



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

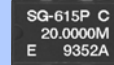
SG-531 : Q32531xx2xxxx00

SG-51 : Q32510xx2xxxx00



Actual size

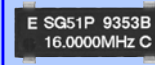
SG-615



SG-531



SG-51



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	Please contact us about available frequencies.
Supply voltage	V_{cc}	5.0 V ± 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 ¹ : $\pm 50 \times 10^{-6}$, 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	Please contact us about available frequencies.
Supply voltage	V_{cc}	2.7 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 μA 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 _o	55.001 MHz to 135.000 MHz		26.001 MHz to 135.000 MHz	Please contact us about available frequencies.
Supply voltage	V _{cc}	5.0 V ±0.5 V		3.3 V ±0.3 V	
Storage temperature	T _{stg}	-55 °C to +125 °C			Storage as single product.
Operating temperature	T _{use}	-20 °C to +70 °C		-40 °C to +85 °C	
Frequency tolerance	f _{tol}	B: ±50 × 10 ⁻⁶ , C ² : ±100 × 10 ⁻⁶		M: ±100 × 10 ⁻⁶	-20 °C to +70 °C -40 °C to +85 °C
Current consumption	I _{cc}	45 mA Max.		28 mA Max.	No load condition(Max. frequency range)
Disable current	I _{dis}	30 mA Max.		16 mA Max.	OE=GND (PTW,PHW,PCW)
Stand-by current	I _{std}	50 µA Max.			ST=GND (STW,SHW,SCW)
Symmetry	SYM	—		40 % to 60 %	50 % V _{cc} level, L _{CMOS} =Max.
		40 % to 60 %		—	1.4 V level, L _{CMOS} =Max.
Output voltage	V _{OH}	V _{cc} -0.4 V Min.			I _{OH} =-16 mA(PTW,STW,PHW,SHW), -8 mA(PCW,SCW)
	V _{OL}	0.4 V Max.			I _{OL} = 16 mA(PTW,STW,PHW,SHW), 8 mA(PCW,SCW)
Output load condition (TTL)	L _{TTL}	5 TTL Max.	—	—	f _o ≤ 90 MHz, Max.supply voltage
Output load condition (CMOS)	L _{CMOS}	15 pF Max.			Max.frequency, Max.supply voltage
Input voltage	V _{IH}	2.0 V Min.		70 % V _{cc} Min.	OE Terminal or ST Terminal
	V _{IL}	0.8 V Max.		20 % V _{cc} Max.	
Rise time / Fall time	tr / tf	—		4 ns Max.	20 % V _{cc} to 80 % V _{cc} level, L _{CMOS} ≤ Max. 0.4 V to 2.4 V level
		4 ns Max.		—	
Start-up time	t _{str}	10 ms Max.			Time at minimum supply voltage to be 0 s
Frequency aging	f _{aging}	±5 × 10 ⁻⁶ / year Max.			+25 °C, V _{cc} =5.0 V / 3.3 V, First year

*2 "C" tolerance : f_o ≥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.

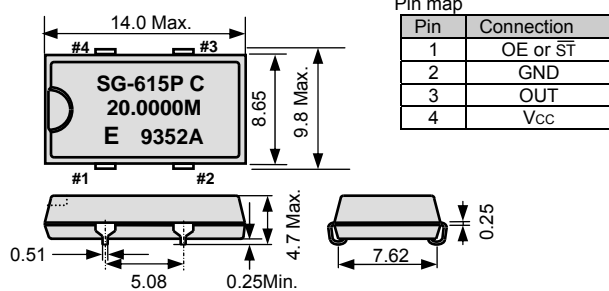
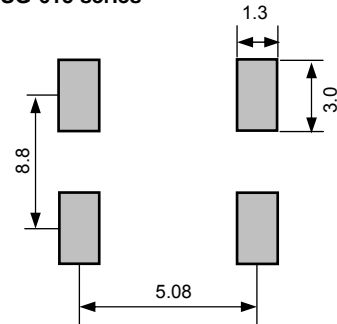
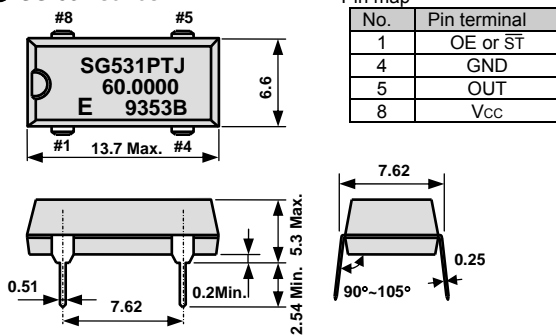
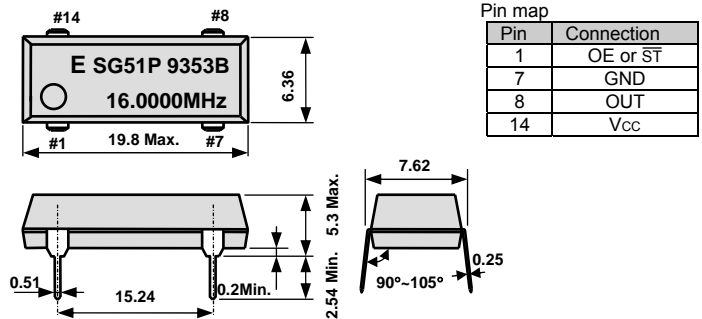
⑤Frequency tolerance	
B	±50 × 10 ⁻⁶ / -20 to +70°C
C	±100 × 10 ⁻⁶ / -20 to +70°C
M	±100 × 10 ⁻⁶ / -40 to +85°C

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_{cc} - GND).

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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.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc.)

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