



Crystal oscillator

SEIKO EPSON CORPORATION

CRYSTAL OSCILLATOR (Programmable)
OUTPUT: CMOS



Product Number
X1G005991xxxx16

SG-8201CJA

- Frequency range : 1.2 MHz to 170 MHz
- Supply voltage : 1.62 V to 3.63 V
- Function : Output enable (OE/ŌE) or Standby (ST/ST)
- Frequency tolerance, operating temperature:
 - $\pm 15 \times 10^{-6}$ (-40 °C to +105 °C)
 - $\pm 25 \times 10^{-6}$, $\pm 50 \times 10^{-6}$ (-40 °C to +125 °C)
- External dimensions : 2.0 × 1.6 × 0.6 (mm)
- PLL technology to enable short lead time
- AEC-Q100 compliant



Specifications (characteristics)

Item	Symbol	Specifications			Conditions/Remarks																							
Supply voltage	V _{cc}	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																								
Output frequency range	f _o	1.2 MHz to 170 MHz																										
Storage temperature	T _{stg}	-55 °C to +150 °C			Storage as single product.																							
Operating temperature	T _{use}	H: -40 °C to +105 °C J: -40 °C to +125 °C																										
Frequency tolerance ^{*1}	f _{tol}	B: $\pm 15 \times 10^{-6}$			T _{use} = -40 °C to +105 °C																							
		D: $\pm 25 \times 10^{-6}$			T _{use} = -40 °C to +125 °C																							
		J: $\pm 50 \times 10^{-6}$			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																							
		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, ŌE = V _{cc}																							
		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}																							
		Symmetry	SYM	45 % to 55 %			50 % V _{cc} Level, L _{CMOS} ≤ 15 pF																					
		Output voltage (DC characteristics)	V _{OH}	90 % V _{cc} Min.			<table border="1"> <thead> <tr> <th colspan="2">Rise/Fall time</th> <th rowspan="2">I_{OH}</th> <th rowspan="2">I_{OL}</th> </tr> <tr> <th>Default 'A' Option^{*2}</th> <th>Other Options</th> </tr> </thead> <tbody> <tr> <td>f_o > 125 MHz</td> <td>B: Faster</td> <td>-2.0 mA</td> <td>2.0 mA</td> </tr> <tr> <td>75 MHz < f_o ≤ 125 MHz</td> <td>C: Fast</td> <td>-1.0 mA</td> <td>1.0 mA</td> </tr> <tr> <td>50 MHz < f_o ≤ 75 MHz</td> <td>D: Slow</td> <td>-0.5 mA</td> <td>0.5 mA</td> </tr> <tr> <td>f_o ≤ 50 MHz</td> <td>E: Slower</td> <td>-0.2 mA</td> <td>0.2 mA</td> </tr> </tbody> </table>		Rise/Fall time		I _{OH}	I _{OL}	Default 'A' Option ^{*2}	Other Options	f _o > 125 MHz	B: Faster	-2.0 mA	2.0 mA	75 MHz < f _o ≤ 125 MHz	C: Fast	-1.0 mA	1.0 mA	50 MHz < f _o ≤ 75 MHz	D: Slow	-0.5 mA	0.5 mA	f _o ≤ 50 MHz	E: Slower
Rise/Fall time			I _{OH}	I _{OL}																								
Default 'A' Option ^{*2}	Other Options																											
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50 MHz < f _o ≤ 75 MHz	D: Slow	-0.5 mA	0.5 mA																									
f _o ≤ 50 MHz	E: Slower	-0.2 mA	0.2 mA																									
V _{OL}	10 % V _{cc} Max.																											
Output load condition	L _{CMOS}	15 pF Max.																										
Input voltage	V _{IH}	70 % V _{cc} Min.			Pin 1																							
	V _{IL}	30 % V _{cc} Max.																										
Rise/Fall time	tr/ff	-			Default 'A' Option ^{*2}																							
		2.0 ns Max.			f _o > 125 MHz																							
		2.5 ns Max.			75 MHz < f _o ≤ 125 MHz																							
		4.0 ns Max.			50 MHz < f _o ≤ 75 MHz																							
6.0 ns Max.			f _o ≤ 50 MHz		E: Slower																							
Output disable time (OE) Output disable time (ST)	t _{stp_oe} t _{stp_st}	1 μs Max.			Measured from the time OE or ST pin crosses 30 % V _{cc} or measured from the time ŌE or ST pin crosses 70 % V _{cc}																							
Output enable time (OE)	t _{tsta_oe}	100 ns + 2 clock cycle Max.			Measured from the time OE pin crosses 70 % V _{cc} or measured from the time ŌE pin crosses 30 % V _{cc}																							
Output enable time (ST)	t _{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	f _{pj}	1.2 ps Typ.			f _o = 25 MHz, Offset frequency: 12 kHz to 5 MHz																							
		1.2 ps Typ.			f _o = 50 MHz, Offset frequency: 12 kHz to 20 MHz																							
		1.2 ps Typ.			f _o = 75 MHz, Offset frequency: 12 kHz to 20 MHz																							
		1.2 ps Typ.			f _o = 100 MHz, Offset frequency: 12 kHz to 20 MHz																							
		1.1 ps Typ.			f _o = 125 MHz, Offset frequency: 12 kHz to 20 MHz																							
		1.4 ps Typ. 1.5 ps Typ.			f _o = 150 MHz, Offset frequency: 12 kHz to 20 MHz f _o = 170 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-8201CJA 170.000000MHz I D J P A
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

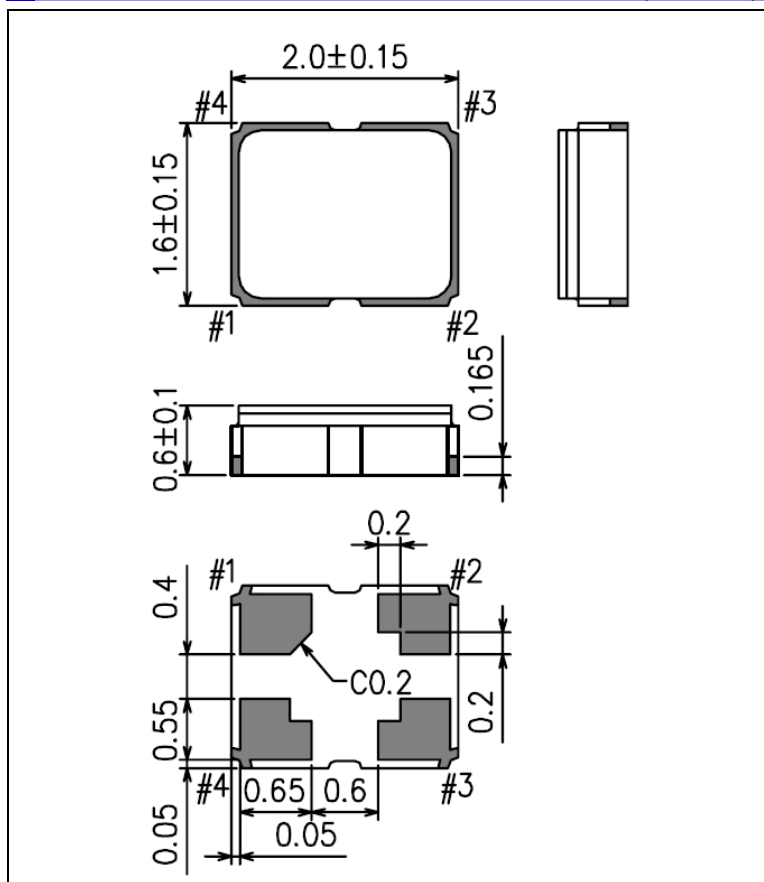
- ① Model ② Package type (CJ: 2.0 mm × 1.6 mm)
- ③ Frequency ④ Supply voltage (T: 1.8 V to 3.3 V Typ.)
- ⑤ Frequency tolerance ⑥ Operating temperature
- ⑦ Function ⑧ Rise/Fall time

⑤ Frequency tolerance / ⑥ Operating temperature	
BH	±15 × 10 ⁻⁶ / -40 °C to +105 °C
DJ	±25 × 10 ⁻⁶ / -40 °C to +125 °C
JJ	±50 × 10 ⁻⁶ / -40 °C to +125 °C

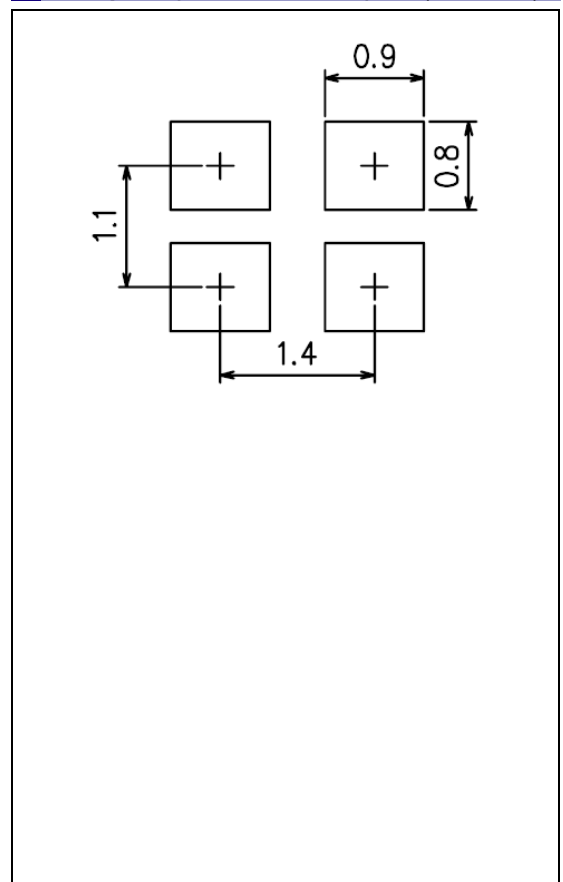
⑧ Rise/Fall time	
A	Default
B	Faster
C	Fast
D	Slow
E	Slower

⑦ Function	
P	Output Enable (OE)
Q	Output Enable (OE)
S	Standby (ST)
T	Standby (ST)

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.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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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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