

TYPE G9 SMD CRYSTAL

G93270001

VER. C 3-Oct-11

VERSION HISTORY

Version No.	Version Date	Customer Receipt Date	Supplier Receipt Date	Description	Notes
A	Apr.18,2011			Initial Release	
B	Oct.3,2011			Changed Operating Temperature Range from -30~70C to -40~85C & Added Shunt Capacitance 7pF	
C	Jan.8,2014			Revised to RoHS Compliant	

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ELECTRICAL SPECIFICATIONS

SRe Part Number : G93270001

Parameters	Symbol	Specifications	Units	Notes
Nominal Frequency	Fn	32.768	KHz	
Frequency Tolerance	FT	± 20	ppm	at 25 °C ± 5 °C
Load Capacitance	CL	9	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 ²	Typ.
Operating Temperature Range	TR	-40~85	°C	
Shunt Capacitance	C0	7	pF	Max.
Storage Temperature Range		-55~125	°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">• 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	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 ² · 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">• 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.														
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. <div><table><tr><td></td><td>Temperature</td><td>Duration</td></tr><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></table></div>			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. <div><table><tr><td></td><td>Items</td><td>Conditions</td></tr><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>$255\pm 5^{\circ}\text{C}$</td></tr></table></div>		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	$255\pm 5^{\circ}\text{C}$	<ul style="list-style-type: none">• Minimum 95% of immersed terminal shall be covered with new uniform solder.		
	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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13	Resistance to soldering heat	<p>Reflow soldering method</p> <p>温度プロファイル Temperature profile</p> <p>予熱 Pre-heating</p> <p>はんだ付け Soldering</p> <p>徐冷(常温自然放置) Slow cooling (Stored at room temperature)</p> <p>Peak temperature: $260 \pm 5^\circ\text{C}$ for within 5 seconds. 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>Soldering iron method</p> <p>Terminals shall be applied $400 \pm 10^\circ\text{C}$ soldering iron heat for 3.5 ± 0.5 seconds twice.</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.
14	Solubility to resistance	<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.

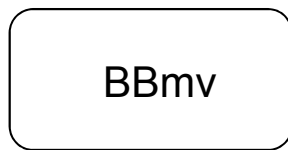
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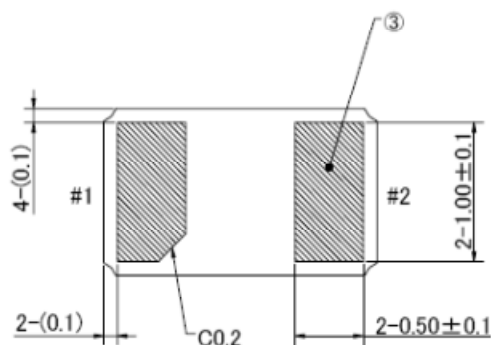
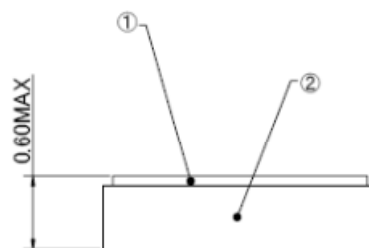
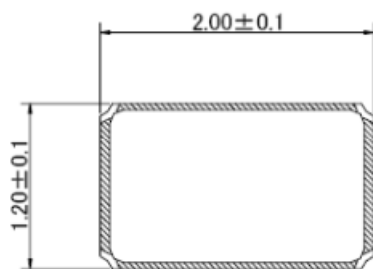
Marking



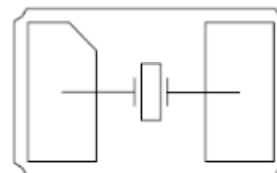
m
Date Code

v
Factory Code

Dimensions (Units: mm)

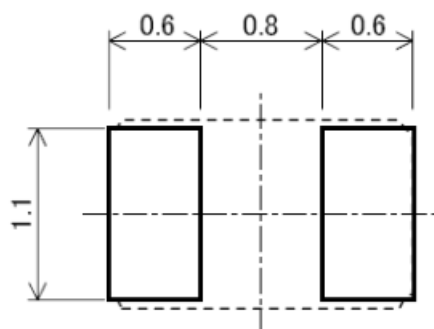


内部接続図
Internal connection



<Top View>

Land dimensions(unit: mm)



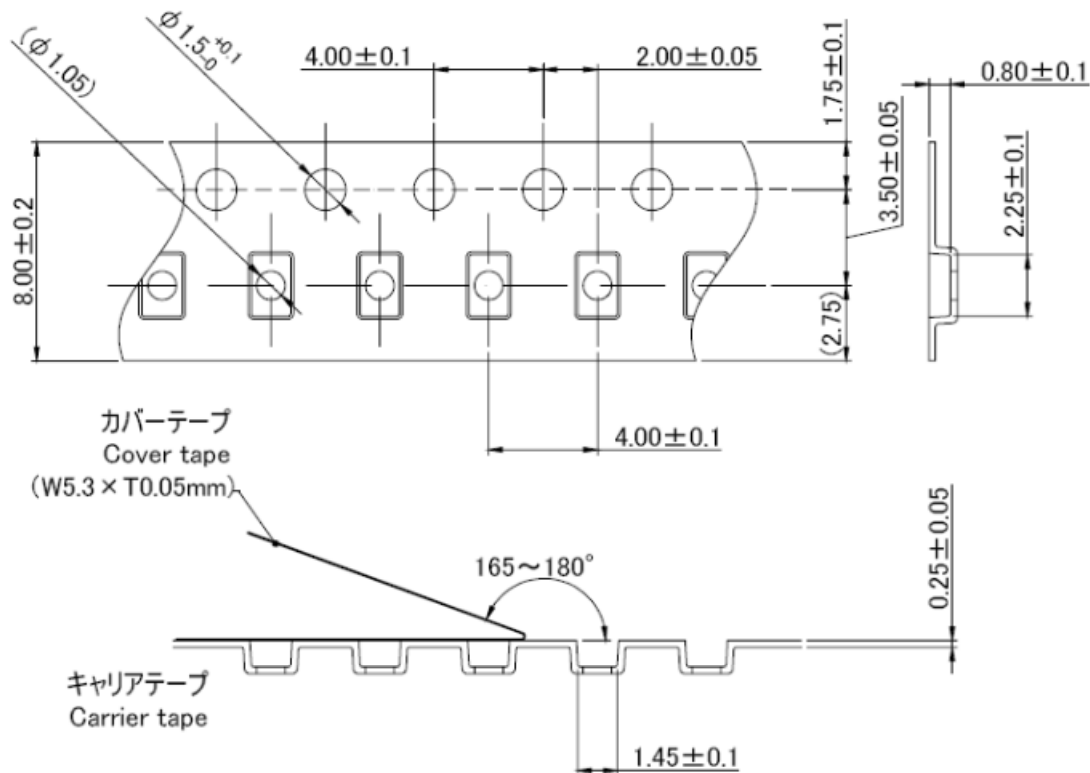
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TAPING



REEL

Reel

