PROGRAMMABLE HIGH-FREQUENCY CRYSTAL OSCILLATOR

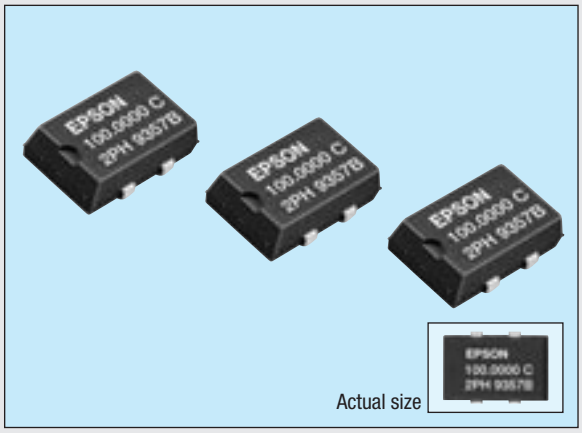
SG-8002JA series

Product number (please refer to page 2)

Q3306JAxxxxxx00

- 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 ($\overline{ST}$) can be used for low current consumption applications.
- Package and pin compatible with SG-615.
- Available for lead (Pb)-free soldering.
- Available for lead (Pb)-free terminal.

SG-Writer available to purchase.
Please contact EPSON or local sales representative.



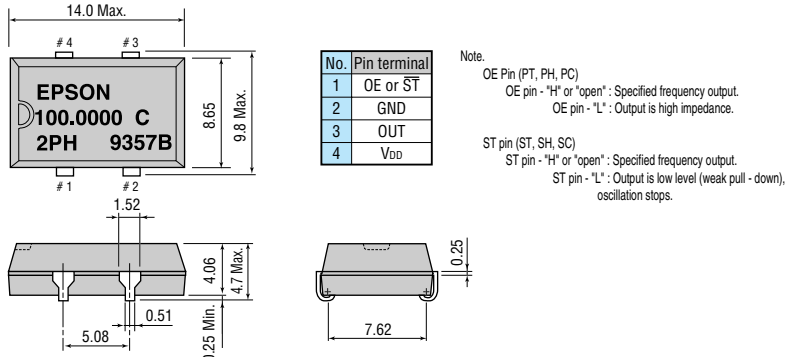
■ Specifications (characteristics)

Item		Symbol	Specifications *2			Remarks
			PT / ST	PH / SH	PC / SC	
Output frequency range		fo	1.0000 MHz to 125.0000 MHz			Refer to page 50. "Frequency range"
Power source voltage	Max. supply voltage	VDD-GND	-0.5 V to +7.0 V			
	Operating voltage	VDD	5.0 V ±0.5 V		3.3 ± 0.3 V	2.7 V to 3.6 V : fo ≤ 66.7 MHz (PC / SC)
Temperature range	Storage temperature	TSTG	-55 °C to +125 °C			Stored as bare product after unpacking
	Operating temperature	TOPR	-20 °C to +70 °C (-40 °C to +85 °C)		-40 °C to +85 °C	Refer to page 50. "Frequency range"
Frequency stability		Δf/fo	B: ±50 x 10^{-6} C: ± 100 x 10^{-6}			B, C : -20 °C to +70 °C
			M: ±100 x 10^{-6}			M : -40 °C to +85 °C
Current consumption		Iop	45 mA Max.		28 mA Max.	No load condition, Max. frequency range
Output disable current		IOE	30 mA Max.		16 mA Max.	OE = GND (PT, PH, PC)
Standby current		IST	50 µA Max.			$\overline{ST}$ = GND ($\overline{ST}$, SH, SC)
Duty *1		tw/ t	–	40 % to 60 %		CMOS load: 1/2 VDD level
			40 % to 60 %	–		TTL load: 1.4 V level
High output voltage		VOH	VDD -0.4 V Min.			IOH = -16 mA (PT / ST, PH / SH),-8 mA (PC / SC)
Low output voltage		VOL	0.4 V Max.			IOL = 16 mA (PT / ST, PH / SH), 8 mA (PC / SC)
Output load condition (fan out) *1	TTL	N	5 TTL Max.	–		Max. frequency and Max. operating voltage range
	CMOS	CL	15 pF Max.	25 pF Max.	15 pF Max.	
Output enable / disable input voltage		VIH	2.0 V Min.		0.7 VDD Min.	$\overline{ST}$, OE terminal
		VIL	0.8 V Max.		0.2 VDD Max.	
Output rise time *1	CMOS level	tR	–	4 ns Max.		CMOS load: 20 % → 80 % VDD
	TTL level		4 ns Max.	–		TTL load: 0.4 V → 2.4 V
Output fall time *1	CMOS level	tF	–	4 ns Max.		CMOS load: 80 % → 20 % VDD
	TTL level		4 ns Max.	–		TTL load: 2.4 V → 0.4 V
Oscillation start up time		tOSC	10 ms Max.			Time at minimum operating voltage to be 0 s
Aging		fa	±5 x 10^{-6} / year Max.			Ta = +25 °C, VDD = 5.0 V / 3.3 V, First year
Shock resistance		S.R.	±20 x 10^{-6} Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s² x 0.3 ms x 1/2sine wave in 3 directions

*1 Operating temperature (-40 °C to +85 °C), the available frequency, duty and output load conditions, please refer to page 50, 51.
*2 PLL - PLL connection & Jitter specification, please refer to page 52.
Checking possible by the Frequency Checking Program. http://www.epsondevice.com/domcfg.nsf

■ External dimensions

(Unit: mm)



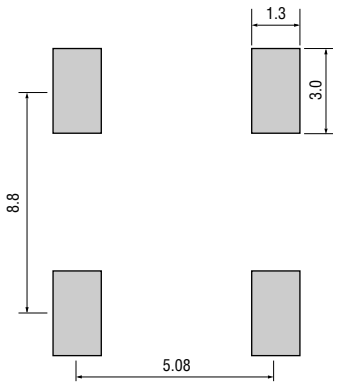
No.	Pin terminal
1	OE or $\overline{ST}$
2	GND
3	OUT
4	VDD

Note.
OE Pin (PT, PH, PC)
OE pin - "H" or "open" : Specified frequency output.
OE pin - "L" : Output is high impedance.

ST pin (ST, SH, SC)
ST pin - "H" or "open" : Specified frequency output.
ST pin - "L" : Output is low level (weak pull - down), oscillation stops.

■ Recommended soldering pattern

(Unit: mm)



■ Frequency range of SG-8002 or HG-8002 series

page	Model		Operating voltage	Frequency stability Operating temprature	1 MHz 27 MHz 40 MHz 55 MHz 80 MHz 125 MHz
43	SG-8002LA SG-8002LB	PH SH	5.0 V ± 0.5 V	B C	
				M	
		PC SC	3.3 V ± 0.3 V *	B C L M	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz
46 48 49	SG-8002CA SG-8002JA SG-8002DB SG-8002DC	PT ST PH SH	4.5 V to 5.5 V	B C	
				M	
		PC SC	3 V to 3.6 V (2.7 V to 3.6 V)	B C M	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz
47	SG-8002JC	PT ST PH SH	4.5 V to 5.5 V	B C	
		PC SC	3 V to 3.6 V (2.7 V to 3.6 V)	B C	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz
45	SG-8002JF	PT ST PH SH	4.5 V to 5.5 V	B C	
				M	
		PC SC	3 V to 3.6 V (2.7 V to 3.6 V)	B C M	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz
44	SG-8002CE	PT ST PH SH	4.5 V to 5.5 V	B C	
				M	
		PC SC	3 V to 3.6 V (2.7 V to 3.6 V)	B C M	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz
64	HG-8002JA	PT ST PH SH	5 V ± 0.25 V	AV BV	
				CX	
		PC SC	3 V ± 0.165 V	AV BV CX	*2.7 V to 3.6 V : 1.0 MHz to 66.7 MHz

Frequency stability Operating temprature : B: ± 50 x 10^{-6} (-20 ˚C to +70 ˚C), C: ± 100 x 10^{-6} (-20 ˚C to +70 ˚C), M: ± 100 x 10^{-6} (-40 ˚C to +85 ˚C), L: ±50 x 10^{-6} (-40 ˚C to +85 ˚C)
AV: ± 20 x 10^{-6} (-20 ˚C to +70 ˚C), BV: ± 25 x 10^{-6} (-20 ˚C to +70 ˚C), CX: ± 30 x 10^{-6} (-40 ˚C to +85 ˚C)

■ Specifications of SG-8002 or HG-8002 series

page	Model \ Item		Current consumption	Operating voltage	Output load	Output rise / fall time	Duty	Output control
43	SG-8002LA (SON 4-pin) SG-8002LB (SOJ 4-pin)	PH	35 mA Max.	4.5 V to 5.5 V	15 pF	4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	40 % to 60 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 80 MHz / -40 °C to +85 °C)	OE
		SH						ST
		PC	28 mA Max.	3.0 V to 3.6 V (2.7 V to 3.6 V)	15 pF	4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 125 MHz) ↑ (50 % V_{DD}, CL = 15 pF, V_{DD} = 2.7 V to 3.6 V, Fo ≤ 66.7 MHz)	OE
		SC						ST
46 48 49	SG-8002CA (Ceramic SMD) SG-8002JA (SOJ 4-pin) SG-8002DB (DIP 14-pin) SG-8002DC (DIP 8-pin)	PT	45 mA Max.	4.5 V to 5.5 V	5TTL + 15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 25 pF (Fo ≤ 66.7 MHz / -20°C to +70 °C) 5TTL + 15 pF (Fo ≤ 40 MHz / -40 °C to +85 °C) 15 pF (Fo ≤ 55 MHz / -40°C to +85 °C)	2.0 ns Max. (0.8 V to 2.0 V / 2.0 V to 0.8 V, CL = Max.) 4.0 ns Max. (0.4 V to 2.4 V / 2.4 V to 0.4 V, CL = Max.)	45 % to 55 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 40 MHz / -40 °C to +85 °C) 40 % to 60 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 15 pF, Fo ≤ 55 MHz / -40 °C to +85 °C)	OE
		ST						ST
		PH			25 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 50 pF (Fo ≤ 66.7 MHz / -20°C to +70 °C) 15 pF (Fo ≤ 55 MHz / -40 °C to +85 °C) 25 pF (Fo ≤ 40 MHz / -40°C to +85 °C)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 25 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 25 pF, Fo ≤ 40 MHz / -40 °C to +85 °C) 40 % to 60 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 50 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 15 pF, Fo ≤ 55 MHz / -40 °C to +85 °C)	OE
		SH						ST
		PC	28 mA Max.	3.0 V to 3.6 V (2.7 V to 3.6 V)	15 pF (Fo ≤ 66.7 MHz / 2.7 V to 3.6 V) 15 pF (Fo ≤ 125 MHz / 3.0 V to 3.6 V) 30 pF (Fo ≤ 40 MHz / 3.0 V to 3.6 V)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 15 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 30 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 125 MHz) ↑ (50 % V_{DD}, CL = 15 pF, V_{DD} = 2.7 V to 3.6 V, Fo ≤ 66.7 MHz)	OE
		SC						ST
47	SG-8002JC (SOJ 4-pin)	PT	45 mA Max.	4.5 V to 5.5 V	5TTL + 15 pF (Fo ≤ 90 MHz / -20 °C to +70 °C) 15 pF (Fo ≤ 125 MHz / -20°C to +70 °C) 25 pF (Fo ≤ 66.7 MHz / -20°C to +70 °C)	2.0 ns Max. (0.8 V to 2.0 V / 2.0 V to 0.8 V, CL = Max.) 4.0 ns Max. (0.4 V to 2.4 V / 2.4 V to 0.4 V, CL = Max.)	45 % to 55 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) 40 % to 60 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 90 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C)	OE
		ST						ST
		PH			15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 25 pF (Fo ≤ 90 MHz / -20°C to +70 °C) 50 pF (Fo ≤ 66.7 MHz / -20°C to +70 °C)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 25 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 25 pF, Fo ≤ 90 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 50 pF, Fo ≤ 50 MHz / -20 °C to +70 °C)	OE
		SH						ST
		PC	28 mA Max.	3.0 V to 3.6 V (2.7 V to 3.6 V)	15 pF (Fo ≤ 66.7 MHz / 2.7 V to 3.6 V) 15 pF (Fo ≤ 125 MHz / 3.0 V to 3.6 V) 30 pF (Fo ≤ 40 MHz / 3.0 V to 3.6 V)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 15 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 30 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 125 MHz) ↑ (50 % V_{DD}, CL = 15 pF, V_{DD} = 2.7 V to 3.6 V, Fo ≤ 66.7 MHz)	OE
		SC						ST
45	SG-8002JF (SOJ 4-pin)	PT	45 mA Max.	4.5 V to 5.5 V	15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 25 pF (Fo ≤ 66.7 MHz / -20°C to +70 °C) 5TTL + 15 pF (Fo ≤ 90 MHz / -20°C to +70 °C) 15 pF (Fo ≤ 40 MHz / -40°C to +85 °C)	2.0 ns Max. (0.8 V to 2.0 V / 2.0 V to 0.8 V, CL = Max.) 4.0 ns Max. (0.4 V to 2.4 V / 2.4 V to 0.4 V, CL = Max.)	45 % to 55 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) 40 % to 60 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 90 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 15 pF, Fo ≤ 40 MHz / -40 °C to +85 °C)	OE
		ST						ST
		PH			15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 25 pF (Fo ≤ 90 MHz / -20°C to +70 °C) 50 pF (Fo ≤ 50 MHz / -20°C to +70 °C) 15 pF (Fo ≤ 40 MHz / -40°C to +85 °C)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 25 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) 40 % to 60 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 90 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 50 pF, Fo ≤ 50 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 15 pF, Fo ≤ 40 MHz / -40 °C to +85 °C)	OE
		SH						ST
		PC	28 mA Max.	3.0 V to 3.6 V (2.7 V to 3.6 V)	15 pF (Fo ≤ 66.7 MHz / 2.7 V to 3.6 V) 15 pF (Fo ≤ 125 MHz / 3.0 V to 3.6 V) 30 pF (Fo ≤ 40 MHz / 3.0 V to 3.6 V)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL ≤ 15 pF) 4.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 30 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 125 MHz) ↑ (50 % V_{DD}, CL = 15 pF, V_{DD} = 2.7 V to 3.6 V, Fo ≤ 66.7 MHz)	OE
		SC						ST
44	SG-8002CE (Ceramic SMD)	PT	40 mA Max.	4.5 V to 5.5 V	5TTL + 15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 5TTL + 15 pF (Fo ≤ 27 MHz / -40°C to +85 °C)	2.0 ns Max. (0.8 V to 2.0 V / 2.0 V to 0.8 V, CL = Max.) 4.0 ns Max. (0.4 V to 2.4 V / 2.4 V to 0.4 V, CL = Max.)	45 % to 55 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 27 MHz / -40 °C to +85 °C) 40 % to 60 % (1.4 V, CL = 5TTL + 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C)	OE
		ST						ST
		PH			15 pF (Fo ≤ 125 MHz / -20 °C to +70 °C) 25 pF (Fo ≤ 100 MHz / -20°C to +70 °C) 25 pF (Fo ≤ 27 MHz / -40°C to +85 °C)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 25 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 25 pF, Fo ≤ 27 MHz / -40 °C to +85 °C) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C)	OE
		SH						ST
		PC	28 mA Max.	3.0 V to 3.6 V (2.7 V to 3.6 V)	15 pF (Fo ≤ 66.7 MHz / 2.7 V to 3.6 V) 15 pF (Fo ≤ 125 MHz / 3.0 V to 3.6 V)	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, V_{DD} = 3.0 V to 3.6 V, Fo ≤ 125 MHz) ↑ (50 % V_{DD}, CL = 15 pF, V_{DD} = 2.7 V to 3.6 V, Fo ≤ 66.7 MHz)	OE
		SC						ST
64	HG-8002JA (SOJ 4-pin)	PT	45 mA Max.	5 V ±0.25 V	15 pF 2TTL + 15 pF	2.0 ns Max. (0.8 V to 2.0 V / 2.0 V to 0.8 V, CL = Max.) 4.0 ns Max. (0.4 V to 2.4 V / 2.4 V to 0.4 V, CL = Max.)	45 % to 55 % (1.4 V, CL = 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 15 pF, Fo ≤ 55 MHz / -40 °C to +85 °C) ↑ (1.4 V, CL = 2TTL + 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 2TTL + 15 pF, Fo ≤ 55 MHz / -40 °C to +85 °C) 40 % to 60 % (1.4 V, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C) ↑ (1.4 V, CL = 2TTL + 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C)	OE
		ST						ST
		PH			15 pF	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 66.7 MHz / -20 °C to +70 °C) ↑ (50 % V_{DD}, CL = 15 pF, Fo ≤ 55 MHz / -40 °C to +85 °C) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 125 MHz / -20 °C to +70 °C)	OE
		SH						ST
		PC	28 mA Max.	3 V ±0.165 V	15 pF	3.0 ns Max. (20 % to 80 % V_{DD} / 80 % to 20 % V_{DD}, CL = Max.)	45 % to 55 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 40 MHz) 40 % to 60 % (50 % V_{DD}, CL = 15 pF, Fo ≤ 125 MHz)	OE
		SC						ST

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

■ PLL-PLL connection

Because of using a PLL technology, there are a few case that the jitter value will increase when SG-8002 is connected the other PLL-oscillator.

In our experience, we are unable to recommend these products for the application such as telecom carrier use or video clock use. Please take careful checking in advance for these application (Jitter specification is Max. 250 ps / CL = 15 pF)

■ Remarks on noise management for power supply line

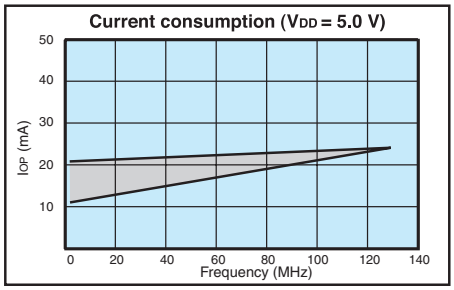
We recommend not to insert the filter and or another devices in the power supply line as the counter measure of EMI noise reduction. This device insertion might cause high-frequency impedance high in the power supply line and it affects oscillator stable drive.

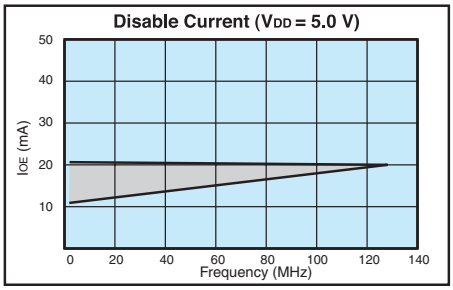
When this measure is required. please evaluate circuitry and device behaviour in the circuit and verify that won't affect oscillation. And start up time (0% V_{DD} to 90% V_{DD}) of power source should be more than 150 µs.

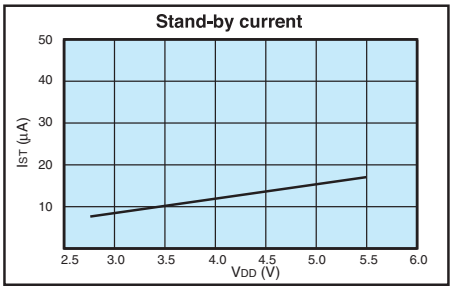
■ Jitter Specifications

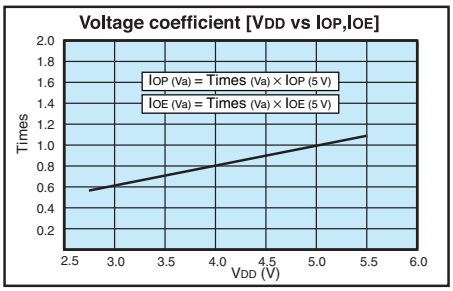
Model	Operating Voltage	Jitter Item	Specifications	Remarks
PT / PH ST / SH	5 V ±0.5 V	Cycle to cycle	150 ps Max.	33 MHz ≤ fo ≤ 125 MHz, C_L = 15 pF
			200 ps Max.	1.0 MHz ≤ fo < 33 MHz, C_L = 15 pF
		Peak to peak	200 ps Max.	33 MHz ≤ fo ≤ 125 MHz, C_L = 15 pF
			250 ps Max.	1.0 MHz ≤ fo < 33 MHz, C_L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

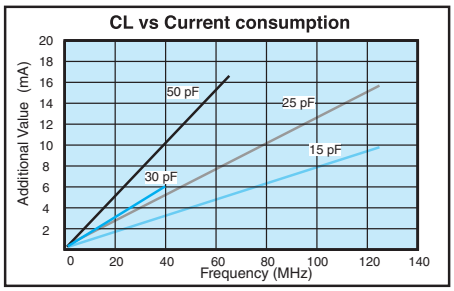
■ SG-8002 series Characteristics chart

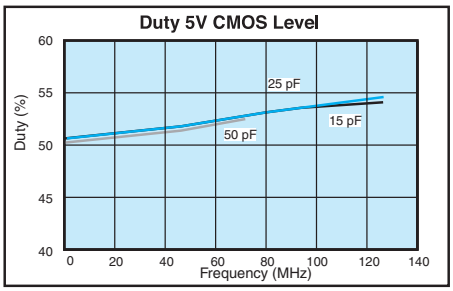


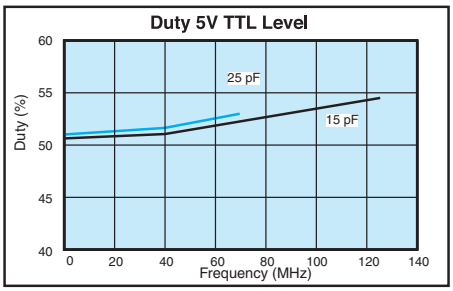


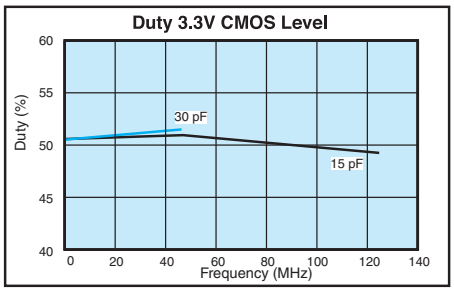


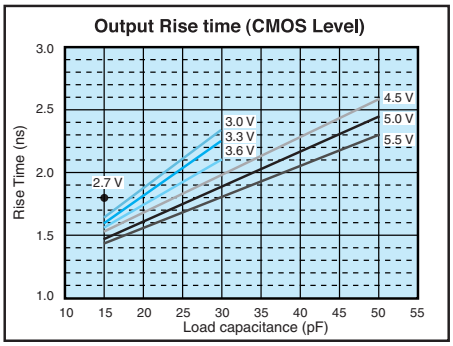


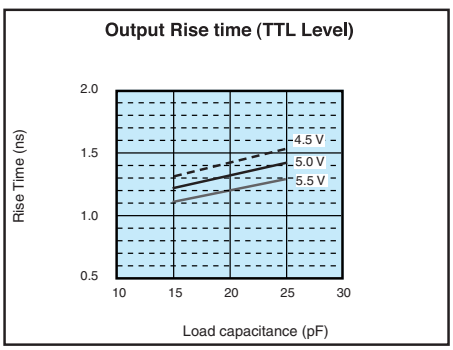


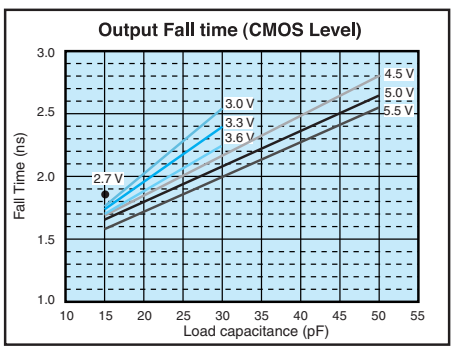


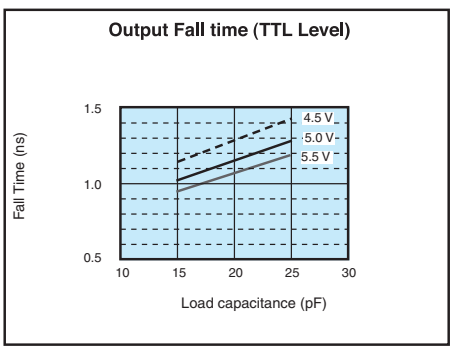












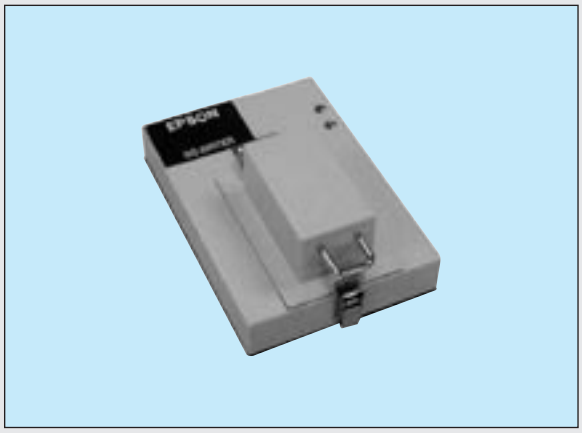
FOR SG-8002 SERIES PROGRAMMING TOOL

SG-WRITER

Product number

Q91PR20W0101000

- Easy frequency program for EPSON SG-8002 series oscillator (Blank oscillator).
- Free power supply for USB accommodate.
- Flexible PC accommodate.
  Windows 98SE, 2000, Me, XP (Except Windows 95, NT)
- Small body and easy carry.



■ Main Body Specifications

Name (Product Number)	SG-Writer for EPSON SG-8002 Series (Q91PR20W0101000)
Operating Temperature	+10 ˚C to +40 ˚C Writing (25 ˚C ±5 ˚C)
Electric Power Supply	Via USB
Standard Interface	USB Type B
External Dimensions (mm)	160 x 110 x 36 (textool top)
Wight	700 g
Accessories	SG-Writer CD-ROM (Software and Instruction Manual : Japanese, English) Documents : Japanese, English
Software, Driver	SG-Writer ∗1 EPSON USB Driver
Option Parts	SMD socket (JA, JC, CA, JF, CE, LA and LB type)

∗1 SG-Writer software is available only from Epson website after user registration. http://www.epsondevice.com/qd_e/SG-8002CS

■ Recommend PC Specifications (Need connect PC and SG-Wrier when you Writing.)

Accommodate OS	Windows XP, Windows Me, Windows 2000, Windows 98SE (Except Windows 95, NT)
Recommend CPU	Pentium Processor 200MHz equivalent and higher
Recommend memory Capacity	Recommend Over 64MB
Recommend HDD Capacity	Need Over 40MB
Other	CD-ROM drive, USB cable (Type A ↔ Type B) Need SMD ∗2 socket when you write SG-8002 SMD products. (Sold individually)

∗2 Conventional SMD socket can be used with new SG-Writer.

THE CRYSTALMASTER

ENERGY SAVING EPSON

EPSON offers effective savings to its customers through a wide range of electronic devices, such as semiconductors, liquid crystal display (LCD) modules, and crystal devices. These savings are achieved through a sophisticated melding of three different efficiency technologies.

Power saving technology provides low power consumption at low voltages.

Space saving technology provides further reductions in product size and weight through super-precise processing and high-density assembly technology.

Time saving technology shortens the time required for design and development on the customer side and shortens delivery times.

Our concept of Energy Saving technology conserves resources by blending the essence of these three efficiency technologies. The essence of these technologies is represented in each of the products that we provide to our customers.

In the industrial sector, leading priorities include measures to counter the greenhouse effect by reducing CO2, measures to preserve the global environment, and the development of energy-efficient products. Environmental problems are of global concern, and although the contribution of energy-saving technology developed by EPSON may appear insignificant, we seek to contribute to the development of energy-saving products by our customers through the utilization of our electronic devices. EPSON is committed to the conservation of energy, both for the sake of people and of the planet on which we live.

WORKING WITH ENVIRONMENTAL ISSUES

In 1988, Seiko Epson led in working to abolish CFCs, and perfect abolition of those ozone layer-destroying substances was achieved in 1992. In 1998, the 10th year of start of the CFC-free activity, Seiko Epson set this year as the "Second Environmental Benchmark Year" and established a new corporate General Environmental Policy. Seiko Epson is tackling with environmental issues comprehensively.

At the end of Fiscal 1988, Seiko Epson succeeded in abolishing chloric solvents doubted to be harmful to human body. In fiscal 1999, Seiko Epson started the activity with a goal of abolishing lead solder pointed out possibility of enironmental pollutant.

Promotion of Environment Management System conforming to International Standard

To strengthen management for environmental activities, Seiko Epson Group aims at acquisition of the ISO14001 certification for Japanese and abroad main business bases (including affiliates) for manufacturing, sales, software development and others.

As of May 25 , 2001, planned 68 bases of all manufacturing bases and some non-manufacturing bases have acquired the certification.

Co-existence Mark

The environmental mark symbolizing Epson's basic stance of "Co-existence with Nature".
The design incorporates a fish, flower, and water, representing mutually supportive co-existence.

ISO14000 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

Seiko-Epson quickly began working to acquire company-wide ISO9000 series certification, and has acquired ISO9001 or ISO9002 certification with all targeted products manufactured in Japanese and overseas plants.

The Quartz Device Operations Division (Ina Japan, EPM and SZE) have acquired QS-9000 certification, which are of higher level.

QS-9000:
This is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.