

CRYSTAL OSCILLATOR (Programmable)
OUTPUT: CMOS

 Product Number
X1G005981xxxx16

SG-8201CJ

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



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 +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: $\pm 15 \times 10^{-6}$			$T_{use} = -40 \text{ °C to } +105 \text{ °C}$			
		D: $\pm 25 \times 10^{-6}$			$T_{use} = -40 \text{ °C to } +125 \text{ °C}$			
Current consumption	I_{CC}	5.2 mA Typ.	5.4 mA Typ.	5.6 mA Typ.	1.2 MHz $\leq f_o \leq$ 25 MHz	No load, Rise/Fall time: Default		
		7.0 mA Max.	7.2 mA Max.	7.5 mA Max.				
		5.4 mA Typ.	5.7 mA Typ.	6.1 mA Typ.	25 MHz $< f_o \leq$ 50 MHz			
		7.3 mA Max.	7.6 mA Max.	8.1 mA Max.				
		5.7 mA Typ.	6.3 mA Typ.	7.0 mA Typ.	50 MHz $< f_o \leq$ 75 MHz			
		7.7 mA Max.	8.2 mA Max.	9.1 mA Max.				
		6.2 mA Typ.	6.9 mA Typ.	7.9 mA Typ.	75 MHz $< f_o \leq$ 100 MHz			
		8.2 mA Max.	9.1 mA Max.	10.4 mA Max.				
		6.9 mA Typ.	7.9 mA Typ.	9.1 mA Typ.	100 MHz $< f_o \leq$ 125 MHz			
		9.4 mA Max.	10.7 mA Max.	12.4 mA Max.				
7.8 mA Typ.	9.2 mA Typ.	11.2 mA Typ.	125 MHz $< f_o \leq$ 170 MHz					
10.4 mA Max.	12.4 mA Max.	15.0 mA Max.						
Output disable current	I_{dis}	5.0 mA Typ.	5.0 mA Typ.	5.1 mA Typ.	OE = GND, $\overline{OE} = V_{CC}$			
		7.2 mA Max.	7.3 mA Max.	7.4 mA Max.				
Standby current	I_{std}	0.3 μ A Typ.	0.3 μ A Typ.	0.5 μ A Typ.	ST = GND, ST = V_{CC}			
		15.0 μ A Max.	15.0 μ A Max.	15.0 μ A Max.				
Symmetry	SYM	45 % to 55 %			50 % V_{CC} Level, $L_{CMOS} \leq 15$ pF			
Output voltage (DC characteristics)	V_{OH}	90 % V_{CC} Min.			Rise/Fall time			
					Default 'A' Option*2	Other Options	I_{OH}	I_{OL}
	V_{OL}	10 % V_{CC} Max.			fo > 125 MHz	B: Faster	-2.0 mA	2.0 mA
					75 MHz $< f_o \leq$ 125 MHz	C: Fast	-1.0 mA	1.0 mA
					50 MHz $< f_o \leq$ 75 MHz	D: Slow	-0.5 mA	0.5 mA
fo \leq 50 MHz	E: Slower	-0.2 mA	0.2 mA					
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	Other Options	20 % - 80 % V_{CC} , $L_{CMOS} = 15$ pF	
		2.0 ns Max.			fo > 125 MHz	B: Faster		
		2.5 ns Max.			75 MHz $< f_o \leq$ 125 MHz	C: Fast		
		4.0 ns Max.			50 MHz $< f_o \leq$ 75 MHz	D: Slow		
6.0 ns Max.			fo \leq 50 MHz	E: Slower				
Output disable time (OE)	tstp_oe	1 μ s Max.			Measured from the time OE or \overline{ST} pin crosses 30 % V_{CC} or measured from the time \overline{OE} or ST pin crosses 70 % V_{CC}			
Output disable time (ST)	tstp_st	1 μ s Max.						
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 \overline{OE} pin crosses 30 % V_{CC}			
Output enable time (ST)	tsta_st	3 ms Max.			Measured from the time \overline{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			
1.5 ps Typ.			fo = 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.

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.
	$\overline{\text{OE}}$	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.
	$\overline{\text{ST}}$	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-8201CJ 170.000000MHz T D J P A
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

⑤Frequency tolerance / ⑥Operating temperature	
BH	$\pm 15 \times 10^{-6}$ / -40 °C to +105 °C
DJ	$\pm 25 \times 10^{-6}$ / -40 °C to +125 °C

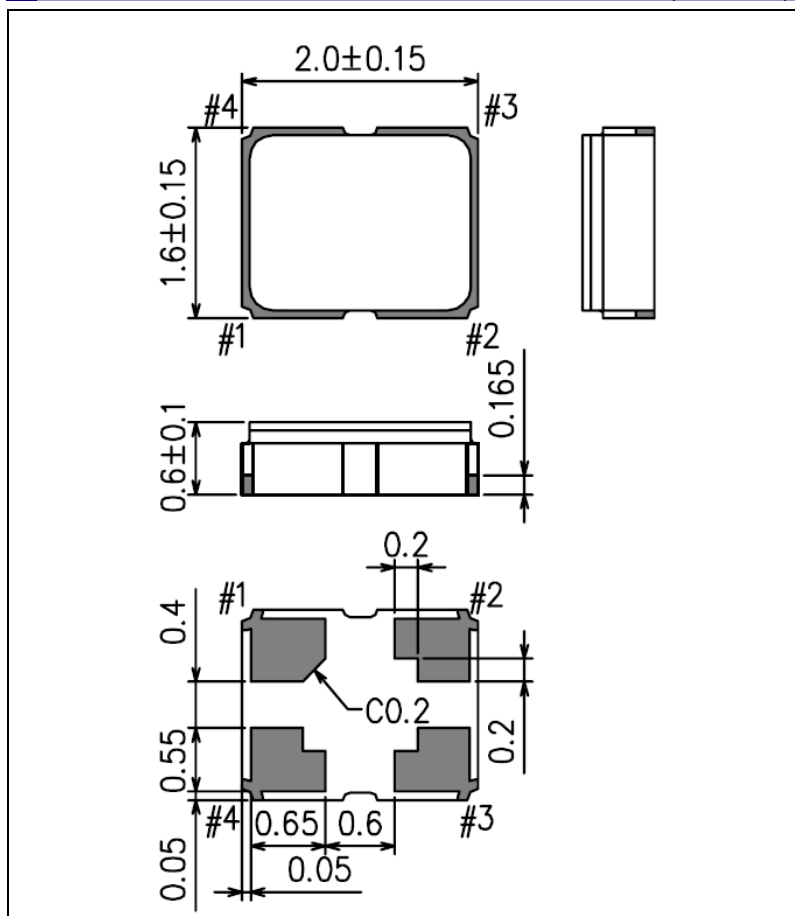
⑧Rise/Fall time	
A	Default
B	Faster
C	Fast
D	Slow
E	Slower

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

⑦Function	
P	Output Enable (OE)
Q	Output Enable ($\overline{\text{OE}}$)
S	Standby ($\overline{\text{ST}}$)
T	Standby (ST)

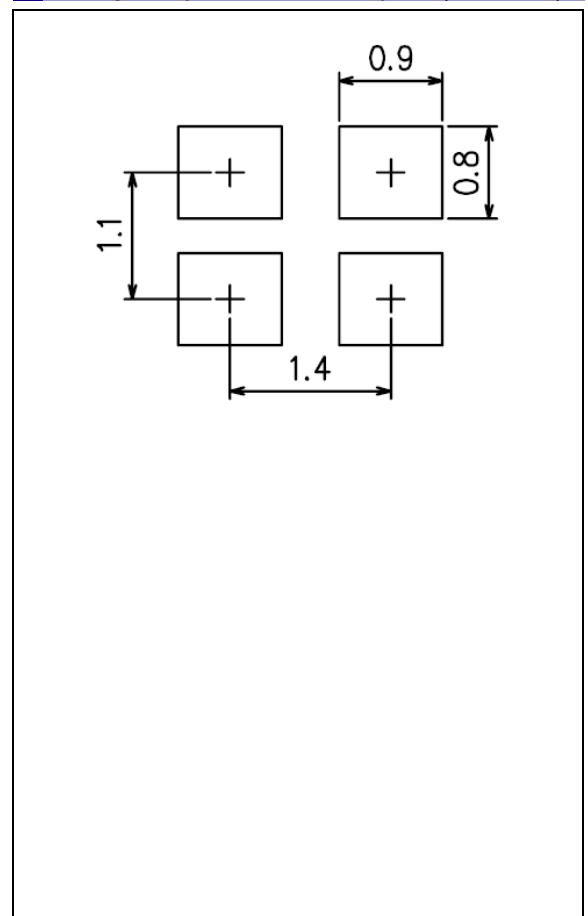
External dimensions

(Unit: mm)



Footprint (Recommended)

(Unit: mm)



Notes:

In order to achieve optimum jitter performance, the 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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All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

ISO 14000 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.

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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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