CRYSTAL OSCILLATOR

LOW-JITTER SAW OSCILLATOR

EG-2121/2102CA

- 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.

Pb Free RoHS Compliant

Product Number (please contact us)
EG-2121CA: Q3805CAx0xxxx00
: X1M000101xxxx00
EG-2102CA: Q3806CA00xxxx00
: X1M000091xxxx00

Actual size

EG-2121CA	EG-2102CA
	

Specifications (characteristics)

►Differential LV-PECL Output

Item	Symbol	EG-2121CA	EG-2102CA	Conditions / Remarks
		Differential LV-PECL		
Output frequency range	fo	53.125 MHz to 500 MHz	100 MHz to 700 MHz	Please contact us for inquiries regarding available frequencies.
Supply voltage	Vcc	2.5 V ±0.125 V	3.3 V ±0.3 V	
Storage temperature	T_stg	-40 °C to +100 °C		Store as bare product .
Operating temperature *1	T_use	P:0 °C to +70 °C ,R:-5 °C to +85 °C ,S:-20 °C to +70 °C		
Frequency tolerance *1	f_tol	G: ± 50 × 10^{-6} ,H: ±100 × 10^{-6}		
Current consumption	Icc	80 mA Max.	100 mA Max.	OE=Vcc, 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	VOH	1.55 V Typ.	2.35 V Typ.	DC characteristics
		Vcc-1.025 V to Vcc-0.88 V		
	VOL	0.8 V Typ.	1.6 V Typ.	
		Vcc-1.81 V to Vcc-1.62 V		
Output load condition (ECL)	L_ECL	50 Ω		Terminated to Vcc -2.0 V
Input voltage	VIH	70 % Vcc Min.		OE terminal
	VIL	30 % Vcc Max.		
Rise time / Fall time	tr / tf	400 ps Max.		Between 20% and 80% of (VOH-VOL)
Start-up time	t_str	10 ms Max.		Time at minimum supply voltage to be 0 s
Phase Jitter	tPJ	1 ps Max.		Offset frequency: 12 kHz to 20 MHz
Frequency aging *2	f_aging	± 10 × 10^{-6} / year Max.		+25 °C, First year, Vcc=2.5 V,3.3 V

*1 As per below table 1.
*2 Except: ***A

►LVDS Output

Item	Symbol	EG-2121CA	EG-2102CA	Conditions / Remarks	
		LVDS			
Output frequency range	fo	53.125 MHz to 700 MHz		Please contact us for inquiries regarding available frequencies.	
Supply voltage	Vcc	2.5 V ±0.125 V	3.3 V ±0.3 V		
Storage temperature	T_stg	-40 °C to +100 °C		Store as bare product.	
Operating temperature *1	T_use	P:0 °C to +70 °C ,R:-5 °C to +85 °C ,S:-20 °C to +70 °C			
Frequency tolerance *1	f_tol	G: ± 50 × 10^{-6} ,H: ±100 × 10^{-6}			
Current consumption	Icc	30 mA Max	45 mA Max.	OE=Vcc, 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	VOD	350 mV Typ. 247 mV to 454 mV		VOD1, VOD2	DC characteristics
	dVOD	50 mV Max.		dVOD = | VOD1-VOD2 |	
	VOS	1.25 V Typ. 1.125 V to 1.375 V		VOS1, VOS2	
	dVOS	150 mV Max.		dVOS = | VOS1-VOS2 |	
Output load condition (LVDS)	L_LVDS	100 Ω		Connected between OUT to $\overline{OUT}$	
Input voltage	VIH	70 % Vcc Min.		OE terminal	
	VIL	30 % Vcc Max.			
Rise time / Fall time	tr / tf	400 ps Max.		Between 20 % and 80 %of Differential Output peek to peek voltage	
Start-up time	t_str	10 ms Max.		Time at minimum supply voltage to be 0 s	
Phase Jitter	tPJ	1 ps Max.		Offset frequency: 12 kHz to 20 MHz	
Frequency aging *2	f_aging	± 10 × 10^{-6} / year Max.		+25 °C, First year, Vcc=2.5 V,3.3 V	

*1 As per below table 1.
*2 Except: ***A

►HCSL Output

Item	Symbol	EG-2121CA	EG-2102CA	Conditions / Remarks
		HCSL		
Output frequency range	fo	100 MHz to 350 MHz		Please contact us for inquiries regarding available frequencies.
Supply voltage	Vcc	2.5 V ±0.125 V	3.3 V ±0.3 V	
Storage temperature	T_stg	-40 °C to +125 °C		Store as bare 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 *1	f_tol	G: ± 50 × 10^{-6} ,H: ±100 × 10^{-6}		
Current consumption	Icc	80 mA Max.	85 mA Max.	OE=Vcc,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	VOH	0.75 V Typ.		DC characteristics
	VOL	-0.3 V Typ.		
Output load condition (HCSL)	L_HCSL	50 Ω		Terminated to GND
Input voltage	VIH	70 % Vcc Min.		OE terminal
	VIL	30 % Vcc 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}	1 ps Max.		Offset frequency: 12 kHz to 20 MHz
Frequency aging *2	f_aging	± 10 × 10^{-6} / year Max.		+25 °C, First year, Vcc=2.5 V,3.3 V

*1 As per below table 1.
*2 Except: ***A

Table 1 Frequency tolerance and aging

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

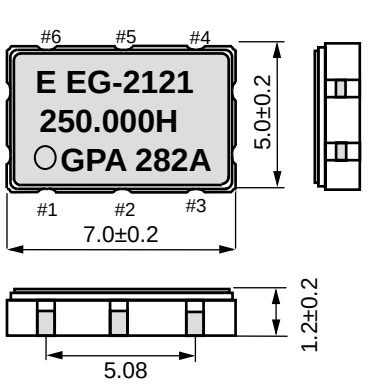
*3 This includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, and aging(+25 °C,10 years).
*4 This includes initial frequency tolerance, temperature variation, supply voltage variation, and reflow drift(except aging).
*5 53.125 MHz ≤ fo < 100 MHz : Unavailable.

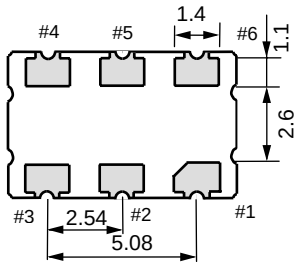
Table 2 Jitter

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 50000 cycles

* Based on DTS-2075 Digital timing system made from 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)





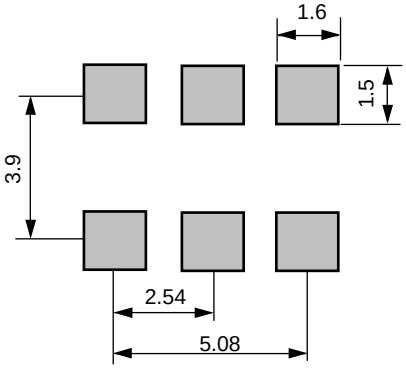
Pin map

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

#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 operation, 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 Vcc - GND).

“QMEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, ”Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

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.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, 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.

WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 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	►The products have been designed for high reliability applications such as Automotive.

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