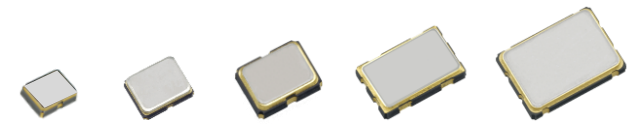
## CRYSTAL OSCILLATOR (SPXO)

**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



SG2016CAN (2.0 x 1.6 mm) SG-210STF (2.5 x 2.0 mm) SG3225CAN (3.2 x 2.5 mm) SG5032CAN (5.0 x 3.2 mm) SG7050CAN (7.0 x 5.0 mm)

## Specifications (characteristics)

| Item | Symbol | Specifications | | | Conditions / Remarks |
|---|---|---|---|---|---|
| Output frequency | fo | 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 | | | 4 MHz ≤ fo ≤ 50 MHz, T_use = +105 °C Max. — Refer to Figure 1 |
| | | 1.71 V to 3.63 V | | | fo = 72 MHz, T_use = +85 °C Max. |
| | | 2.25 V to 3.63 V | | | fo = 72 MHz, T_use = +105 °C Max. |
| Storage temperature | T_stg | -55 °C to +125 °C | | | SG2016CAN |
| | | -40 °C to +125 °C | | | 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 | ±25 × $10^{-6}$ | | | -20 °C to +70 °C |
| | | ±50 × $10^{-6}$ | | | -40 °C to +85 °C, -40 °C to +105 °C |
| Current consumption | $I_{CC}$ | $V_{CC}$ = 1.8 V ± 10 % | $V_{CC}$ = 2.5 V ± 10 % | $V_{CC}$ = 3.3 V ± 10 % | |
| | | 1.5 mA Max. | 1.6 mA Max. | 1.8 mA Max. | No load condition, 4 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 ≤ 50 MHz |
| | | 2.4 mA Max. | 2.8 mA Max. | 3.0 mA Max. | No load condition, fo = 72 MHz |
| Stand-by current | I_std | 2.1 µA Max. | 2.5 µA Max. | 2.7 µA Max. | $\overline{ST}$ =GND |
| Symmetry | SYM | 45 % to 55 % | | | 50 % $V_{CC}$ level, L_CMOS ≤ 15 pF |
| Output voltage | $V_{OH}$ | 90 % $V_{CC}$ Min. | | | 1.8 V ± 10 %: $I_{OH}$ -1.5 mA, $I_{OL}$ 1.5 mA; 2.5 V ± 10 %: $I_{OH}$ -3 mA, $I_{OL}$ 3 mA; 3.3 V ± 10 %: $I_{OH}$ -4 mA, $I_{OL}$ 4 mA |
| | $V_{OL}$ | 10 % $V_{CC}$ Max. | | | |
| | $V_{OH-2}$ | $V_{CC}$ - 0.4 V Min. | | | 1.8 V±10 %: $I_{OH}$ -3 mA, $I_{OL}$ 3 mA; 2.5 V±10 %: $I_{OH}$ -4 mA, $I_{OL}$ 4 mA; 3.3 V±10 %: $I_{OH}$ -6 mA, $I_{OL}$ 6 mA |
| | $V_{OL-2}$ | 0.4 V Max. | | | |
| Output load condition (CMOS) | L_CMOS | 15 pF Max. | | | |
| Input voltage | $V_{IH}$ | 80 % $V_{CC}$ Min. | | | $\overline{ST}$ terminal |
| | $V_{IL}$ | 20 % $V_{CC}$ Max. | | | |
| Rise time and Fall time | tr / tf | 3 ns Max.<br>3.5 ns Max. (@1.8 V±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 | ±3 × $10^{-6}$ / year Max. | | | +25 °C, First year |

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

Product name SG2016 C AN 25.000000MHz T J H 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 | |
|---|---|
| T | 1.8 V to 3.3 V Typ. |
| K | 2.5 V to 3.3 V Typ. |

| ⑤Frequency tolerance / ⑥Operating temperature range | |
|---|---|
| DB* | ±25 × $10^{-6}$ / -20 °C to +70 °C |
| JG | ±50 × $10^{-6}$ / -40 °C to +85 °C |
| JH | ±50 × $10^{-6}$ / -40 °C to +105 °C |

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

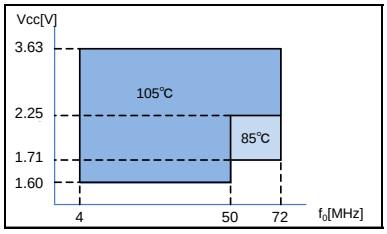



Figure 1 : The upper limit of Operating temperature and the related conditions

Please note that Supply voltage range ($V_{CC}$) depends on Output frequency (fo) and upper limit of Operationg temperature (T_use Max.).

[Model : SG-210STF]

Product name SG-210 S T F 25.000000MHz Y
(Standard form) ① ②③ ④ ⑤

①Model ②Function(S:Standby) ③Supply voltage
④Frequency ⑤Frequency tolerance

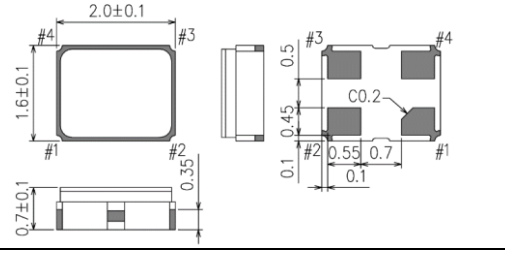
| ③Supply voltage *See Figure 1 | |
|---|---|
| T | 1.8 V to 3.3 V Typ. |

| ⑤Frequency tolerance | |
|---|---|
| S* | ±25 × $10^{-6}$ / -20 °C to +70 °C |
| L | ±50 × $10^{-6}$ / -40 °C to +85 °C |
| Y | ±50 × $10^{-6}$ / -40 °C to +105 °C |

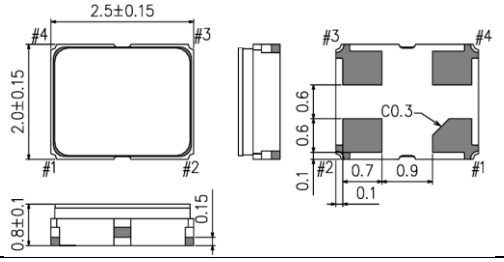
* Please refer to Product number list on Full Data Sheet for available frequencies

## External dimensions (Unit:mm)

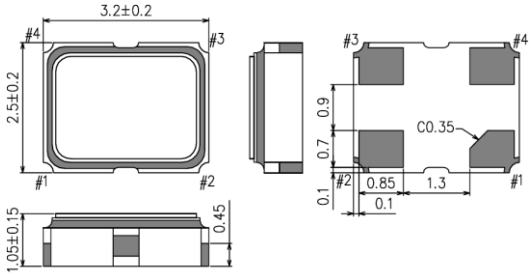
SG2016CAN



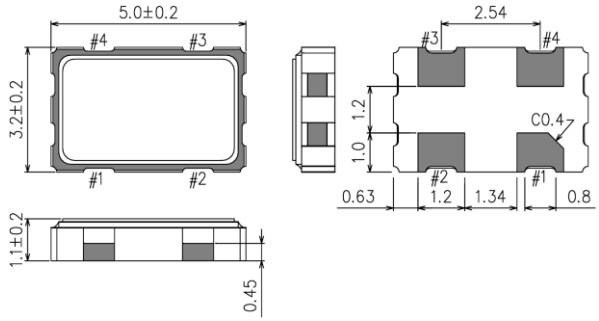

SG-210STF



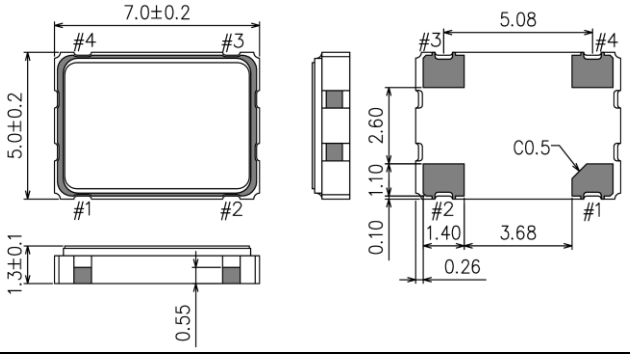

SG3225CAN




SG5032CAN

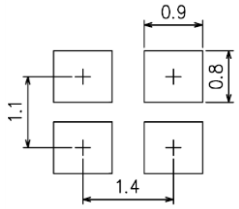



SG7050CAN

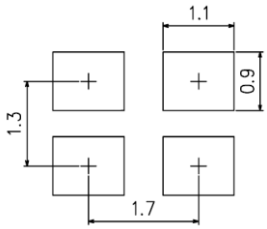



## Footprint (Recommended) (Unit:mm)

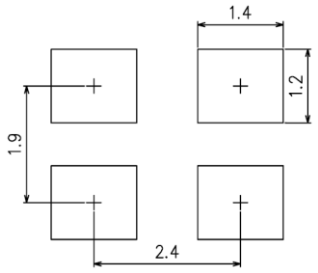
SG2016CAN



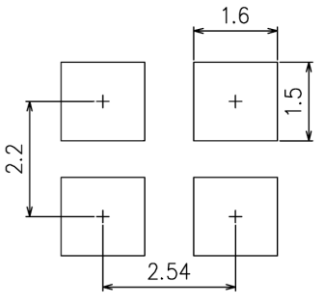

SG-210STF



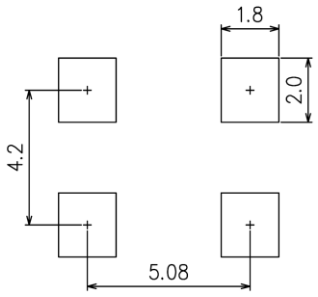

SG3225CAN




SG5032CAN




SG7050CAN




## Pin Map

| Pin | Connection | Function |
|---|---|---|
| 1 | ST | ST terminal |
| 2 | GND | Ground |
| 3 | OUT | Clock output |
| 4 | $V_{CC}$ | Power supply |

ST terminal

| ST function | Oscillator circuit | Output |
|---|---|---|
| HIGH or "open" | Oscillation | Specified frequency: Enable |
| LOW | Oscillation stop | High impedance: Disable |

■**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 Vcc - 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.

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IATF 16949 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.<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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