



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 × 2.5 × 1.05 mm



Product Number (please contact us)
Q33310xx0xxx00



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_0	2.000 MHz to 48.000 MHz			3.000 MHz to 80.000 MHz		Please contact us about available frequencies.
Supply voltage	V_{CC}	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 °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: $\pm 100 \times 10^{-6}$ L: $\pm 50 \times 10^{-6}$, M: $\pm 100 \times 10^{-6}$			D: $\pm 20 \times 10^{-6}$, S: $\pm 25 \times 10^{-6}$ R: $\pm 25 \times 10^{-6}$, P: $\pm 20 \times 10^{-6}$ J: $\pm 25 \times 10^{-6}$		-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
		1.5 mA Max.			4.0 mA Max.		No load condition, 2 MHz < f_0 ≤ 4 MHz
		1.5 mA Max.			4.0 mA Max.		No load condition, 4 MHz < f_0 ≤ 8 MHz
		1.5 mA Max.			4.0 mA Max.		No load condition, 8 MHz < f_0 ≤ 16 MHz
Current consumption	I_{CC}	1.5 mA Max.	2.0 mA Max.	2.5 mA Max.	6.0 mA Max.	7.0 mA Max.	No load condition, 16 MHz < f_0 ≤ 25 MHz
		2.0 mA Max.	2.0 mA Max.	2.5 mA Max.			No load condition, 25 MHz < f_0 ≤ 33 MHz
		2.0 mA Max.	2.5 mA Max.	3.5 mA Max.			No load condition, 33 MHz < f_0 ≤ 48 MHz
		3.0 mA Max.	3.5 mA Max.	4.5 mA Max.			No load condition, 48 MHz < f_0 ≤ 80 MHz
		-					-
Stand-by current	I_{std}	0.7 μ A Max. (0.2 μ A Typ.)	1.5 μ A Max. (0.5 μ A Typ.)	2.0 μ A Max. (1.0 μ A Typ.)	10 μ A Max.		\overline{ST} = GND
Symmetry	SYM	45 % to 55 %	45 % to 55 %	45 % to 55 %	45 % to 55 %		2 MHz < f_0 ≤ 16 MHz
		40 % to 60 %					40 % to 60 %
Output voltage	V_{OH}	90 % V_{CC} Min.				I_{OH} = -3 mA	
	V_{OL}	10 % V_{CC} Max.				I_{OL} = 3 mA	
Output load condition (CMOS)	L_{CMOS}	15 pF Max.					
Input voltage	V_{IH}	80 % V_{CC} Min.			70 % V_{CC} Min.		\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} = 15 pF
Start-up time	t_{str}	10 ms Max.			2 ms Max.		$t=0$ at 90 % V_{CC}
Frequency aging	f_{aging}	$\pm 5 \times 10^{-6}$ / year Max.			$\pm 3 \times 10^{-6}$ / year Max.		+25 °C, First year, V_{CC} = 1.8 V, 2.5 V, 3.3 V
		-			$\pm 10 \times 10^{-6}$ Max.		+25 °C, 10 years

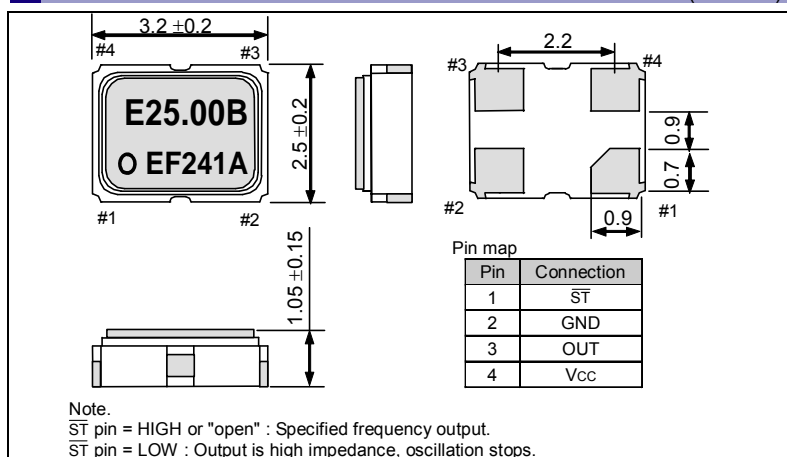
Product Name (Standard form) **SG-310 S E F 25.000000MHz L**
 ① Model ② Function (S: Standby)
 ③ Supply voltage ④ Frequency
 ⑤ Frequency tolerance

③ Supply voltage	④ Frequency
E 1.8 V Typ.	B $\pm 50 \times 10^{-6}$ / -20 to +70 °C
D 2.5 V Typ.	C $\pm 100 \times 10^{-6}$ / -20 to +70 °C
C 3.3 V Typ.	L $\pm 50 \times 10^{-6}$ / -40 to +85 °C
	M $\pm 100 \times 10^{-6}$ / -40 to +85 °C

⑤ Frequency tolerance	*Only SDN, SCN are available
D* $\pm 20 \times 10^{-6}$ / -20 to +70 °C	S* $\pm 25 \times 10^{-6}$ / -20 to +70 °C
R* $\pm 25 \times 10^{-6}$ / -30 to +85 °C	P* $\pm 20 \times 10^{-6}$ / -30 to +85 °C
J* $\pm 25 \times 10^{-6}$ / -40 to +85 °C	

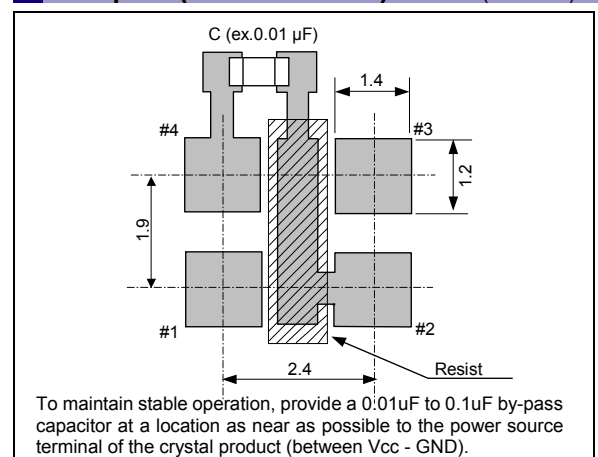
External dimensions

(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.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.





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	► Pb free.
	► 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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