



## CRYSTAL OSCILLATOR SPXO

# SG-615 series SG-531 / SG-51 series

- Frequency range : 1.025 MHz to 135 MHz
- Supply voltage : 3.3 V / 5.0 V
- Function : Output enable(OE) or Standby( $\overline{ST}$ )
- Pin compatible with full-size metal can. (SG-51 series)
- Pin compatible with half-size metal can. (SG-531 series)



Product Number (please contact us)

SG-615 : Q33615xx1xxxx00

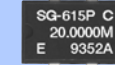
SG-531 : Q32531xx1xxxx00

SG-51 : Q32510xx1xxxx00



Actual size

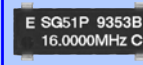
SG-615



SG-531



SG-51



### Specifications (characteristics)

| Item                                  | Symbol                             | Specifications   |                                    | Remarks   |
|---------------------------------------|------------------------------------|--|------------------------------------|---|
|                                       |                                    | SG-615P<br>SG-531P<br>SG-51P                             | SG-615PTJ<br>SG-531PTJ<br>SG-51PTJ |   |
| Output frequency range                | $f_o$                              | 1.025 MHz to 26 MHz                                      | 26.001 MHz to 66.667 MHz           | .   |
| Supply voltage                        | $V_{cc}$                           | 5.0 V $\pm$ 0.5 V  |                                    |   |
| Temperature range                     | Storage temperature<br>$T_{stg}$   | -55 °C to +125 °C  |                                    | Store as bare product after unpacking   |
|                                       | Operating temperature<br>$T_{use}$ | -20 °C to +70 °C   |                                    |   |
| Frequency tolerance                   | $f_{tol}$                          | B: $\pm 50 \times 10^{-6}$ , C: $\pm 100 \times 10^{-6}$ |                                    | -20 °C to +70 °C *1   |
| Current consumption                   | $I_{cc}$                           | 23 mA Max.   | 35 mA Max.                         | No load condition   |
| Disable current                       | $I_{dis}$                          | 12 mA Max.   | 28 mA Max.                         | OE=GND  |
| Symmetry                              | SYM                                | 40 % to 60 %   | —                                  | CMOS load: 50 % $V_{cc}$ level  |
|                                       |                                    | 40 % to 60 %   | 45 % to 55 %                       | TTL load: 1.4 V level   |
| High output voltage                   | $V_{OH}$                           | $V_{cc}$ -0.4 V Min.                                     | 2.4 V Min.                         | $I_{OH}$ =-400 $\mu$ A  |
| Low output voltage                    | $V_{OL}$                           | 0.4 V Max.   |                                    | $I_{OL}$ =16 mA(P)/ 8 mA(PTJ)   |
| Output load condition (TTL)           | $L_{TTL}$                          | 10 TTL Max.  | 5 TTL Max.                         | $L_{CMOS} \leq 15$ pF   |
| Output load condition (CMOS)          | $L_{CMOS}$                         | 50 pF Max.   | —                                  |   |
| Output enable / disable input voltage | $V_{IH}$                           | 2.0 V Min.   | 3.5 V Min.                         | $I_{IH}$ = 1 $\mu$ A Max. (OE= $V_{cc}$ )   |
|                                       | $V_{IL}$                           | 0.8 V Max.   | 1.5 V Max.                         | $I_{IL}$ = -100 $\mu$ A Min. (OE=GND),<br>PTJ: $I_{IL}$ = -500 $\mu$ A Min.(OE=GND) |
| Rise time / Fall time                 | $t_r / t_f$                        | 8 ns Max.  | —                                  | CMOS load: 20 % $V_{cc}$ to 80 % $V_{cc}$ level                                     |
|                                       |                                    | 8 ns Max.  | 5 ns Max.                          | TTL load: 0.4 V to 2.4 V level  |
| Start-up time                         | $t_{str}$                          | 4 ms Max.  | 10 ms Max.                         | Time at minimum supply voltage to be 0 s  |
| Frequency aging                       | $f_{aging}$                        | $\pm 5 \times 10^{-6}$ / year Max.                       |                                    | +25 °C, $V_{cc}$ =5.0 V, First year   |

\*1 "B" tolerance will be available up to 55 MHz.

### Specifications (characteristics)

| Item                                  | Symbol                             | Specifications  |                        |                          | Remarks  |
|---------------------------------------|------------------------------------|---|------------------------|--------------------------|--|
|                                       |                                    | SG-615PCG<br>SG-531PCG  | SG-615SCG<br>SG-531SCG | SG-615PCN                |  |
| Output frequency range                | $f_o$                              | 1.500 MHz to 26.000 MHz   |                        | 26.001 MHz to 66.667 MHz |  |
| Supply voltage                        | $V_{cc}$                           | 2.7 V to 3.6 V  |                        | 3.0 V to 3.6 V           |  |
| Temperature range                     | Storage temperature<br>$T_{stg}$   | -55 °C to +125 °C   |                        |                          | Store as bare product after unpacking                      |
|                                       | Operating temperature<br>$T_{use}$ | -40 °C to +85 °C  |                        |                          |  |
| Frequency tolerance                   | $f_{tol}$                          | B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$<br>M: $\pm 100 \times 10^{-6}$ |                        |                          | -20 °C to +70 °C<br>-40 °C to +85 °C                       |
| Current consumption                   | $I_{cc}$                           | 12 mA Max.  |                        | 20 mA Max.               | No load condition  |
| Disable current                       | $I_{dis}$                          | 10 mA Max.  | —                      | 10 mA Max.               | OE=GND (PCG,PCN)   |
| Stand-by current                      | $I_{std}$                          | —   | 50 $\mu$ A Max.        | —                        | $\overline{ST}$ =GND (SCG)                                 |
| Symmetry                              | SYM                                | 45 % to 55 %  |                        |                          | 50 % $V_{cc}$ level, $L_{CMOS}$ =Max.                      |
| High output voltage                   | $V_{OH}$                           | $V_{cc}$ -0.4 V Min.  |                        | $V_{cc}$ -0.4 V Min.     | $I_{OH}$ =-8 mA  |
| Low output voltage                    | $V_{OL}$                           | 0.4 V Max.  |                        | 0.4 V Max.               | $I_{OL}$ = 8 mA  |
| Output load condition                 | $L_{CMOS}$                         | 25 pF Max.  |                        | 15 pF Max.               |  |
| Output enable / disable input voltage | $V_{IH}$                           | 70 % $V_{cc}$ Min.  |                        | 70 % $V_{cc}$ Min.       | OE Terminal or $\overline{ST}$ Terminal                    |
|                                       | $V_{IL}$                           | 20 % $V_{cc}$ Max.  |                        | 30 % $V_{cc}$ Max.       |  |
| Rise time / Fall time                 | $t_r / t_f$                        | 4 ns Max.   |                        |                          | 20 % $V_{cc}$ to 80 % $V_{cc}$ level, $L_{CMOS} \leq$ Max. |
| Start-up time                         | $t_{str}$                          | 12 ms Max.  |                        | 10 ms Max.               | $t=0$ at 90% $V_{cc}$                                      |
| Frequency aging                       | $f_{aging}$                        | $\pm 5 \times 10^{-6}$ / year Max.  |                        |                          | +25 °C, $V_{cc}$ =3.3 V, First year                        |



## Specifications (characteristics)

| Item                                  | Symbol                | Specifications   |                                    |                                    | Remarks  |
|---------------------------------------|-----------------------|--|------------------------------------|------------------------------------|--|
|                                       |                       | SG-615PTW / STW<br>SG-531PTW / STW                       | SG-615PHW / SHW<br>SG-531PHW / SHW | SG-615PCW / SCW<br>SG-531PCW / SCW |  |
| Output frequency range                | $f_0$                 | 55.001 MHz to 135.000 MHz                                |                                    | 26.001 MHz to 135.000 MHz          |  |
| Supply voltage                        | $V_{cc}$              | 5.0 V $\pm$ 0.5 V  |                                    | 3.3 V $\pm$ 0.3 V                  |  |
| Temperature range                     | Storage temperature   | -55 °C to +125 °C  |                                    |                                    | Store as bare product after unpacking                      |
|                                       | Operating temperature | -20 °C to +70 °C   |                                    | -40 °C to +85 °C                   |  |
| Frequency tolerance                   | $f_{tol}$             | B: $\pm 50 \times 10^{-6}$ , C: $\pm 100 \times 10^{-6}$ |                                    | M: $\pm 100 \times 10^{-6}$        | -20 °C to +70 °C *1<br>-40 °C to +85 °C                    |
| Current consumption                   | $I_{cc}$              | 45 mA Max.   |                                    | 28 mA Max.                         | No load condition( Max. frequency range )                  |
| Disable current                       | $I_{dis}$             | 30 mA Max.   |                                    | 16 mA Max.                         | OE=GND (PTW,PHW,PCW)                                       |
| Stand-by current                      | $I_{std}$             | 50 $\mu$ A Max.  |                                    |                                    | $\overline{ST}$ =GND (STW,SHW,SCW)                         |
| Symmetry                              | SYM                   | 40 % to 60 %   |                                    | 40 % to 60 %                       | 50 % $V_{cc}$ level, L_CMOS=Max.                           |
|                                       |                       | —  |                                    | —                                  | 1.4 V level, L_CMOS=Max.                                   |
| High output voltage                   | $V_{OH}$              | $V_{cc}$ -0.4 V Min.                                     |                                    |                                    | $I_{OH}$ = 16 mA(PTW,STW,PHW,SHW),-8 mA(PCW,SCW)           |
| Low output voltage                    | $V_{OL}$              | 0.4 V Max.   |                                    |                                    | $I_{OL}$ = 16 mA(PTW,STW,PHW,SHW), 8 mA(PCW,SCW)           |
| Output load condition (TTL)           | $L_{TTL}$             | 5 TTL Max.   | —                                  | —                                  | $f_0 \leq 90$ MHz , Max.supply voltage                     |
| Output load condition (CMOS)          | $L_{CMOS}$            | 15 pF Max.   |                                    |                                    | Max.frequency , Max.supply voltage                         |
| Output enable / disable input voltage | $V_{IH}$              | 2.0 V Min.   |                                    | 70 % $V_{cc}$ Min.                 | OE Terminal or $\overline{ST}$ Terminal                    |
|                                       | $V_{IL}$              | 0.8 V Max.   |                                    | 20 % $V_{cc}$ Max.                 |  |
| Rise time / Fall time                 | $t_r / t_f$           | —  |                                    | 4 ns Max.                          | 20 % $V_{cc}$ to 80 % $V_{cc}$ level, $L_{CMOS} \leq$ Max. |
|                                       |                       | 4 ns Max.  | —                                  | —                                  | 0.4 V to 2.4 V level                                       |
| Start-up time                         | $t_{str}$             | 10 ms Max..  |                                    |                                    | Time at minimum supply voltage to be 0 s                   |
| Frequency aging                       | $f_{aging}$           | $\pm 5 \times 10^{-6}$ / year Max.                       |                                    |                                    | +25 °C, $V_{cc}$ =5.0 V / 3.3 V, First year                |

\*1 "C" tolerance : $f_0 \geq 66.667$  MHz(PTW,STW,PHW,SHW)

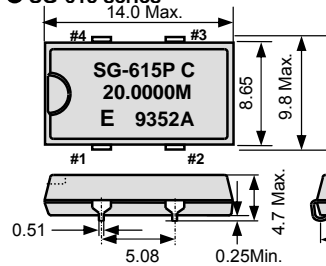
## External dimensions

(Unit:mm)

## Footprint (Recommended)

(Unit:mm)

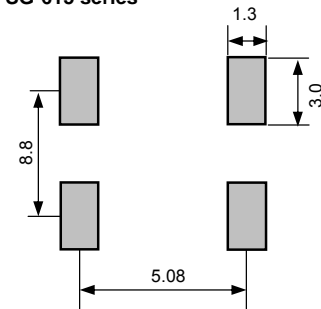
## ● SG-615 series



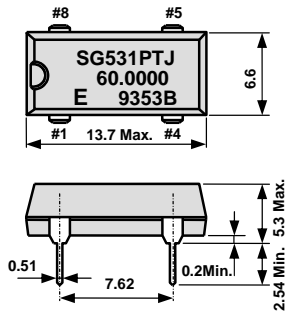
Pin map

| Pin | Connection |
|-----|------------|
| 1   | OE or ST   |
| 2   | GND        |
| 3   | OUT        |
| 4   | $V_{cc}$   |

## ● SG-615 series

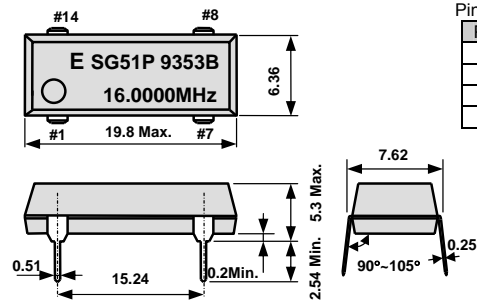


## ● SG-531 series



| No. | Pin terminal |
|-----|--------------|
| 1   | OE or ST     |
| 4   | GND          |
| 5   | OUT          |
| 8   | $V_{cc}$     |

## ● SG-51 series



Pin map

| Pin | Connection |
|-----|------------|
| 1   | OE or ST   |
| 7   | GND        |
| 8   | OUT        |
| 14  | $V_{cc}$   |

## Note.

OE pin (P,PTJ,PTW,PHW,PCW,PCN,PCG)  
OE pin = "H" or "open" : Specified frequency output.  
OE pin = "L" : Output is high impedance.

$\overline{ST}$  pin (STW, SHW, SCW,SCG)  
ST pin = "H" or "open" : Specified frequency output.  
ST pin = "L" : Output is low level  
(weak pull - down), oscillation stops.

To maintain stable operation, provide by-pass capacitor with more than 0.1  $\mu$ F at a location as near as possible to the power source terminal of the crystal products (between  $V_{cc}$  - GND).