



Crystal oscillator

SEIKO EPSON CORPORATION

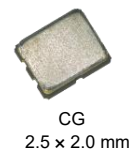
CRYSTAL OSCILLATOR (Programmable)
OUTPUT: CMOS

SG-8200 series

- Frequency range : 1.2 MHz to 170 MHz
- Supply voltage : 1.62 V to 3.63 V
- Function : Output enable (OE/OE) or Standby (ST/ST)
- Frequency tolerance, operating temperature:
±50 × 10⁻⁶ (-40 °C to +125 °C)
- PLL technology to enable setting any output frequency



Product Number
SG-8200CJ: X1G006211xxxx16
SG-8200CG: X1G006201xxxx16



Specifications (characteristics)

Item	Symbol	Specifications			Conditions/Remarks							
		1.80 V Typ. 1.62 V to 1.98 V	2.50 V Typ. 2.25 V to 2.75 V	3.30 V Typ. 2.97 V to 3.63 V								
Supply voltage	V _{CC}											
Output frequency range	f _o	1.2 MHz to 170 MHz										
Storage temperature	T _{stg}	-55 °C to +125 °C			Storage as single product.							
Operating temperature	T _{use}	J: -40 °C to +125 °C										
Frequency tolerance ^{*1}	f _{tol}	J: ±50 × 10 ⁻⁶			T _{use} = -40 °C to +125 °C							
Current consumption	I _{CC}	5.2 mA Typ. 7.0 mA Max.	5.4 mA Typ. 7.2 mA Max.	5.6 mA Typ. 7.5 mA Max.	1.2 MHz ≤ f _o ≤ 25 MHz		No load, Rise/Fall time: Default					
		5.4 mA Typ. 7.3 mA Max.	5.7 mA Typ. 7.6 mA Max.	6.1 mA Typ. 8.1 mA Max.	25 MHz < f _o ≤ 50 MHz							
		5.7 mA Typ. 7.7 mA Max.	6.3 mA Typ. 8.2 mA Max.	7.0 mA Typ. 9.1 mA Max.	50 MHz < f _o ≤ 75 MHz							
		6.2 mA Typ. 8.2 mA Max.	6.9 mA Typ. 9.1 mA Max.	7.9 mA Typ. 10.4 mA Max.	75 MHz < f _o ≤ 100 MHz							
		6.9 mA Typ. 9.4 mA Max.	7.9 mA Typ. 10.7 mA Max.	9.1 mA Typ. 12.4 mA Max.	100 MHz < f _o ≤ 125 MHz							
		7.8 mA Typ. 10.4 mA Max.	9.2 mA Typ. 12.4 mA Max.	11.2 mA Typ. 15.0 mA Max.	125 MHz < f _o ≤ 170 MHz							
		Output disable current	I _{dis}	5.0 mA Typ. 7.2 mA Max.	5.0 mA Typ. 7.3 mA Max.	5.1 mA Typ. 7.4 mA Max.			OE = GND, OE = V _{CC}			
		Standby current	I _{std}	0.3 µA Typ. 15.0 µA Max.	0.3 µA Typ. 15.0 µA Max.	0.5 µA Typ. 15.0 µA Max.			ST = GND, ST = V _{CC}			
									50 % V _{CC} Level, L _{CMOS} ≤ 15 pF			
		Output voltage (DC characteristics)	V _{OH}	90 % V _{CC} Min.					Rise/Fall time		I _{OH}	I _{OL}
				Default 'A' Option ^{*2}	Other Options							
V _{OL}	10 % V _{CC} Max.			fo > 125 MHz	B: Faster	-2.0 mA	2.0 mA					
				75 MHz < fo ≤ 125 MHz	C: Fast	-1.0 mA	1.0 mA					
Output load condition	L _{CMOS}	15 pF Max.			50 MHz < fo ≤ 75 MHz	D: Slow	-0.5 mA	0.5 mA				
Input voltage	V _{IH}	70 % V _{CC} Min.			fo ≤ 50 MHz	E: Slower	-0.2 mA	0.2 mA				
	V _{IL}	30 % V _{CC} Max.										
Rise/Fall time	tr/tf	-			Default 'A' Option ^{*2}		20 % - 80 % V _{CC} , L _{CMOS} = 15 pF					
					fo > 125 MHz	B: Faster						
					75 MHz < fo ≤ 125 MHz	C: Fast						
					50 MHz < fo ≤ 75 MHz	D: Slow						
Output disable time (OE) Output disable time (ST)	tstp_oe tstp_st	1 µs Max.			Measured from the time OE or ST pin crosses 30 % V _{CC} or measured from the time OE or ST pin crosses 70 % V _{CC}							
Output enable time (OE)	tsta_oe	100 ns + 2 clock cycle Max.			Measured from the time OE pin crosses 70 % V _{CC} or measured from the time OE pin crosses 30 % V _{CC}							
Output enable time (ST)	tsta_st	3 ms Max.			Measured from the time ST pin crosses 70 % V _{CC} or measured from the time ST pin crosses 30 % V _{CC}							
Start-up time	t_str	3 ms Max.			Measured from the time V _{CC} reaches its rated minimum value, 1.62 V							
Phase Jitter	t _{pj}	1.2 ps Typ.			fo = 25 MHz, Offset frequency: 12 kHz to 5 MHz							
		1.2 ps Typ.			fo = 50 MHz, Offset frequency: 12 kHz to 20 MHz							
		1.2 ps Typ.			fo = 75 MHz, Offset frequency: 12 kHz to 20 MHz							
		1.2 ps Typ.			fo = 100 MHz, Offset frequency: 12 kHz to 20 MHz							
		1.1 ps Typ.			fo = 125 MHz, Offset frequency: 12 kHz to 20 MHz							
		1.4 ps Typ.			fo = 150 MHz, Offset frequency: 12 kHz to 20 MHz							
Frequency aging	f_age	This is included in frequency tolerance specification.			+25 °C, first year							

*1 Frequency tolerance includes initial frequency tolerance, temperature variation, supply voltage variation, reflow drift, load drift and aging (+25 °C, 1 year).

*2 Default 'A' Rise/Fall time and I_{OH}/I_{OL} are dependent on programmed frequency.



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Pin description

Pin	Name	I/O type	Function	
1	OE	Input	Output Enable	High ^{*1} or Open: Specified frequency output from OUT pin Low: OUT pin is low (pull down with 500 kΩ), only output driver is disabled.
	OE	Input	Output Enable	Low ^{*2} or Open: Specified frequency output from OUT pin High: OUT pin is low (pull down with 500 kΩ), only output driver is disabled.
	ST	Input	Standby	High ^{*1 *3} : Specified frequency output from OUT pin Low: OUT pin is low (pull down with 500 kΩ), Device goes to standby mode. Supply current reduces to the least as I_std.
	ST	Input	Standby	Low ^{*2 *3} : Specified frequency output from OUT pin High: OUT pin is low (pull down with 500 kΩ), Device goes to standby mode. Supply current reduces to the least as I_std.
2	GND	Power	Ground	
3	OUT	Output	Clock output	
4	V _{CC}	Power	Power supply	

*1 If fixing it at High, please connect to V_{CC} directly.
 *2 If fixing it at Low, please connect to GND directly.
 *3 If necessary to use Open, please select Output Enable function.

Product Name

SG-8200CJ 170.000000MHZ T J J P A
 a b c d e f g h

b: Package type	
CJ	2.0 mm × 1.6 mm
CG	2.5 mm × 2.0 mm

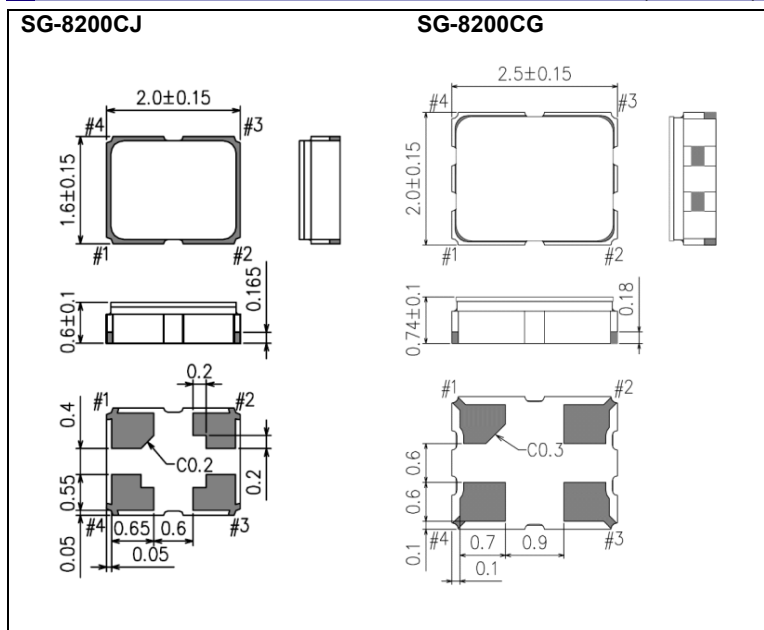
e: Frequency tolerance / f: Operating temperature	
JJ	±50 x 10 ⁻⁶ / -40 °C to +125 °C

- a: Model b: Package type
- c: Frequency d: Supply voltage (T: 1.8 V to 3.3 V Typ.)
- e: Frequency tolerance f: Operating temperature
- g: Function h: Rise/Fall time

g: Function		h: Rise/Fall time	
P	Output Enable (OE)	A	Default
Q	Output Enable (OE)	B	Faster
S	Standby (ST)	C	Fast
T	Standby (ST)	D	Slow
		E	Slower

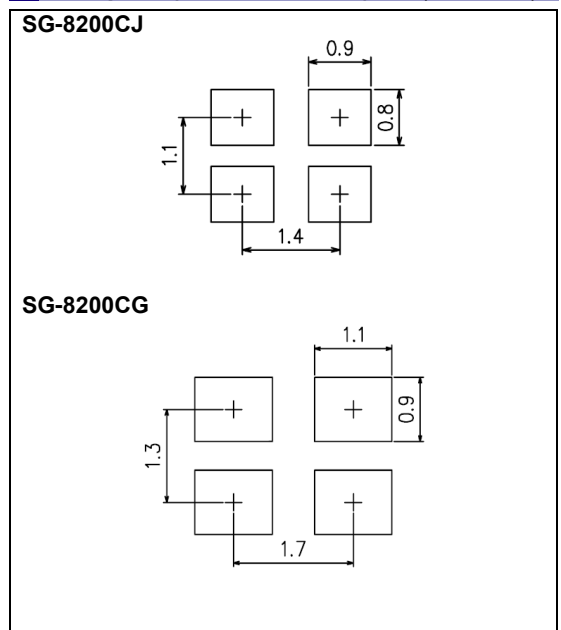
External dimensions

(Unit: mm)



Footprint (Recommended)

(Unit: mm)



Notes:

In order to achieve optimum jitter performance, the 0.01 μF to 0.1 μF capacitor between V_{CC} and GND should be placed. It is also recommended that the capacitors are placed on the device side of the PCB, as close to the device as possible and connected together with short wiring pattern.

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	► 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.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
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