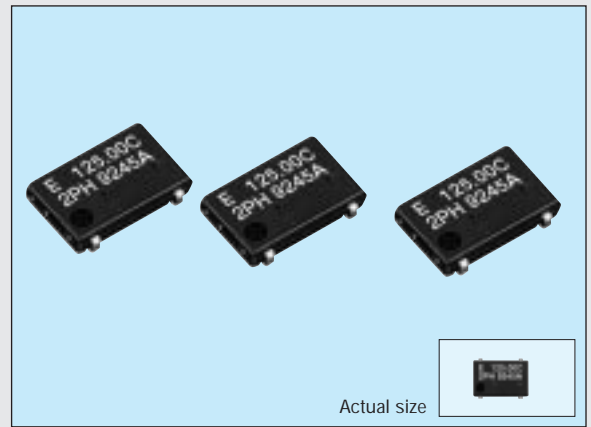


# PROGRAMMABLE HIGH-FREQUENCY CRYSTAL OSCILLATOR

## SG-8002JF series

Products number  
**Q3308JFxxxxxx00**

- 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.
- Pin compatible with ceramic package crystal oscillator (7 x 5)  
 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 <sub>o</sub>	1.0000 MHz to 125.0000 MHz			Refer to page 12. "Frequency range".
Power source voltage	Max. supply voltage	V <sub>DD-GND</sub>	-0.5 V to +7.0 V		Stored as bare product after unpacking
	Operating voltage	V <sub>DD</sub>	5.0 V ± 0.5 V		
Temperature range	Storage temperature	T <sub>STG</sub>	-55 °C to +125 °C		Stored as bare product after unpacking
	Operating temperature	T <sub>OPR</sub>	-20 °C to +70 °C (-40 °C to +85 °C)		
Frequency stability	Δf/f <sub>o</sub>	B: ±50 x 10 <sup>-6</sup> C: ±100 x 10 <sup>-6</sup> M: ±100 x 10 <sup>-6</sup>			B,C: -20 °C to +70 °C, M: -40 °C to +85 °C
Current consumption	I <sub>OP</sub>	45 mA Max.		28 mA Max.	No load condition, Max. frequency range
Output disable current	I <sub>OE</sub>	30 mA Max.		16 mA Max.	OE=GND(PT,PH,PC)
Standby current	I <sub>ST</sub>	50 μA Max.			ST=GND(ST,SH,SC)
Duty	t <sub>w</sub> /t	—		40 % to 60 %	C-MOS load: 1/2V <sub>DD</sub> level
		40 % to 60 %		—	TTL load: 1.4 V level
High output voltage	V <sub>OH</sub>	V <sub>DD</sub> - 0.4 V Min.			I <sub>OH</sub> = -16 mA(PT/ST,PH/SH), -8 mA(PC/SC)
Low output voltage	V <sub>OL</sub>	0.4 V Max.			I <sub>OL</sub> = 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	CL	15 pF Max.		
Output enable/disable input voltage	V <sub>IH</sub>	2.0 V Min.		0.7 x V <sub>DD</sub> Min.	ST, OE terminal
	V <sub>IL</sub>	0.8 V Max.		0.2 x V <sub>DD</sub> Max.	
Output rise time	C-MOS level	t <sub>TLH</sub>	—	4 ns Max.	C-MOS load: 20 % → 80 % V <sub>DD</sub>
	TTL level	t <sub>TLH</sub>	4 ns Max.	—	TTL load: 0.4 V → 2.4 V
Output fall time	C-MOS level	t <sub>THL</sub>	—	4 ns Max.	C-MOS load: 80 % → 20 % V <sub>DD</sub>
	TTL level	t <sub>THL</sub>	4 ns Max.	—	TTL load: 2.4 V → 0.4 V
Oscillation start up time	t <sub>OSC</sub>	10 ms Max.			Time at minimum operating voltage to be 0 s
Aging	f <sub>a</sub>	±5 x 10 <sup>-6</sup> /year Max.			T <sub>a</sub> = +25 °C, V <sub>DD</sub> = 5.0 V/3.3 V(PC/SC)
Shock resistance	S.R.	±20 x 10 <sup>-6</sup> 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.

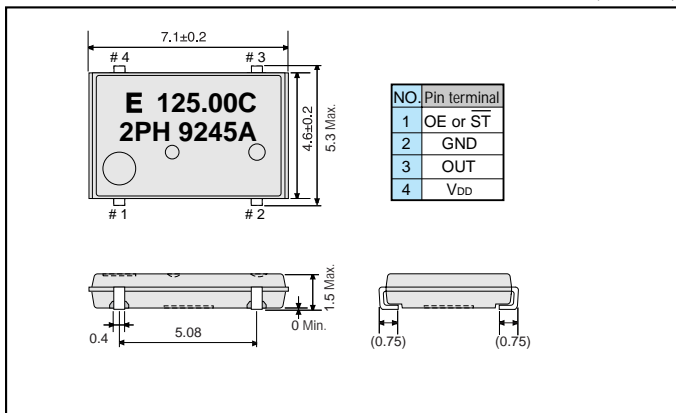
Checking possible by the Frequency Checking Program. <http://www.epson.co.jp/device/>

Metal may be exposed on the top or bottom this product. This won't affect any quality, reliability or electrical spec.

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

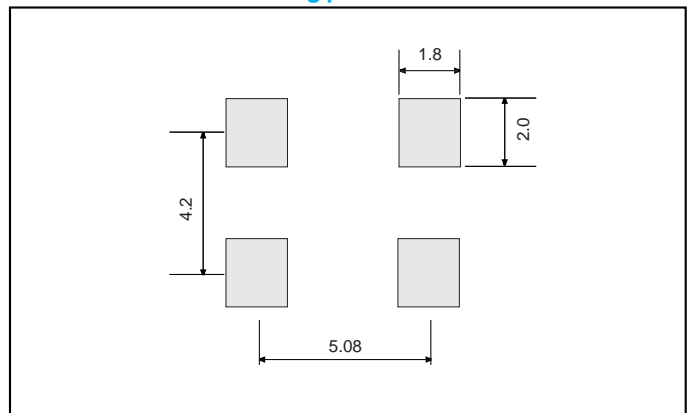
### External dimensions

(Unit: mm)



### Recommended soldering pattern

(Unit: mm)



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

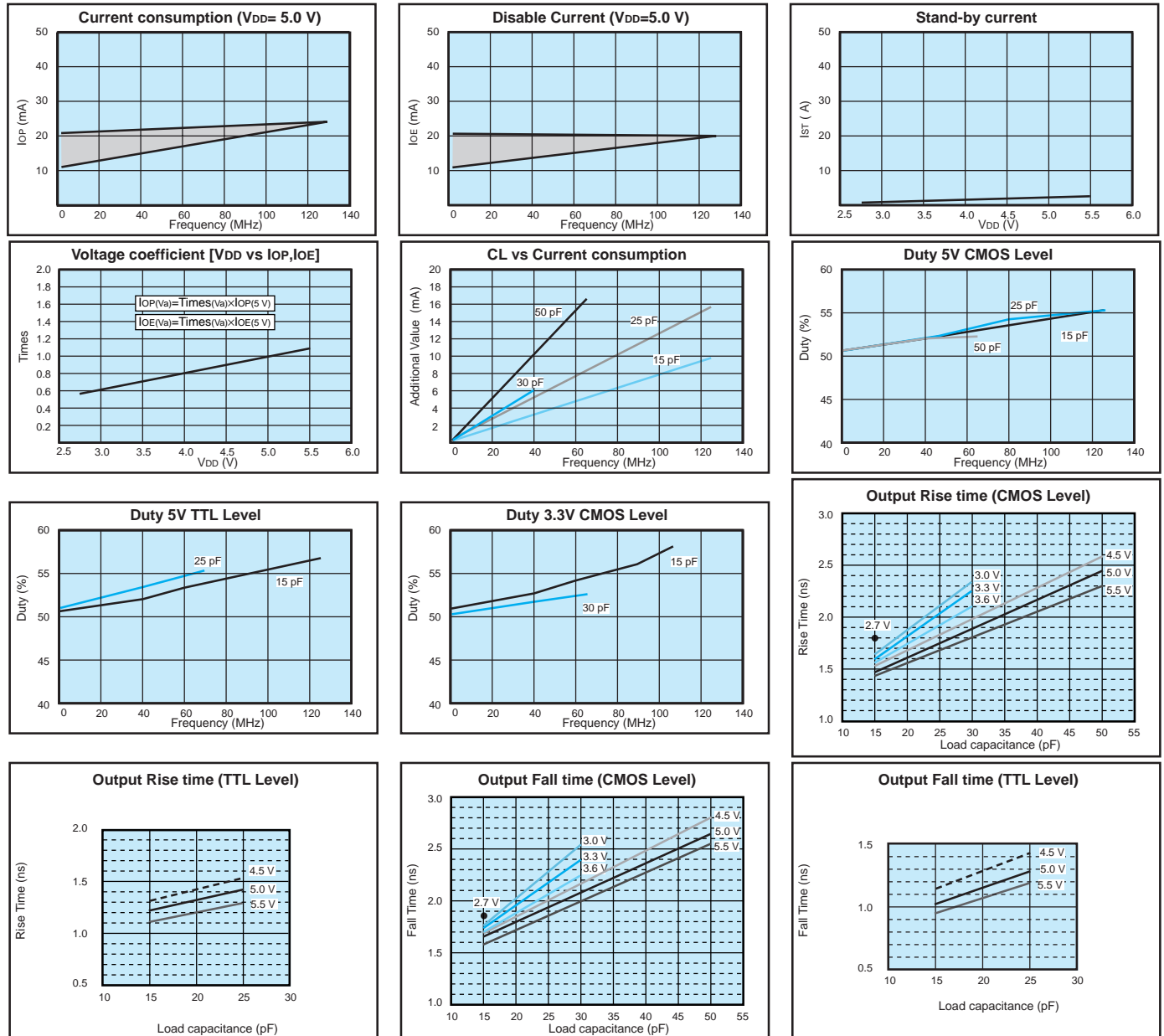
## ■ PLL-PLL connection

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

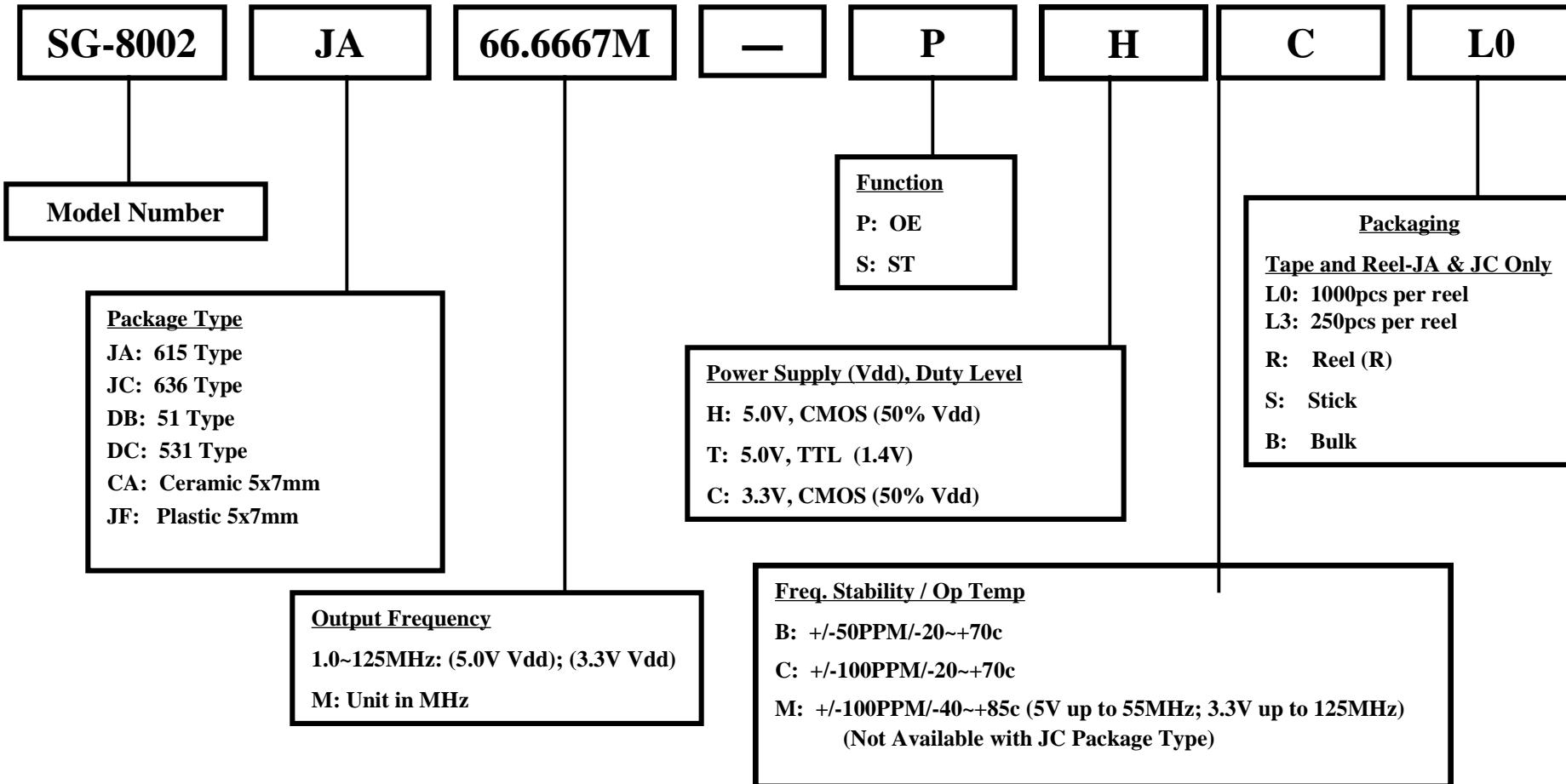
## ■ HG-8002Series

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

# Part Numbering System

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## Programmable Series Oscillators



# SG8002 Series Part Number Selection Guide

OPERATING VOLTAGE

## PART NUMBER SUFFIX

SERIES	OP VOLT	1MHz	125MHz
DB DC JA CA JF	5.0v	1MHz	PHC PTC SHC STC PHB PTB SHB STB
	3.3v	1MHz	PCC SCC PCB SCB PCM SCM
	5.0V	1MHz	55MHz PHM SHM PTM STM

## FREQUENCY RANGE

SERIES	OP VOLT	1MHz	125MHz
JC	5.0V	1MHz	PHC PTC SHC STC PHB PTB SHB STB
	3.3V		PCC SCC PCB SCB  125MHz

KEY:

FUNCTION	LOAD	STABILITY
P=OUTPUT ENABLE S= STANDBY	H=CMOS/5V T= TTL/5V C=CMOS/3V	C = +/-100PPM (-20 to 70c) B = +/-50PPM (-20 to 70c) M = +/-100PPM (-40 to 85c)

# SG8002 Series Part Number Selection Guide

OPERATING TEMP

## PART NUMBER SUFFIX

SERIES	TEMP	1MHz	125MHz
DB DC JA CA JF	-20 TO 70C	PHC PTC SHC STC PCC SCC PHB PTB SHB STB PCB SCB	
	-40 TO 85C	1MHz	55MHz
PCM SCM			
		PHM SHM PTM STM	

## FREQUENCY RANGE

SERIES	TEMP	1MHz	125MHz
JC	-20 TO 70C	PHC PTC SHC STC PCC SCC PHB PTB SHB STB PCB SCB	
	-40 TO 85C	1MHz	55MHz
		Not Available	

KEY:

	X	X	X
FUNCTION	LOAD	STABILITY	
P=OUTPUT ENABLE S= STANDBY	H=CMOS/5V T= TTL/5V C=CMOS/3V	C = +/-100PPM (-20 to 70c) B = +/-50PPM (-20 to 70c) M = +/-100PPM (-40 to 85c)	