

CRYSTAL OSCILLATOR (SPXO)

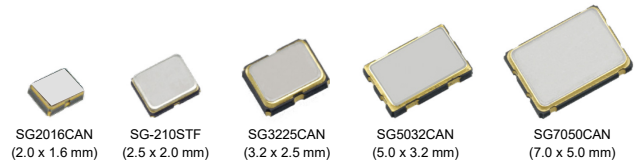
OUTPUT : CMOS



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 33.33 MHz 33.3333 MHz 40 MHz 48 MHz 50 MHz 72 MHz | | | | | | | | | | | | | | |
| Supply voltage | V_{CC} | 1.60 V to 3.63 V | 4 MHz $\leq f_o \leq$ 50 MHz, $T_{use} = +105^\circ\text{C}$ Max. | | | | | | | | | | | | | |
| | | 1.71 V to 3.63 V | $f_o = 72$ MHz, $T_{use} = +85^\circ\text{C}$ Max. | | | | | | | | | | | | | |
| | | 2.25 V to 3.63 V | $f_o = 72$ MHz, $T_{use} = +105^\circ\text{C}$ Max. | | | | | | | | | | | | | |
| Storage temperature | T_{stg} | -55 °C to +125 °C | SG2016CAN, SG3225CAN | | | | | | | | | | | | | |
| | | -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} | $\pm 25 \times 10^{-6}$ | -20 °C to +70 °C | | | | | | | | | | | | | |
| | | $\pm 50 \times 10^{-6}$ | -40 °C to +85 °C, -40 °C to +105 °C | | | | | | | | | | | | | |
| Current consumption | I_{CC} | $V_{CC} = 1.8 \text{ V} \pm 10 \%$ | $V_{CC} = 2.5 \text{ V} \pm 10 \%$ | $V_{CC} = 3.3 \text{ V} \pm 10 \%$ | | | | | | | | | | | | |
| | | 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 | | | | | | | | | | | |
| | | 2.4 mA Max. | 2.8 mA Max. | 3.0 mA Max. | No load condition, $f_o = 72$ MHz | | | | | | | | | | | |
| Stand-by current | I_{std} | 2.1 μA Max. | 2.5 μA Max. | 2.7 μA Max. | $\overline{ST} = \text{GND}$ | | | | | | | | | | | |
| Symmetry | SYM | 45 % to 55 % | 50 % V_{CC} level, $L_{CMOS} \leq 15 \text{ pF}$ | | | | | | | | | | | | | |
| Output voltage | V_{OH} | 90 % V_{CC} Min. | <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> | | | 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} | -1.5 mA | -3 mA | -4 mA | | | | | | | | | | | | |
| | I_{OL} | 1.5 mA | 3 mA | 4 mA | | | | | | | | | | | | |
| V_{OL} | 10 % V_{CC} 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>-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} | -3 mA | -4 mA | -6 mA | I_{OL} | 3 mA | 4 mA | 6 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 | | | | | | | | | | | | | |
| V_{OH-2} | $V_{CC} - 0.4 \text{ V}$ Min. | | | | | | | | | | | | | | | |
| 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 | t_r / t_f | 3 ns Max. 3.5 ns Max. (@1.8 V $\pm 10 \%$) | 20 % V_{CC} to 80 % V_{CC} level, $L_{CMOS} = 15 \text{ pF}$ | | | | | | | | | | | | | |
| 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 | | ⑤Frequency 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

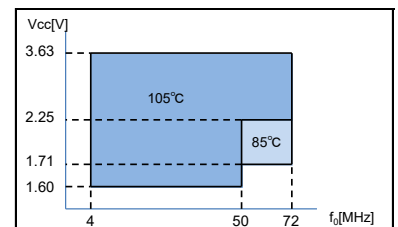


Figure 1 : The upper limit of Operating temperature and the related conditions

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

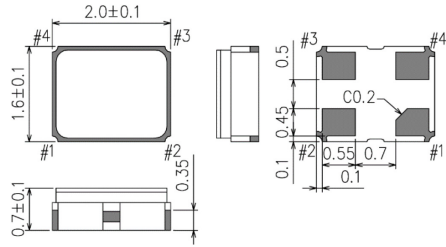
External dimensions

(Unit:mm)

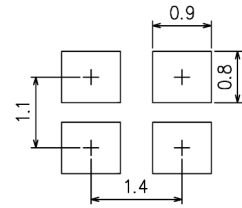
Footprint (Recommended)

(Unit:mm)

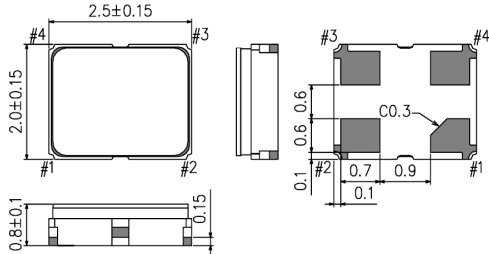
SG2016CAN



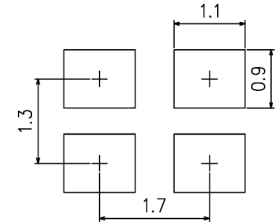
SG2016CAN



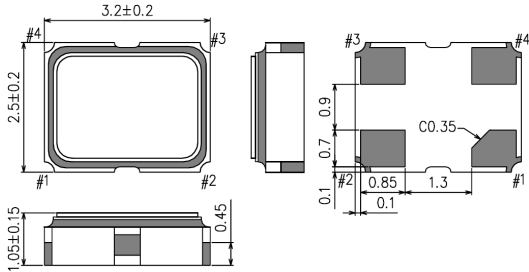
SG-210STF



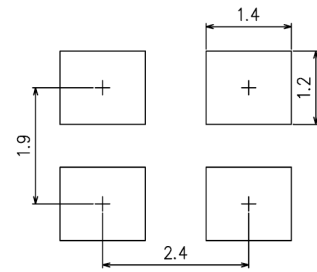
SG-210STF



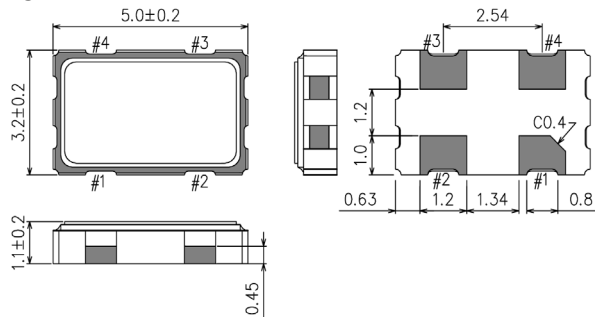
SG3225CAN



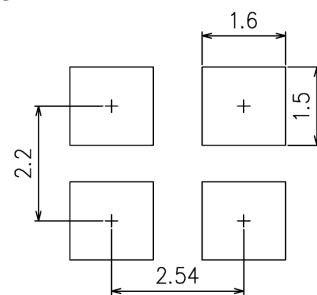
SG3225CAN



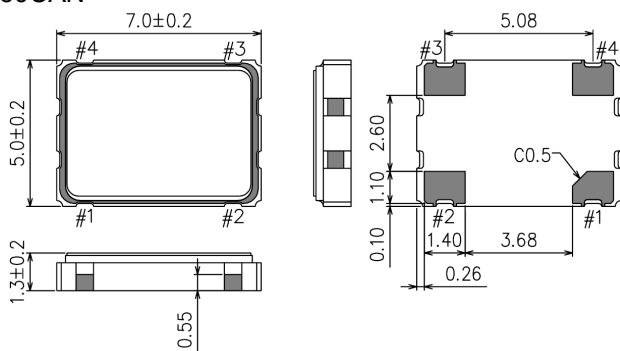
SG5032CAN



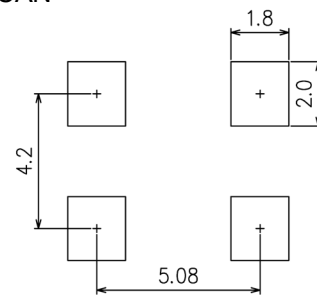
SG5032CAN



SG7050CAN



SG7050CAN



Pin Map

| Pin | Connection | Function | | |
|-----|-----------------|----------------|--------------------|-----------------------------|
| 1 | ST | ST terminal | | |
| | | ST function | 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 _{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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| | |
|---|---|
|  | ► Pb free. |
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