



LOW-JITTER SAW OSCILLATOR (SPSO)

OUTPUT : LV-PECL, LVDS, HCSL

Product Number
X1M0001x1xxxx00EG-4121CA
EG-4101CA

- Frequency range : 100 MHz to 700 MHz
- Supply voltage : 2.5 V ... EG-4121CA
3.3 V ... EG-4101CA
- 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-4121CA P	EG-4101CA P	Conditions / Remarks
		LV-PECL		
Output frequency range	f _o	100 MHz to 700 MHz		Please contact us about available frequencies.
Supply voltage	V _{CC}	2.5 V ± 0.125 V	3.3 V ± 0.33 V	
Storage temperature	T _{stg}	-55 C to +125 C		Storage as single product.
Operating temperature	T _{use}	W: -40 C to +85 C		
Frequency tolerance	f _{tol}	G: ± 50 × 10 ⁻⁶		
Current consumption	I _{CC}	60 mA Max.		OE=V _{CC} , L_ECL = 50 Ω
Disable current	I _{dis}	2 mA Max.		OE=GND
Symmetry	SYM	45 % to 55 %		at outputs crossing point
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		
		0.8 V Typ.	1.6 V Typ.	
	V _{OL}	V _{CC} -1.81 V to V _{CC} -1.62 V		
Output load condition (ECL)	L_ECL	50 Ω		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}	0.23 ps Max.		100 MHz ≤ f _o < 150 MHz
		0.22 ps Max.		150 MHz ≤ f _o < 200 MHz
		0.21 ps Max.		200 MHz ≤ f _o < 300 MHz
		0.18 ps Max.		300 MHz ≤ f _o < 400 MHz
		0.16 ps Max.		400 MHz ≤ f _o < 500 MHz
		0.14 ps Max.		500 MHz ≤ f _o < 600 MHz
		0.10 ps Max.	600 MHz ≤ f _o ≤ 700 MHz	Offset frequency: 12 kHz to 20 MHz

► LVDS Output

Item	Symbol	EG-4121CA L	EG-4101CA L	Conditions / Remarks
		LVDS		
Output frequency range	f _o	100 MHz to 700 MHz		Please contact us about available frequencies.
Supply voltage	V _{CC}	2.5 V ± 0.125 V	3.3 V ± 0.33 V	
Storage temperature	T _{stg}	-55 C to +125 C		Storage as single product.
Operating temperature	T _{use}	W: -40 C to +85 C		
Frequency tolerance	f _{tol}	G: ± 50 × 10 ⁻⁶		
Current consumption	I _{CC}	30 mA Max.		OE=V _{CC} , L_LVDS=100 Ω
Disable current	I _{dis}	15 mA Max.		OE=GND
Symmetry	SYM	45 % to 55 %		at outputs crossing point
Output voltage	V _{OD}	350 mV Typ. 247 mV to 454 mV		DC characteristics
		50 mV Max.		
		1.25 V Typ. 1.125 V to 1.375 V		
		150 mV Max.		
Output load condition (LVDS)	L_LVDS	100 Ω		Connected between OUT to 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}	0.27 ps Max.		100 MHz ≤ f _o < 150 MHz
		0.24 ps Max.		150 MHz ≤ f _o < 200 MHz
		0.23 ps Max.		200 MHz ≤ f _o < 300 MHz
		0.19 ps Max.		300 MHz ≤ f _o < 400 MHz
		0.16 ps Max.		400 MHz ≤ f _o < 500 MHz
		0.14 ps Max.		500 MHz ≤ f _o < 600 MHz
		0.10 ps Max.	600 MHz ≤ f _o ≤ 700 MHz	Offset frequency: 12 kHz to 20 MHz

► HCSL Output

Item	Symbol	EG-4121CA H	EG-4101CA H	Conditions / Remarks
		HCSL		
Output frequency range	fo	100 MHz to 200 MHz		Please contact us about available frequencies.
Supply voltage	Vcc	2.5 V ± 0.125 V	3.3 V ± 0.3 V	
Storage temperature	T stg	-55 °C to +125 °C		Storage as single product.
Operating temperature	T use	W: -40 °C to +85 °C		
Frequency tolerance	f tol	G: ± 50 × 10 ⁻⁶		
Current consumption	Icc	35 mA Max.		OE=Vcc, L_HCSL=50 Ω
Disable current	I dis	15 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 % Vcc Min.		OE terminal
	V _{IL}	30 % Vcc Max.		
Rise time / Fall time	tr / tf	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}	0.3 ps Max.		Offset frequency: 12 kHz to 20 MHz
		0.4 ps Max.		
		0.2 ps Max.		

Product Name EG-4121 CA 250.000000MHz P G W A

(Standard form)

① ② ③ ④⑤⑥⑦

① Model ② Package type ③ Frequency

④ Output (P: LV-PECL, L: LVDS, H: HCSL)

⑤ Frequency tolerance ⑥ Operating temperature

⑦ Frequency aging (A*1: Frequency tolerance include aging)

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

⑤ Frequency tolerance	G	±50 × 10 ⁻⁶
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⑥ Operating temp.	W	-40 °C to +85 °C
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Table 2 Jitter

Item	Symbol	Specifications	Remarks
Jitter *	t _{DJ}	0.3 ps Typ.	Deterministic Jitter
	t _{RJ}	2 ps Typ.	Random Jitter
	t _{RMS}	2 ps Typ.	σ (RMS of total distribution)
	t _{p-p}	20 ps Typ.	Peak to Peak
	t _{acc}	3 ps Typ.	Accumulated Jitter(σ) n=2 to 50 000 cycles

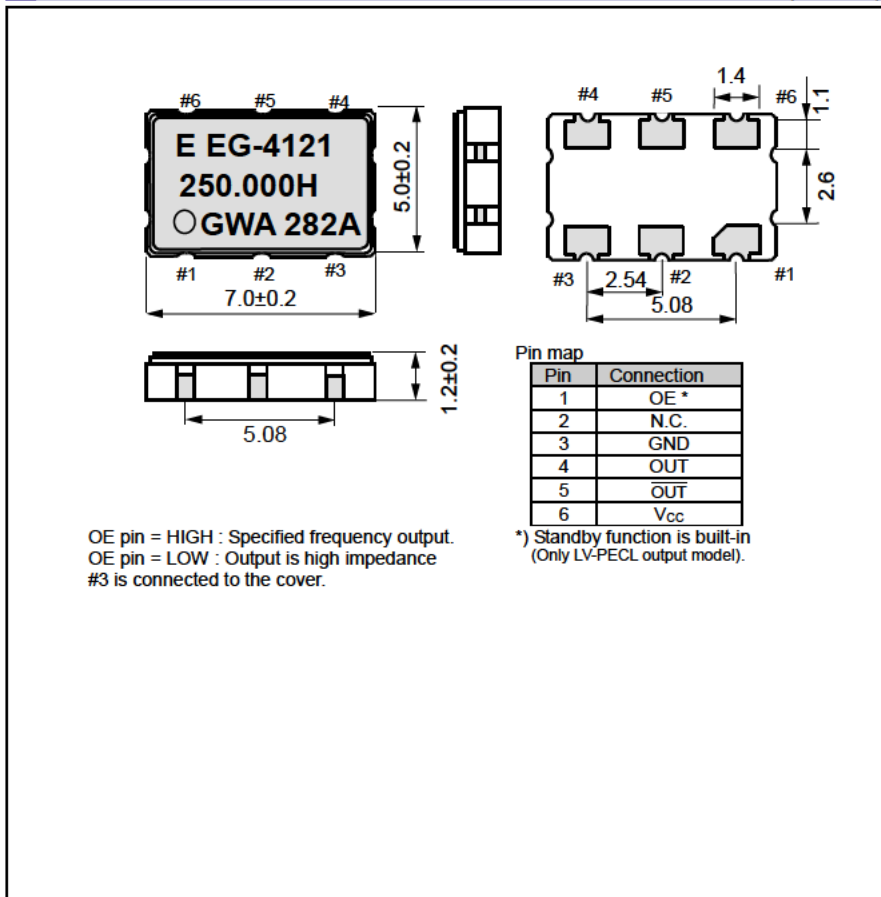
* Tested using a DTS-2075 Digital timing system made by WAVECREST with jitter analysis software VISI6.

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

: LV-PECL, LVDS output
: HCSL output

External dimensions

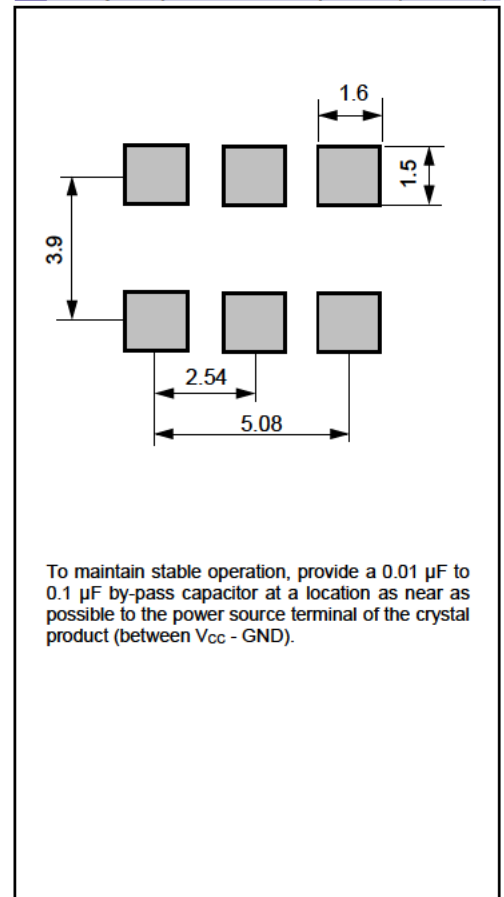
(Unit:mm)



OE pin = HIGH : Specified frequency output.
OE pin = LOW : Output is high impedance
#3 is connected to the cover.

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.

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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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