

LOW-JITTER SAW OSCILLATOR (SPSO)
OUTPUT : LV-PECL, LVDS, HCSL


Product Number
EG-2121CA: Q3805CAx0xxx00
: X1M000101xxx00
EG-2102CA: Q3806CA00xxx00
: X1M000091xxx00

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)	D: 48 % to 52 % (f _o ≤ 350 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.		
		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}	0.8 ps Max.		f _o < 100 MHz	Offset frequency: 12 kHz to 20 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)	L:45 % to 55 % (f _o ≤ 350 MHz)			
		V:48 % to 52 % (f _o ≤ 175 MHz)	V:48 % to 52 % (f _o ≤ 175 MHz)			
Output voltage	V _{OD}	350 mV Typ. 247 mV to 454 mV		V _{OD1} , V _{OD2}	DC characteristics	
	dV _{OD}	50 mV Max.		dV _{OD} = V _{OD1} -V _{OD2}		
	V _{OS}	1.25 V Typ. 1.125 V to 1.375 V		V _{OS1} , V _{OS2}		
	dV _{OS}	150 mV Max.		dV _{OS} = V _{OS1} -V _{OS2}		
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		Offset frequency: 12 kHz to 20 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	f _o	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.		f _o < 100 MHz
		0.5 ps Max.		100 MHz ≤ f _o < 200 MHz
		0.3 ps Max.		200 MHz ≤ f _o
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 ② ③ ④⑤⑥⑦

①Model ②Package type ③Frequency

④Output/Symmetry ⑤Frequency tolerance ⑥Operating temperature

⑦Frequency 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 ≤ f_o < 100 MHz only HP is available)

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

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

⑥Operating 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.

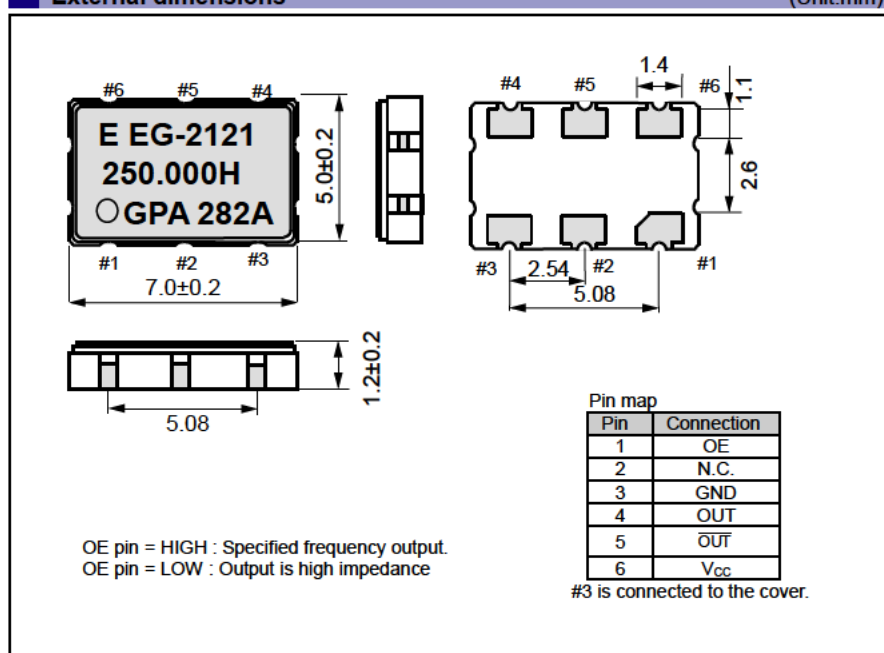
* Based on SIA-3100C signal integrity analyzer made from WAVECREST.

: Differential LV-PECL, LVDS output

: HCSL output

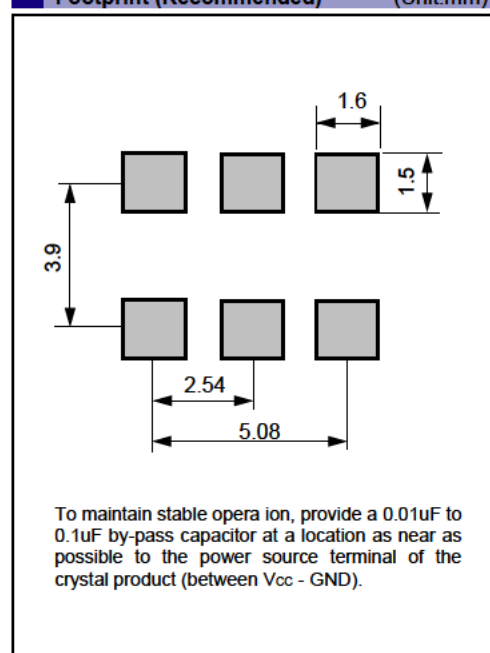
External dimensions

(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.

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	► 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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