# VOLTAGE-CONTROLLED SAW OSCILLATOR (VCSO)

**Output: LV-PECL**

**LOW PHASE JITTER**

NEW

# EV7050EAN

- Low phase jitter : 18 fs typ. *3
- Frequency range : 600 MHz to 1100 MHz
  : 1200 MHz to 2200 MHz
- Function : OUTPUT disable(OE)/Standby(ST)
- Supply voltage : 3.3 V
- Absolute pull range : $\pm 50 \times 10^{-6}$ Min./ $\pm 30 \times 10^{-6}$ Min.
- External dimensions: 7.0 × 5.0 × 1.6(t) mm
- Output : LV-PECL

Application : OTN(40GbE,100GbE,400GbE),
High Speed ADCs and DACs, Test Instrument

RoHS Compliant Pb Free

**Product Number (please contact us)**
**X1M00052xxxxxxx**

Actual size

## Specifications (characteristics)

### Type OE

| Item | Symbol | EV7050EAN | | Conditions / Remarks | |
|---|---|---|---|---|---|
| Output frequency range | $f_0$ | 600 MHz to 1100 MHz / 1200 MHz to 2200 MHz | | Please contact us about available frequencies | |
| Supply voltage | $V_{CC}$ | 3.3 V ±0.165 V | | | |
| Storage temperature | T_stg | -55 °C to +125 °C | | Storage as single product | |
| Operating temperature | T_use | -10 °C to +85 °C | -40 °C to +85 °C | | |
| Frequency tolerance *1 | f_tol | $-100 \times 10^{-6}$ to $+100 \times 10^{-6}$ | $-120 \times 10^{-6}$ to $+120 \times 10^{-6}$ | | |
| Absolute pull range *2 | APR | $\pm 50 \times 10^{-6}$ Min | $\pm 30 \times 10^{-6}$ Min | | |
| Current consumption | $I_{CC}$ | $f_0$=600 to 1100 MHz : 115 mA Max<br>$f_0$=1200 to 2200 MHz : 175 mA Max | | | |
| Output disable current | I_dis | $f_0$=600 to 1100 MHz : 80 mA Max<br>$f_0$=1200 to 2200 MHz : 135 mA Max | | | |
| Input resistance | Rin | 50 kΩ Min | | DC level | |
| Frequency change polarity | — | Positive slope | | | |
| Symmetry | SYM | 45 % to 55 % | | Reference is crossing point of OUT1 and OUT2 | |
| Output voltage | $V_{OH}$ | $V_{CC}$ -1.25 V Min | | Output termination is L_ECL | |
| | $V_{OL}$ | $V_{CC}$ -1.55 V Max | | Output termination is L_ECL | |
| Input voltage | $V_{IH}$ | 80% $V_{CC}$ | | OE terminal(#2) | |
| | $V_{IL}$ | 20% $V_{CC}$ | | | |
| Output load condition | L_ECL | 50 Ω | | Terminated to Vcc-2.0V | |
| Rise time / Fall time | $t_r$ / $t_f$ | 0.125 ns Max | | Between 20% and 80% of output single ended swing | |
| Start-up time | t_str | 10 ms Max | | Time at 90 %$V_{CC}$ to be 0 s | |
| Enable delay time | tpzx | 1.0 us Max | | The time from release OE to Output signal | |
| Phase Jitter | tPJ | 18fs typ. *3 40fs Max | | 990 MHz ≤ $f_0$ ≤ 1100 MHz<br>1980 MHz ≤ $f_0$ ≤ 2200 MHz | Offset frequency:<br>12 kHz to 20 MHz |
| | | 60fs Max | | Except for the above | |

### Type ST

| Item | Symbol | EV7050EAN | | Conditions / Remarks | |
|---|---|---|---|---|---|
| Output frequency range | $f_0$ | 600 MHz to 1100 MHz / 1200 MHz to 2200 MHz | | Please contact us about available frequencies | |
| Supply voltage | $V_{CC}$ | 3.3 V ±0.165 V | | | |
| Storage temperature | T_stg | -55 °C to +125 °C | | Storage as single product | |
| Operating temperature | T_use | -10 °C to +85 °C | -40 °C to +85 °C | | |
| Frequency tolerance *1 | f_tol | $-100 \times 10^{-6}$ to $+100 \times 10^{-6}$ | $-120 \times 10^{-6}$ to $+120 \times 10^{-6}$ | | |
| Absolute pull range *2 | APR | $\pm 50 \times 10^{-6}$ Min | $\pm 30 \times 10^{-6}$ Min | | |
| Current consumption | $I_{CC}$ | $f_0$=600 to 1100 MHz : 115 mA Max<br>$f_0$=1200 to 2200 MHz : 175 mA Max | | | |
| Standby current | I_std | 7 mA Max | | | |
| Input resistance | Rin | 50 kΩ Min | | DC level | |
| Frequency change polarity | — | Positive slope | | | |
| Symmetry | SYM | 45 % to 55 % | | Reference is crossing point of OUT1 and OUT2 | |
| Output voltage | $V_{OH}$ | $V_{CC}$ -1.25 V Min | | Output termination is L_ECL | |
| | $V_{OL}$ | $V_{CC}$ -1.55 V Max | | Output termination is L_ECL | |
| Input voltage | $V_{IH}$ | 80% $V_{CC}$ | | ST terminal(#2) | |
| | $V_{IL}$ | 20% $V_{CC}$ | | | |
| Output load condition | L_ECL | 50 Ω | | Terminated to Vcc-2.0V | |
| Rise time / Fall time | $t_r$ / $t_f$ | 0.125 ns Max | | Between 20% and 80% of output single ended swing | |
| Start-up time | t_str | 10 ms Max | | Time at ST terminal is $V_{IH}$(Active Low is $V_{IL}$) to be 0 s | |
| Resume time | t_res | 10 ms Max | | | |
| Phase Jitter | tPJ | 18fs typ. *3 40fs Max | | 990 MHz ≤ $f_0$ ≤ 1100 MHz<br>1980 MHz ≤ $f_0$ ≤ 2200 MHz | Offset frequency:<br>12 kHz to 20 MHz |
| | | 60fs Max | | Except for the above | |

*1 Frequency tolerance includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, and aging (+25°C, 10 years).
*2 Absolute pull range (APR) = Frequency control range - Frequency tolerance
*3 Put bypass capacitor (0.1uF and 10uF) near by Vcc terminal for jitter performance.

Product Name (Standard form) EV7050 EAN 1986.819000MHz C L E H B A
① ② ③ ④⑤⑥⑦⑧⑨

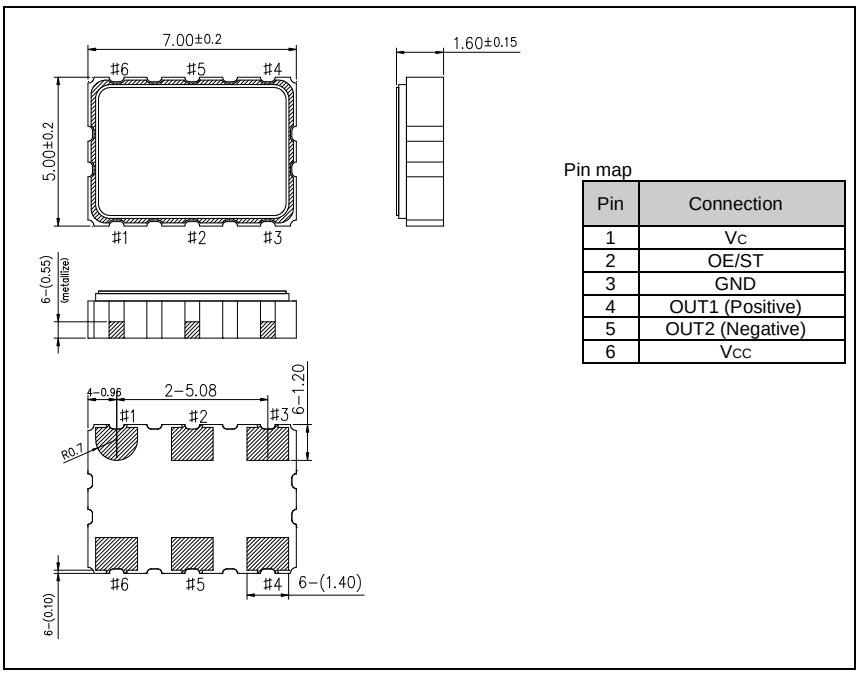
①Model ②Output(E: LV-PECL) ③Frequency
④Supply voltage (C: 3.3 V Typ.) ⑤Frequency tolerance
⑥Operating temperature ⑦OE function
⑧Absolute pull range(APR)
⑨Internal identification code (“A” is default)

| ④Supply voltage | ⑤Frequency tolerance | ⑥Operating temperature | ⑦OE function | ⑧APR | ⑨identification code |
|---|---|---|---|---|---|
| C:3.3V Typ | L: -100~+100× $10^{-6}$ | E: -10 ~ +85℃ | H:OE Active High<br>L:OE Active Low<br>S:ST Active High<br>T:ST Active Low | B: ±50 × $10^{-6}$ Min. | A |
| | U: -120~+120× $10^{-6}$ | G: -40 ~ +85℃ | | A: ±30 × $10^{-6}$ Min. | |

## OE Standby Type

| Product | Oscillation | Outputs |
|---|---|---|
| OE Active High | High: enable /Low: enable | High: enable(specified frequency) Low: disable(Hi-Z) |
| OE Active Low | High: enable /Low: enable | High: disable(Hi-Z) Low: enable(specified frequency) |
| ST Active High | High: enable /Low: disable | High: enable(specified frequency) Low: disable(Hi-Z) |
| ST Active Low | High: disable /Low: enable | High: disable(Hi-Z) Low: enable(specified frequency) |

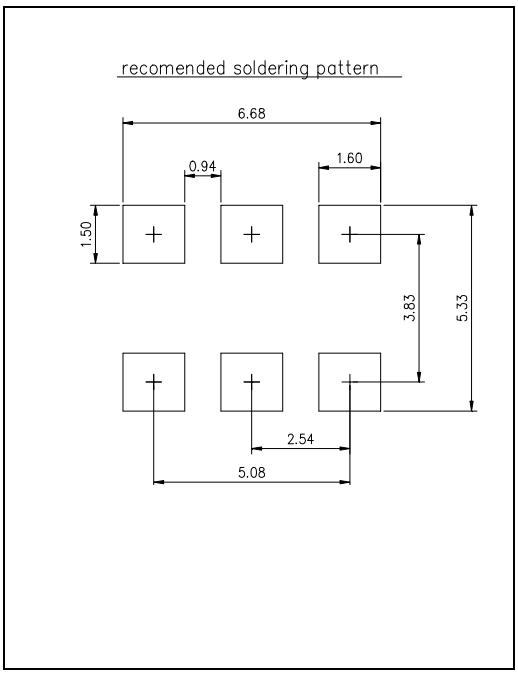
## External dimensions (Unit :mm)




Pin map

| Pin | Connection |
|---|---|
| 1 | Vc |
| 2 | OE/ST |
| 3 | GND |
| 4 | OUT1 (Positive) |
| 5 | OUT2 (Negative) |
| 6 | Vcc |

## Footprint(Recommended (Unit :mm)



## 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.

## WORKING FOR HIGH QUALITY

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

Seiko Epson 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 | ►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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