

CRYSTAL OSCILLATOR (Programmable)
OUTPUT: CMOS

 Product Number
X1G005171xxxx00

SG-8101CGA

- Frequency range : 0.67 MHz to 170 MHz (1 ppm Step)
- Supply voltage : 1.62 V to 3.63 V
- Function : Output enable (OE) or Standby (ST)
- Frequency tolerance, operating temperature:
 - ±15 ppm (-40 °C to +85 °C)
 - ±20 ppm (-40 °C to +105 °C)
 - ±50 ppm (-40 °C to +125 °C)
 - ±100 ppm (-40 °C to +125 °C)
- Package : 2.5 x 2.0 (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 1.98 V to 2.20 V 2.50 V Typ. 2.20 V to 2.80 V 3.30 V Typ. 2.70 V to 3.63 V																																														
Output frequency range	f _o	0.67 MHz to 170 MHz																																														
Storage temperature	T _{stg}	-40 °C to +125 °C	Storage as single product.																																													
Operating temperature	T _{use}	-40 °C to +85 °C -40 °C to +105 °C -40 °C to +125 °C																																														
Frequency tolerance*1	f _{tol}	B : ±15 × 10 ⁻⁶ C : ±20 × 10 ⁻⁶ J : ±50 × 10 ⁻⁶ L : ±100 × 10 ⁻⁶	T _{use} = -40 °C to +85 °C T _{use} = -40 °C to +105 °C T _{use} = -40 °C to +125 °C T _{use} = -40 °C to +125 °C																																													
Current consumption	I _{CC}	3.3 mA Max. 3.4 mA Max. 3.5 mA Max. 3.6 mA Max. 3.2 mA Max. 3.3 mA Max. 3.4 mA Max. 3.5 mA Max. 2.7 mA Typ. 2.9 mA Typ. 3.0 mA Typ. 3.0 mA Typ. 5.6 mA Max. 5.9 mA Max. 6.8 mA Max. 8.2 mA Max. 5.5 mA Max. 5.8 mA Max. 6.7 mA Max. 8.1 mA Max.	T _{use} = +125 °C T _{use} = +105 °C T _{use} = +25 °C T _{use} = +125 °C T _{use} = +105 °C No load, f _o = 20 MHz No load, f _o = 170 MHz																																													
Output disable current	I _{dis}	4.7 mA Typ. 5.7 mA Typ. 6.8 mA Typ. 3.3 mA Max. 3.4 mA Max. 3.4 mA Max. 3.6 mA Max. 3.2 mA Max. 3.3 mA Max. 3.3 mA Max. 3.5 mA Max.	T _{use} = +25 °C T _{use} = +125 °C T _{use} = +105 °C OE = GND, f _o = 170 MHz																																													
Standby current	I _{std}	2.3 µA Max. 2.5 µA Max. 3.0 µA Max. 4.2 µA Max. 0.9 µA Max. 1.0 µA Max. 1.5 µA Max. 2.5 µA Max. 0.3 µA Typ. 0.4 µA Typ. 0.5 µA Typ. 1.1 µA Typ.	T _{use} = +125 °C T _{use} = +105 °C T _{use} = +25 °C ST = GND																																													
Symmetry	SYM	45 % to 55 %	50 % V _{CC} Level																																													
Output voltage (DC characteristics)	V _{OH} V _{OL}	90 % V _{CC} Min. 10 % V _{CC} Max.	<table border="1"> <thead> <tr> <th colspan="6">I_{OH}/I_{OL} Conditions [mA]</th> </tr> <tr> <th>Rise/Fall time selection</th> <th>V_{CC}</th> <th>*A</th> <th>*B</th> <th>*C</th> <th>*D</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Default (f_o > 40 MHz), Fast</td> <td>I_{OH}</td> <td>-2.5</td> <td>-3.5</td> <td>-4.0</td> <td>-5.0</td> </tr> <tr> <td>I_{OL}</td> <td>2.5</td> <td>3.5</td> <td>4.0</td> <td>5.0</td> </tr> <tr> <td rowspan="2">Default (f_o ≤ 40 MHz)</td> <td>I_{OH}</td> <td>-1.5</td> <td>-2.0</td> <td>-2.5</td> <td>-3.0</td> </tr> <tr> <td>I_{OL}</td> <td>1.5</td> <td>2.0</td> <td>2.5</td> <td>3.0</td> </tr> <tr> <td rowspan="2">Slow</td> <td>I_{OH}</td> <td>-1.0</td> <td>-1.5</td> <td>-2.0</td> <td>-2.5</td> </tr> <tr> <td>I_{OL}</td> <td>1.0</td> <td>1.5</td> <td>2.0</td> <td>2.5</td> </tr> </tbody> </table> <p>*A: 1.62 V to 1.98 V, *B: 1.98 V to 2.20 V, *C: 2.20 V to 2.80 V, *D: 2.70 V to 3.63 V</p>	I _{OH} /I _{OL} Conditions [mA]						Rise/Fall time selection	V _{CC}	*A	*B	*C	*D	Default (f _o > 40 MHz), Fast	I _{OH}	-2.5	-3.5	-4.0	-5.0	I _{OL}	2.5	3.5	4.0	5.0	Default (f _o ≤ 40 MHz)	I _{OH}	-1.5	-2.0	-2.5	-3.0	I _{OL}	1.5	2.0	2.5	3.0	Slow	I _{OH}	-1.0	-1.5	-2.0	-2.5	I _{OL}	1.0	1.5	2.0	2.5
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Slow	I _{OH}	-1.0	-1.5	-2.0	-2.5																																											
	I _{OL}	1.0	1.5	2.0	2.5																																											
Output load condition	L _{CMOS}	15 pF Max.																																														
Input voltage	V _{IH} V _{IL}	70 % V _{CC} Min. 30 % V _{CC} Max.	OE or ST																																													
Rise and Fall time	Default Fast Slow	tr/ft 3.0 ns Max. 6.0 ns Max. 3.0 ns Max. 10.0 ns Max.	f _o > 40 MHz f _o ≤ 40 MHz f _o = 0.67 MHz to 170 MHz f _o = 0.67 MHz to 20 MHz																																													
Disable Time	t _{stp}	1 µs Max.	20 % - 80 % V _{CC} , L _{CMOS} = 15 pF																																													
Enable Time	t _{sta}	1 µs Max.	Measured from the time OE pin crosses 30 % V _{CC}																																													
Resume Time	t _{res}	3 ms Max.	Measured from the time ST pin crosses 70 % V _{CC}																																													
Start-up time	t _{str}	3 ms Max.	Measured from the time V _{CC} reaches its rated minimum value, 1.62 V																																													
Frequency aging	f _{aging}	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).

Pin description

Pin	Name	I/O type	Function
1	OE	Input	Output enable High: Specified frequency output from OUT pin Low: Out pin is low (weak pull down), only output driver is disabled.
	ST	Input	Standby High: Specified frequency output from OUT pin Low: Out pin is low (weak pull down), 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



Product Name

SG-8101CGA 170.000000MHz T C H P A
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

② Package type
CG 2.5 mm x 2.0 mm

⑤⑥	⑤ Frequency tolerance	⑥ Operating temperature
BG	B: 15×10^{-6}	G: -40 °C to +85 °C
CH	C: 20×10^{-6}	H: -40 °C to +105 °C
JJ	J: 50×10^{-6}	J: -40 °C to +125 °C
LJ	L: 100×10^{-6}	

⑦ Function
P Output Enable
S Standby

④ Supply voltage
T 1.8 V to 3.3 V Typ.

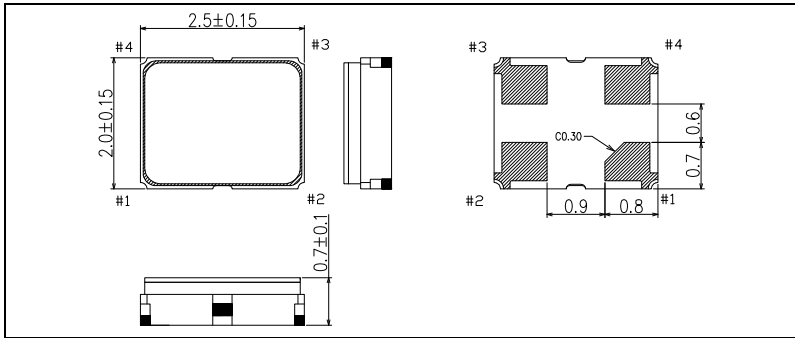
⑧ Rise/Fall time
A Default
B Fast
C* Slow

- ① Model, ② Package type,
- ③ Frequency, ④ Supply voltage,
- ⑤ Frequency tolerance, ⑥ Operating temperature,
- ⑦ Function, ⑧ Rise/Fall time

* Available only when fo ≤ 20 MHz

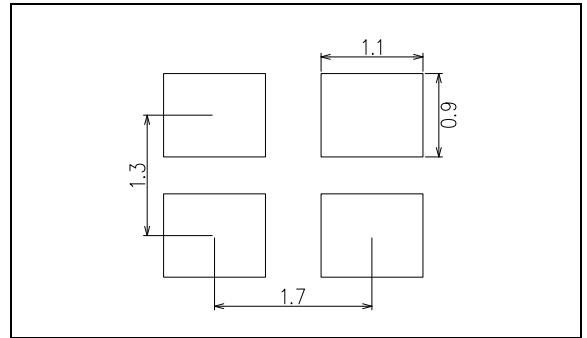
External dimensions

(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.

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