



# LOW-JITTER SAW OSCILLATOR (SPSO)

## OUTPUT : CMOS

### EG - 2021 / 2001CA

- Frequency range : 62.5 MHz to 250 MHz
- Supply voltage : 2.5 V ... EG-2021CA  
3.3 V ... EG-2001CA
- Output : CMOS
- Function : Output enable (OE)
- External dimensions : 7.0 × 5.0 × 1.2 mm
- Very low jitter and low phase noise by SAW unit.



Product Number (please contact us)  
EG-2021CA: Q3807CA00xxxx00  
EG-2001CA: Q3801CA00xxxx00



Actual size

EG-2021CA



EG-2001CA



## Specifications (characteristics)

| Item                         | Symbol                          | Specifications                                            |                          | Conditions / Remarks                                       |                                                                                    |
|------------------------------|---------------------------------|-----------------------------------------------------------|--------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------|
|                              |                                 | EG-2021CA                                                 |                          |                                                            | EG-2001CA                                                                          |
| Output frequency range       | f <sub>o</sub>                  | 62.500 MHz to 170.000MHz                                  | 170.001MHz to 250.000MHz | 106.250 MHz to 170.000 MHz                                 | Please contact us about available frequencies.                                     |
| Supply voltage               | V <sub>cc</sub>                 | 2.5 V± 0.125 V                                            |                          | 3.3 V± 0.3 V                                               |                                                                                    |
| Storage temperature          | T <sub>stg</sub>                | -40 °C to +100 °C                                         |                          |                                                            | Storage as single product.                                                         |
| Operating temperature        | T <sub>use</sub>                | P: 0 °C to +70 °C<br>R: -5 °C to +85 °C                   |                          | 0 °C to +70° C                                             |                                                                                    |
| Frequency tolerance          | f <sub>tol</sub>                | G: ± 50 × 10 <sup>-6</sup><br>H: ± 100 × 10 <sup>-6</sup> |                          | Z: ± 50 × 10 <sup>-6</sup><br>Y,H: ±100 × 10 <sup>-6</sup> |                                                                                    |
| Current consumption          | I <sub>cc</sub>                 | 25 mA Max.                                                | 30 mA Max.               | 50 mA Max.                                                 | OE=V <sub>CC</sub> , No load condition                                             |
| Disable current              | I <sub>dis</sub>                | 600 μA Max.                                               |                          | 10 μA Max.                                                 | OE=GND                                                                             |
| Symmetry                     | SYM                             | 45 % to 55 %                                              | 40 % to 60 %             | 45 % to 55 %                                               | 50 % V <sub>CC</sub> level, L <sub>CMOS</sub> ≤ Max.                               |
| Output voltage               | V <sub>OH</sub>                 | V <sub>CC</sub> -0.35 V Min.                              |                          | V <sub>CC</sub> -0.4 V Min.                                | I <sub>OH</sub> = -8 mA                                                            |
|                              | V <sub>OL</sub>                 | 0.35 V Max.                                               |                          | 0.4 V Max.                                                 | I <sub>OL</sub> = 8 mA                                                             |
| Output load condition (CMOS) | L <sub>CMOS</sub>               | 15 pF Max.                                                |                          |                                                            |                                                                                    |
| Input voltage                | V <sub>IH</sub>                 | 70 % V <sub>CC</sub> Min.                                 |                          |                                                            | OE terminal                                                                        |
|                              | V <sub>IL</sub>                 | 30 % V <sub>CC</sub> Max.                                 |                          |                                                            |                                                                                    |
| Rise time / Fall time        | t <sub>r</sub> / t <sub>f</sub> | 2 ns Max.                                                 |                          |                                                            | Between 20% V <sub>CC</sub> and80% V <sub>CC</sub> level, L <sub>CMOS</sub> ≤ Max. |
| Start-up time                | t <sub>str</sub>                | 10 ms Max.                                                |                          |                                                            | Time at minimum supply voltage to be 0 s                                           |
| Jitter *1                    | t <sub>DJ</sub>                 | 0.2 ps Typ.                                               |                          |                                                            | Deterministic Jitter                                                               |
|                              | t <sub>RJ</sub>                 | 3 ps Typ.                                                 |                          |                                                            | Random Jitter                                                                      |
|                              | t <sub>RMS</sub>                | 3 ps Typ.                                                 |                          |                                                            | σ (RMS of total distribution)                                                      |
|                              | t <sub>p-p</sub>                | 25 ps Typ.                                                |                          |                                                            | Peak to Peak                                                                       |
|                              | t <sub>acc</sub>                | 4 ps Typ.                                                 |                          |                                                            | Accumulated Jitter(σ) n=2 to 50000 cycles                                          |
| Phase Jitter                 | t <sub>pJ</sub>                 | 1 ps Max.                                                 |                          |                                                            | Offset frequency: 12 kHz to 20 MHz                                                 |
| Frequency aging              | f <sub>aging</sub>              | ± 10 × 10 <sup>-6</sup> / year Max.                       |                          | ± 5 × 10 <sup>-6</sup> / year Max.                         | +25 °C, First year, V <sub>CC</sub> =2.5 V,3.3 V                                   |

\*1 Tested using a DTS-2075 Digital timing system made by WAVECREST with jitter analysis software VISI6.

Product Name EG-2021 CA 125.000000MHz C H P A (⑤⑥⑦: GPA, GRA are not available)

(Standard form)

① ② ③ ④⑤⑥⑦

①Model ②Package type ③Frequency

④Output(C:CMOS)

⑤Frequency tolerance ⑥Operating temperature

⑦Frequency aging (A\*2: Frequency tolerance include aging, N\*3: Frequency tolerance exclude aging)

| ⑤Frequency tolerance |                         | ⑥Operating temp. |             |
|----------------------|-------------------------|------------------|-------------|
| G                    | ±50 × 10 <sup>-6</sup>  | P                | 0 to +70°C  |
| H                    | ±100 × 10 <sup>-6</sup> | R                | -5 to +85°C |

Product Name EG-2001 CA 125.000000MHz P C H

(Standard form)

① ② ③ ④⑤⑥

①Model ②Package type ③Frequency

④Symmetry (P: 50±5%) ⑤Supply voltage

⑥Frequency tolerance / Operating temperature

| ⑤Supply voltage |            | ⑥Frequency tolerance / Operating temperature |                                      |
|-----------------|------------|----------------------------------------------|--------------------------------------|
| C               | 3.3 V Typ. | H*2                                          | ±100 × 10 <sup>-6</sup> / 0 to +70°C |
|                 |            | Y*3                                          | ±100 × 10 <sup>-6</sup> / 0 to +70°C |
|                 |            | Z*4                                          | ±50 × 10 <sup>-6</sup> / 0 to +70°C  |

\*2 This includes initial frequency tolerance, temperature variation, supply voltage variation, load variation, reflow drift, and aging(+25 °C,10 years).

\*3 This includes initial frequency tolerance, temperature variation, supply voltage variation, load variation, and reflow drift.(except aging)

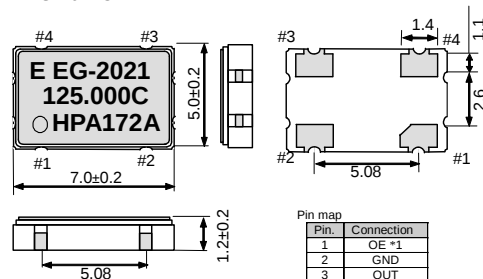
\*4 This includes initial frequency tolerance, and temperature variation.(except reflow drift, supply voltage variation, load variation and aging)

## External dimensions

(Unit:mm)

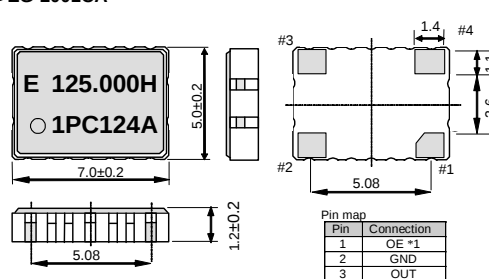
Footprint (Recommended) (Unit:mm)

### ●EG-2021CA



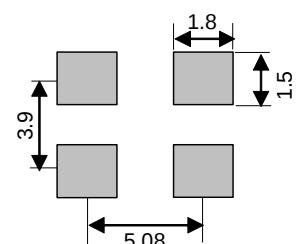
\*1 Standby function built-in  
#2 is connected to the cover.

### ●EG-2001CA



OE pin = HIGH : Specified frequency output.  
OE pin = LOW : Output is high impedance

\*1 Standby function built-in  
#2 is connected to the cover.



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