

**CRYSTAL OSCILLATOR (SPXO)**  
**OUTPUT : CMOS, TTL**

# SG-615 series

# SG-531 / SG-51 series

- Frequency range : 1.025 MHz to 135 MHz
- Supply voltage : 3.3 V Typ. / 5.0 V Typ.
- Function : Output enable(OE) or Standby( $\overline{ST}$ )
- Pin compatible with full-size metal can. (SG-51 series)
- Pin compatible with half-size metal can. (SG-531 series)


**Product Number (please contact us)**

- SG-615 : Q33615xx2xxxx00
- SG-531 : Q32531xx2xxxx00
- SG-51 : Q32510xx2xxxx00



Actual size


**Specifications (characteristics)**

Item	Symbol	Specifications		Conditions / Remarks
		SG-615P SG-531P SG-51P	SG-615PTJ SG-531PTJ SG-51PTJ	
Output frequency range	$f_o$	1.025 MHz to 26 MHz	26.001 MHz to 66.667 MHz	.
Supply voltage	$V_{cc}$	5.0 V $\pm 0.5$ V		
Storage temperature	$T_{stg}$	-55 °C to +125 °C		Storage as single product.
Operating temperature	$T_{use}$	-20 °C to +70 °C		
Frequency tolerance	$f_{tol}$	B <sup>1</sup> : $\pm 50 \times 10^{-6}$ , C: $\pm 100 \times 10^{-6}$		-20 °C to +70 °C
Current consumption	$I_{cc}$	23 mA Max.	35 mA Max.	No load condition
Disable current	$I_{dis}$	12 mA Max.	28 mA Max.	OE=GND
Symmetry	SYM	40 % to 60 %	—	CMOS load:50 % $V_{cc}$ level
		40 % to 60 %	45 % to 55 %	TTL load: 1.4 V level
Output voltage	$V_{OH}$	$V_{cc}-0.4$ V Min.	2.4 V Min.	$I_{OH}=-400 \mu A$
	$V_{OL}$	0.4 V Max.		$I_{OL}=16$ mA(P)/ 8 mA(PTJ)
Output load condition (TTL)	$L_{TTL}$	10 TTL Max.	5 TTL Max.	$L_{CMOS} \leq 15$ pF
Output load condition (CMOS)	$L_{CMOS}$	50 pF Max.	—	
Input voltage	$V_{IH}$	2.0 V Min.	3.5 V Min.	$I_{IH}=1 \mu A$ Max. (OE= $V_{cc}$ )
	$V_{IL}$	0.8 V Max.	1.5 V Max.	$I_{IL}=-100 \mu A$ Min. (OE=GND), PTJ: $I_{IL}=-500 \mu A$ Min.(OE=GND)
Rise time / Fall time	$t_r / t_f$	8 ns Max.	—	CMOS load:20 % $V_{cc}$ to 80 % $V_{cc}$ level
		8 ns Max.	5 ns Max.	TTL load:0.4 V to 2.4 V level
Start-up time	$t_{str}$	4 ms Max.	10 ms Max.	Time at minimum supply voltage to be 0 s
Frequency aging	$f_{aging}$	$\pm 5 \times 10^{-6}$ / year Max.		+25 °C, $V_{cc}=5.0$ V, First year

\*1 "B" tolerance will be available up to 55 MHz.

**Specifications (characteristics)**

Item	Symbol	Specifications			Conditions / Remarks
		SG-615PCG SG-531PCG	SG-615SCG SG-531SCG	SG-615PCN	
Output frequency range	$f_o$	1.500 MHz to 26.000 MHz		26.001 MHz to 66.667 MHz	
Supply voltage	$V_{cc}$	2.7 V to 3.6 V		3.0 V to 3.6 V	
Storage temperature	$T_{stg}$	-55 °C to +125 °C			Storage as single product.
Operating temperature	$T_{use}$	-40 °C to +85 °C			
Frequency tolerance	$f_{tol}$	B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$ M: $\pm 100 \times 10^{-6}$			-20 °C to +70 °C -40 °C to +85 °C
Current consumption	$I_{cc}$	12 mA Max.		20 mA Max.	No load condition
Disable current	$I_{dis}$	10 mA Max.	—	10 mA Max.	OE=GND (PCG,PCN)
Stand-by current	$I_{std}$	—	50 $\mu A$ Max.	—	$\overline{ST}$ =GND (SCG)
Symmetry	SYM	45 % to 55 %			50 % $V_{cc}$ level, $L_{CMOS}=\text{Max.}$
		$V_{cc}-0.4$ V Min.		$V_{cc}-0.4$ V Min.	$I_{OH}=-8$ mA
Output voltage	$V_{OH}$	$V_{cc}-0.4$ V Min.		$V_{cc}-0.4$ V Min.	$I_{OL}=8$ mA
	$V_{OL}$	0.4 V Max.		0.4 V Max.	
Output load condition	$L_{CMOS}$	25 pF Max.		15 pF Max.	
Input voltage	$V_{IH}$	70 % $V_{cc}$ Min.		70 % $V_{cc}$ Min.	OE Terminal or $\overline{ST}$ Terminal
	$V_{IL}$	20 % $V_{cc}$ Max.		30 % $V_{cc}$ Max.	
Rise time / Fall time	$t_r / t_f$	4 ns Max.			20 % $V_{cc}$ to 80 % $V_{cc}$ level, $L_{CMOS} \leq \text{Max.}$
Start-up time	$t_{str}$	12 ms Max.		10 ms Max.	$t=0$ at 90% $V_{cc}$
Frequency aging	$f_{aging}$	$\pm 5 \times 10^{-6}$ / year Max.			+25 °C, $V_{cc}=3.3$ V, First year

**Specifications (characteristics)**

Item	Symbol	Specifications			Conditions / Remarks
		SG-615PTW / STW SG-531PTW / STW	SG-615PHW / SHW SG-531PHW / SHW	SG-615PCW / SCW SG-531PCW / SCW	
Output frequency range	f <sub>o</sub>	55.001 MHz to 135.000 MHz		26.001 MHz to 135.000 MHz	
Supply voltage	V <sub>cc</sub>	5.0 V ±0.5 V		3.3 V ±0.3 V	
Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C			Storage as single product.
Operating temperature	T <sub>use</sub>	-20 °C to +70 °C		-40 °C to +85 °C	
Frequency tolerance	f <sub>tol</sub>	B: ±50 × 10 <sup>-6</sup> , C <sup>2</sup> : ±100 × 10 <sup>-6</sup>		M: ±100 × 10 <sup>-6</sup>	-20 °C to +70 °C -40 °C to +85 °C
Current consumption	I <sub>cc</sub>	45 mA Max.		28 mA Max.	No load condition( Max. frequency range )
Disable current	I <sub>dis</sub>	30 mA Max.		16 mA Max.	OE=GND (PTW,PHW,PCW)
Stand-by current	I <sub>std</sub>	50 µA Max.			ST=GND (STW,SHW,SCW)
Symmetry	SYM	40 % to 60 %	40 % to 60 %		50 % V <sub>cc</sub> level, L <sub>CMOS</sub> =Max. 1.4 V level ,L <sub>CMOS</sub> =Max.
Output voltage	V <sub>oH</sub>	V <sub>cc</sub> -0.4 V Min.			I <sub>oH</sub> =-16 mA(PTW,STW,PHW,SHW),-8 mA(PCW,SCW)
	V <sub>oL</sub>	0.4 V Max.			I <sub>oL</sub> = 16 mA(PTW,STW,PHW,SHW), 8 mA(PCW,SCW)
Output load condition (TTL)	L <sub>TTL</sub>	5 TTL Max.	—	—	f <sub>o</sub> ≤ 90 MHz , Max.supply voltage
Output load condition (CMOS)	L <sub>CMOS</sub>	15 pF Max.			Max.frequency , Max.supply voltage
Input voltage	V <sub>IH</sub>	2.0 V Min.		70 % V <sub>cc</sub> Min.	OE Terminal or ST Terminal
	V <sub>IL</sub>	0.8 V Max.		20 % V <sub>cc</sub> Max.	
Rise time / Fall time	tr / tf	—			20 % V <sub>cc</sub> to 80 % V <sub>cc</sub> level, L <sub>CMOS</sub> ≤ Max. 0.4 V to 2.4 V level
		4 ns Max.	—	4 ns Max.	
Start-up time	t <sub>str</sub>	10 ms Max.			Time at minimum supply voltage to be 0 s
Frequency aging	f <sub>aging</sub>	±5 × 10 <sup>-6</sup> / year Max.			+25 °C, V <sub>cc</sub> =5.0 V / 3.3 V, First year

\*2 "C" tolerance : f<sub>o</sub> ≥66.667 MHz(PTW,STW,PHW,SHW)

Product Name **SG-615 P C G 20.000000MHz C**  
 (Standard form) ① ②③ ④ ⑤  
 ①Model ②Function (P: Output enable, S:Standby)  
 ③Supply voltage ④Frequency  
 ⑤Frequency tolerance

③Supply voltage	
C	3.3 V Typ.
T,H	5.0 V Typ.
Blank	5.0 V Typ.

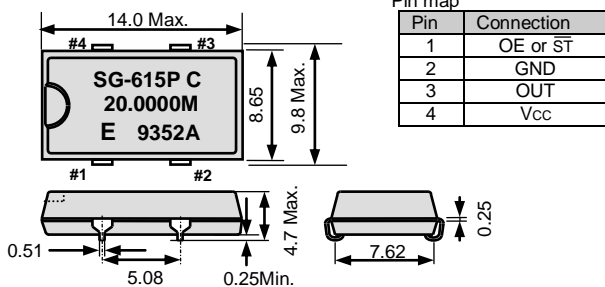
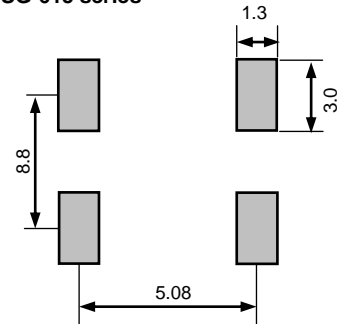
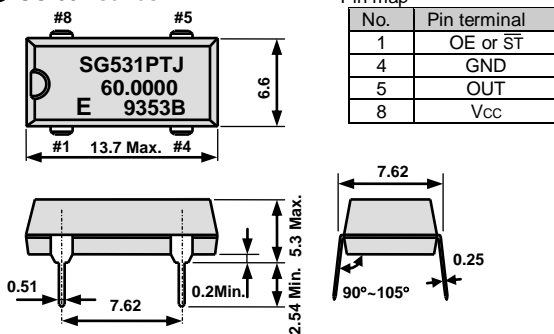
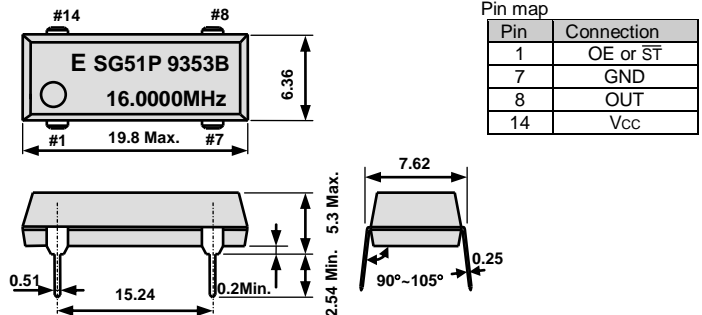
⑤Frequency tolerance	
B	±50 × 10 <sup>-6</sup> / -20 to +70°C
C	±100 × 10 <sup>-6</sup> / -20 to +70°C
M	±100 × 10 <sup>-6</sup> / -40 to +85°C

**External dimensions**

(Unit:mm)

**Footprint (Recommended)**

(Unit:mm)

**SG-615 series**

**SG-615 series**

**SG-531 series**

**SG-51 series**


Note.  
 OE pin (P,PTJ,PTW,PHW,PCW,PCN,PCG)  
 OE pin = "H" or "open" : Specified frequency output.  
 OE pin = "L" : Output is high impedance.

ST pin (STW, SHW, SCW,SCG)  
 ST pin = "H" or "open" : Specified frequency output.  
 ST pin = "L" : Output is low level  
 (weak pull - down), oscillation stops.

To maintain stable operation, provide a 0.01µF to 0.1µF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V<sub>cc</sub> - GND).