

CRYSTAL OSCILLATOR (SPXO)

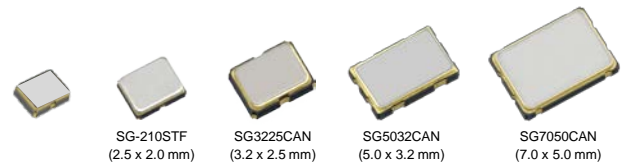
OUTPUT : CMOS



Product Number  
 SG2016CAN: X1G004801xxxx00  
 SG-210STF: X1G004171xxxx00  
 SG3225CAN: X1G005961xxxx15  
 SG5032CAN: X1G004451xxxx00  
 SG7050CAN: X1G004481xxxx00

SG2016 / 3225 / 5032 / 7050CAN  
 SG-210STF

- Frequency range : 1.2 MHz to 75 MHz (SG2016CAN)  
 1 MHz to 75 MHz (other than the above)
- Supply voltage : 1.8 V to 3.3 V Typ.
- Function : Standby( $\overline{ST}$ )
- Operating temperature : -40 °C to +105 °C



Specifications (characteristics)

Item	Symbol	Specifications	Conditions / Remarks														
Output frequency range	fo	1.2 MHz to 75 MHz	SG2016CAN														
		1 MHz to 75 MHz	All others														
Supply voltage	V <sub>CC</sub>	1.60 V to 3.63 V	1 MHz ≤ fo ≤ 60 MHz, T <sub>use</sub> = +105 °C Max.														
		1.71 V to 3.63 V	60 MHz < fo ≤ 75 MHz, T <sub>use</sub> = +85 °C Max.														
		2.25 V to 3.63 V	60 MHz < fo ≤ 75 MHz, T <sub>use</sub> = +105 °C Max.														
Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C	SG2016CAN														
		-40 °C to +125 °C	All others														
Operating temperature	T <sub>use</sub>	-20 °C to +70 °C, -40 °C to +85 °C, -40 °C to +105 °C	See of figure *1														
Frequency tolerance	f <sub>tol</sub>	±25 × 10 <sup>-6</sup> , ±50 × 10 <sup>-6</sup>	-20 °C to +70 °C														
		±50 × 10 <sup>-6</sup>	-40 °C to +85 °C														
		±50 × 10 <sup>-6</sup> , ±100 × 10 <sup>-6</sup>	-40 °C to +105 °C														
Current consumption	I <sub>CC</sub>	V <sub>CC</sub> = 1.8 V ± 10 %	V <sub>CC</sub> = 2.5 V ± 10 %	V <sub>CC</sub> = 3.3 V ± 10 %													
		1.5 mA Max.	1.6 mA Max.	1.8 mA Max.	No load condition, 1 MHz ≤ fo ≤ 20 MHz												
		1.8 mA Max.	2.0 mA Max.	2.2 mA Max.	No load condition, 20 MHz < fo ≤ 40 MHz												
		2.1 mA Max.	2.4 mA Max.	2.6 mA Max.	No load condition, 40 MHz < fo ≤ 60 MHz												
		2.4 mA Max.	2.8 mA Max.	3.0 mA Max.	No load condition, 60 MHz < fo ≤ 75 MHz												
Stand-by current	I <sub>std</sub>	2.1 μA Max.	2.5 μA Max.	2.7 μA Max.	$\overline{ST}$ = GND												
Symmetry	SYM	45 % to 55 %	50 % V <sub>CC</sub> level, L <sub>CMOS</sub> ≤ 15 pF														
Output voltage	V <sub>OH</sub>	90 % V <sub>CC</sub> Min.	<table border="1"> <tr> <td></td> <td>1.8 V ± 10 %</td> <td>2.5 V ± 10 %</td> <td>3.3 V ± 10 %</td> </tr> <tr> <td>I<sub>OH</sub></td> <td>-1.5 mA</td> <td>-3 mA</td> <td>-4 mA</td> </tr> <tr> <td>I<sub>OL</sub></td> <td>1.5 mA</td> <td>3 mA</td> <td>4 mA</td> </tr> </table>				1.8 V ± 10 %	2.5 V ± 10 %	3.3 V ± 10 %	I <sub>OH</sub>	-1.5 mA	-3 mA	-4 mA	I <sub>OL</sub>	1.5 mA	3 mA	4 mA
		1.8 V ± 10 %	2.5 V ± 10 %	3.3 V ± 10 %													
	I <sub>OH</sub>	-1.5 mA	-3 mA	-4 mA													
	I <sub>OL</sub>	1.5 mA	3 mA	4 mA													
V <sub>OL</sub>	10 % V <sub>CC</sub> Max.	<table border="1"> <tr> <td></td> <td>1.8 V ± 10 %</td> <td>2.5 V ± 10 %</td> <td>3.3 V ± 10 %</td> </tr> <tr> <td>I<sub>OH</sub></td> <td>-3 mA</td> <td>-4 mA</td> <td>-6 mA</td> </tr> <tr> <td>I<sub>OL</sub></td> <td>3 mA</td> <td>4 mA</td> <td>6 mA</td> </tr> </table>				1.8 V ± 10 %	2.5 V ± 10 %	3.3 V ± 10 %	I <sub>OH</sub>	-3 mA	-4 mA	-6 mA	I <sub>OL</sub>	3 mA	4 mA	6 mA	
	1.8 V ± 10 %	2.5 V ± 10 %	3.3 V ± 10 %														
I <sub>OH</sub>	-3 mA	-4 mA	-6 mA														
I <sub>OL</sub>	3 mA	4 mA	6 mA														
V <sub>OH-2</sub>	V <sub>CC</sub> - 0.4 V Min.																
V <sub>OL-2</sub>	0.4 V Max.																
Output load condition (CMOS)	L <sub>CMOS</sub>	15 pF Max.															
Input voltage	V <sub>IH</sub>	80 % V <sub>CC</sub> Min.	$\overline{ST}$ terminal														
	V <sub>IL</sub>	20 % V <sub>CC</sub> Max.															
Rise time and Fall time	tr / tf	3 ns Max. 3.5 ns Max. (@1.8 V ± 10 %)	20 % V <sub>CC</sub> to 80 % V <sub>CC</sub> level, L <sub>CMOS</sub> = 15 pF														
Start-up time	t <sub>str</sub>	3 ms Max.	T = 0 at 90 % V <sub>CC</sub>														
Frequency aging	f <sub>age</sub>	±3 × 10 <sup>-6</sup> / year Max.	+25 °C, First year														

[Model : SG2016 / 3225 / 5032 / 7050CAN]

Product name SG2016CAN25.000000MHzTJGA (ⓄⓄ: Available code DB, JB, JG, JH, LG, LH)

(Standard form) ① ② ③ ④⑤⑥⑦

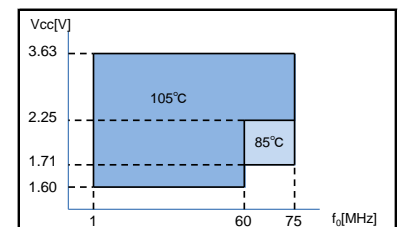
①Model ②Output(C:CMOS) ③Frequency ④Supply voltage

⑤Frequency tolerance ⑥Operating temperature range ⑦Internal identification code("A" is default)

④Supply voltage See *1	
T	1.60 to 3.63 V
K	2.25 to 3.63 V

⑤Frequency tolerance	
D	±25 × 10 <sup>-6</sup>
J	±50 × 10 <sup>-6</sup>
L	±100 × 10 <sup>-6</sup>

⑥Operating temperature range	
B	-20 °C to +70 °C
G	-40 °C to +85 °C
H	-40 °C to +105 °C



[Model : SG-210STF]

Product name SG-210STF25.000000MHzL

(Standard form) ① ②③ ④ ⑤

①Model ②Function(S:Standby) ③Supply voltage

④Frequency ⑤Frequency tolerance

③Supply voltage See *1	
T	1.60 to 3.63 V

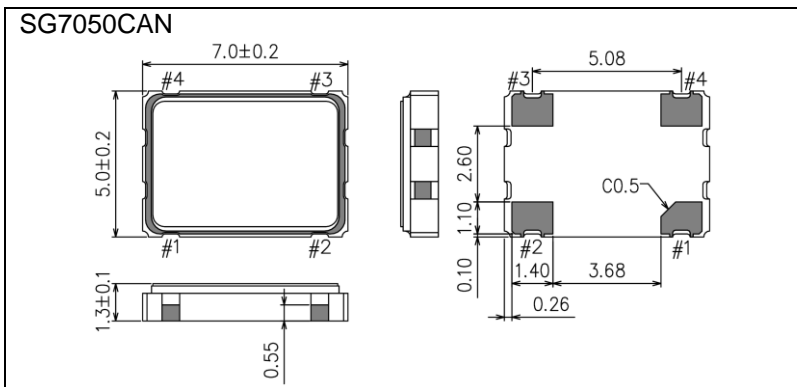
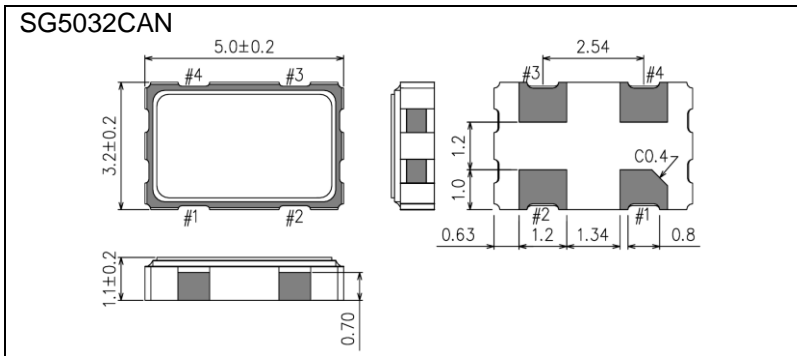
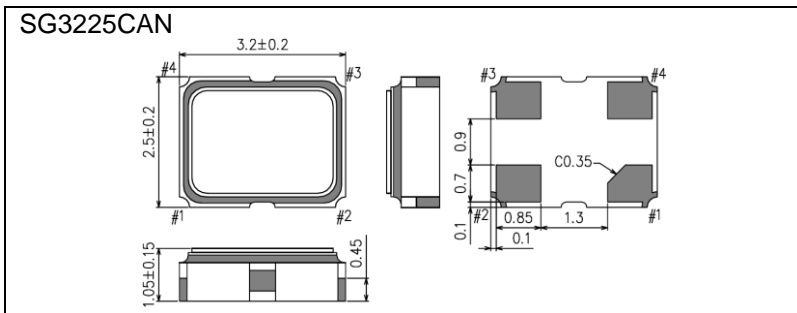
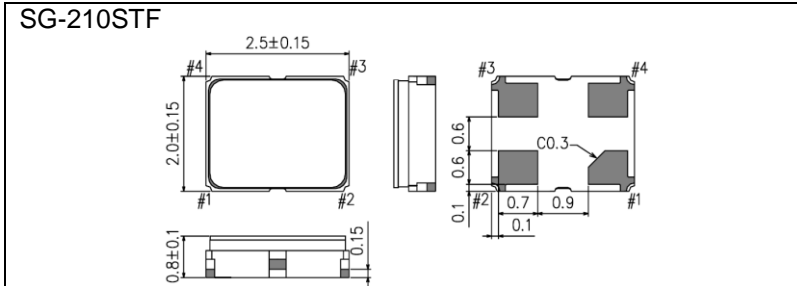
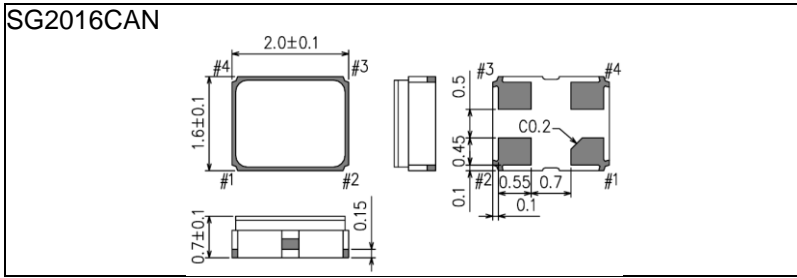
⑤Frequency tolerance	
S	±25 × 10 <sup>-6</sup> / -20 °C to +70 °C
L	±50 × 10 <sup>-6</sup> / -40 °C to +85 °C
Y	±50 × 10 <sup>-6</sup> / -40 °C to +105 °C
W	±100 × 10 <sup>-6</sup> / -40 °C to +105 °C

\*1 : The upper limit of Operating temperature and the related conditions

Please note that Supply voltage range (V<sub>CC</sub>) depends on Output frequency(fo) and upper limit of Operating temperature(T<sub>use</sub> Max.).

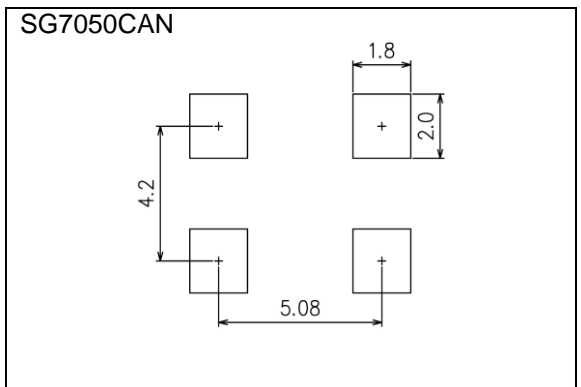
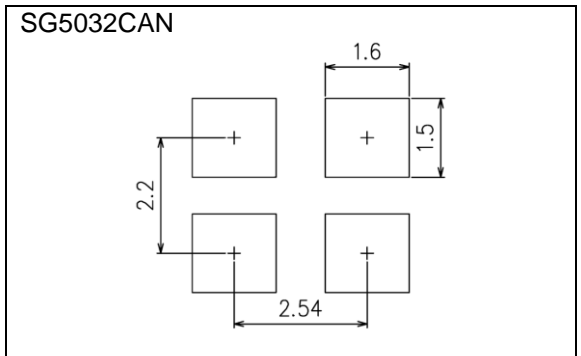
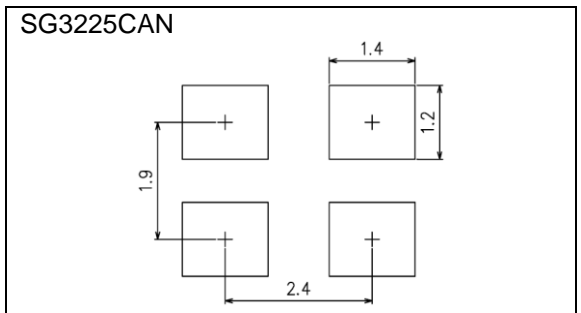
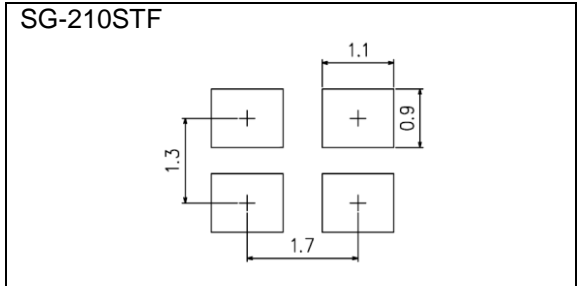
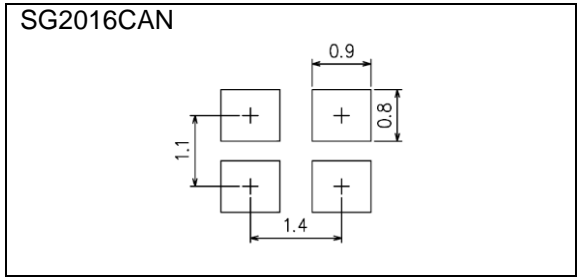
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



Pin Map

Pin	Connection	Function		
		ST terminal	Oscillator circuit	Output
1	ST	ST function	Oscillator circuit	Output
		HIGH or "open"	Oscillation	Specified frequency: Enable
		LOW	Oscillation stop	High impedance: Disable
2	GND	Ground		
3	OUT	Clock output		
4	V <sub>CC</sub>	Power supply		

■Notes: To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V<sub>CC</sub> - GND).

## 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.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

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.





## WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

### ► Explanation of the mark that are using it for the catalog

	► Pb free.
	► 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.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc ).

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