

CRYSTAL OSCILLATOR (SPXO)

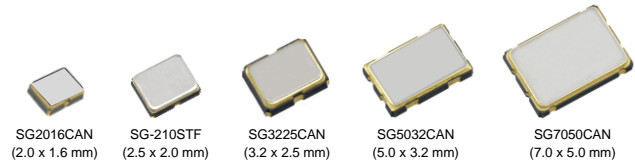
OUTPUT : CMOS



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<br>14.7456 MHz 16 MHz 20 MHz 24 MHz 24.576 MHz<br>25 MHz 26 MHz 27 MHz 32 MHz 33.33 MHz<br>33.3333 MHz 40 MHz 48 MHz 50 MHz 72 MHz |  |                            |  |
| Supply voltage               | $V_{CC}$   | 1.60 V to 3.63 V<br>1.71 V to 3.63 V<br>2.25 V to 3.63 V  | 4 MHz $\leq f_o \leq$ 50 MHz, $T_{use} = +105$ °C Max.<br>fo = 72 MHz, $T_{use} = +85$ °C Max.<br>fo = 72 MHz, $T_{use} = +105$ °C Max.<br>Refer to Figure 1 |                            |  |
| Storage temperature          | $T_{stg}$  | -55 °C to +125 °C<br>-40 °C to +125 °C  | SG2016CAN<br>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          | $f_{tol}$  | $\pm 25 \times 10^{-6}$<br>$\pm 50 \times 10^{-6}$  | -20 °C to +70 °C<br>-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.                | No load condition, 4 MHz $\leq f_o \leq$ 20 MHz          |
|                              |  | 1.8 mA Max.   | 2.0 mA Max.  | 2.2 mA Max.                | No load condition, 20 MHz < $f_o \leq$ 40 MHz            |
|                              |  | 2.1 mA Max.   | 2.4 mA Max.  | 2.6 mA Max.                | No load condition, 40 MHz < $f_o \leq$ 50 MHz            |
| Stand-by current             | $I_{std}$  | 2.1 $\mu$ A Max.  | 2.5 $\mu$ A Max.   | 2.7 $\mu$ A Max.           | $\overline{ST} = GND$                                    |
|                              |  | Symmetry  |  |                            | SYM  |
| Output voltage               | $V_{OH}$<br>$V_{OL}$<br>$V_{OH-2}$<br>$V_{OL-2}$ | 90 % $V_{CC}$ Min.  |  |                            |  |
|                              |  | 10 % $V_{CC}$ Max.  |  |                            |  |
|                              |  | $V_{CC} - 0.4$ V Min.   |  |                            |  |
|                              |  | 0.4 V Max.  |  |                            |  |
| Output load condition (CMOS) | $L_{CMOS}$                                       | 15 pF Max.  |  |                            |  |
| Input voltage                | $V_{IH}$<br>$V_{IL}$                             | 80 % $V_{CC}$ Min.  |  |                            | $\overline{ST}$ terminal                                 |
|                              |  | 20 % $V_{CC}$ Max.  |  |                            |  |
| Rise time and Fall time      | $t_r / t_f$                                      | 3 ns Max.<br>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 SG2016CAN25.000000MHzTJHA  
 (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

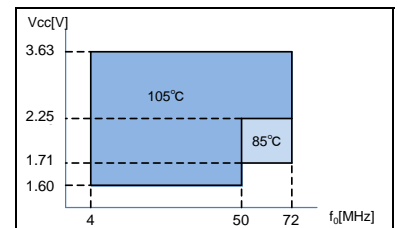


Figure 1 : The upper limit of Operating temperature and the related conditions

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

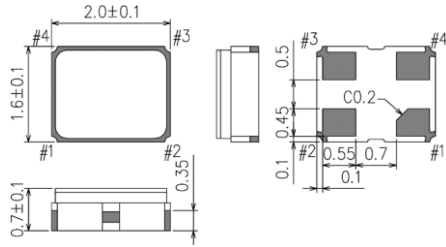
External dimensions

(Unit:mm)

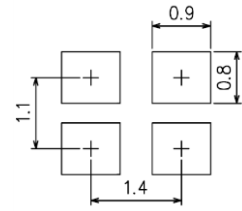
Footprint (Recommended)

(Unit:mm)

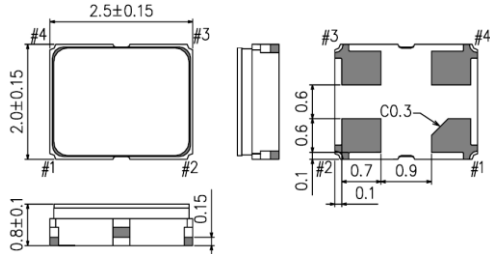
SG2016CAN



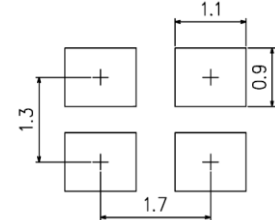
SG2016CAN



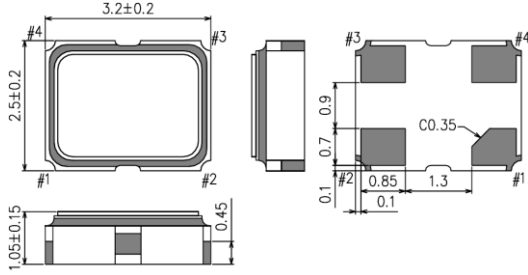
SG-210STF



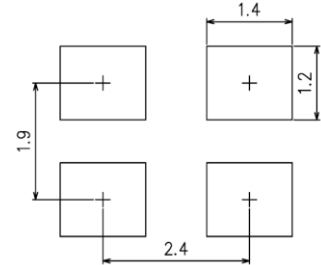
SG-210STF



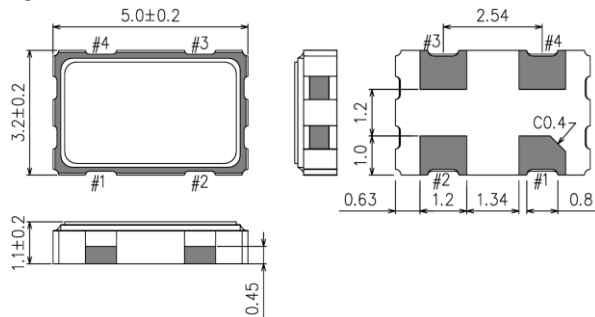
SG3225CAN



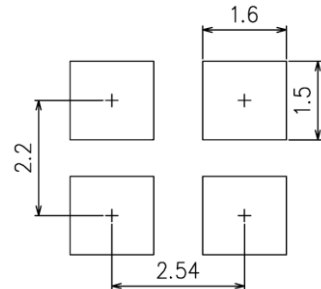
SG3225CAN



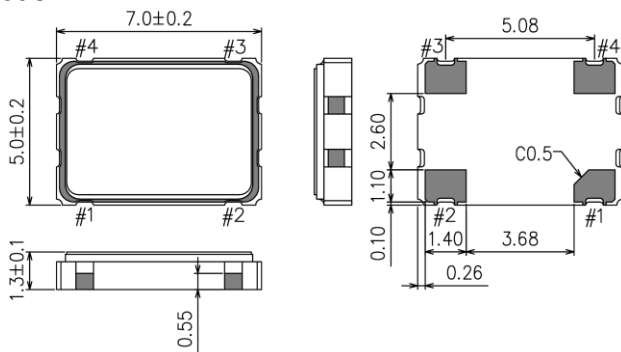
SG5032CAN



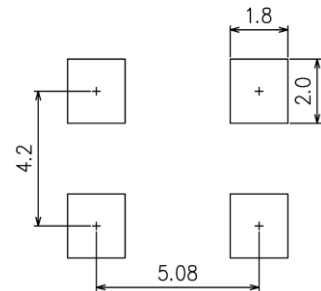
SG5032CAN



SG7050CAN



SG7050CAN



Pin Map

| Pin | Connection      | Function                      |                                   |                                       |
|-----|-----------------|-------------------------------|-----------------------------------|---------------------------------------|
| 1   | ST              | ST terminal                   |                                   |                                       |
|     |                 | ST function<br>HIGH or "open" | Oscillator circuit<br>Oscillation | Output<br>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

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

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|   |   |
|---|---|
|  | ► Pb free.  |
|  | ► Complies with EU RoHS directive.<br>*About the products without the Pb-free mark.<br>Contains Pb in products exempted by EU RoHS directive.<br>(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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