# Crystal oscillator

## **CRYSTAL OSCILLATOR (SPXO)**

**OUTPUT: CMOS** 

### SG-310 series

: 2 MHz to 80 MHz •Frequency range

: 1.8 V Typ. / 2.5 V Typ. / 3.3 V Typ. Supply voltage

•Current consumption : 1.5 mA Typ.

(SEF: 1.8 V No load condition 48 MHz)

: Standby(ST) •External dimensions :  $3.2 \times 2.5 \times 1.05$  mm



#### Specifications (characteristics)

Item	Symbol	SG-310 SEF	SG-310 SDF	SG-310 SCF	SG-310 SDN	SG-310 SCN	Conditions /	Remarks
Output frequency range	f0	2.000	2.000 MHz to 48.000 MHz 3.000 MHz to 80.000 MHz		80.000 MHz	Please contact us about available frequencies.		
Supply voltage	Vcc	1.8 V Typ. 1.6 V to 2.2 V	2.5 V Typ. 2.2 V to 3.0 V	3.3 V Typ. 2.7 V to 3.6 V	2.5 V Typ. 2.2 V to 2.7 V	3.3 V Typ. 2.7 V to 3.6 V		
Storage temperature	T_stg		-	40 °C to +125 ℃	·		Storage as single product.	
Operating temperature	T_use	-40 °C to +85 ℃					Please contact us about +85 ℃ < T_use	
	f_tol	B: ±50 × 10 <sup>-6</sup> , C: ±100 × 10 <sup>-6</sup>			-20 °C to +70 °C			
Frequency tolerance		L: $\pm 50 \times 10^{-6}$ , M: $\pm 100 \times 10^{-6}$			-40 °C to +85 °C			
		_			D:±20 × 10 <sup>-6</sup> ,S:±25 × 10 <sup>-6</sup>		-20 °C to +70 °C	
		_			R: $\pm 25 \times 10^{-6}$ ,P: $\pm 20 \times 10^{-6}$		-30 °C to +85 °C	
		_		J:±25 × 10 <sup>-6</sup>		-40 °C to +85 °C		
	Icc	1.5 mA Max.	1.5 mA Max.	1.5 mA Max.		5.0 mA Max.	No load condition, 2 MHz≤fo≤ 4 MHz	
		1.5 mA Max.	1.5 mA Max.	2.0 mA Max.			No load condition, 4 MHz <fo≤ 8="" mhz<="" td=""></fo≤>	
		1.5 mA Max.	2.0 mA Max.	2.5 mA Max.	4.0 mA Max.		No load condition, 8 MHz <fo≤16 mhz<="" td=""></fo≤16>	
Current consumption		2.0 mA Max.	2.0 mA Max.	2.5 mA Max.	4.0 MA Max.		No load condition, 16 MHz <fo≤25 mhz<="" td=""></fo≤25>	
		2.0 mA Max.	2.5 mA Max.	3.5 mA Max.			No load condition, 25 MHz <fo≤33 mhz<="" td=""></fo≤33>	
		3.0 mA Max.	3.5 mA Max.	4.5 mA Max.			No load condition, 33 MHz <fo≤48 mhz<="" td=""></fo≤48>	
		_			6.0 mA Max.	7.0 mA Max.	No load condition, 48 Mi	Hz <fo≤80 mhz<="" td=""></fo≤80>
Stand-by current	I_std	0.7 μA Max. (0.2 μA Typ.)	1.5 μΑ Max. (0.5 μΑ Typ.)	2.0 μA Max. (1.0 μA Typ.)	10 μA Max. $\overline{\text{ST}}$ =GND			
	SYM	45 % to 55 %	45.0/ . 55.0/	% to 55 % 45 % to 55 %	45 % to 55 %		2 MHz≤fo≤16 MHz	50.0(.)(
Symmetry		40.0/ +- 00.0/	45 % to 55 % 40 % to 60 %				16 MHz <fo≤40 mhz<="" td=""><td rowspan="2">50 % Vcc level L_CMOS ≤ 15 pF</td></fo≤40>	50 % Vcc level L_CMOS ≤ 15 pF
		40 % to 60 %					40 MHz <fo≤80 mhz<="" td=""></fo≤80>	
Output valtage	Voн	90 % Vcc Min.					IOH=-3 mA	
Output voltage	Vol	10 % Vcc Max.					IOL= 3 mA	
Output load condition (CMOS)	L_CMOS	15 pF Max.						
Input voltage	VIH	80 % Vcc Min. 70 % Vcc Min.				cc Min.	ST terminal	
Input voltage	VIL	20 % Vcc Max. 30 % Vcc Max.				ST terminal		
Rise time / Fall time	tr/ tf	4 ns Max.					20 % Vcc to 80 % Vcc level, L_CMOS=15 pF	
Start-up time	t_str	10 ms Max.			2 ms Max.		t=0 at 90 % Vcc	
Frequency aging	f_aging	$\pm 5 \times 10^{-6}$ / year Max.			$\pm 3 \times 10^{-6}$ / year Max.		+25 ℃, First year, V cc=1.8 V, 2.5 V, 3.3 V	
requerity aging		_			±10 × 1	0 <sup>-6</sup> Max.	+25 ℃, 10 years	

③Supply voltage 1.8 V Typ.

2.5 V Typ.

3.3 V Typ.

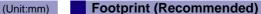
**Product Name** (Standard form) SG-310 S E F 25.000000MHz L 1 23 4

3 (5)

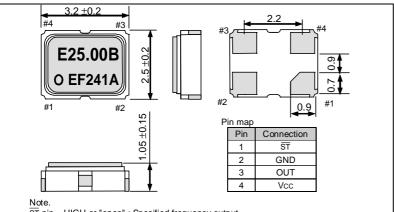
)Model ②Function (S:Standby)	D							
Supply voltage ④Frequency	С							
Frequency tolerance								

⑤F	requency tolerance	*Only SDN, SCN are available			
В	$\pm 50 \times 10^{-6}$ / -20 to +70°C	D*	±20 × 10 <sup>-6</sup> / -20 to +70℃		
С	±100 × 10 <sup>-6</sup> / -20 to +70℃	S*	±25 × 10 <sup>-6</sup> / -20 to +70℃		
L	$\pm 50 \times 10^{-6}$ / -40 to +85°C	R*	±25 × 10 <sup>-6</sup> / -30 to +85℃		
M	±100 × 10 <sup>-6</sup> / -40 to +85℃	P*	±20 × 10 <sup>-6</sup> / -30 to +85℃		
		J*	±25 × 10 <sup>-6</sup> / -40 to +85℃		

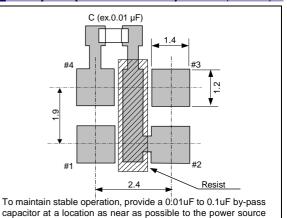
#### External dimensions



(Unit:mm)



ST pin = HIGH or "open" : Specified frequency output.
ST pin = LOW : Output is high impedance, oscillation stops



terminal of the crystal product (between Vcc - GND).

# PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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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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