

**VOLTAGE-CONTROLLED SAW OSCILLATOR (VCSO)****Output: LV-PECL, Sine wave****LOW PHASE JITTER****EV1409EAN / SAN**

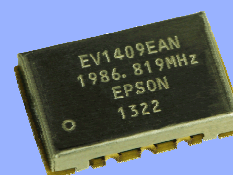
- Low phase jitter : 22fs typ. (EV1409EAN) *3
: 10fs typ. (EV1409SAN) *3
- Frequency range : 1000 MHz to 3000 MHz (EV1409EAN)
: 1000 MHz to 2500 MHz (EV1409SAN)
- Supply voltage : 3.3 V
- Absolute pull range : $\pm 50 \times 10^{-6}$ Min.
- External dimensions: 14.0 × 9.0 × 2.6(t) mm (Low Profile)
- Output : LV-PECL or Sine wave
- Application : OTN(40GbE, 100GbE, 400GbE),
High Speed ADCs and DACs, Test Instrument.



Product Number (please contact us)

EV1409EAN: X1M000391xxxxxx

EV1409SAN: X1M000401xxxxxx



Actual size

**Specifications (characteristics)**

Item	Symbol	EV1409EAN (LV-PECL)	EV1409SAN (Sine wave)	Conditions / Remarks
Output frequency range	f_o	1000 MHz to 3000 MHz	1000 MHz to 2500 MHz	Please contact us about available frequencies.
Supply voltage	V_{cc}	3.3 V ± 0.165 V		
Storage temperature	T_{stg}	-45 °C to +90 °C		Storage as single product.
Operating temperature	T_{use}	-10 °C to +85 °C		
Frequency tolerance *1	f_{tol}	P: -70×10^{-6} to $+120 \times 10^{-6}$		
Current consumption	I_{cc}	90 mA Max.		
Absolute pull range *2	APR	$\pm 50 \times 10^{-6}$ Min.		$V_c = 1.65 \pm 1.65$ V
Pull range	—	-170×10^{-6} Max. ($V_c = 0$ V), $+120 \times 10^{-6}$ Min. ($V_c = 3.3$ V)		$V_c = 1.65 \pm 1.65$ V
Input resistance	R_{in}	100 k Ω Min.		DC level
Frequency change polarity	—	Positive slope		
Symmetry	SYM	40 % to 60 %	—	$V_{cc} - 1.45$ V, $V_c = 1/2 V_{cc}$
Output voltage	V_{OH}	$V_{cc} - 1.3$ V Min.	—	1000 MHz $< f_o \leq 2000$ MHz
		$V_{cc} - 1.4$ V Min.	—	2000 MHz $< f_o \leq 3000$ MHz
	V_{OL}	$V_{cc} - 1.65$ V Max.	—	1000 MHz $< f_o \leq 2000$ MHz
		$V_{cc} - 1.6$ V Max.	—	2000 MHz $< f_o \leq 2500$ MHz
		$V_{cc} - 1.5$ V Max.	—	2500 MHz $< f_o \leq 3000$ MHz
Output level	—	—	0 dBm Min.	
Output load condition	L_{ECL}	50 Ω	—	Terminated to $V_{cc} - 2.0$ V
	Load_R	—	50 Ω	Terminated to GND
Rise time / Fall time	t_r / t_f	0.5 ns Max.	—	1000 MHz $\leq f_o \leq 1700$ MHz
		0.3 ns Max.	—	1700 MHz $< f_o \leq 3000$ MHz
Start-up time	t_{str}	10 ms Max.		Time at 90 % V_{cc} to be 0 s
Phase Jitter	t_{PJ}	100 fs Max.	50 fs Max.	1000 MHz $\leq f_o \leq 1700$ MHz
		22 fs typ. *3 50 fs Max.	10 fs typ. *3 30 fs Max.	1700 MHz $< f_o \leq 3000$ MHz

*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 Output frequency is at 1986.819MHz(LV-PECL), 1968.75MHz(Sine wave)

Product Name **EV1409 EAN 1986.819000MHz C P E N B A**
 (Standard form) ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

⑤ Frequency tolerance	
P	-70 to $+120 \times 10^{-6}$

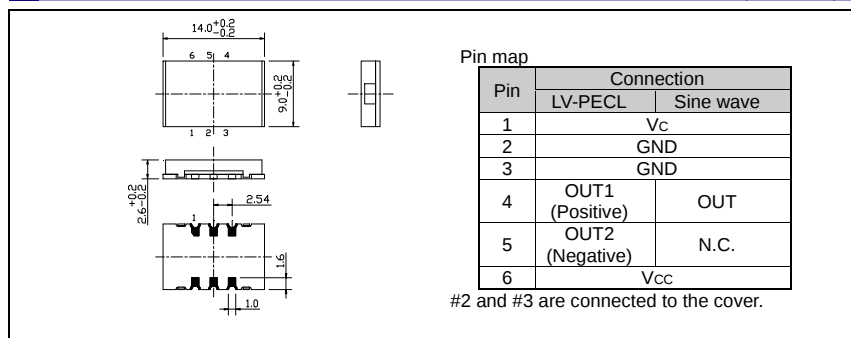
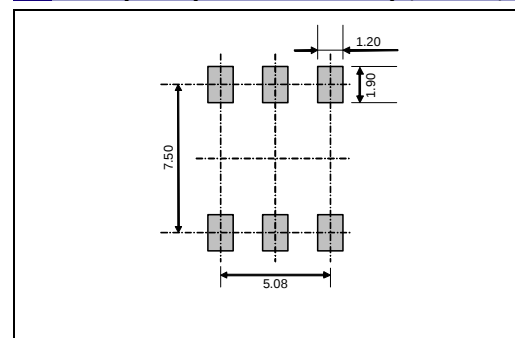
⑥ Operating temp.	
E	-10 to $+85$ °C

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

⑧ Absolute pull range	
B	$\pm 50 \times 10^{-6}$ Min.

External dimensions

(Unit :mm)

**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.

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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.
	► 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.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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