



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

**SG-310 series**

- Frequency range : 2 MHz to 80 MHz
- Supply voltage : 1.8 V Typ. / 2.5 V Typ. / 3.3 V Typ.
- Current consumption : 1.5 mA Typ.  
(SEF: 1.8 V No load condition 48 MHz)
- Function : Standby( $\overline{ST}$ )
- External dimensions : 3.2 x 2.5 x 1.05 mm



Product Number (please contact us)  
Q33310xx0xxxx00



Actual size

**Specifications (characteristics)**

Item	Symbol	SG-310 SEF	SG-310 SDF	SG-310 SCF	SG-310 SDN	SG-310 SCN	Conditions / Remarks
Output frequency range	f <sub>0</sub>	2.000 MHz to 48.000 MHz			3.000 MHz to 80.000 MHz		Please contact us about available frequencies.
Supply voltage	V <sub>cc</sub>	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 <sub>stg</sub>	-40 °C to +125 °C					Storage as single product.
Operating temperature	T <sub>use</sub>	-40 °C to +85 °C					Please contact us about +85 °C < T <sub>use</sub>
Frequency tolerance	f <sub>tol</sub>	B: ±50 × 10 <sup>-6</sup> , C: ±100 × 10 <sup>-6</sup> L: ±50 × 10 <sup>-6</sup> , M: ±100 × 10 <sup>-6</sup>			D: ±20 × 10 <sup>-6</sup> , S: ±25 × 10 <sup>-6</sup> R: ±25 × 10 <sup>-6</sup> , P: ±20 × 10 <sup>-6</sup> J: ±25 × 10 <sup>-6</sup>		-20 °C to +70 °C -40 °C to +85 °C -20 °C to +70 °C -30 °C to +85 °C -40 °C to +85 °C
		-			-		-
		-			-		-
		-			-		-
Current consumption	I <sub>cc</sub>	1.5 mA Max.	1.5 mA Max.	1.5 mA Max.	4.0 mA Max.	5.0 mA Max.	No load condition, 2 MHz < f <sub>0</sub> ≤ 4 MHz
		1.5 mA Max.	1.5 mA Max.	2.0 mA Max.			No load condition, 4 MHz < f <sub>0</sub> ≤ 8 MHz
		1.5 mA Max.	2.0 mA Max.	2.5 mA Max.			No load condition, 8 MHz < f <sub>0</sub> ≤ 16 MHz
		2.0 mA Max.	2.0 mA Max.	2.5 mA Max.			No load condition, 16 MHz < f <sub>0</sub> ≤ 25 MHz
		2.0 mA Max.	2.5 mA Max.	3.5 mA Max.			No load condition, 25 MHz < f <sub>0</sub> ≤ 33 MHz
		3.0 mA Max.	3.5 mA Max.	4.5 mA Max.			No load condition, 33 MHz < f <sub>0</sub> ≤ 48 MHz
Stand-by current	I <sub>std</sub>	0.7 µA Max. (0.2 µA Typ.)	1.5 µA Max. (0.5 µA Typ.)	2.0 µA Max. (1.0 µA Typ.)	6.0 mA Max. / 7.0 mA Max.		No load condition, 48 MHz < f <sub>0</sub> ≤ 80 MHz
Symmetry	SYM	45 % to 55 %	45 % to 55 %	45 % to 55 %	45 % to 55 %		2 MHz < f <sub>0</sub> ≤ 16 MHz
		40 % to 60 %					40 % to 60 %
Output voltage	V <sub>OH</sub>	90 % V <sub>cc</sub> Min.					I <sub>OH</sub> = -3 mA
	V <sub>OL</sub>	10 % V <sub>cc</sub> Max.					I <sub>OL</sub> = 3 mA
Output load condition (CMOS)	L <sub>CMOS</sub>	15 pF Max.					
Input voltage	V <sub>IH</sub>	80 % V <sub>cc</sub> Min.			70 % V <sub>cc</sub> Min.		$\overline{ST}$ terminal
	V <sub>IL</sub>	20 % V <sub>cc</sub> Max.			30 % V <sub>cc</sub> Max.		
Rise time / Fall time	t <sub>r</sub> / t <sub>f</sub>	4 ns Max.					20 % V <sub>cc</sub> to 80 % V <sub>cc</sub> level, L <sub>CMOS</sub> = 15 pF
Start-up time	t <sub>str</sub>	10 ms Max.			2 ms Max.		t=0 at 90 % V <sub>cc</sub>
Frequency aging	f <sub>aging</sub>	±5 × 10 <sup>-6</sup> / year Max.			±3 × 10 <sup>-6</sup> / year Max.		+25 °C, First year, V <sub>cc</sub> = 1.8 V, 2.5 V, 3.3 V
		-			±10 × 10 <sup>-6</sup> Max.		+25 °C, 10 years

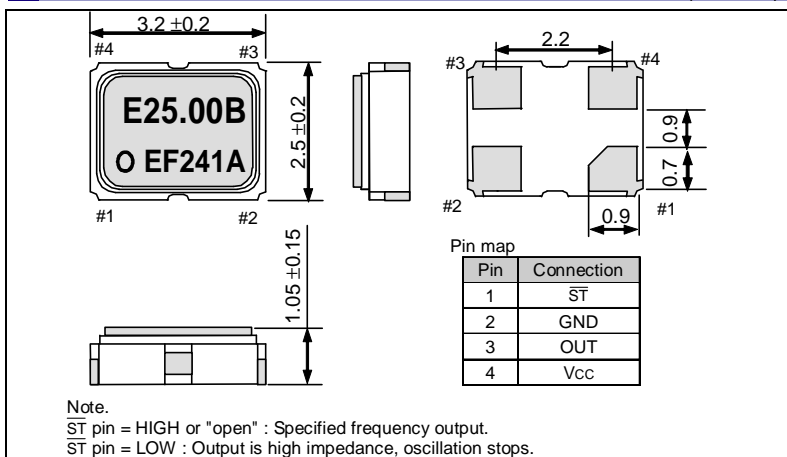
Product Name SG-310 S E F 25.000000MHz L  
(Standard form) ① ② ③ ④ ⑤  
① Model ② Function (S: Standby)  
③ Supply voltage ④ Frequency  
⑤ Frequency tolerance

③ Supply voltage	
E	1.8 V Typ.
D	2.5 V Typ.
C	3.3 V Typ.

⑤ Frequency tolerance	*Only SDN, SCN are available	
B ±50 × 10 <sup>-6</sup> / -20 to +70 °C	D*	±20 × 10 <sup>-6</sup> / -20 to +70 °C
C ±100 × 10 <sup>-6</sup> / -20 to +70 °C	S*	±25 × 10 <sup>-6</sup> / -20 to +70 °C
L ±50 × 10 <sup>-6</sup> / -40 to +85 °C	R*	±25 × 10 <sup>-6</sup> / -30 to +85 °C
M ±100 × 10 <sup>-6</sup> / -40 to +85 °C	P*	±20 × 10 <sup>-6</sup> / -30 to +85 °C
	J*	±25 × 10 <sup>-6</sup> / -40 to +85 °C

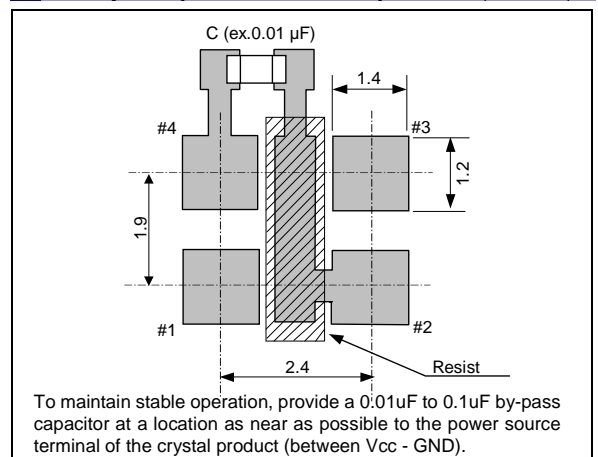
**External dimensions**

(Unit:mm)



**Footprint (Recommended)**

(Unit:mm)



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At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

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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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