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

Pb Free RoHS Compliant

Product Number
EG-2121CA: Q3805CAx0xxxx00
: X1M000101xxxx00
EG-2102CA: Q3806CA00xxxx00
: X1M000091xxxx00

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	fo	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 % (fo > 350 MHz)	P:45 % to 55 %	at outputs crossing point
		P:45 % to 55 % (fo ≤ 350 MHz)		
		D:48 % to 52 % (fo ≤ 175 MHz)	D:48 % to 52 % (fo ≤ 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	tr / tf	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.		fo < 100 MHz; Offset frequency: 12 kHz to 20 MHz
		0.5 ps Max.		100 MHz ≤ fo < 200 MHz; Offset frequency: 12 kHz to 20 MHz
		0.3 ps Max.		200 MHz ≤ fo; Offset frequency: 12 kHz to 20 MHz
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	fo	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 % (fo > 350 MHz)	L:40 % to 60 % (fo > 350 MHz)	at outputs crossing point
		L:45 % to 55 % (fo ≤ 350 MHz)	L:45 % to 55 % (fo ≤ 350 MHz)	
		V:48 % to 52 % (fo ≤ 175 MHz)	V:48 % to 52 % (fo ≤ 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} |; DC characteristics
	V_{OS}	1.25 V Typ. 1.125 V to 1.375 V		V_{OS1}, V_{OS2}; DC characteristics
	dV_{OS}	150 mV Max.		dV_{OS} = | V_{OS1}-V_{OS2} |; DC characteristics
Output load condition (LVDS)	L_LVDS	100 Ω		Connected between OUT to $\overline{OUT}$
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.		fo < 100 MHz; Offset frequency: 12 kHz to 20 MHz
		0.5 ps Max.		100 MHz ≤ fo < 200 MHz; Offset frequency: 12 kHz to 20 MHz
		0.3 ps Max.		200 MHz ≤ fo; Offset frequency: 12 kHz to 20 MHz
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 HCSL		Conditions / Remarks
Output frequency range	fo	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.	fo < 100 MHz	Offset frequency: 12 kHz to 20 MHz
		0.5 ps Max.	100 MHz ≤ fo < 200 MHz	
		0.3 ps Max.	200 MHz ≤ fo	
Frequency aging *2	f_aging	± 10 × 10^{-6} / year Max.		+25 C, First year, V_{CC}=2.5 V, 3.3 V

Product Name (Standard form)

EG-2121 CA 250.000000MHz P G P A
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 ≤ fo < 100 MHz only HP is available)

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

⑤Frequency tolerance	
G	±50 × 10^{-6}
H	±100 × 10^{-6}

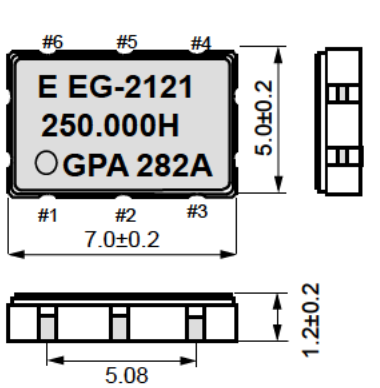
⑥Operating temperature	
P	0 °C to +70 °C
R	-5 °C to +85 °C
S	-20 °C to +70 °C

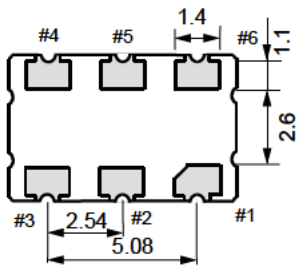
Table 2 Jitter

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 iming system made by WAVECREST with jitter analysis software VISI6. : Differential LV-PECL, LVDS output
* Based on SIA-3100C signal integrity analyzer made from WAVECREST. : HCSL output

External dimensions (Unit:mm)





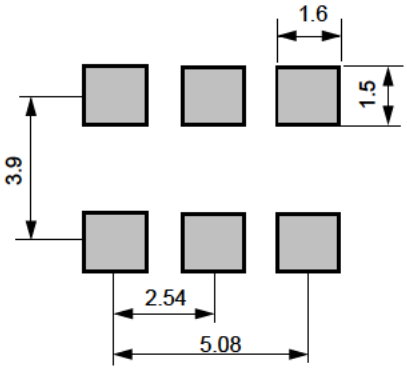
Pin map

Pin	Connection
1	OE
2	N.C.
3	GND
4	OUT
5	$\overline{OUT}$
6	V_{CC}

#3 is connected to the cover.

OE pin = HIGH : Specified frequency output.
OE pin = LOW : Output is high impedance

Footprint (Recommended) (Unit:mm)



To maintain stable opera ion, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V_{CC} - GND).

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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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 IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

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	►Pb free.
RoHS Compliant	►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.)
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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