

LOW-JITTER SAW OSCILLATOR (SPSO)

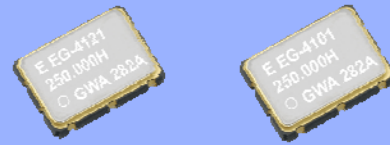
OUTPUT : LV-PECL, LVDS, HCSL

EG-4121 / 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.



Product Number (please contact us)
X1M0001x1xxxx00



Actual size

EG-4121CA

EG-4101CA



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 \pm 0.125 V	3.3 V \pm 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: $\pm 50 \times 10^{-6}$		
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_{OL}	0.8 V Typ.	1.6 V Typ.	
		$V_{cc}-1.025$ V to $V_{cc}-0.88$ V		
		$V_{cc}-1.81$ 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	tpj	0.23 ps Max.		100 MHz $\leq f_o < 150$ MHz
		0.22 ps Max.		150 MHz $\leq f_o < 200$ MHz
		0.21 ps Max.		200 MHz $\leq f_o < 300$ MHz
		0.18 ps Max.		300 MHz $\leq f_o < 400$ MHz
		0.16 ps Max.		400 MHz $\leq f_o < 500$ MHz
		0.14 ps Max.		500 MHz $\leq f_o < 600$ MHz
		0.10 ps Max.		600 MHz $\leq f_o \leq 700$ 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 \pm 0.125 V	3.3 V \pm 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: $\pm 50 \times 10^{-6}$		
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
	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 $\bar{O}UT$
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	tpj	0.27 ps Max.		100 MHz $\leq f_o < 150$ MHz
		0.24 ps Max.		150 MHz $\leq f_o < 200$ MHz
		0.23 ps Max.		200 MHz $\leq f_o < 300$ MHz
		0.19 ps Max.		300 MHz $\leq f_o < 400$ MHz
		0.16 ps Max.		400 MHz $\leq f_o < 500$ MHz
		0.14 ps Max.		500 MHz $\leq f_o < 600$ MHz
		0.10 ps Max.		600 MHz $\leq f_o \leq 700$ MHz

Offset frequency:
12 kHz to 20 MHz



► HCSL Output

Item	Symbol	EG-4121CA H		EG-4101CA H	Conditions / Remarks
		HCSL			
Output frequency range	f _o	100 MHz to 200 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}	-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}	35 mA Max.			OE=V _{cc} , 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 % 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}	0.3 ps Max.			f _o ≤ 160 MHz
		0.4 ps Max.			160 MHz < f _o ≤ 175 MHz
		0.2 ps Max.			f _o > 175 MHz

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 variation, reflow drift, and aging(+25 °C,10 years).

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

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 50000 cycles

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

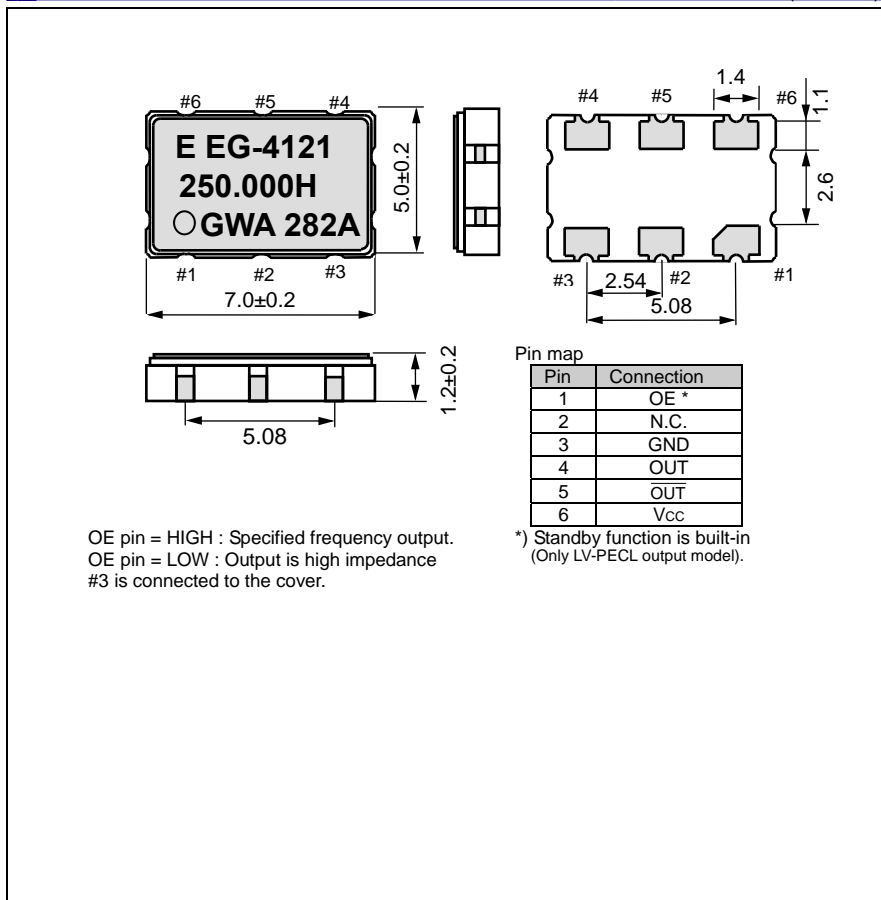
: LV-PECL, LVDS output

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

: HCSL output

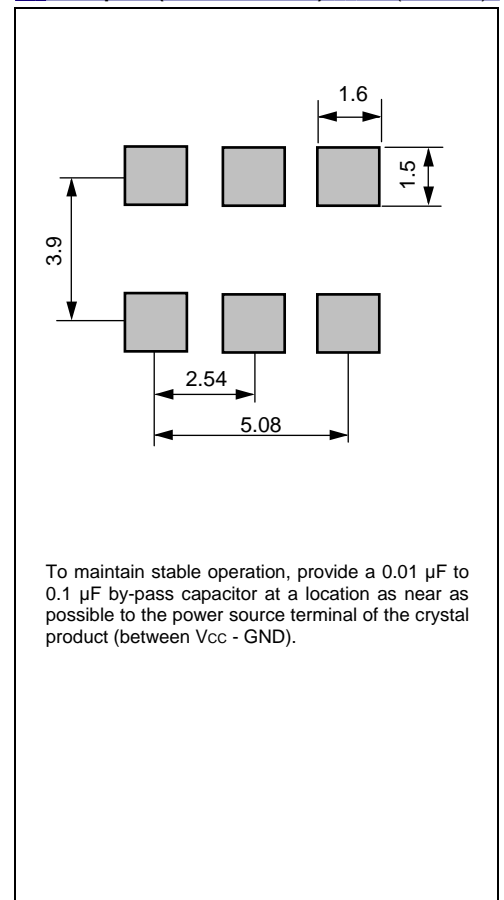
External dimensions

(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.

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	► 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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