

## CRYSTAL OSCILLATOR SPXO

# SG-615/531/51 series

- Frequency range : 1.025 MHz to 135 MHz
- Supply voltage : 3.3 V / 5.0 V
- Function : Output enable(OE) Standby( $\overline{ST}$ )
- Lead(Pb)-free : Contains high melting temperature type solder (Pb85 %) exempted by RoHS directive.
- Pin compatible with full-size metal can. (SG-51 series)
- Pin compatible with half-size metal can. (SG-531 series)



Actual size



### Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615P SG-531P SG-51P	SG-615PTJ SG-531PTJ SG-51PTJ	SG-615PH SG-531PH SG-51PH	
Output frequency range	$f_o$	1.0250 MHz to 26 MHz	26.001 MHz to 66.667 MHz		.
Supply voltage	$V_{cc}$	5.0 V $\pm$ 0.5 V			
Temperature range	Storage temperature $T_{stg}$	-55 °C to +125 °C			Stored as bare product after unpacking
	Operating temperature $T_{use}$	-20 °C to +70 °C			
Frequency tolerance	$F_{tol(osc)}$	B: $\pm 50 \times 10^{-6}$ , C: $\pm 100 \times 10^{-6}$			-20 °C to +70 °C*1
Current consumption	$I_{cc}$	23 mA Max.	35 mA Max.		No load condition
Output disable current	$I_{dis}$	12 mA Max.	28 mA Max.	20 mA Max.	OE=GND
Symmetry	SYM	40 % to 60 %	—	40 % to 60 %	CMOS load:50 % $V_{cc}$ level TTL load: 1.4 V level
		40 % to 60 %	45 % to 55 %	—	
High output voltage	$V_{OH}$	$V_{cc}$ -0.4 V Min.	2.4 V Min.	$V_{cc}$ -0.4 V Min.	$I_{OH}$ =-400 $\mu$ A(P,PTJ)/-4 mA(PH)
Low output voltage	$V_{OL}$	0.4 V Max.			$I_{OL}$ =16 mA(P)/ 8 mA(PTJ)/ 4 mA(PH)
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.	—	50 pF Max.	
Output enable / disable input voltage	$V_{IH}$	2.0 V Min.	3.5 V Min.	2.0 V Min.	$I_{IH}$ = 1 $\mu$ A Max. (OE= $V_{cc}$ )
	$V_{IL}$	0.8 V Max.	1.5 V Max.	0.8 V Max.	$I_{IL}$ = -100 $\mu$ A Min. (OE=GND), PTJ: $I_{IL}$ = -500 $\mu$ A Min. (OE=GND)
Output rise and fall time	$t_r / t_f$	8 ns Max.	—	7 ns Max.	CMOS load:20 % $V_{cc}$ to 80 % $V_{cc}$ level TTL load:0.4 V to 2.4 V level
		8 ns Max.	5 ns Max.	—	
Oscillation start up time	$t_{osc}$	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			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	
Temperature range	Storage temperature $T_{stg}$	-55 °C to +125 °C			Stored as bare product after unpacking
	Operating temperature $T_{use}$	-40 °C to +85 °C			
Frequency tolerance	$F_{tol(osc)}$	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
Output 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, $L_{CMOS}$ =Max.	
High output voltage	$V_{OH}$	$V_{cc}$ -0.4 V Min.		$V_{cc}$ -0.4 V Min.	$I_{OH}$ =-8 mA
Low output voltage	$V_{OL}$	0.4 V Max.		0.4 V Max.	$I_{OL}$ = 8 mA
Output load condition	$L_{CMOS}$	25 pF Max.		15 pF Max.	
Output enable / disable input voltage	$V_{IH}$	70 % $V_{cc}$ Min.		70 % $V_{cc}$ Min.	OE Terminal , $\overline{ST}$ Terminal
	$V_{IL}$	20 % $V_{cc}$ Max.		30 % $V_{cc}$ Max.	
Output rise and fall time	$t_r / t_f$	4 ns Max.			20 % $V_{cc}$ to 80 % $V_{cc}$ level, $L_{CMOS} \leq$ Max.
Oscillation start up time	$t_{osc}$	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			Remarks	
		SG-615PTW / STW SG-531PTW / STW	SG-615PHW / SHW SG-531PHW / SHW	SG-615PCW / SCW SG-531PCW / SCW		
Output frequency range	f <sub>0</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		
Temperature range	Storage temperature	-55 °C to +125 °C			Stored as bare product after unpacking	
	Operating temperature	-20 °C to +70 °C		-40 °C to +85 °C		
Frequency tolerance	F <sub>tol(osc)</sub>	B: ±50 × 10 <sup>-6</sup> , C: ±100 × 10 <sup>-6</sup>		-20 °C to +70 °C	*1	
		—		M: ±100 × 10 <sup>-6</sup>		-40 °C to +85 °C
Current consumption	I <sub>cc</sub>	45 mA Max.		28 mA Max.	No load condition( Max. frequency range )	
Output 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 %	50 % V <sub>cc</sub> level, L <sub>CMOS</sub> =Max.	
		40 % to 60 %		—	1.4 V level, L <sub>CMOS</sub> =Max.	
High 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)	
Low output voltage	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>0</sub> ≤ 90 MHz, Max.supply voltage	
Output load condition (CMOS)	L <sub>CMOS</sub>	15 pF Max.			Max.frequency, Max.supply voltage	
Output enable / disable input voltage	V <sub>IH</sub>	2.0 V Min.		70 % V <sub>cc</sub> Min.	OE Terminal, ST Terminal	
	V <sub>IL</sub>	0.8 V Max.		20 % V <sub>cc</sub> Max.		
Output rise and fall time	tr / tf	—			4 ns Max.	20 % V <sub>cc</sub> to 80 % V <sub>cc</sub> level, L <sub>CMOS</sub> ≤ Max.
		4 ns Max.		—	—	0.4 V to 2.4 V level
Oscillation start up time	t <sub>osc</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	

\*1 "C" tolerance : f<sub>0</sub> ≥66.667 MHz(PTW,STW,PHW,SHW)

External dimensions

(Unit:mm)

Footprint (Recommended)

(Unit:mm)

**SG-615 Series**

**SG-531 Series**

**SG-51 Series**

**SG-615 Series**

Note.  
 OE pin (P,PTJ,PH,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.