

SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-615 series

- High-density mounting-type SMD.
- A general-purpose SMD with heat-resisting cylindrical AT-cut crystal unit and allowing almost the same soldering temperature as SMD IC.
- Cylindrical AT crystal unit builtin, thus assuring high reliability.
- Provided with output enable function.
- Low current consumption.

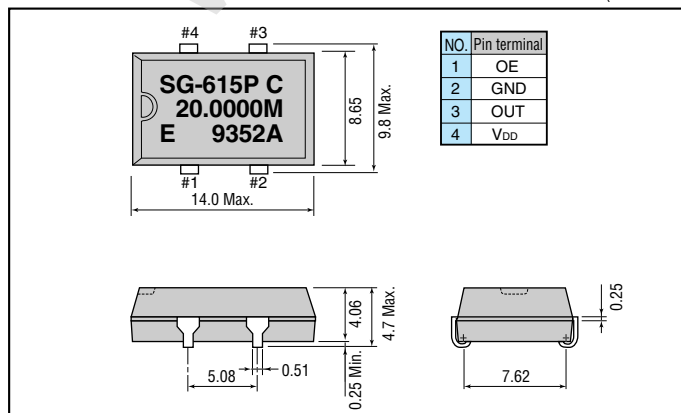
Specifications (characteristics)

| Item | Symbol | SG-615P | SG-615PTJ | SG-615PH | Remarks |
|-------------------------------------|-----------------------|---|-----------------------------------|----------------------|---|
| | | Specifications | | | |
| Output frequency range | f_0 | 1.0250 MHz to 26.0000 MHz | 26.0001 MHz to 66.6667 MHz | | |
| Power source voltage | Max. supply voltage | V_{DD-GND} | -0.3 V to +7.0 V | | |
| | Operating voltage | V_{DD} | 5.0 V \pm 0.5 V | | |
| Temperature range | Storage temperature | T_{STG} | -55 °C to +125 °C | | Stored as bare product after unpacking 55 MHz Max.(-40 °C to +85 °C) |
| | Operating temperature | T_{OPR} | -20 °C to 70 °C (-40 °C to 85 °C) | | |
| Soldering condition | T_{SOL} | Twice at under 260 °C within 10 s or under 230 °C within 3 min. | | | |
| Frequency stability | $\Delta f/f_0$ | B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$ | | | B type is possible up to 55 MHz |
| Current consumption | I_{OP} | 23 mA Max. | 35 mA Max. | | No load condition |
| Duty | C-MOS level | 40 % to 60 % | | 40 % to 60 % | C-MOS load: 1/2 V_{DD} TTL load: 1.4 V |
| | TTL level | 45 % to 55 % | | | |
| Output voltage | V_{OH} | V_{DD} -0.4 V Min. | 2.4 V Min. | V_{DD} -0.4 V Min. | |
| | (I_{OH}) | -400 μ A | | -4 mA | |
| | V_{OL} | 0.4 V Max. | | | |
| | (I_{OL}) | 16 mA | 8 mA | 4 mA | |
| Output load condition (fan out) | C-MOS | C_L 50 pF Max. | — | 50 pF Max. | $C_L \leq 15$ pF $I_{IH} = 1$ μ A Max.(OE= V_{DD}) $I_{IL} = 100$ μ A Min.(OE=GND) $I_{IL} = 500$ μ A Min.(OE=GND) PTJ |
| | TTL | N 10 TTL Max. | 5 TTL Max. | — | |
| Output enable/disable input voltage | V_{IH} | 2.0 V Min. | 3.5 V Min. | 2.0 V Min. | |
| | V_{IL} | 0.8 V Max. | 1.5 V Max. | 0.8 V Max. | |
| Output disable current | I_{OE} | 12 mA Max. | 28 mA Max. | 20 mA Max. | OE=GND |
| Output rise time | C-MOS level | t_{TLH} | — | 7 ns Max. | C-MOS load: 20 % \rightarrow 80 % V_{DD} TTL load: 0.4 V \rightarrow 2.4 V |
| | TTL level | | 8 ns Max. | 5 ns Max. | |
| Output fall time | C-MOS level | t_{THL} | — | 7 ns Max. | C-MOS load: 80 % \rightarrow 20 % V_{DD} TTL load: 2.4 V \rightarrow 0.4 V |
| | TTL level | | 8 ns Max. | 5 ns Max. | |
| Oscillation start up time | t_{OSC} | 4 ms Max. | 10 ms Max. | | Time at 4.5 V to be 0 s |
| Aging | f_a | $\pm 5 \times 10^{-6}$ /year Max. | | | $T_a = +25$ °C, $V_{DD} = 5$ V, first year |
| Shock resistance | S.R. | $\pm 20 \times 10^6$ Max. | | | Three drops on a hard board from 750 mm or excitation test with 29400 m/s ² x 0.3 ms x 1/2sine wave in 3 directions |

Note: • Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.
• External by-pass capacitor is recommended.

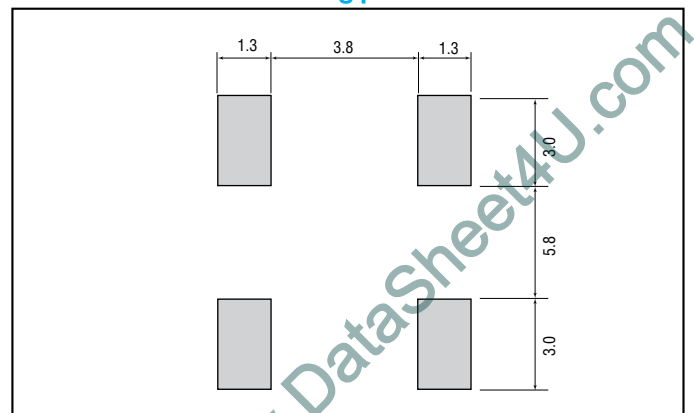
External dimensions

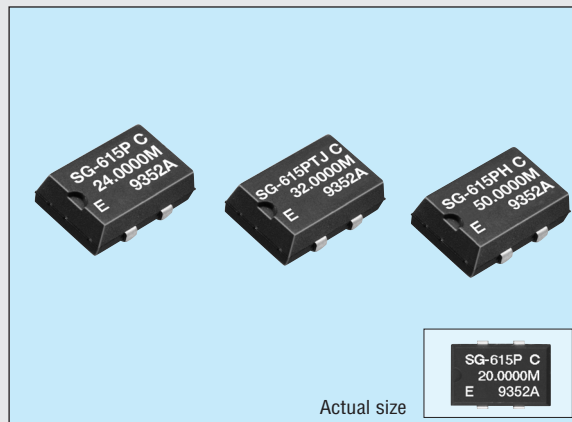
(Unit: mm)



Recommended soldering pattern

(Unit: mm)





Specifications (characteristics)

| Item | Symbol | SG-615PTW/STW | SG-615PHW/SHW | SG-615PCW/SCW | Remarks |
|-------------------------------------|-----------------------|---|---------------|-----------------------------|---|
| | | Specifications | | | |
| Output frequency range | f_0 | 55.0001 MHz to 135.0000 MHz | | 26.0001 MHz to 135.0000 MHz | |
| Power source voltage | Max. supply voltage | V_{DD-GND} -0.5 V to +7.0 V | | | |
| | Operating voltage | V_{DD} 5.0 V \pm 0.5 V | | 3.3 V \pm 0.3 V | |
| Temperature range | Storage temperature | T_{STG} -55 °C to +125 °C | | | |
| | Operating temperature | T_{OPR} -20 °C to +70 °C | | -40 °C to +85 °C | |
| Soldering condition (lead part) | T_{SOL} | Twice at under 260 °C within 10 s or under 230 °C within 3 min. | | | |
| Frequency stability | $\Delta f/f_0$ | B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$ | | | -20 °C to +70 °C |
| | | M: $\pm 100 \times 10^{-6}$ | | | 40 °C to +85 °C |
| Current consumption | I_{OP} | 45 mA Max. | | 28 mA Max. | No load condition |
| Output disable current | I_{OE} | 30 mA Max. | | 16 mA Max. | OE=GND |
| Output disable current | I_{ST} | 50 μ A Max. | | | ST=GND |
| Duty | C-MOS level | — | | 40 % to 60 % | C-MOS load: $1/2V_{DD}$ |
| | TTL level | 40 % to 60 % | | — | TTL load: 1.4 V |
| Output voltage | V_{OH} | $V_{DD}-0.4$ V Min. | | | $I_{OH} = -16$ mA (*TW/HW)/-8 mA (*CW) |
| | V_{OL} | 0.4 V Max. | | | $I_{OL} = -16$ mA (*TW/HW)/8 mA (*CW) |
| Output load condition (fan out) | C_L | 15 pF Max. | | | |
| Output enable/disable input voltage | V_{IH} | 2.0 V Min. | | 0.7 V_{DD} Min. | OE,ST |
| | V_{IL} | 0.8 V Max. | | 0.2 V_{DD} Min. | OE,ST |
| Output rise time | C-MOS level | — | | 4 ns Max. | C-MOS load: 20 % \rightarrow 80 % V_{DD} |
| | TTL level | 4 ns Max. | | — | TTL load: 0.4 V \rightarrow 2.4 V |
| Output fall time | C-MOS level | — | | 4 ns Max. | C-MOS load: 80 % \rightarrow 20 % V_{DD} |
| | TTL level | 4 ns Max. | | — | TTL load: 2.4 V \rightarrow 0.4 V |
| Oscillation start up time | t_{OSC} | 10 ms Max. | | | Time at 4.5 V to be 0 s |
| Aging | f_a | $\pm 5 \times 10^{-6}$ /year Max. | | | $T_a = +25$ °C, $V_{DD} = 5$ V |
| Shock resistance | S.R. | $\pm 20 \times 10^{-6}$ Max. | | | Three drops on a hard board from 750 mm or excitation test with 29400 m/s ² x 0.3 ms x 1/2 sine wave in 3 directions |

Operating condition and Frequency band

| Operating condition | | 1 MHz | 50 MHz | 100 MHz | 150 MHz |
|---------------------|---------------------------------------|---------|---------------|-----------------------|---------|
| 5 V \pm 0.5 V | Frequency stability:B (-20 to +70 °C) | 1.025 | 26 | 55 | 135 |
| | | SG-615P | SG-615PTJ/PH | SG-615PTW/STW/PHW/SHW | |
| 5 V \pm 0.5 V | Frequency stability:C (-20 to +70 °C) | 1.025 | 26 | 66.667 | 135 |
| | | SG-615P | SG-615PTJ/PH | SG-615PTW/STW/PHW/SHW | |
| 3.3 V \pm 0.3 V | Frequency stability:B (-20 to +70 °C) | | 26 | | 135 |
| | | | SG-615PCW/SCW | | |
| | Frequency stability:C (-20 to +70 °C) | | 26 | | 135 |
| | | | SG-615PCW/SCW | | |
| 3.3 V \pm 0.3 V | Frequency stability:M (-40 to +85 °C) | | 26 | | 135 |
| | | | SG-615PCW/SCW | | |