

## CRYSTAL OSCILLATOR (Programmable)

OUTPUT: CMOS

**SG-8101** series**NEW**

Product Number (please contact us)

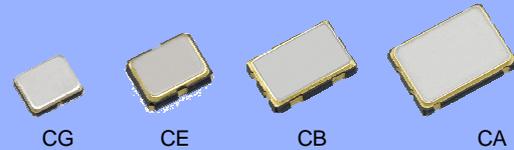
SG-8101CA: X1G00519xxxxx00

SG-8101CB: X1G00520xxxxx00

SG-8101CE: X1G00521xxxxx00

SG-8101CG: X1G00518xxxxx00

- Frequency range : 0.67 MHz ~ 170 MHz (1 ppm Step)
- Supply voltage : 1.62 V ~ 3.63 V
- Function : Output enable (OE) or Standby (ST)
- Frequency tolerance, operating temperature:
  - ±15 ppm (-40 °C ~ +85 °C)
  - ±20 ppm, ±50 ppm (-40 °C ~ +105 °C)
- Package : 2.5 x 2.0, 3.2 x 2.5, 5.0 x 3.2, 7.0 x 5.0 (mm)
- PLL technology to enable short lead time
- Available field oscillator programmer "SG-Writer II"



## Specifications (characteristics)

Item	Symbol	Specifications				Conditions/Remarks																																											
Supply voltage	V <sub>CC</sub>	1.80 V Typ.		2.50 V Typ.	3.30 V Typ.	-																																											
		1.62 V ~ 1.98 V	1.98 V ~ 2.20 V	2.20 V ~ 2.80 V	2.70 V ~ 3.63 V																																												
Output frequency range	f <sub>o</sub>	0.67 MHz ~ 170 MHz																																															
Storage temperature	T <sub>stg</sub>	-40 °C ~ +125 °C				Storage as single product.																																											
Operating temperature	T <sub>use</sub>	-40 °C ~ +85 °C				2.5 x 2.0, 3.2 x 2.5 (mm) Package only																																											
		-40 °C ~ +105 °C																																															
Frequency tolerance <sup>*1</sup>	f <sub>tol</sub>	B: ±15 × 10 <sup>-6</sup>				T <sub>use</sub> = -40 °C ~ +85 °C																																											
		C: ±20 × 10 <sup>-6</sup>				T <sub>use</sub> = -40 °C ~ +105 °C																																											
		J: ±50 × 10 <sup>-6</sup>				T <sub>use</sub> = -40 °C ~ +105 °C																																											
Current consumption	I <sub>CC</sub>	3.1 mA Max.	3.2 mA Max.	3.3 mA Max.	3.4 mA Max.	T <sub>use</sub> = +105 °C	No load, f <sub>o</sub> = 20 MHz																																										
		2.7 mA Typ.		2.8 mA Typ.	2.9 mA Typ.	T <sub>use</sub> = +25 °C																																											
		5.2 mA Max.	5.5 mA Max.	6.3 mA Max.	7.6 mA Max.	T <sub>use</sub> = +105 °C	No load, f <sub>o</sub> = 170 MHz																																										
Output disable current	I <sub>dis</sub>	4.6 mA Typ.		5.5 mA Typ.	6.7 mA Typ.	T <sub>use</sub> = +25 °C																																											
Standby current	I <sub>std</sub>	3.2 mA Max.	3.2 mA Max.	3.3 mA Max.	3.5 mA Max.	OE = GND, f <sub>o</sub> = 170 MHz																																											
		0.8 µA Max.	0.9 µA Max.	1.4 µA Max.	2.5 µA Max.	T <sub>use</sub> = +105 °C	ST = GND																																										
Symmetry	SYM	45 % ~ 55 %				50 % V <sub>CC</sub> Level																																											
Output voltage (DC characteristics)	V <sub>OH</sub>	90 % V <sub>CC</sub> Min.				<table border="1"> <thead> <tr> <th></th> <th></th> <th>V<sub>CC</sub></th> <th>*A</th> <th>*B</th> <th>*C</th> <th>*D</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Rise/Fall time</td> <td>Default (f<sub>o</sub> &gt; 40 MHz),</td> <td>I<sub>OH</sub></td> <td>-2.5</td> <td>-3.5</td> <td>-4.0</td> <td>-5.0</td> </tr> <tr> <td>Fast</td> <td>I<sub>OL</sub></td> <td>2.5</td> <td>3.5</td> <td>4.0</td> <td>5.0</td> </tr> <tr> <td rowspan="2">Default (f<sub>o</sub> ≤ 40 MHz)</td> <td>I<sub>OH</sub></td> <td>-1.5</td> <td>-2.0</td> <td>-2.5</td> <td>-3.0</td> </tr> <tr> <td>I<sub>OL</sub></td> <td>1.5</td> <td>2.0</td> <td>2.5</td> <td>3.0</td> </tr> <tr> <td rowspan="2">Slow</td> <td>I<sub>OH</sub></td> <td>-1.0</td> <td>-1.5</td> <td>-2.0</td> <td>-2.5</td> </tr> <tr> <td>I<sub>OL</sub></td> <td>1.0</td> <td>1.5</td> <td>2.0</td> <td>2.5</td> </tr> </tbody> </table>				V <sub>CC</sub>	*A	*B	*C	*D	Rise/Fall time	Default (f <sub>o</sub> > 40 MHz),	I <sub>OH</sub>	-2.5	-3.5	-4.0	-5.0	Fast	I <sub>OL</sub>	2.5	3.5	4.0	5.0	Default (f <sub>o</sub> ≤ 40 MHz)	I <sub>OH</sub>	-1.5	-2.0	-2.5	-3.0	I <sub>OL</sub>	1.5	2.0	2.5	3.0	Slow	I <sub>OH</sub>	-1.0	-1.5	-2.0	-2.5	I <sub>OL</sub>	1.0	1.5	2.0	2.5
			V <sub>CC</sub>	*A	*B			*C	*D																																								
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	I <sub>OL</sub>	1.0	1.5	2.0	2.5																																												
V <sub>OL</sub>	10 % V <sub>CC</sub> Max.																																																
Output load condition	L <sub>CMOS</sub>	15 pF Max.				-																																											
Input voltage	V <sub>IH</sub>	70 % V <sub>CC</sub> Min.				OE or ST																																											
	V <sub>IL</sub>	30 % V <sub>CC</sub> Max.																																															
Rise and Fall time	Default	tr/ff	3.0 ns Max.			f <sub>o</sub> > 40 MHz																																											
			6.0 ns Max.			f <sub>o</sub> ≤ 40 MHz																																											
			3.0 ns Max.			f <sub>o</sub> = 0.67 MHz ~ 170 MHz																																											
			10.0 ns Max.			f <sub>o</sub> = 0.67 MHz ~ 20 MHz																																											
Enable/Disable Time	t <sub>oe</sub>	1 µs Max.				Measured from the time OE pin crosses 70 % / 30 % V <sub>CC</sub>																																											
Resume Time	t <sub>res</sub>	3 ms Max.				Measured from the time ST pin crosses 70 % V <sub>CC</sub>																																											
Start-up time	t <sub>str</sub>	3 ms Max.				Measured from the time V <sub>CC</sub> reaches its rated minimum value, 1.62 V																																											
Frequency aging	f <sub>aging</sub>	This is included in frequency tolerance specification.				+25 °C, first year																																											

\*1 Frequency tolerance includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, load drift and aging (+25 °C, 1 year).

## Pin description

Pin	Name	I/O type	Function	
1	OE	Input	Output enable	High or Open: Specified frequency output from OUT pin Low: Out pin is low (weak pull down), only output driver is disabled.
	ST	Input	Standby	High or Open: Specified frequency output from OUT pin Low: Out pin is low (weak pull down), Device goes to standby mode. Supply current reduces to the least as I <sub>std</sub> .
2	GND	Power	Ground	
3	OUT	Output	Clock output	
4	V <sub>CC</sub>	Power	Power supply	



Product Name

SG-8101CG 170.000000MHz T C H P A

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Model, ② Package type,
- ③ Frequency, ④ Supply voltage,
- ⑤ Frequency tolerance, ⑥ Operating temperature,
- ⑦ Function, ⑧ Rise/Fall time

② Package type
CA: 7.0 mm x 5.0 mm
CB: 5.0 mm x 3.2 mm
CE: 3.2 mm x 2.5 mm
CG: 2.5 mm x 2.0 mm

④ Supply voltage
T: 1.8 V ~ 3.3 V Typ.

⑥ Operating temperature
G: -40 °C ~ +85 °C
H: -40 °C ~ +105 °C

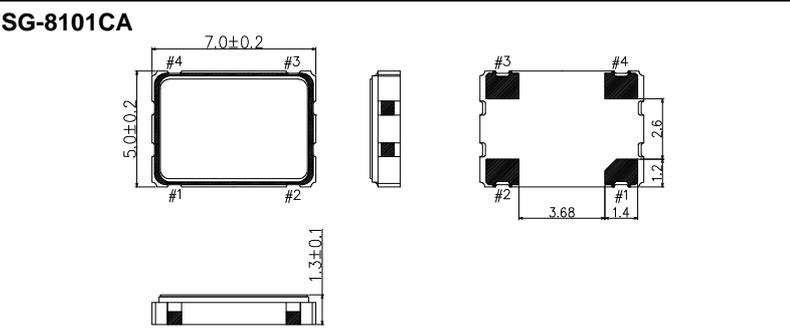
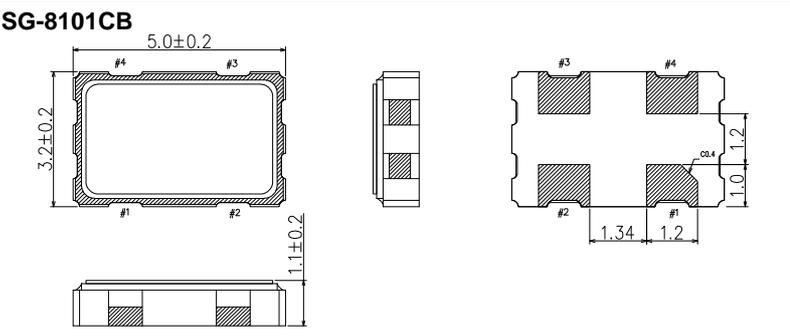
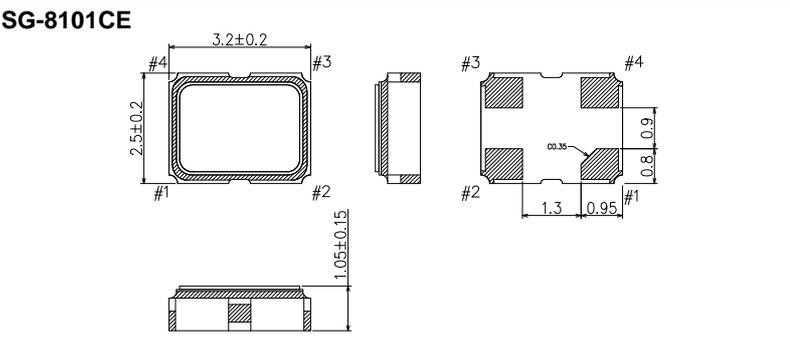
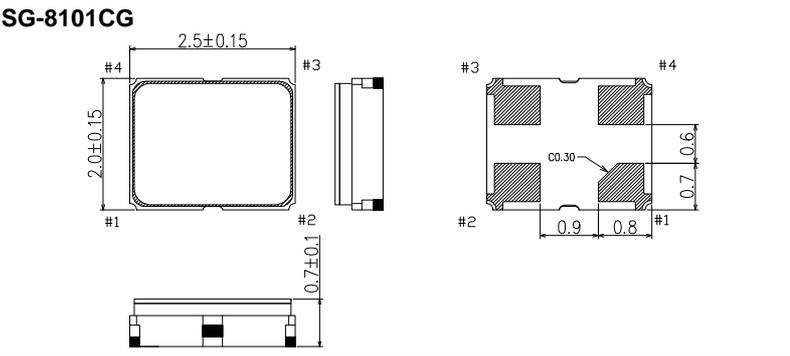
⑧ Rise/Fall time
A: Default
B: Fast
C: Slow

⑤ Frequency tolerance
B: 15 x 10 <sup>-6</sup>
C: 20 x 10 <sup>-6</sup>
J: 50 x 10 <sup>-6</sup>

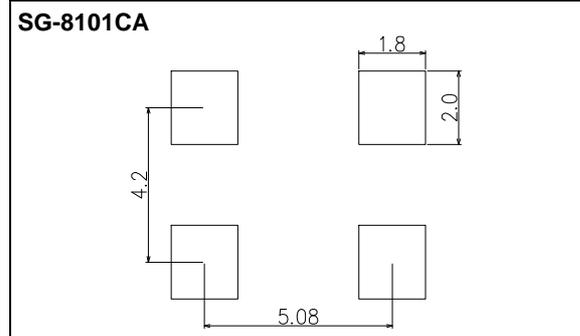
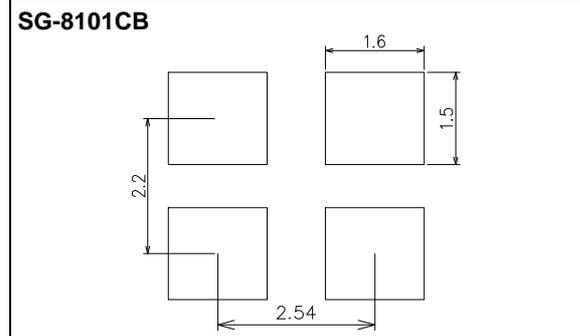
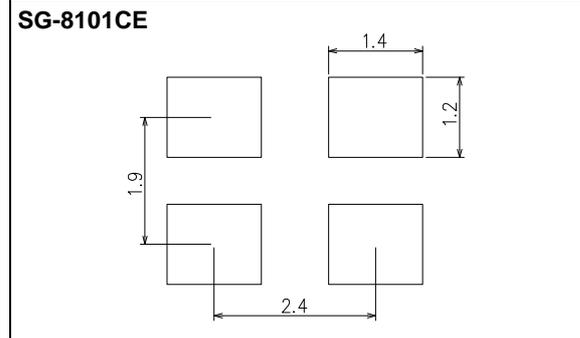
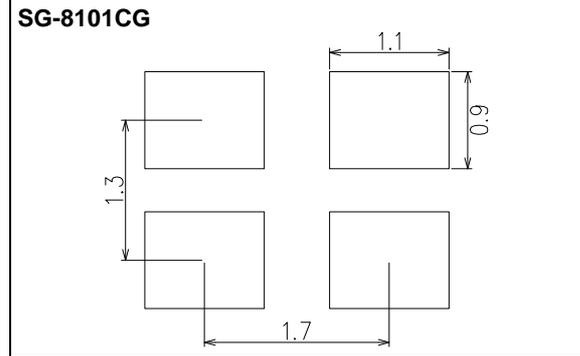
⑦ Function
P: Output Enable
S: Standby

Available combination	CA: 7.0 mm x 5.0 mm			CB: 5.0 mm x 3.2 mm			CE: 3.2 mm x 2.5 mm			CG: 2.5 mm x 2.0 mm		
Frequency tolerance	B: 15 x 10 <sup>-6</sup>	C: 20 x 10 <sup>-6</sup>	J: 50 x 10 <sup>-6</sup>	B: 15 x 10 <sup>-6</sup>	C: 20 x 10 <sup>-6</sup>	J: 50 x 10 <sup>-6</sup>	B: 15 x 10 <sup>-6</sup>	C: 20 x 10 <sup>-6</sup>	J: 50 x 10 <sup>-6</sup>	B: 15 x 10 <sup>-6</sup>	C: 20 x 10 <sup>-6</sup>	J: 50 x 10 <sup>-6</sup>
Operating temperature	G: -40 °C ~ +85 °C	✓		✓			✓			✓		
	H: -40 °C ~ +105 °C							✓	✓		✓	✓

External dimensions (Unit: mm)



Footprint (Recommended) (Unit: mm)



Notes:

In order to achieve optimum jitter performance, the 0.1 μF capacitor between V<sub>CC</sub> and GND should be placed. It is also recommended that the capacitors are placed on the device side of the PCB, as close to the device as possible and connected together with short wiring pattern.

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

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ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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	► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
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