# 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.

Pb Free RoHS Compliant

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

Actual size

| EG-2021CA | EG-2001CA |
|---|---|
|  |  |

## Specifications (characteristics)

| Item | Symbol | Specifications EG-2021CA | | Specifications EG-2001CA | Conditions / Remarks |
|---|---|---|---|---|---|
| Output frequency range | $f_0$ | 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 | $V_{CC}$ | 2.5 V± 0.125 V | | 3.3 V± 0.3 V | |
| Storage temperature | T_stg | -40 °C to +100 °C | | | Storage as single product. |
| Operating temperature | T_use | P: 0 °C to +70 °C<br>R: -5 °C to +85 °C | | 0 °C to +70° C | |
| Frequency tolerance | f_tol | G: ± 50 × $10^{-6}$<br>H: ± 100 × $10^{-6}$ | | Z: ± 50 × $10^{-6}$<br>Y,H: ±100 × $10^{-6}$ | |
| Current consumption | $I_{CC}$ | 25 mA Max. | 30 mA Max. | 50 mA Max. | OE=$V_{CC}$, No load condition |
| Disable current | I_dis | 600 µA Max. | | 10 µA Max. | OE=GND |
| Symmetry | SYM | 45 % to 55 % | 40 % to 60 % | 45 % to 55 % | 50 % $V_{CC}$ level, L_CMOS≤ Max. |
| Output voltage | $V_{OH}$ | $V_{CC}$-0.35 V Min. | | $V_{CC}$-0.4 V Min. | $I_{OH}$ = -8 mA |
| | $V_{OL}$ | 0.35 V Max. | | 0.4 V Max. | $I_{OL}$ = 8 mA |
| Output load condition (CMOS) | L_CMOS | 15 pF Max. | | | |
| Input voltage | $V_{IH}$ | 70 % $V_{CC}$ Min. | | | OE terminal |
| | $V_{IL}$ | 30 % $V_{CC}$ Max. | | | |
| Rise time / Fall time | $t_r$ / $t_f$ | 2 ns Max. | | | Between 20% $V_{CC}$ and80% $V_{CC}$ level, L_CMOS≤ Max. |
| Start-up time | t_str | 10 ms Max. | | | Time at minimum supply voltage to be 0 s |
| Jitter *1 | $t_{DJ}$ | 0.2 ps Typ. | | | Deterministic Jitter |
| | $t_{RJ}$ | 3 ps Typ. | | | Random Jitter |
| | $t_{RMS}$ | 3 ps Typ. | | | σ (RMS of total distribution) |
| | $t_{p-p}$ | 25 ps Typ. | | | Peak to Peak |
| | $t_{acc}$ | 4 ps Typ. | | | Accumulated Jitter(σ) n=2 to 50000 cycles |
| Phase Jitter | $t_{PJ}$ | 1 ps Max. | | | Offset frequency: 12 kHz to 20 MHz |
| Frequency aging | f_aging | ± 10 × $10^{-6}$/ year Max. | | ± 5 × $10^{-6}$/ year Max. | +25 °C, First year, $V_{CC}$=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 (Standard form): EG-2021 CA 125.000000MHz C H P A (⑤⑥⑦: GPA, GRA are not available)
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 | |
|---|---|
| G | ±50 × $10^{-6}$ |
| H | ±100 × $10^{-6}$ |

| ⑥Operating temp. | |
|---|---|
| P | 0 to +70°C |
| R | -5 to +85°C |

Product Name (Standard form): EG-2001 CA 125.000000MHz P C H
① ② ③ ④⑤⑥
①Model ②Package type ③Frequency
④Symmetry (P: 50±5%) ⑤Supply voltage
⑥Frequency tolerance / Operating temperature

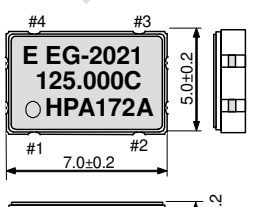
| ⑤Supply voltage | |
|---|---|
| C | 3.3 V Typ. |

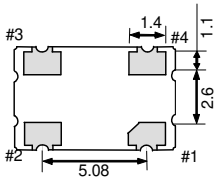
| ⑥Frequency tolerance / Operating temperature | |
|---|---|
| H*2 | ±100 × $10^{-6}$/ 0 to +70°C |
| Y*3 | ±100 × $10^{-6}$/ 0 to +70°C |
| Z*4 | ±50 × $10^{-6}$/ 0 to +70°C |

*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)

●EG-2021CA



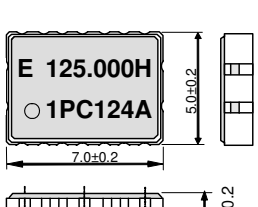



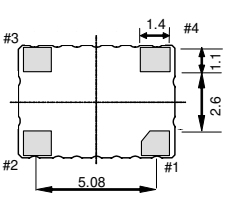

Pin map

| Pin. | Connection |
|---|---|
| 1 | OE *1 |
| 2 | GND |
| 3 | OUT |
| 4 | Vcc |

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

●EG-2001CA



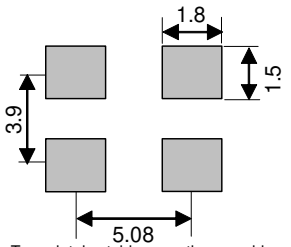

Pin map

| Pin | Connection |
|---|---|
| 1 | OE *1 |
| 2 | GND |
| 3 | OUT |
| 4 | Vcc |

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

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

**Footprint (Recommended) (Unit:mm)**




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).

## PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, 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.

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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 | ►Pb free. |
| RoHS Compliant | ►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.) |
| For Automotive | ►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc. |
| Automotive Safety | ►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc ). |

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