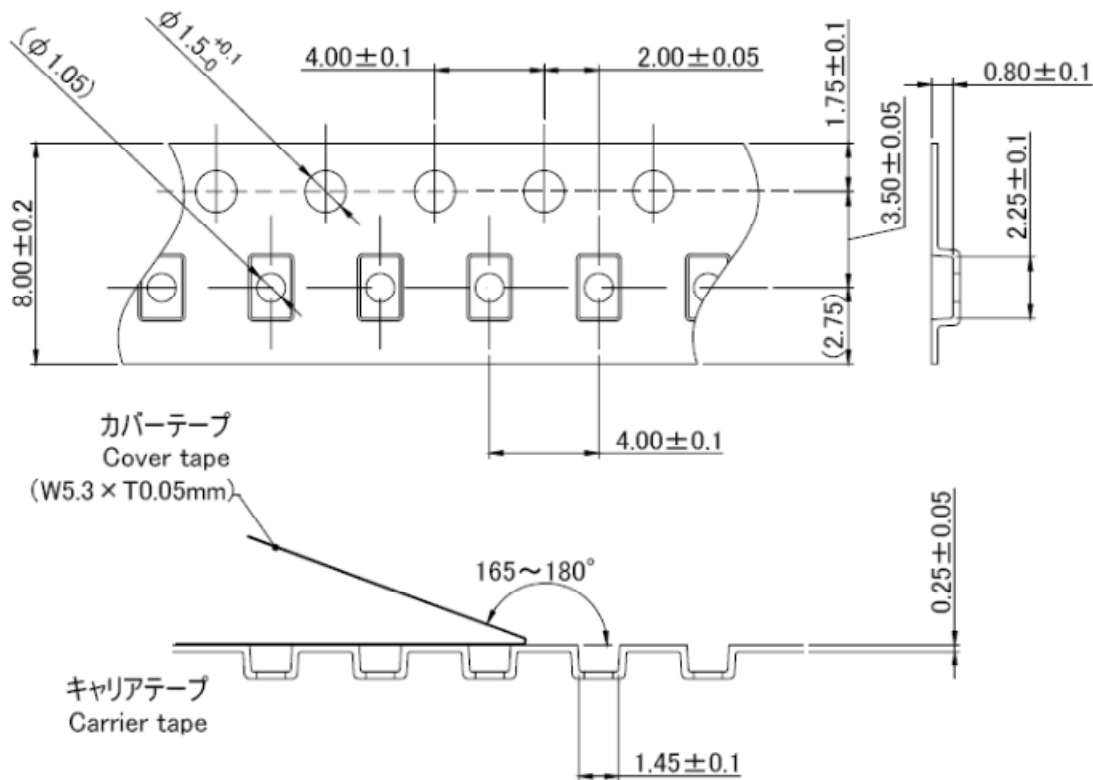


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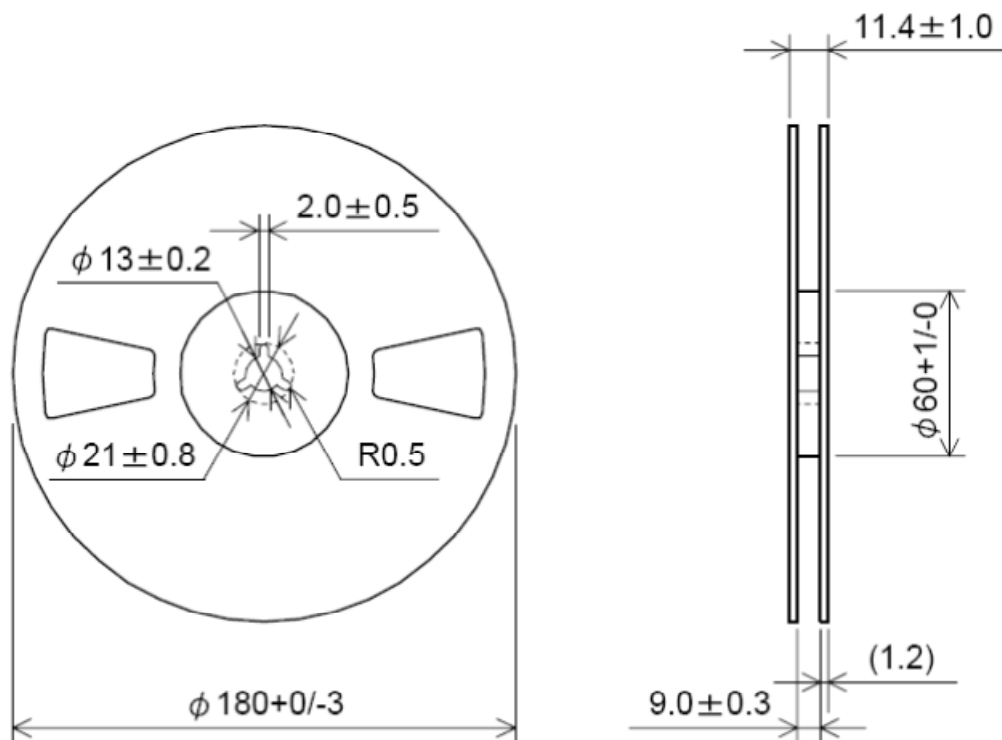
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