

## CRYSTAL OSCILLATOR PROGRAMMABLE

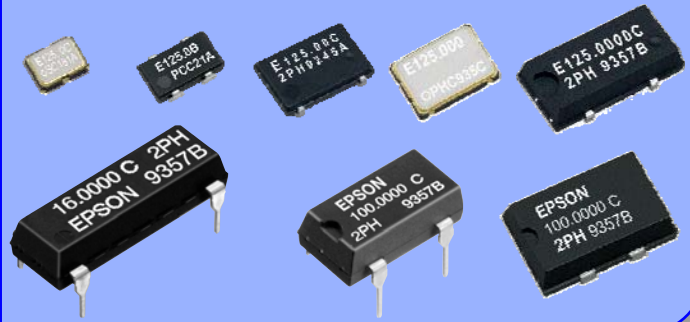
# SG-8002 series

- Frequency range : 1 MHz to 125 MHz
- Supply voltage : 3.0 V / 3.3 V / 5.0 V
- Function : Output enable(OE) or Standby( $\overline{ST}$ )
- Short mass production lead time by PLL technology.
- SG-Writer available to purchase, please contact Epson Toyocom or local sales representative.



CE, LB, CA

Product Number (please contact us)



### Specifications (characteristics)

| Item                                  | Symbol             | Specifications *2                                      |                            |                            | Conditions / Remarks  |
|---------------------------------------|--------------------|--|----------------------------|----------------------------|---|
|                                       |                    | PT / ST  | PH / SH                    | PC / SC                    |   |
| Output frequency range                | f <sub>o</sub>     | 1 MHz to 125 MHz                                       |                            | —                          | V <sub>CC</sub> = 4.5 V to 5.5 V (except SG-8002LB)   |
|                                       |                    | —  | 1 MHz to 80 MHz            | —                          | V <sub>CC</sub> = 4.5 V to 5.5 V (SG-8002LB only)   |
|                                       |                    | —  | —                          | 1 MHz to 125 MHz           | V <sub>CC</sub> = 3.0 V to 3.6 V  |
|                                       |                    | —  | —                          | 1 MHz to 66.7 MHz          | V <sub>CC</sub> = 2.7 V to 3.6 V  |
| Supply voltage                        | V <sub>CC</sub>    | 4.5 V to 5.5 V   |                            | 2.7 V to 3.6 V             |   |
| Storage temperature                   | T <sub>stg</sub>   | -55 °C to +125 °C (SG-8002CA / JF / JA / DC / DB)      |                            |                            | Store as bare product.  |
|                                       |                    | -55 °C to +100 °C (SG-8002JC)                          |                            |                            |   |
| Operating temperature                 | T <sub>use</sub>   | -40 °C to +125 °C (SG-8002CE / LB)                     |                            |                            | *1  |
|                                       |                    | -20 °C to +70 °C / -40 °C to +85 °C                    |                            |                            |   |
| Frequency tolerance                   | f <sub>tol</sub>   | B: ±50 × 10 <sup>-6</sup> , C: ±100 × 10 <sup>-6</sup> |                            | —                          | -20 °C to +70 °C  |
|                                       |                    | —  | M: ±100 × 10 <sup>-6</sup> | M: ±100 × 10 <sup>-6</sup> | -40 °C to +85 °C (except SG-8002JC) *3  |
|                                       |                    | —  | L: ±50 × 10 <sup>-6</sup>  | L: ±50 × 10 <sup>-6</sup>  | -40 °C to +85 °C (SG-8002LB only) *3  |
| Current consumption                   | I <sub>CC</sub>    | 40 mA Max. (SG-8002CE)                                 |                            | 28 mA Max.                 | No load condition, Max. frequency   |
|                                       |                    | 30 mA Max. (SG-8002LB)                                 |                            |                            |   |
|                                       |                    | 45 mA Max. (SG-8002CA / JF / JC / JA / DC / DB)        |                            |                            |   |
| Output disable current                | I <sub>dis</sub>   | 30 mA Max.   |                            | 16 mA Max.                 | OE=GND (PT,PH,PC) (except SG-8002LB)  |
|                                       |                    | —  | 25 mA Max.                 | 16 mA Max.                 | OE=GND (PH,PC) (SG-8002LB only)   |
| Stand-by current                      | I <sub>std</sub>   | 50 µA Max.   |                            |                            | $\overline{ST}$ =GND (ST,SH,SC)   |
| Symmetry *1                           | SYM                | 40 % to 60 %   | —                          |                            | TTL load: 1.4 V, Max. load condition (except SG-8002LB)   |
|                                       |                    | —  | 40 % to 60 %               |                            | CMOS load: 50 % V <sub>CC</sub> level, Max. load condition (except SG-8002LB)                           |
|                                       |                    | —  | 40 % to 60 %               | —                          | 50 % V <sub>CC</sub> , L <sub>CMOS</sub> =15 pF, ≤80 MHz (SG-8002LB)                                    |
|                                       |                    | —  | —                          | 40 % to 60 %               | 50 % V <sub>CC</sub> , L <sub>CMOS</sub> =15 pF, V <sub>CC</sub> =3.0 V to 3.6 V, ≤125 MHz (SG-8002LB)  |
|                                       |                    | —  | —                          | 40 % to 60 %               | 50 % V <sub>CC</sub> , L <sub>CMOS</sub> =15 pF, V <sub>CC</sub> =2.7 V to 3.6 V, ≤66.7 MHz (SG-8002LB) |
| High output voltage                   | V <sub>OH</sub>    | 45 % to 55 %   |                            |                            | *1  |
| Low output voltage                    | V <sub>OL</sub>    | V <sub>CC</sub> -0.4 V Min.                            |                            |                            | I <sub>OH</sub> =-16 mA (PT,ST,PH,SH) , -8 mA (PC,SC)   |
| Output load condition (TTL) *1        | L <sub>TTL</sub>   | 5 TTL Max.   | —                          |                            | I <sub>OL</sub> =16 mA (PT,ST,PH,SH) , 8 mA (PC,SC)   |
|                                       |                    | 5 TTL Max.   | —                          |                            | Max. frequency and Max. Supply voltage (SG-8002CE / CA / JA / DC / DB)                                  |
| Output load condition (CMOS) *1       | L <sub>CMOS</sub>  | 15 pF Max.   |                            |                            | Max. frequency and Max. Supply voltage (SG-8002CE / JF / JC)  |
|                                       |                    | —  | 15 pF Max.                 |                            | Max. frequency and Max. Supply voltage (SG-8002LB)  |
|                                       |                    | 15 pF Max.   | 25 pF Max.                 | 15 pF Max.                 | Max. frequency and Max. Supply voltage (SG-8002CA / JA / DC / DB)                                       |
| Output enable / disable input voltage | V <sub>IH</sub>    | 2.0 V Min.   |                            | 70 % V <sub>CC</sub> Min.  | OE terminal or $\overline{ST}$ terminal   |
|                                       | V <sub>IL</sub>    | 0.8 V Max.   |                            | 20 % V <sub>CC</sub> Max.  |   |
| Rise / Fall time *1                   | tr / tf            | 4 ns Max.  | —                          |                            | TTL load: 0.4 V to 2.4 V level (except SG-8002LB)   |
|                                       |                    | —  | 3 ns Max.                  |                            | CMOS load: 20 % V <sub>CC</sub> to 80 % V <sub>CC</sub> level   |
| Start-up time                         | t <sub>str</sub>   | 10 ms Max.   |                            |                            | Time at minimum supply voltage to be 0 s  |
| Frequency aging                       | f <sub>aging</sub> | ±5 × 10 <sup>-6</sup> / year Max.                      |                            |                            | +25 °C, V <sub>CC</sub> =5.0 V / 3.3 V (PC,SC) First year   |

\*1 Operating temperature, the available frequency, symmetry, output load conditions and rise/fall time, please refer to "Outline specifications" page.

\*2 PLL-PLL connection & Jitter specification, please refer to "Jitter specifications and characteristics chart" page.

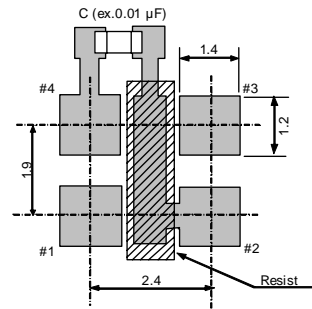
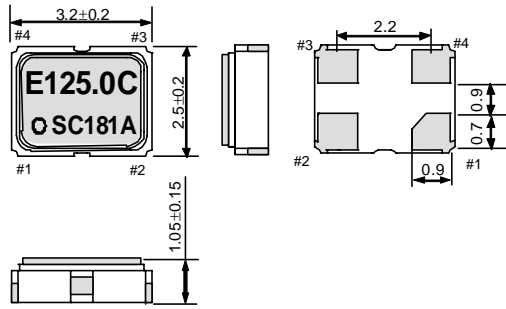
\*3 Refer to "Outline specifications" (Frequency range) for "M" and "L" tolerance availability. Checking possible by the Frequency checking program.



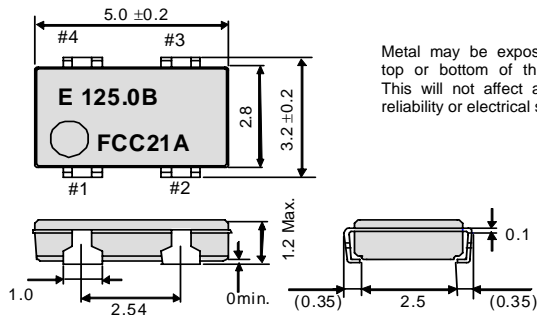
External dimensions and Recommended footprint

(Unit:mm)

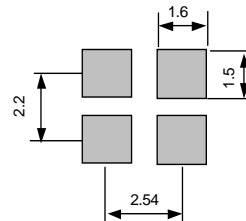
SG-8002CE Ceramic SON 4pin 3.2x2.5x1.05 mm



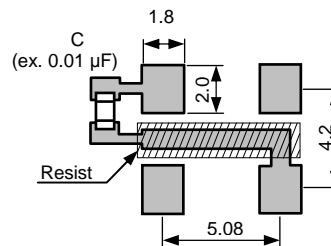
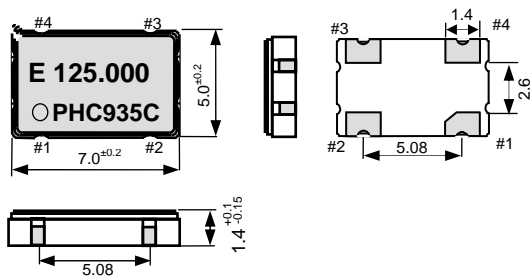
SG-8002LB SOJ 4pin 5.0x3.2x1.2 mm



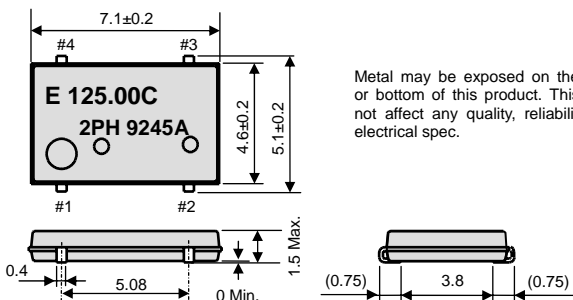
Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec.



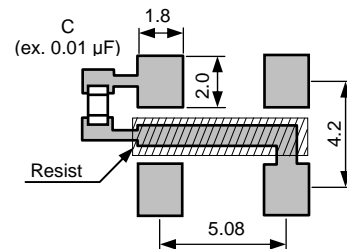
SG-8002CA Ceramic SON 4pin 7.0x5.0x1.4 mm



SG-8002JF SOJ 4pin 7.1x5.1x1.5 mm



Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec.



Note.

- OE Pin (PT, PH, PC)
- OE Pin = "H" or "open": Specified frequency output.
- OE Pin = "L": Output is high impedance.

- ST Pin (ST, SH, SC)
- ST Pin = "H" or "open": Specified frequency output.
- ST Pin = "L": Output is low level (weak pull - down), oscillation stops.

Pin map

| Pin | Connection            |
|-----|-----------------------|
| 1   | OE or $\overline{ST}$ |
| 2   | GND                   |
| 3   | OUT                   |
| 4   | VCC                   |

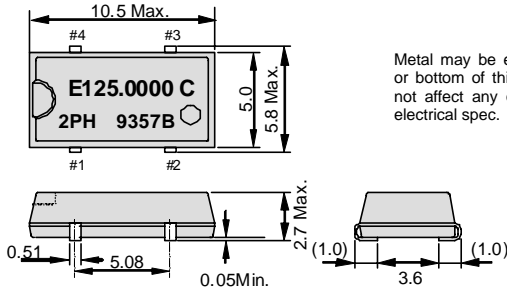
To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).



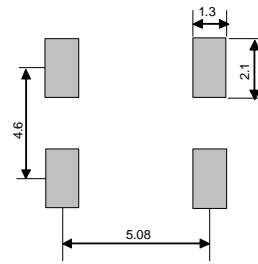
External dimensions and Recommended footprint (Continued)

(Unit:mm)

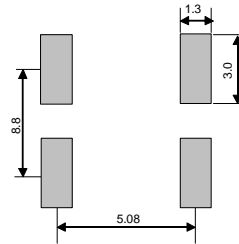
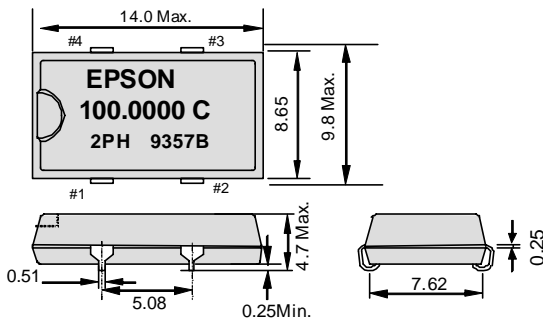
SG-8002JC SOJ 4pin 10.5x5.8x2.7 mm Package and pin compatible with SG-636.



Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec.



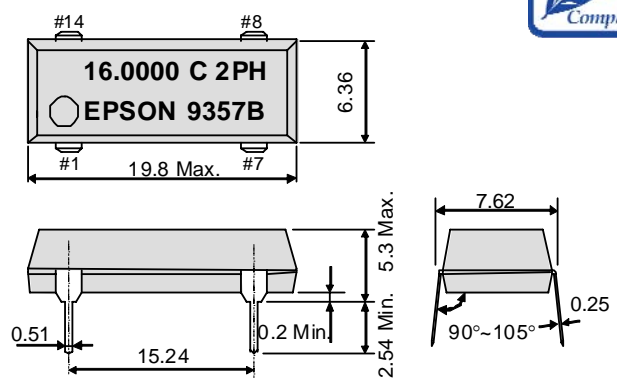
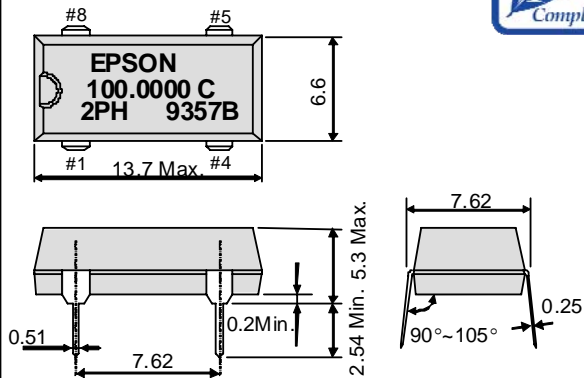
SG-8002JA SOJ 4pin 14.0x9.8x4.7 mm Package and pin compatible with SG-615.



SG-8002DC DIP half size



SG-8002DB DIP full size



Note.

- OE Pin (PT, PH, PC)
- OE Pin = "H" or "open": Specified frequency output.
- OE Pin = "L": Output is high impedance.

- $\overline{ST}$  Pin (ST, SH, SC)
- ST Pin = "H" or "open": Specified frequency output.
- ST Pin = "L": Output is low level (weak pull - down), oscillation stops.

Pin map

| Pin | Connection            |
|-----|-----------------------|
| 1   | OE or $\overline{ST}$ |
| 2   | GND                   |
| 3   | OUT                   |
| 4   | VCC                   |

Pin map: SG-8002DC

| Pin | Connection            |
|-----|-----------------------|
| 1   | OE or $\overline{ST}$ |
| 4   | GND                   |
| 5   | OUT                   |
| 8   | VCC                   |

Pin map: SG-8002DB

| Pin | Connection            |
|-----|-----------------------|
| 1   | OE or $\overline{ST}$ |
| 7   | GND                   |
| 8   | OUT                   |
| 14  | VCC                   |

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).

Products number

(Please contact us for each product.)

- SG-8002CE: Q3321CExxxxx00
- SG-8002LB: Q3323LBxxxxx00
- SG-8002CA: Q3309CAx0xxx00
- SG-8002JF: Q3308JFx1xxxx00

- SG-8002JC: Q3307JCx1xxxx00
- SG-8002JA: Q3306JAx1xxxx00
- SG-8002DC: Q3204DCx1xxxx00
- SG-8002DB: Q3203DBx1xxxx00



## SG-8002 Series Outline of specifications

| Model     | Supply voltage                            | Operating temperature                     | Output load condition   | Symmetry  | Output rise time / Output fall time   |
|-----------|---|---|---|---|---|
| SG-8002CE | PT/ST<br>4.5 V to 5.5 V                   | -20 °C to +70 °C                          | 5TTL+15pF   | 40 % to 60 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤125 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤66.7 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤27.0 MHz)                           | 2.0 ns Max. (0.8 V to 2.0 V, L_TTL=Max.)<br>4.0 ns Max. (0.4 V to 2.4 V, L_TTL=Max.)  |
|           |   | -40 °C to +85 °C                          | 15 pF (f0≤125 MHz)<br>25 pF (f0≤100 MHz)<br>25 pF (f0≤27 MHz)       | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤66.7 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤27.0 MHz)                                 | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)   |
|           | PC/SC<br>3.0 V to 3.6 V<br>2.7 V to 3.6 V | -40 °C to +85 °C                          | 15 pF   | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=15 pF, f0≤40 MHz)<br>40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤66.7 MHz)                                   | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)   |
| SG-8002LB | PH/SH<br>4.5 V to 5.5 V                   | -40 °C to +85 °C                          | 15 pF<br>25pF (f0≤50 MHz)   | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤80 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤50 MHz)  | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)   |
|           |   | PC/SC<br>3.0 V to 3.6 V<br>2.7 V to 3.6 V | -40 °C to +85 °C  | 15 pF   | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=15 pF, f0≤40 MHz)<br>40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤66.7 MHz) |
| SG-8002JF | PT/ST<br>4.5 V to 5.5 V                   | -20 °C to +70 °C                          | 5TTL+15 pF (f0≤90 MHz)<br>15 pF (f0≤125 MHz)<br>25 pF (f0≤66.7 MHz) | 40 % to 60 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤90 MHz)<br>↑ (1.4 V, L_CMOS=15 pF, f0≤125 MHz)<br>↑ (1.4 V, L_CMOS=25 pF, f0≤66.7 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤66.7 MHz)     | 2.0 ns Max. (0.8 V to 2.0 V, L_CMOS≤25pF)<br>4.0 ns Max. (0.4 V to 2.4 V, L_CMOS or L_TTL=Max.)   |
|           |   | -40 °C to +85 °C                          | 15 pF (f0≤40 MHz)   | 40 % to 60 % (1.4 V, L_CMOS=15 pF, f0≤40 MHz)   |   |
|           | PH/SH                                     | -20 °C to +70 °C                          | 15 pF (f0≤125 MHz)<br>25 pF (f0≤90 MHz)<br>50 pF (f0≤50 MHz)        | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>↑ (50 % VCC, L_CMOS=25 pF, f0≤90.0 MHz)<br>↑ (50 % VCC, L_CMOS=50 pF, f0≤50.0 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤66.7 MHz) | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤25pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |
|           |   | -40 °C to +85 °C                          | 15 pF (f0≤40 MHz)   | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤40 MHz)  |   |
|           | PC/SC<br>3.0 V to 3.6 V<br>2.7 V to 3.6 V | -40 °C to +85 °C                          | 15 pF<br>30 pF (f0≤40 MHz)<br>15 pF                                 | 40 % to 60 % (50 % VCC, CL=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, CL=30 pF, f0≤40 MHz)<br>40 % to 60 % (50 % VCC, CL=15 pF, f0≤66.7 MHz)   | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤15pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |
| SG-8002CA | PT/ST<br>4.5 V to 5.5 V                   | -20 °C to +70 °C                          | 5TTL+15pF (f0≤125 MHz)<br>25 pF (f0≤66.7 MHz)                       | 40 % to 60 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤125 MHz)<br>↑ (1.4 V, L_CMOS=25 pF, f0≤66.7 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤66.7 MHz)   | 2.0 ns Max. (0.8 V to 2.0 V, L_CMOS or L_TTL=Max.)<br>4.0 ns Max. (0.4 V to 2.4 V, L_CMOS or L_TTL=Max.)  |
|           |   | -40 °C to +85 °C                          | 5 TTL+15 pF (f0≤40 MHz)<br>15 pF (f0≤55 MHz)                        | 40 % to 60 % (1.4 V, L_CMOS=15 pF, f0≤55.0 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤40.0 MHz)   |   |
| SG-8002JA | PH/SH                                     | -20 °C to +70 °C                          | 25 pF (f0≤125 MHz)<br>50 pF (f0≤66.7 MHz)                           | 40 % to 60 % (50 % VCC, L_CMOS=25 pF, f0≤125 MHz)<br>↑ (50 % VCC, L_CMOS=50 pF, f0≤66.7 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤66.7 MHz)  | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤25pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |
| SG-8002DC |   | -40 °C to +85 °C                          | 15 pF (f0≤55 MHz)<br>25 pF (f0≤40 MHz)                              | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤55.0 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤40.0 MHz)  |   |
|           | PC/SC<br>3.0 V to 3.6 V<br>2.7 V to 3.6 V | -40 °C to +85 °C                          | 15 pF<br>30 pF (f0≤40 MHz)<br>15 pF                                 | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=30 pF, f0≤40 MHz)<br>40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤66.7 MHz)                                   | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤15pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |
| SG-8002JC | PT/ST<br>4.5 V to 5.5 V                   | -20 °C to +70 °C                          | 5TTL+15 pF (f0≤90 MHz)<br>15 pF (f0≤125 MHz)<br>25 pF (f0≤66.7 MHz) | 40 % to 60 % (1.4 V, L_CMOS=15 pF, f0≤125 MHz)<br>↑ (1.4 V, L_TTL=5 TTL+15 pF, f0≤90.0 MHz)<br>↑ (1.4 V, L_CMOS=25 pF, f0≤66.7 MHz)<br>45 % to 55 % (1.4 V, L_TTL=5 TTL+15 pF, f0≤66.7 MHz)   | 2.0 ns Max. (0.8 V to 2.0 V, L_CMOS or L_TTL=Max.)<br>4.0 ns Max. (0.4 V to 2.4 V, L_CMOS or L_TTL=Max.)  |
|           |   |   | 15 pF (f0≤125 MHz)<br>25 pF (f0≤90 MHz)<br>50 pF (f0≤66.7 MHz)      | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>↑ (50 % VCC, L_CMOS=25 pF, f0≤90 MHz)<br>↑ (50 % VCC, L_CMOS=50 pF, f0≤50 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=25 pF, f0≤66.7 MHz)     | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤25pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |
|           | PC/SC<br>3.0 V to 3.6 V<br>2.7 V to 3.6 V | -20 °C to +70 °C                          | 15 pF<br>30 pF (f0≤40 MHz)<br>15 pF                                 | 40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤125 MHz)<br>45 % to 55 % (50 % VCC, L_CMOS=30 pF, f0≤40 MHz)<br>40 % to 60 % (50 % VCC, L_CMOS=15 pF, f0≤66.7 MHz)                                   | 3.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS≤15pF)<br>4.0 ns Max. (20 % VCC to 80 % VCC, L_CMOS=Max.)  |

## ▶ TABLE OF FREQUENCY RANGE

| Model  | Supply voltage   | Frequency      | Frequency tolerance<br>Operating Temperature |                    |
|--|------------------|----------------|--|--------------------|
| SG-8002CE  | PT/ ST<br>PH/ SH | 4.5 V to 5.5 V | 1.0 MHz to 125 MHz<br>1.0 MHz to 27 MHz      | B,C<br>M           |
|  | PC/SC            | 3.0 V to 3.6 V | 1.0 MHz to 125 MHz                           | B,C,M              |
|  |                  | 2.7 V to 3.6 V | 1.0 MHz to 66.7 MHz                          |                    |
| SG-8002LB  | PH/ SH           | 4.5 V to 5.5 V | 1.0 MHz to 80 MHz<br>1.0 MHz to 27 MHz       | B,C<br>M,L         |
|  |                  | PC/ SC         | 3.0 V to 3.6 V                               | 1.0 MHz to 125 MHz |
|  | 2.7 V to 3.6 V   |                | 1.0 MHz to 66.7 MHz                          |                    |
| SG-8002JF  | PT/ ST<br>PH/ SH | 4.5 V to 5.5 V | 1.0 MHz to 125 MHz<br>1.0 MHz to 40 MHz      | B,C<br>M           |
|  | PC/ SC           | 3.0 V to 3.6 V | 1.0 MHz to 125 MHz                           | B,C,M              |
|  |                  | 2.7 V to 3.6 V | 1.0 MHz to 66.7 MHz                          |                    |
| SG-8002CA<br>SG-8002JA<br>SG-8002DB<br>SG-8002DC | PT/ ST<br>PH/ SH | 4.5 V to 5.5 V | 1.0 MHz to 125 MHz<br>1.0 MHz to 55 MHz      | B,C<br>M           |
|  | PC/ SC           | 3.0 V to 3.6 V | 1.0 MHz to 125 MHz                           | B,C,M              |
|  |                  | 2.7 V to 3.6 V | 1.0 MHz to 66.7 MHz                          |                    |
| SG-8002JC  | PT/ ST<br>PH/ SH | 4.5 V to 5.5 V | 1.0 MHz to 125 MHz                           | B,C                |
|  | PC/ SC           | 3.0 V to 3.6 V | 1.0 MHz to 125 MHz                           | B,C                |
|  |                  | 2.7 V to 3.6 V | 1.0 MHz to 66.7 MHz                          |                    |

Frequency tolerance: B:±50×10<sup>-6</sup> (-20 °C to +70 °C), C:±100×10<sup>-6</sup> (-20 °C to +70 °C), M:±100×10<sup>-6</sup> (-40 °C to +85 °C), L:±50×10<sup>-6</sup> (-40 °C to +85 °C)



### SG-8002 series Jitter specifications and characteristics chart

#### ■ PLL-PLL connection

Because we use a PLL technology, there are a few cases that the jitter value will increase when SG-8002 is connected to another PLL-oscillator.

In our experience, we are unable to recommend these products for the applications such as telecom carrier use or analog video clock use. Please be careful checking in advance for these application (Jitter specification is Max.250 ps/CL=15 pF)

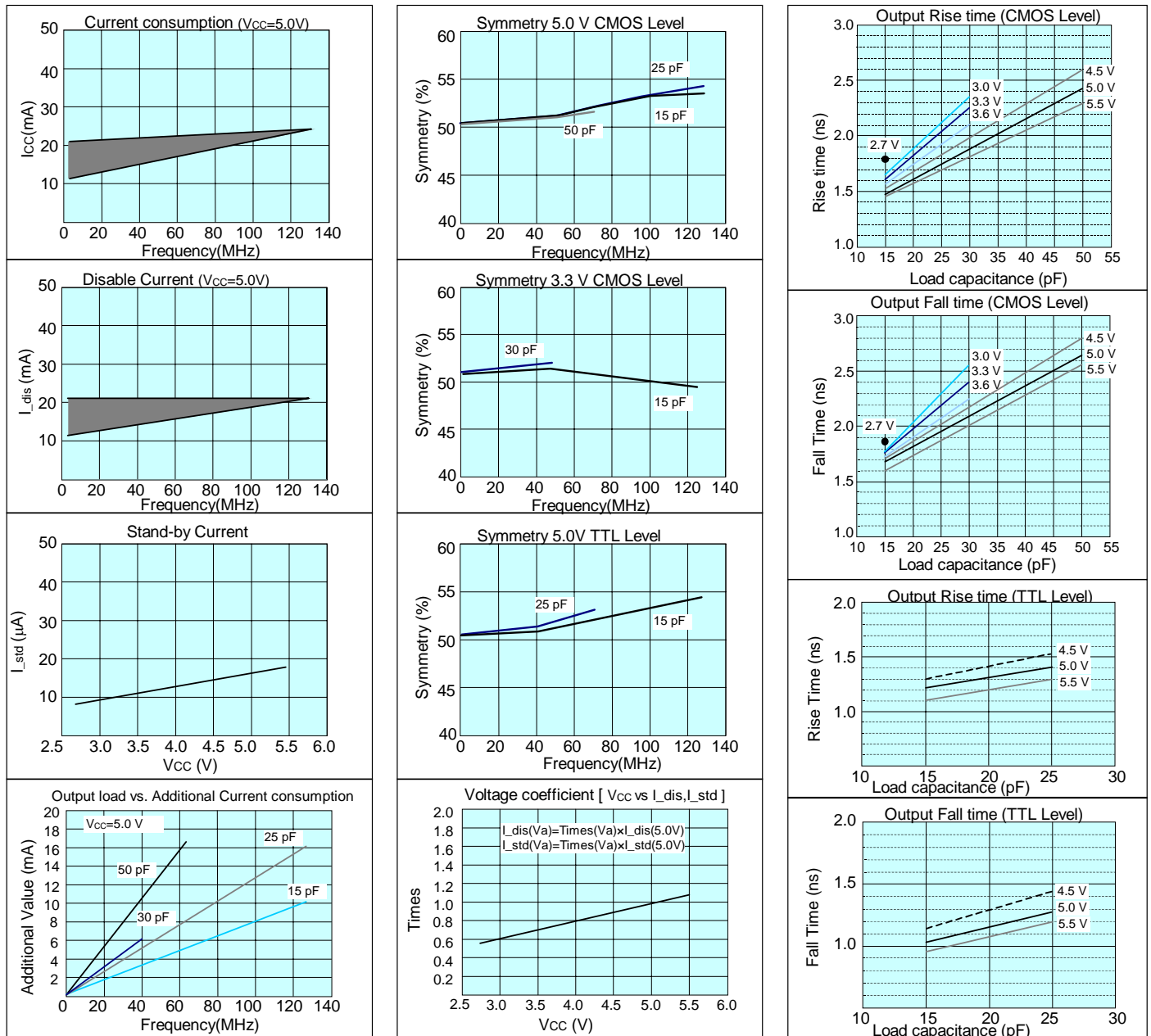
#### Jitter Specifications

| Model              | Supply Voltage | Jitter Item    | Specifications | Remarks  |
|--------------------|----------------|----------------|----------------|--|
| PT / PH<br>ST / SH | 5.0 V ±0.5 V   | Cycle to cycle | 150 ps Max.    | 33 MHz ≤ f <sub>0</sub> ≤ 125 MHz, L_CMOS=15 pF  |
|                    |                |                | 200 ps Max.    | 1.0 MHz ≤ f <sub>0</sub> < 33 MHz, L_CMOS=15 pF  |
|                    |                | Peak to peak   | 200 ps Max.    | 33 MHz ≤ f <sub>0</sub> ≤ 125 MHz, L_CMOS=15 pF  |
|                    |                |                | 250 ps Max.    | 1.0 MHz ≤ f <sub>0</sub> < 33 MHz, L_CMOS=15 pF  |
| SC / PC            | 3.3 V ±0.3 V   | Cycle to cycle | 200 ps Max.    | 1.0 MHz ≤ f <sub>0</sub> ≤ 125 MHz, L_CMOS=15 pF |
|                    |                | Peak to peak   | 250 ps Max.    | 1.0 MHz ≤ f <sub>0</sub> ≤ 125 MHz, L_CMOS=15 pF |

#### ■ Remarks on noise management for power supply line

We do not recommend inserting filters or other devices in the power supply line as the counter measure of EMI noise reduction. This device insertion might cause high-frequency impedance high in the power supply line and it affects oscillator stable drive. When this measure is required, please evaluate circuitry and device behavior in the circuit and verify that it will not affect oscillation. Start up time (0 % V<sub>CC</sub> to 90 % V<sub>CC</sub>) of power source should be more than 150 μs.

#### ■ SG-8002 series Characteristics chart



# “QMEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, “Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications

and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.



QMEMS

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## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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.




## WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 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.) |
|  | ► The products have been designed for high reliability applications such as Automotive.   |

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