

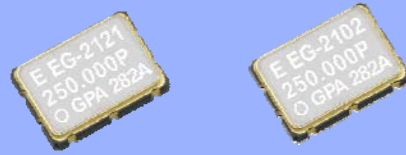
**CRYSTAL OSCILLATOR**  
**LOW-JITTER SAW OSCILLATOR**

# EG-2121 / 2102CA series

- Frequency range : 53.125 MHz to 700 MHz
- Supply voltage : 2.5 V (EG-2121CA)  
3.3 V (EG-2102CA)
- Output : Differential 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)**  
**EG-2121CA: Q3805CAx0xxx00**  
**: X1M000101xxx00**  
**EG-2102CA: Q3806CA00xxx00**  
**: X1M000091xxx00**



Actual size

EG-2121CA

EG-2102CA



## Specifications (characteristics)

### ► Differential LV-PECL Output

Item	Symbol	EG-2121CA	EG-2102CA	Remarks
		Differential LV-PECL		
Output frequency range	$f_0$	53.125 MHz to 500 MHz	100 MHz to 700 MHz	Please contact us for inquiries regarding available frequencies.
Supply voltage	$V_{CC}$	2.5 V $\pm 0.125$ V	3.3 V $\pm 0.3$ V	
Temperature range	Storage temperature	-40 °C to +100 °C		Store as bare product after unpacking
	Operating temperature	P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C		Please contact us for inquiries about S spec.
Frequency tolerance <sup>*1</sup>	$f_{tol}$	G: $\pm 50 \times 10^{-6}$ , H: $\pm 100 \times 10^{-6}$		P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C
Current consumption	$I_{CC}$	80 mA Max.	100 mA Max.	OE= $V_{CC}$ , $R_L=50 \Omega$ or 100 $\Omega$
Disable current	$I_{dis}$	20 mA Max.	32 mA Max.	OE=GND
Symmetry	SYM	P: 40 % to 60 % ( $f_0 > 350$ MHz)	P: 45 % to 55 %	at outputs crossing point
		P: 45 % to 55 % ( $f_0 \leq 350$ MHz)		
		D: 48 % to 52 % ( $f_0 \leq 175$ 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.	
Output load condition	$L_{PECL}$	50 $\Omega$		Terminated to $V_{CC}-2.0$ V
Output enable input voltage	$V_{IH}$	70 % $V_{CC}$ Min.		OE terminal
Output disable input voltage	$V_{IL}$	30 % $V_{CC}$ Max.		OE terminal
Rise time / Fall time	$t_r / t_f$	400 ps Max.		Between 20% $V_{CC}$ and 80% of ( $V_{OH}-V_{OL}$ ) 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	$t_{PJ}$	1 ps Max.		Offset frequency: 12 kHz to 20 MHz
Frequency aging <sup>*2</sup>	$f_{aging}$	$\pm 10 \times 10^{-6}$ / year Max.		+25 °C, First year, $V_{CC}=2.5$ V, 3.3 V

\*1 As per below table 1.

\*2 Except: \*\*\*A

### ► LVDS Output

Item	Symbol	EG-2121CA	EG-2102CA	Remarks
		LVDS		
Output frequency range	$f_0$	53.125 MHz to 700 MHz		Please contact us for inquiries regarding available frequencies.
Supply voltage	$V_{CC}$	2.5 V $\pm 0.125$ V	3.3 V $\pm 0.3$ V	
Temperature range	Storage temperature	-40 °C to +100 °C		Store as bare product after unpacking
	Operating temperature	P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C		Please contact us for inquiries about S spec.
Frequency tolerance <sup>*1</sup>	$f_{tol}$	G: $\pm 50 \times 10^{-6}$ , H: $\pm 100 \times 10^{-6}$		P: 0 °C to +70 °C, R: -5 °C to +85 °C, S: -20 °C to +70 °C
Current consumption	$I_{CC}$	30 mA Max.	45 mA Max.	OE= $V_{CC}$ , $R_L=50 \Omega$ or 100 $\Omega$
Disable current	$I_{dis}$	20 mA Max.	30 mA Max.	OE=GND
Symmetry	SYM	L: 40 % to 60 % ( $f_0 > 350$ MHz)	L: 40 % to 60 % ( $f_0 > 350$ MHz)	at outputs crossing point
		L: 45 % to 55 % ( $f_0 \leq 350$ MHz)		
		V: 48 % to 52 % ( $f_0 \leq 175$ MHz)		
Output voltage	$V_{OD}$	350 mV Typ. 247 mV to 454 mV		Differential output, DC characteristics
	$\Delta V_{OD}$	50 mV		Output change, DC characteristics
	$V_{OS}$	1.25 V Typ. 1.125 V to 1.375 V		Offset, DC characteristics
	$\Delta V_{OS}$	150 mV		Offset change, DC characteristics
Output load condition	$L_{LVDS}$	100 $\Omega$		Connected between OUT to $\overline{OUT}$
Output enable input voltage	$V_{IH}$	70 % $V_{CC}$ Min.		OE terminal
Output disable input voltage	$V_{IL}$	30 % $V_{CC}$ Max.		OE terminal
Rise time / Fall time	$t_r / t_f$	400 ps Max.		Between 20% $V_{CC}$ and 80% of ( $V_{OH}-V_{OL}$ ) 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	$t_{PJ}$	1 ps Max.		Offset frequency: 12 kHz to 20 MHz
Frequency aging <sup>*2</sup>	$f_{aging}$	$\pm 10 \times 10^{-6}$ / year Max.		+25 °C, First year, $V_{CC}=2.5$ V, 3.3 V

\*1 As per below table 1.

\*2 Except: \*\*\*A

HCSL Output

Item	Symbol	EG-2121CA	EG-2102CA	Remarks
		HCSL		
Output frequency range	$f_0$	100 MHz to 350 MHz		Please contact us for inquiries regarding available frequencies.
Supply voltage	V <sub>cc</sub>	2.5 V $\pm$ 0.125 V	3.3 V $\pm$ 0.3 V	
Temperature range	Storage temperature	T <sub>stg</sub> -40 °C to +125 °C		Store as bare product after unpacking
	Operating temperature	T <sub>use</sub> P:0 °C to +70 °C ,R:-5 °C to +85 °C ,S:-20 °C to +70 °C		
Frequency tolerance <sup>*1</sup>	f <sub>tol</sub>	G: $\pm 50 \times 10^{-6}$ ,H: $\pm 100 \times 10^{-6}$		
Current consumption	I <sub>cc</sub>	80 mA Max.	85 mA Max.	OE=V <sub>cc</sub> ,L_HCSL=50 $\Omega$
Disable current	I <sub>dis</sub>	20 mA Max.	35 mA Max	OE=GND
Symmetry	SYM	45 % to 55 %		at outputs crossing point
High output voltage	V <sub>OH</sub>	0.75 V Typ.		DC characteristics
Low output Voltage	V <sub>OL</sub>	-0.3 V Typ.		
Output load condition	L <sub>HCSL</sub>	50 $\Omega$		Terminated to GND
Output enable input voltage	V <sub>IH</sub>	70 % V <sub>cc</sub> Min.		OE terminal
Output disable input voltage	V <sub>IL</sub>	30 % V <sub>cc</sub> Max.		OE terminal
Rise time / Fall time	t <sub>r</sub> / t <sub>f</sub>	500 ps Max.		Between 0.175 V and 0.525 V of output
Start-up time	t <sub>str</sub>	10 ms Max.		Time at minimum supply voltage to be 0 s
Phase Jitter	t <sub>PJ</sub>	1 ps Max.		Offset frequency: 12 kHz to 20 MHz
Frequency aging <sup>*2</sup>	f <sub>aging</sub>	$\pm 10 \times 10^{-6}$ / year Max.		+25 °C,First year,V <sub>cc</sub> =2.5 V,3.3 V

\*1 As per below table 1.

\*2 Except: \*\*\*A

Table 1 Frequency tolerance and aging

Frequency range	EG-2121CA	P:Differential LV-PECL		D: Differential LV-PECL		L:LVDS		V:LVDS		H:HCSSL	
	EG-2102CA	All range		$f_0 \leq 175$ MHz $f_0 \leq 350$ MHz		All range		$f_0 \leq 175$ MHz		All range	
Details of frequency tolerance		A <sup>*3</sup>	N <sup>*4</sup>	A <sup>*3</sup>	N <sup>*4</sup>	A <sup>*3</sup>	N <sup>*4</sup>	A <sup>*3</sup>	N <sup>*4</sup>	A <sup>*3</sup>	N <sup>*4</sup>
Frequency tolerance	HP: $\pm 100 \times 10^{-6}$ (0°C to +70°C)	PHPA	PHPN	DHPA	DHPN	LHPA	LHPN	VHPA	VHPN	HHPA	HHPN
	HR: $\pm 100 \times 10^{-6}$ (-5°C to +85°C)	PHRA <sup>*5</sup>	PHRN <sup>*5</sup>	DHRA <sup>*5</sup>	DHRN <sup>*5</sup>	LHRA <sup>*5</sup>	LHRN <sup>*5</sup>	VHRA <sup>*5</sup>	VHRN <sup>*5</sup>	HHRA	HHRN
	GP: $\pm 50 \times 10^{-6}$ (0°C to +70°C)	PGPA <sup>*5</sup>	PGPN <sup>*5</sup>	DGPA <sup>*5</sup>	DGPN <sup>*5</sup>	LGPA <sup>*5</sup>	LGPN <sup>*5</sup>	VGPA <sup>*5</sup>	VGPN <sup>*5</sup>	HGPA	HGPN
	GR: $\pm 50 \times 10^{-6}$ (-5°C to +85°C)	—	PGRN <sup>*5</sup>	—	DGRN <sup>*5</sup>	—	LGRN <sup>*5</sup>	—	VGRN <sup>*5</sup>	—	HGRN
	HS: $\pm 100 \times 10^{-6}$ (-20°C to +70°C)	PHSA <sup>*5</sup>	PHSN <sup>*5</sup>	DHSA <sup>*5</sup>	DHSN <sup>*5</sup>	LHSA <sup>*5</sup>	LHSN <sup>*5</sup>	VHSA <sup>*5</sup>	VHSN <sup>*5</sup>	HHSA	HHSN
	GS: $\pm 50 \times 10^{-6}$ (-20°C to +70°C)	—	PGSN <sup>*5</sup>	—	DGSN <sup>*5</sup>	—	LGSN <sup>*5</sup>	—	VGSN <sup>*5</sup>	—	HGSN

\*3 This includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, and aging(+25 °C, 10 years).

\*4 This includes initial frequency tolerance, temperature variation, supply voltage variation, and reflow drift(except aging).

\*5 53.125 MHz  $\leq f_0 < 100$  MHz : Unavailable.

Table 2 Jitter

Item	Symbol	Specifications	Remarks
Jitter *	t <sub>DJ</sub>	0.2 ps Typ.	Deterministic Jitter
	t <sub>RJ</sub>	3 ps Typ.	Random Jitter
	t <sub>RMS</sub>	3 ps Typ.	$\sigma$ (RMS of total distribution)
	t <sub>p-p</sub>	25 ps Typ.	Peak to Peak
	t <sub>acc</sub>	4 ps Typ.	Accumulated Jitter( $\sigma$ ) n=2 to 50000 cycles

\* Based on DTS-2075 Digital timing system made from WAVECREST with jitter analysis software VISI6.

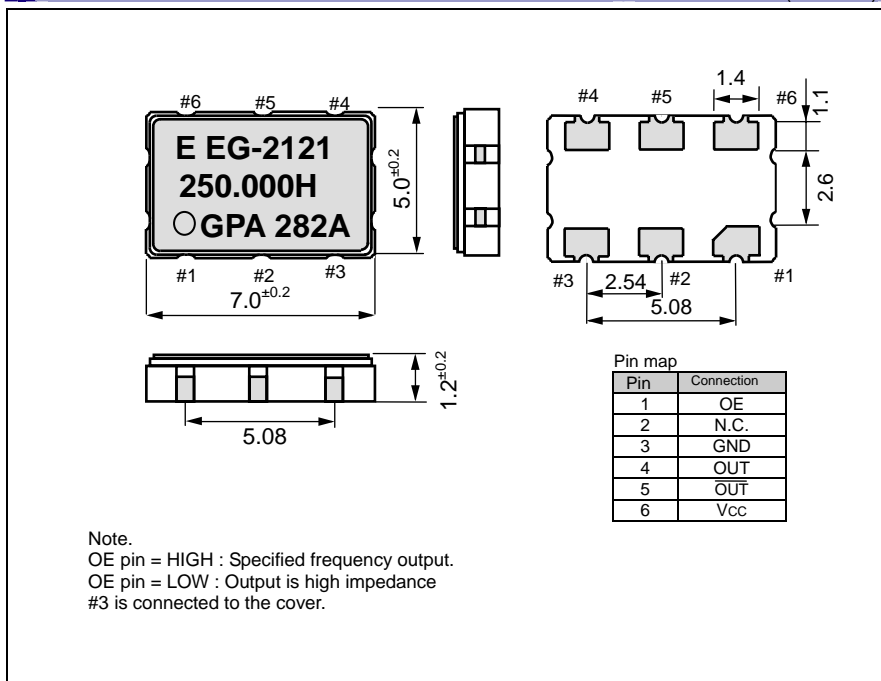
\* Based on SIA-3100C signal integrity analyzer made from WAVECREST.

: Differential LV-PECL, LVDS output

: HCSL output

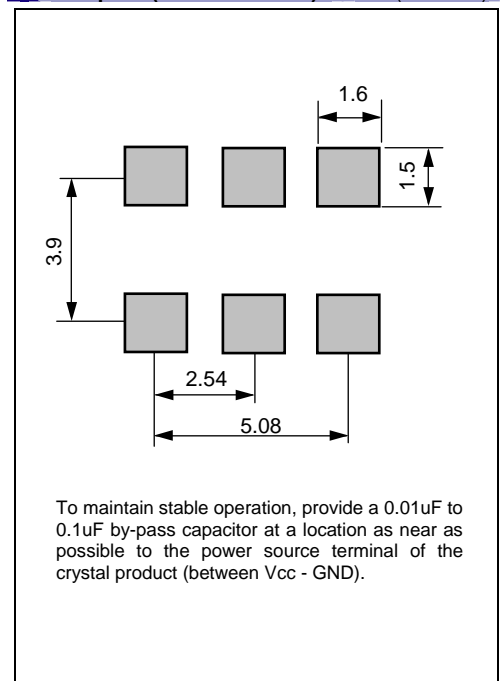
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



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Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

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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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	► The products have been designed for high reliability applications such as Automotive.

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