

CRYSTAL OSCILLATOR (SPXO)

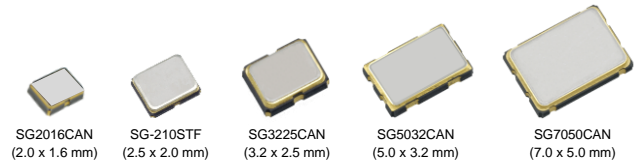
OUTPUT : CMOS



Product Number (please contact us)
 SG2016CAN: X1G004801xxxx00
 SG-210STF: X1G004171xxxx00
 SG3225CAN: X1G005961xxxx15
 SG5032CAN: X1G004451xxxx00
 SG7050CAN: X1G004481xxxx00

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

- Frequency : 20 standard frequencies
- 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	f_o	4 MHz 8 MHz 10 MHz 12 MHz 12.288 MHz 14.7456 MHz 16 MHz 20 MHz 24 MHz 24.576 MHz 25 MHz 26 MHz 27 MHz 32 MHz 33.333 MHz 33.3333 MHz 40 MHz 48 MHz 50 MHz 72 MHz																									
Supply voltage	V_{CC}	1.60 V to 3.63 V 1.71 V to 3.63 V 2.25 V to 3.63 V	4 MHz $\leq f_o \leq$ 50 MHz, $T_{use} = +105$ °C Max. fo = 72 MHz, $T_{use} = +85$ °C Max. fo = 72 MHz, $T_{use} = +105$ °C Max. Refer to Figure 1																								
Storage temperature	T_{stg}	-55 °C to +125 °C -40 °C to +125 °C	SG2016CAN All others																								
Operating temperature	T_{use}	-20 °C to +70 °C, -40 °C to +85 °C, -40 °C to +105 °C	See of figure *1																								
Frequency tolerance	f_{tol}	$\pm 25 \times 10^{-6}$ $\pm 50 \times 10^{-6}$	-20 °C to +70 °C -40 °C to +85 °C, -40 °C to +105 °C																								
Current consumption	I_{CC}	$V_{CC} = 1.8 V \pm 10 \%$ $V_{CC} = 2.5 V \pm 10 \%$ $V_{CC} = 3.3 V \pm 10 \%$ 1.5 mA Max. 1.6 mA Max. 1.8 mA Max. 1.8 mA Max. 2.0 mA Max. 2.2 mA Max. 2.1 mA Max. 2.4 mA Max. 2.6 mA Max. 2.4 mA Max. 2.8 mA Max. 3.0 mA Max.	No load condition, 4 MHz $\leq f_o \leq$ 20 MHz No load condition, 20 MHz < fo \leq 40 MHz No load condition, 40 MHz < fo \leq 50 MHz No load condition, fo = 72 MHz																								
Stand-by current	I_{std}	2.1 μ A Max. 2.5 μ A Max. 2.7 μ A Max.	$\overline{ST} = GND$																								
Symmetry	SYM	45 % to 55 %	50 % V_{CC} level, $L_{CMOS} \leq 15$ pF																								
Output voltage	V_{OH} V_{OL} V_{OH-2} V_{OL-2}	90 % V_{CC} Min. 10 % V_{CC} Max. $V_{CC} - 0.4$ V Min. 0.4 V Max.	<table border="1"> <tr> <td></td> <td>1.8 V $\pm 10 \%$</td> <td>2.5 V $\pm 10 \%$</td> <td>3.3 V $\pm 10 \%$</td> </tr> <tr> <td>I_{OH}</td> <td>-1.5 mA</td> <td>-3 mA</td> <td>-4 mA</td> </tr> <tr> <td>I_{OL}</td> <td>1.5 mA</td> <td>3 mA</td> <td>4 mA</td> </tr> </table> <table border="1"> <tr> <td></td> <td>1.8 V $\pm 10 \%$</td> <td>2.5 V $\pm 10 \%$</td> <td>3.3 V $\pm 10 \%$</td> </tr> <tr> <td>I_{OH}</td> <td>-3 mA</td> <td>-4 mA</td> <td>-6 mA</td> </tr> <tr> <td>I_{OL}</td> <td>3 mA</td> <td>4 mA</td> <td>6 mA</td> </tr> </table>		1.8 V $\pm 10 \%$	2.5 V $\pm 10 \%$	3.3 V $\pm 10 \%$	I_{OH}	-1.5 mA	-3 mA	-4 mA	I_{OL}	1.5 mA	3 mA	4 mA		1.8 V $\pm 10 \%$	2.5 V $\pm 10 \%$	3.3 V $\pm 10 \%$	I_{OH}	-3 mA	-4 mA	-6 mA	I_{OL}	3 mA	4 mA	6 mA
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I_{OL}	3 mA	4 mA	6 mA																								
Output load condition (CMOS)	L_{CMOS}	15 pF Max.																									
Input voltage	V_{IH} V_{IL}	80 % V_{CC} Min. 20 % V_{CC} Max.	\overline{ST} terminal																								
Rise time and Fall time	t_r / t_f	3 ns Max. 3.5 ns Max. (@1.8 V $\pm 10 \%$)	20 % V_{CC} to 80 % V_{CC} level, $L_{CMOS} = 15$ pF																								
Start-up time	t_{str}	3 ms Max.	$T = 0$ at 90 % V_{CC}																								
Frequency aging	f_{age}	$\pm 3 \times 10^{-6}$ / year Max.	+25 °C, First year																								

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

Product name SG2016CAN25.000000MHzTJH A
 (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 Figure 1		⑥Frequency tolerance / ⑥Operating temperature range	
T	1.8 V to 3.3 V Typ.	DB*	$\pm 25 \times 10^{-6}$ / -20 °C to +70 °C
K	2.5 V to 3.3 V Typ.	JG	$\pm 50 \times 10^{-6}$ / -40 °C to +85 °C
		JH	$\pm 50 \times 10^{-6}$ / -40 °C to +105 °C

* Please refer to Product number list on Full Data Sheet for available frequencies

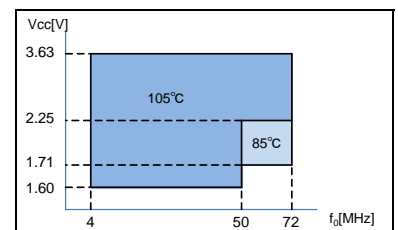


Figure 1 : The upper limit of Operating temperature and the related conditions

Please note that Supply voltage range (V_{CC}) depends on Output frequency (f_o) and upper limit of Operating temperature ($T_{use} \text{ Max.}$).

[Model : SG-210STF]

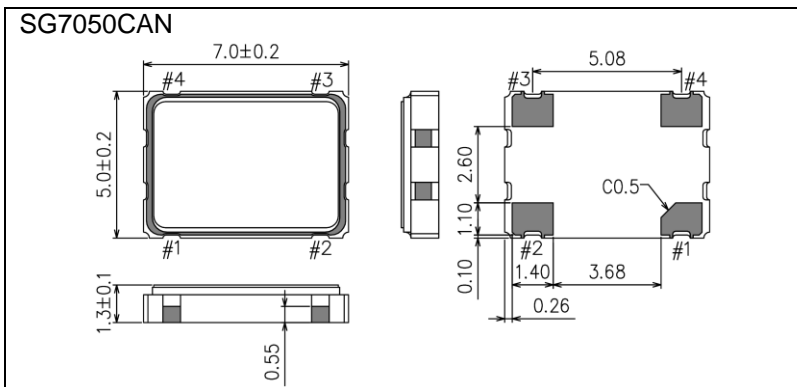
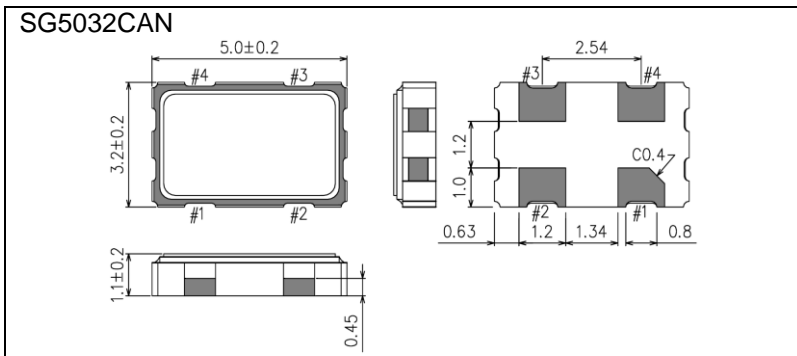
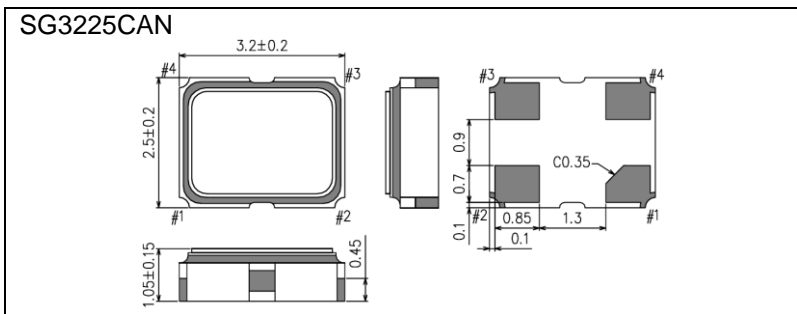
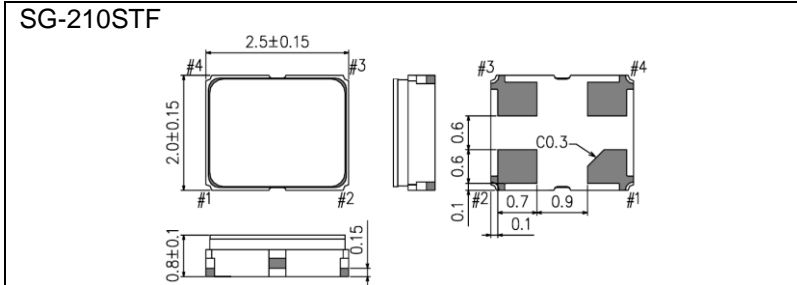
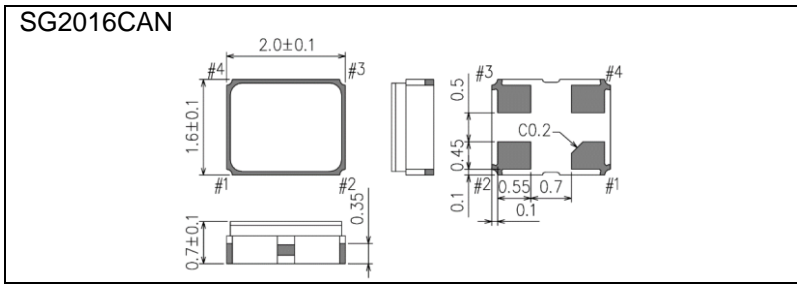
Product name SG-210STF25.000000MHzY
 (Standard form) ① ②③ ④ ⑤
 ①Model ②Function(S: Standby) ③Supply voltage
 ④Frequency ⑤Frequency tolerance

③Supply voltage *See Figure 1		⑤Frequency tolerance	
T	1.8 V to 3.3 V Typ.	S*	$\pm 25 \times 10^{-6}$ / -20 °C to +70 °C
		L	$\pm 50 \times 10^{-6}$ / -40 °C to +85 °C
		Y	$\pm 50 \times 10^{-6}$ / -40 °C to +105 °C

* Please refer to Product number list on Full Data Sheet for available frequencies

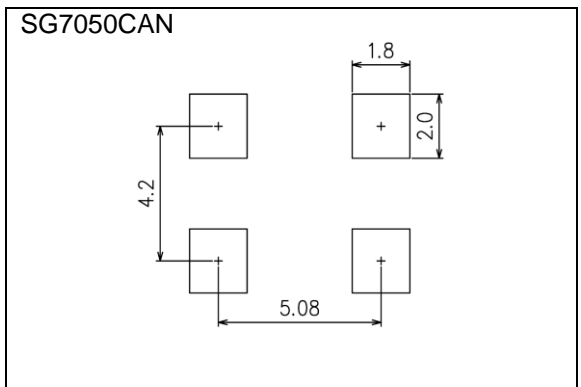
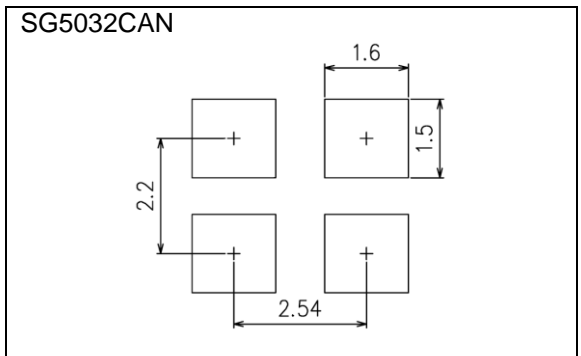
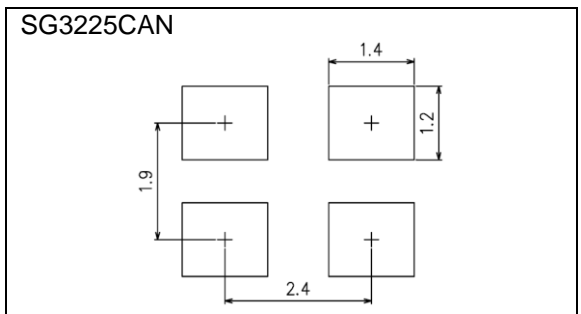
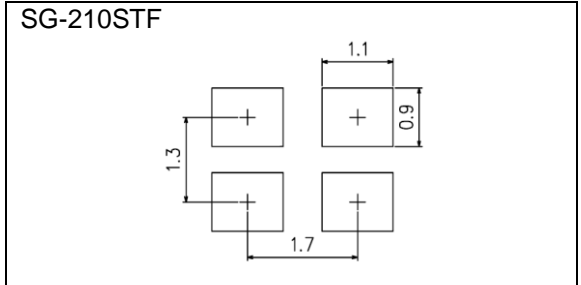
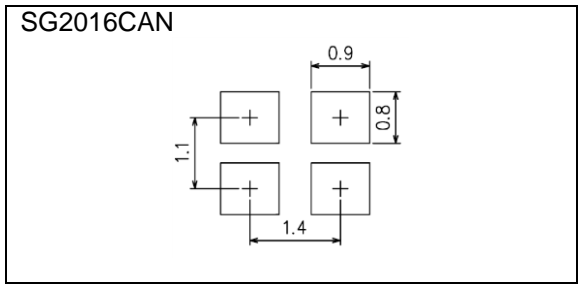
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



Pin Map

Pin	Connection	Function			
		ST terminal	Oscillator circuit	Output	
1	ST	ST function	ST function	Oscillation	Specified frequency: Enable
			HIGH or "open"	Oscillation stop	High impedance: Disable
			LOW		
2	GND	Ground			
3	OUT	Clock output			
4	V _{CC}	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_{cc} - GND).

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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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