

LOW-JITTER SAW OSCILLATOR (SPSO)

OUTPUT : LV-PECL, LVDS, HCSL



Product Number
 EG-2121CA: Q3805CAx0xxxx00
 : X1M000101xxxx00
 EG-2102CA: Q3806CA00xxxx00
 : X1M000091xxxx00

EG-2121CA
EG-2102CA



- Frequency range : 53.125 MHz to 700 MHz
- Supply voltage : 2.5 V ... EG-2121CA
3.3 V ... EG-2102CA
- Output : LV-PECL or LVDS or HCSL
- Function : Output enable (OE)
- External dimensions : 7.0 × 5.0 × 1.2 mm

•Very low jitter and low phase noise by SAW unit.

Specifications (characteristics)

► Differential LV-PECL Output

| Item | Symbol | EG-2121CA | | EG-2102CA | | Conditions / Remarks |
|-----------------------------|---|--|--|--------------------|--|--|
| | | LV-PECL | | | | |
| Output frequency range | f _o | 53.125 MHz to 500 MHz | | 100 MHz to 700 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, R: -5 C to +85 C, S: -20 C to +70 C | | | | |
| Frequency tolerance | f _{tol} | G: ± 50 × 10 ⁻⁶ , H: ± 100 × 10 ⁻⁶ | | | | |
| Current consumption | I _{CC} | 80 mA Max. | | 100 mA Max. | | OE=V _{CC} , L ECL=50 Ω |
| Disable current | I _{dis} | 20 mA Max. | | 32 mA Max. | | OE=GND |
| Symmetry | SYM | P: 40 % to 60 % (f _o > 350 MHz) | | P: 45 % to 55 % | | at outputs crossing point |
| | | P: 45 % to 55 % (f _o ≤ 350 MHz) | | | | |
| | | D: 48 % to 52 % (f _o ≤ 175 MHz) | | | | |
| Output voltage | V _{OH} | 1.55 V Typ. | | 2.35 V Typ. | | DC characteristics |
| | V _{CC} -1.025 V to V _{CC} -0.88 V | | | | | |
| | V _{OL} | 0.8 V Typ. | | 1.6 V Typ. | | |
| Output load condition (ECL) | L _{ECL} | V _{CC} -1.81 V to V _{CC} -1.62 V | | | | Terminated to V _{CC} -2.0 V |
| Input voltage | V _{IH} | 70 % V _{CC} Min. | | | | OE terminal |
| | V _{IL} | 30 % V _{CC} Max. | | | | |
| Rise time / Fall time | t _r / t _f | 400 ps Max. | | | | Between 20 % and 80 % of (V _{OH} -V _{OL}) |
| Start-up time | t _{str} | 10 ms Max. | | | | Time at minimum supply voltage to be 0 s |
| Phase Jitter | t _{pj} | 0.8 ps Max. | | | | f _o < 100 MHz |
| | | 0.5 ps Max. | | | | 100 MHz ≤ f _o < 200 MHz |
| | | 0.3 ps Max. | | | | 200 MHz ≤ f _o |
| Frequency aging | f _{aging} | ± 10 × 10 ⁻⁶ / year Max. | | | | +25 C, First year, V _{CC} =2.5 V, 3.3 V |

► LVDS Output

| Item | Symbol | EG-2121CA | | EG-2102CA | | Conditions / Remarks |
|------------------------------|---------------------------------|--|--|---|--|---|
| | | LVDS | | | | |
| Output frequency range | f _o | 53.125 MHz to 700 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, R: -5 C to +85 C, S: -20 C to +70 C | | | | |
| Frequency tolerance | f _{tol} | G: ± 50 × 10 ⁻⁶ , H: ± 100 × 10 ⁻⁶ | | | | |
| Current consumption | I _{CC} | 30 mA Max. | | 45 mA Max. | | OE=V _{CC} , L LVDS= 100 Ω |
| Disable current | I _{dis} | 20 mA Max. | | 30 mA Max. | | OE=GND |
| Symmetry | SYM | L: 40 % to 60 % (f _o > 350 MHz) | | L: 40 % to 60 % (f _o > 350 MHz) | | at outputs crossing point |
| | | L: 45 % to 55 % (f _o ≤ 350 MHz) | | | | |
| | | V: 48 % to 52 % (f _o ≤ 175 MHz) | | | | |
| Output voltage | V _{OD} | 350 mV Typ. 247 mV to 454 mV | | | | DC characteristics |
| | dV _{OD} | 50 mV Max. | | | | |
| | V _{OS} | 1.25 V Typ. 1.125 V to 1.375 V | | | | |
| | dV _{OS} | 150 mV Max. | | | | |
| Output load condition (LVDS) | L _{LVDS} | 100 Ω | | | | Connected between OUT to $\overline{\text{OUT}}$ |
| Input voltage | V _{IH} | 70 % V _{CC} Min. | | | | OE terminal |
| | V _{IL} | 30 % V _{CC} Max. | | | | |
| Rise time / Fall time | t _r / t _f | 400 ps Max. | | | | Between 20 % and 80 % of Differential Output Peak to Peak voltage |
| Start-up time | t _{str} | 10 ms Max. | | | | Time at minimum supply voltage to be 0 s |
| Phase Jitter | t _{pj} | 0.8 ps Max. | | | | f _o < 100 MHz |
| | | 0.5 ps Max. | | | | 100 MHz ≤ f _o < 200 MHz |
| | | 0.3 ps Max. | | | | 200 MHz ≤ f _o |
| Frequency aging | f _{aging} | ± 10 × 10 ⁻⁶ / year Max. | | | | +25 C, First year, V _{CC} =2.5 V, 3.3 V |

► HCSL Output

| Item | Symbol | EG-2121CA | | EG-2102CA | | Conditions / Remarks |
|------------------------------|---------------------------------|--|--|---------------|--|---|
| | | HCSL | | | | |
| Output frequency range | fo | 100 MHz to 350 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 +125 °C | | | | Storage as single product. |
| Operating temperature | T _{use} | P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C | | | | |
| Frequency tolerance | f _{tol} | G: ±50 × 10 ⁻⁶ , H: ±100 × 10 ⁻⁶ | | | | |
| Current consumption | I _{CC} | 80 mA Max. | | 85 mA Max. | | OE=V _{CC} , L HCSL=50 Ω |
| Disable current | I _{dis} | 20 mA Max. | | 35 mA Max. | | OE=GND |
| Symmetry | SYM | 45 % to 55 % | | | | at outputs crossing point |
| Output Voltage | V _{OH} | 0.75 V Typ. | | | | DC characteristics |
| | V _{OL} | -0.3 V Typ. | | | | |
| Output load condition (HCSL) | L HCSL | 50 Ω | | | | Terminated to GND |
| Input voltage | V _{IH} | 70 % V _{CC} Min. | | | | OE terminal |
| | V _{IL} | 30 % V _{CC} Max. | | | | |
| Rise time / Fall time | t _r / t _f | 500 ps Max. | | | | Between 0.175 V and 0.525 V of output |
| Start-up time | t _{str} | 10 ms Max. | | | | Time at minimum supply voltage to be 0 s |
| Phase Jitter | t _{pj} | 0.8 ps Max. | | | | Offset frequency: 12 kHz to 20 MHz |
| | | 0.5 ps Max. | | | | |
| | | 0.3 ps Max. | | | | |
| Frequency aging *2 | f _{aging} | ± 10 × 10 ⁻⁶ / year Max. | | | | +25 °C, First year, V _{CC} =2.5 V, 3.3 V |

Product Name EG-2121 CA 250.00000MHz P G P A

(Standard form)

- ① Model ② Package type ③ Frequency
 ④ Output/Symmetry ⑤ Frequency tolerance ⑥ Operating temperature
 ⑦ Frequency aging (A*1: Frequency tolerance include aging, N*2: Frequency tolerance exclude aging)

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

*2 This includes initial frequency tolerance, temperature variation, supply voltage change, and reflow drift(except aging).

(⑤⑥⑦): GRA, GSA are not available)

(⑤⑥): As for LV-PECL and LVDS output, for 53.125 MHz ≤ fo < 100 MHz only HP is available)

| ④ Symbol | Output | Symmetry | |
|-------------|---------|----------------------------|----------------------------|
| | | EG-2121CA | EG-2102CA |
| P | LV-PECL | 40 % to 60 %(fo > 350 MHz) | 45 % to 55 % |
| | | 45 % to 55 %(fo ≤ 350 MHz) | |
| D | LV-PECL | 48 % to 52 %(fo ≤ 175 MHz) | 48 % to 52 %(fo ≤ 350 MHz) |
| L | LVDS | 40 % to 60 %(fo > 350 MHz) | 45 % to 55 %(fo ≤ 350 MHz) |
| | | 45 % to 55 %(fo ≤ 350 MHz) | |
| V | LVDS | 48 % to 52 %(fo ≤ 175 MHz) | |
| H | HCSL | 45 % to 55 % | |

| ⑤ Frequency tolerance | |
|-----------------------|-------------------------|
| G | ±50 × 10 ⁻⁶ |
| H | ±100 × 10 ⁻⁶ |

| ⑥ Operating temperature | |
|-------------------------|------------------|
| P | 0 °C to +70 °C |
| R | -5 °C to +85 °C |
| S | -20 °C to +70 °C |

Table 2 Jitter

| Item | Symbol | Specifications | Remarks |
|----------|------------------|----------------|--|
| Jitter * | 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 50 000 cycles |

* Tested using a DTS-2075 Digital timing system made by WAVECREST with jitter analysis software VISI6. : Differential LV-PECL, LVDS output

* Based on SIA-3100C signal integrity analyzer made from WAVECREST. : HCSL output

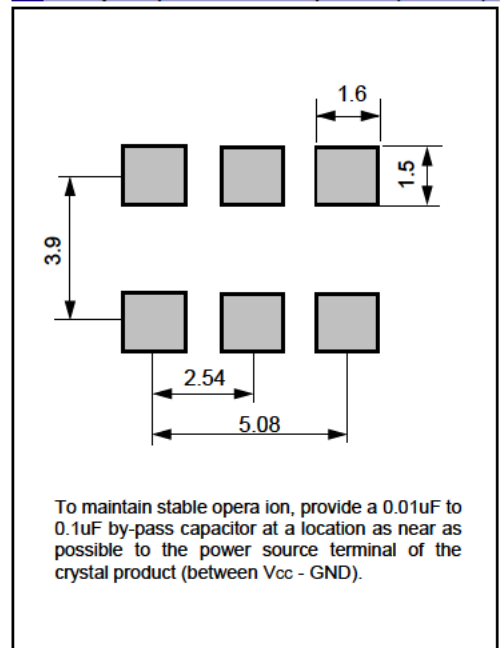
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



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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.

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IATF 16949 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. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.) |
|  | ► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc. |
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