

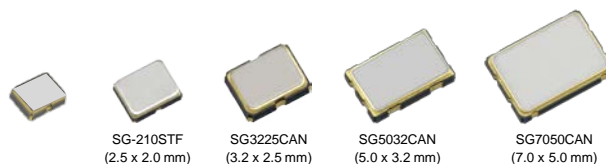
**CRYSTAL OSCILLATOR (SPXO)**
**OUTPUT : CMOS**

**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

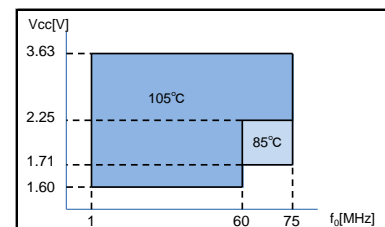
①Model ②Output(C:CMOS) ③Frequency ④Supply voltage

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

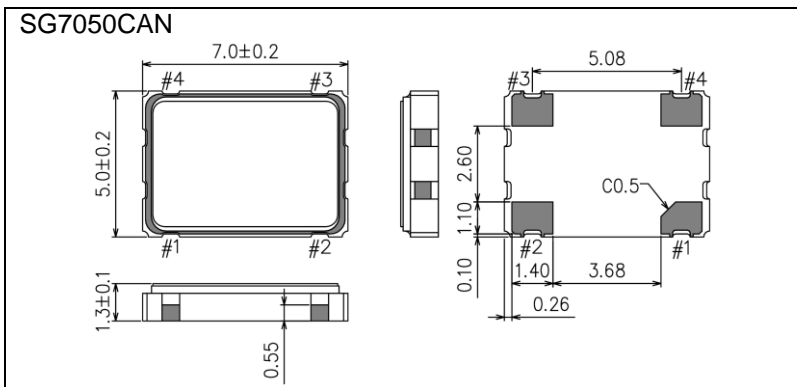
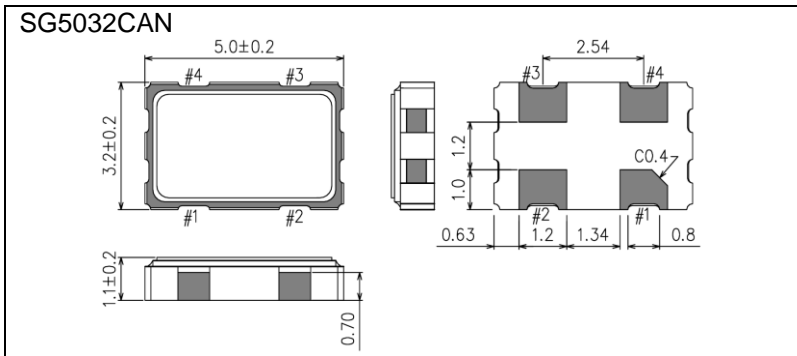
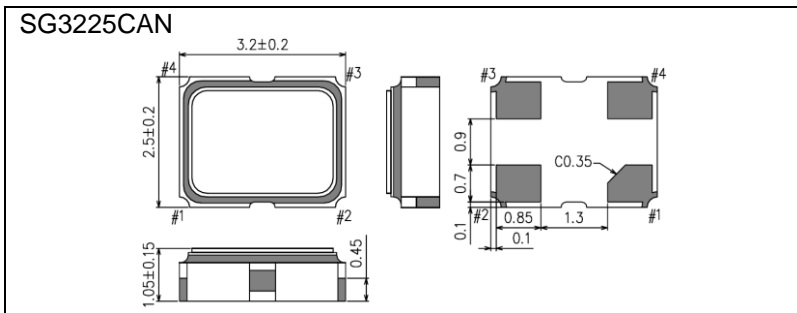
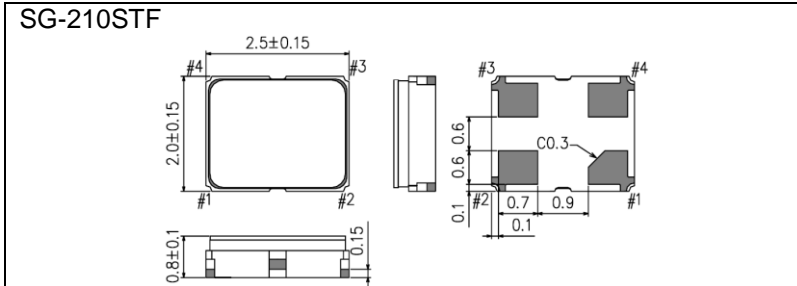
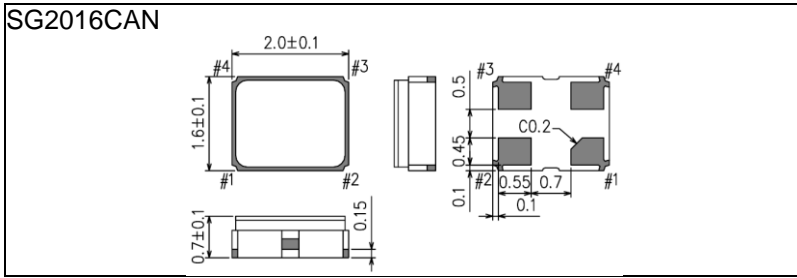
⑤Frequency tolerance	
S	±25 × 10 <sup>-6</sup> / -20 °C to +70 °C
L	±50 × 10 <sup>-6</sup> / -40 °C to +85 °C
Y	±50 × 10 <sup>-6</sup> / -40 °C to +105 °C
W	±100 × 10 <sup>-6</sup> / -40 °C to +105 °C

\*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.).

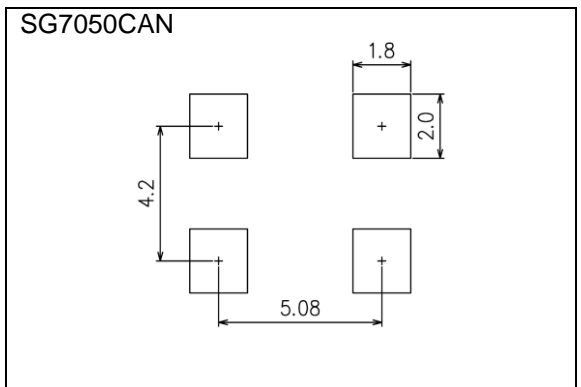
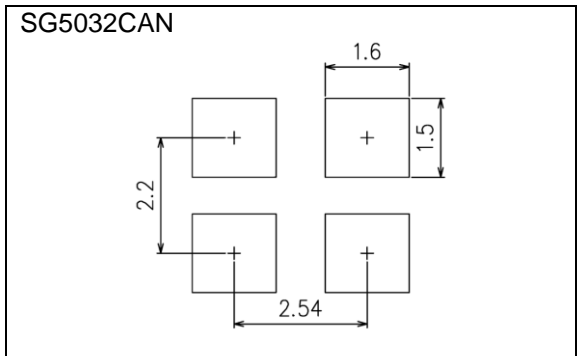
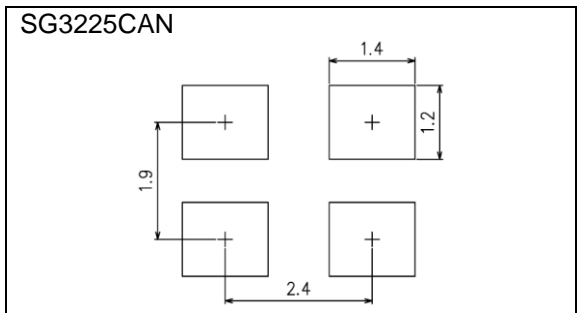
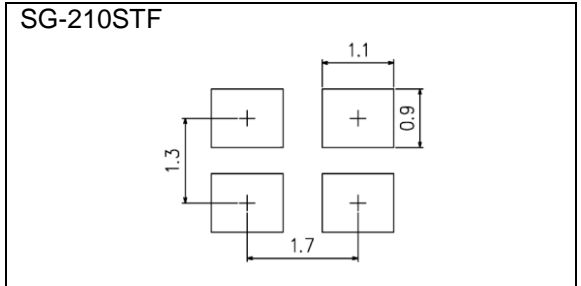
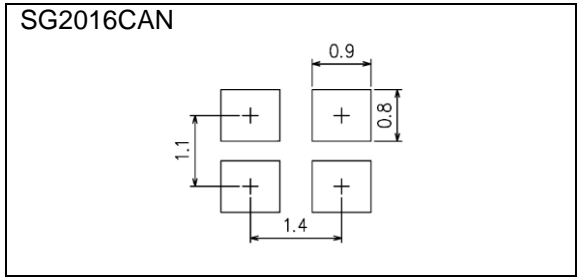
External dimensions

(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).

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	► 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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