

## PROGRAMMABLE HIGH-FREQUENCY CRYSTAL OSCILLATOR

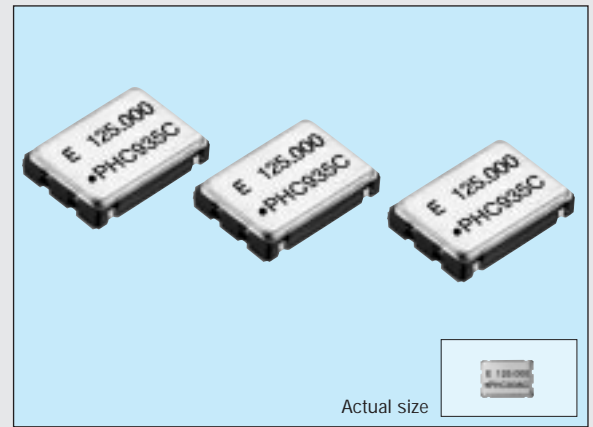
**SG-8002CA series**

Products number

**Q3309CAxxxxxx00**

- Wide frequency output by PLL technology.
- Quick delivery of samples and short lead mass production time.
- Excellent environmental capability.
- Output enable function (OE) and stand-by function (ST) can be used for low current consumption applications.

8002 PROM Writer available to purchase.(Type:PRW-8000A3-M01)  
Please contact EPSON or local sales representative.



### Specifications (characteristics)

Item	Symbol	PT/ST	PH/SH		PC/SC	Remarks
			Specifications *			
Output frequency range	$f_0$		1.0000 MHz to 125.0000 MHz <sup>1</sup>			Refer to page 12. "Frequency range"
Power source voltage	Max. supply voltage	$V_{DD\_GND}$	-0.5 V to +7.0 V			
	Operating voltage	$V_{DD}$	5.0 V $\pm$ 0.5 V		3.3 $\pm$ 0.3 V	3.0 V $\pm$ 0.3 V: $f_0 \leq 66.7$ MHz(PC/SC)
Temperature range	Storage temperature	$T_{STG}$	-55 °C to +125 °C			Stored as bare product after unpacking
	Operating temperature	$T_{OPR}$	-20 °C to +70 °C (-40 °C to +85 °C)		-40 °C to +85 °C	Refer to page 12."Frequency range"
Frequency stability	$\Delta f/f_0$		B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$ M: $\pm 100 \times 10^{-6}$			B,C: -20 °C to +70 °C, M: -40 °C to +85 °C
Current consumption	$I_{OP}$		45 mA Max.		28 mA Max.	No load condition, Max. frequency range
Output disable current	$I_{OE}$		30 mA Max.		16 mA Max.	OE=GND
Standby current	$I_{ST}$		50 $\mu$ A Max.			ST=GND
Duty	$t_w/t$	—	40 % to 60 %			C-MOS load: 1/2 $V_{DD}$ level
		40 % to 60 %	—			TTL load: 1.4 V level
High output voltage	$V_{OH}$		$V_{DD}$ -0.4 V Min.			$I_{OH}$ =-16 mA(PT/ST,PH/SH),-8 mA(PC/SC)
Low output voltage	$V_{OL}$		0.4 V Max.			$I_{OL}$ = 16 mA(PT/ST,PH/SH), 8 mA(PC/SC)
Output load condition (fan out)	TTL	N	5 TTL Max.		—	Max. frequency and Max. operating voltage range
	C-MOS	$C_L$	15 pF Max.		25 pF Max. 15 pF Max.	
Output enable/disable input voltage	$V_{IH}$		2.0 V Min.		0.7 x $V_{DD}$ Min.	ST, OE terminal
	$V_{IL}$		0.8 V Max		0.2 x $V_{DD}$ Max.	
Output rise time	C-MOS level	$t_{TLH}$	—		4 ns Max.	C-MOS load: 20 % $\rightarrow$ 80 % $V_{DD}$
	TTL level		4 ns Max.		—	TTL load: 0.4 V $\rightarrow$ 2.4 V
Output fall time	C-MOS level	$t_{THL}$	—		4 ns Max.	C-MOS load: 80 % $\rightarrow$ 20 % $V_{DD}$
	TTL level		4 ns Max.		—	TTL load: 2.4 V $\rightarrow$ 0.4 V
Oscillation start up time	$t_{OSC}$		10 ms Max.			Time at minimum operating voltage to be 0 s
Aging	$f_a$		$\pm 5 \times 10^{-6}$ /year Max.			$T_a = +25$ °C, $V_{DD} = 5.0$ V/3.3 V(PC/SC)
Shock resistance	S.R.		$\pm 20 \times 10^{-6}$ Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s <sup>2</sup> x 0.3 ms x 1/2sine wave in 3 directions

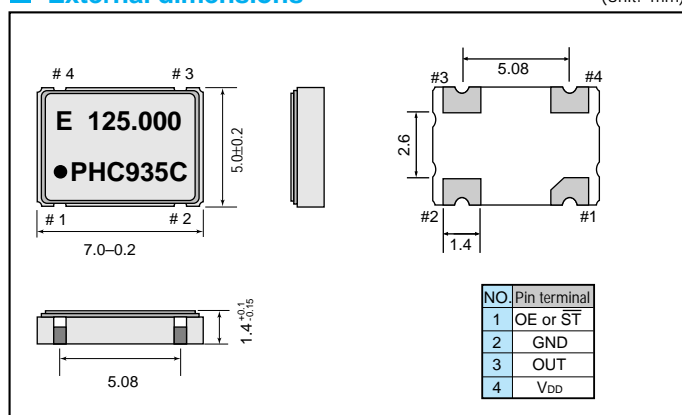
Note: • Please contact us for inquiries about operating temperature(-40 °C to +85 °C), the available frequency, duty and output load conditions.  
Checking possible by the Frequency Checking Program.

\*PLL - PLL connection & Jitter specification, please refer to page 46.

<http://www.epson.co.jp/device/>

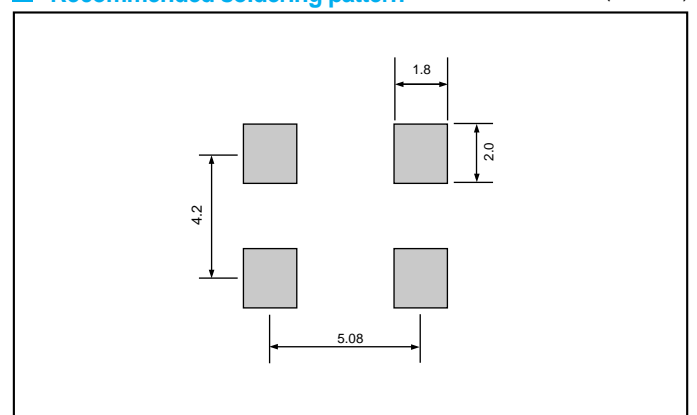
### External dimensions

(Unit: mm)



### Recommended soldering pattern

(Unit: mm)



# PLL oscillator (SG-8002 series and HG-8002 series)

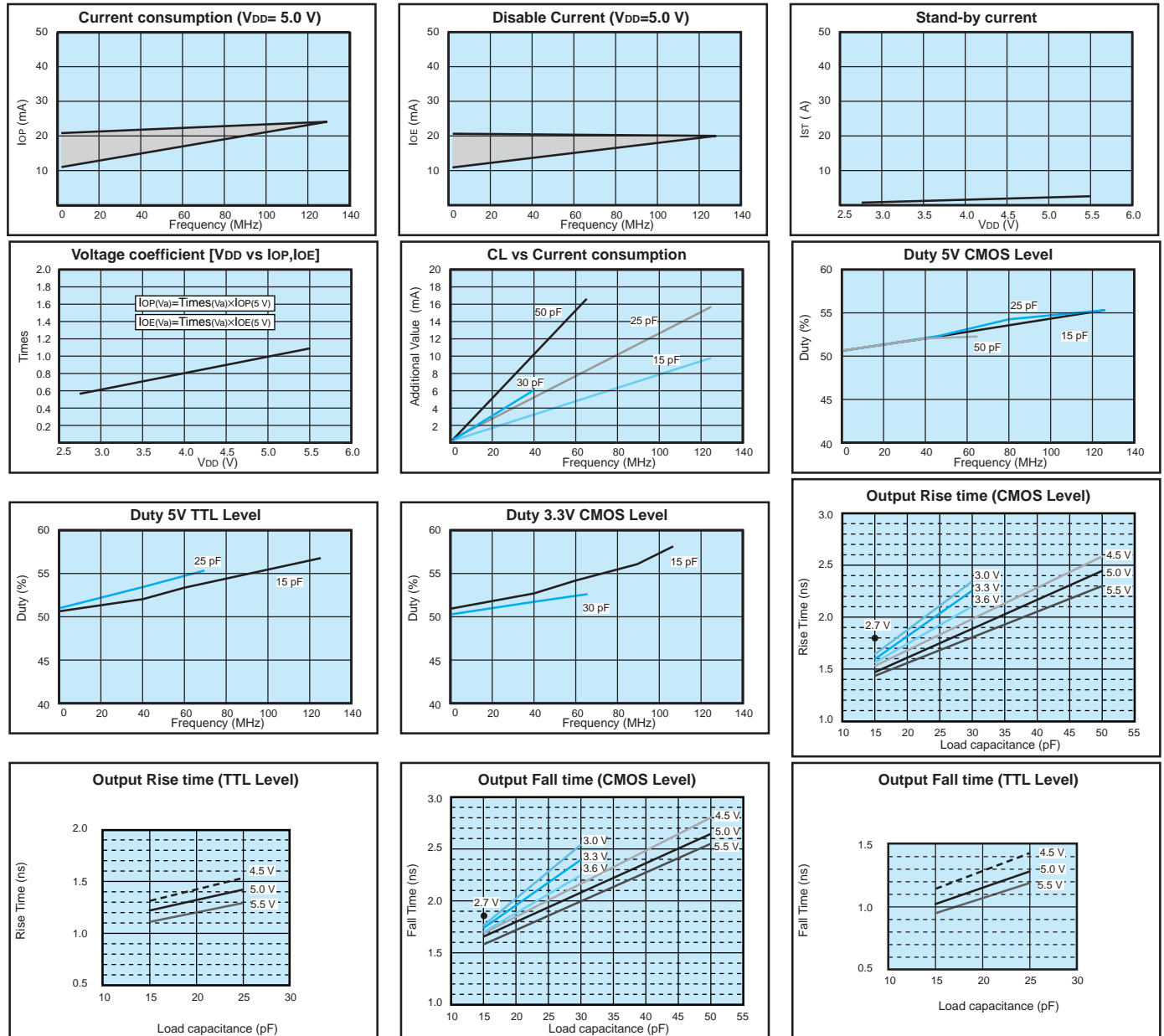
## ■ PLL-PLL connection

The 8002 series uses PLL technology. There are some cases where jitter will increase when connected to other PLL type devices. For application assistance, please contact Epson.

## ■ Jitter Specifications

Model	Operating Voltage	Jitter Item	Specifications	Remarks
PT/PH ST/SH	5 V±0.5 V	Cycle to cycle	150 ps Max.	33 MHz≤f <sub>o</sub> ≤125 MHz, C <sub>L</sub> =15 pF
			200 ps Max.	1.0 MHz≤f <sub>o</sub> <33 MHz, C <sub>L</sub> =15 pF
		Peak to peak	200 ps Max.	33 MHz≤f <sub>o</sub> ≤125 MHz, C <sub>L</sub> =15 pF
			250 ps Max.	1.0 MHz≤f <sub>o</sub> <33 MHz, C <sub>L</sub> =15 pF
SC/PC	3.3 V±0.3 V	Cycle to cycle	200 ps Max.	1.0 MHz≤f <sub>o</sub> ≤125 MHz, C <sub>L</sub> =15 pF
		Peak to peak	250 ps Max.	1.0 MHz≤f <sub>o</sub> ≤125 MHz, C <sub>L</sub> =15 pF

## ■ SG-8002 series Characteristics chart



## ■ SG-8002Series

Function	P : Output enable			S : Standby			
	Operating voltage	5.0 V ±0.5 V	3.3 V ±0.3 V	5.0 V ±0.5 V	3.3 V ±0.3 V	3.3 V ±0.3 V	
Output load condition	T : TTL	H : C-MOS	C : C-MOS	T : TTL	H : C-MOS	C : C-MOS	
Frequency	B : ±50x 10 <sup>-6</sup> (-20 °C to +70 °C)	PTB	PHB	PCB	STB	SHB	SCB
Stability	C : ±100x 10 <sup>-6</sup> (-20 °C to +70 °C)	PTC	PHC	PCC	STC	SHC	SCC
	M : ±100x 10 <sup>-6</sup> (-40 °C to +85 °C)	PTM	PHM	PCM	STM	SHM	SCM

## ■ HG-8002Series

Function	P : Output enable			S : Standby			
	Operating voltage	5.0 V ±0.5 V	3.3 V ±0.3 V	5.0 V ±0.5 V	3.3 V ±0.3 V	3.3 V ±0.3 V	
Output load condition	T : TTL	H : C-MOS	C : C-MOS	T : TTL	H : C-MOS	C : C-MOS	
Frequency	AV : ±20x 10 <sup>-6</sup> (-20 °C to +70 °C)	PTAV	PHAV	PCAV	STAV	SHAV	SCAV
Stability	BV : ±25x 10 <sup>-6</sup> (-20 °C to +70 °C)	PTBV	PHBV	PCBV	STBV	SHBV	SCBV
	CX : ±30x 10 <sup>-6</sup> (-40 °C to +85 °C)	PTCX	PHCX	PCCX	STCX	SHCX	SCCX