



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)
Q33310xx0xxxx00



Actual size

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					Please contact us about +85 °C < T_{use}	
Frequency tolerance	f_{tol}	B: $\pm 50 \times 10^{-6}$, C: $\pm 100 \times 10^{-6}$ L: $\pm 50 \times 10^{-6}$, M: $\pm 100 \times 10^{-6}$					-20 °C to +70 °C	
		-			D: $\pm 20 \times 10^{-6}$, S: $\pm 25 \times 10^{-6}$		-40 °C to +85 °C	-20 °C to +70 °C
		-			R: $\pm 25 \times 10^{-6}$, P: $\pm 20 \times 10^{-6}$		-30 °C to +85 °C	-30 °C to +85 °C
		-			J: $\pm 25 \times 10^{-6}$		-40 °C to +85 °C	-40 °C to +85 °C
Current consumption	I_{CC}	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_0 ≤ 4 MHz	
		1.5 mA Max.	1.5 mA Max.	2.0 mA Max.			No load condition, 4 MHz < f_0 ≤ 8 MHz	
		1.5 mA Max.	2.0 mA Max.	2.5 mA Max.			No load condition, 8 MHz < f_0 ≤ 16 MHz	
		2.0 mA Max.	2.0 mA Max.	2.5 mA Max.			No load condition, 16 MHz < f_0 ≤ 25 MHz	
		2.0 mA Max.	2.5 mA Max.	3.5 mA Max.			No load condition, 25 MHz < f_0 ≤ 33 MHz	
		3.0 mA Max.	3.5 mA Max.	4.5 mA Max.			No load condition, 33 MHz < f_0 ≤ 48 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.		No load condition, 48 MHz < f_0 ≤ 80 MHz \overline{ST} = GND	
Symmetry	SYM	45 % to 55 %	45 % to 55 %	45 % to 55 %	45 % to 55 %	45 % to 55 %	2 MHz < f_0 ≤ 16 MHz	50 % V_{CC} level $L_{CMOS} \leq 15$ pF
		40 % to 60 %					16 MHz < f_0 ≤ 40 MHz	
			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 SG-310 S E F 25.000000MHz L
(Standard form) ① ② ③ ④ ⑤

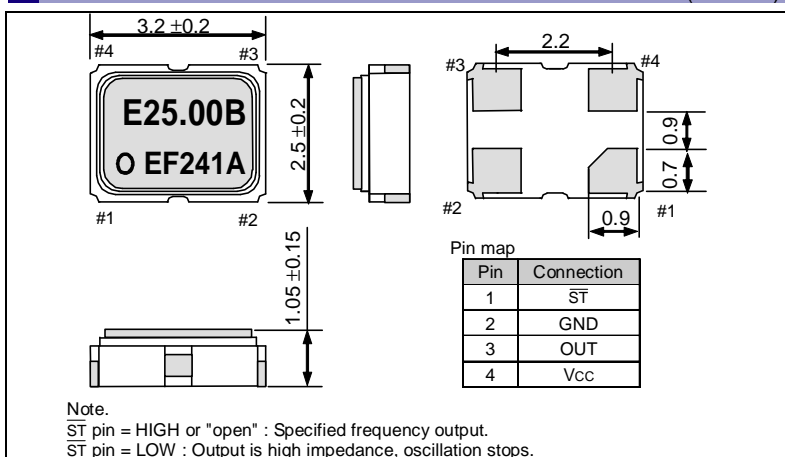
① Model ② Function (S: Standby)
③ Supply voltage ④ Frequency
⑤ Frequency tolerance

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	$\pm 50 \times 10^{-6}$ / -20 to +70 °C	D* $\pm 20 \times 10^{-6}$ / -20 to +70 °C
C	$\pm 100 \times 10^{-6}$ / -20 to +70 °C	S* $\pm 25 \times 10^{-6}$ / -20 to +70 °C
L	$\pm 50 \times 10^{-6}$ / -40 to +85 °C	R* $\pm 25 \times 10^{-6}$ / -30 to +85 °C
M	$\pm 100 \times 10^{-6}$ / -40 to +85 °C	P* $\pm 20 \times 10^{-6}$ / -30 to +85 °C
		J* $\pm 25 \times 10^{-6}$ / -40 to +85 °C

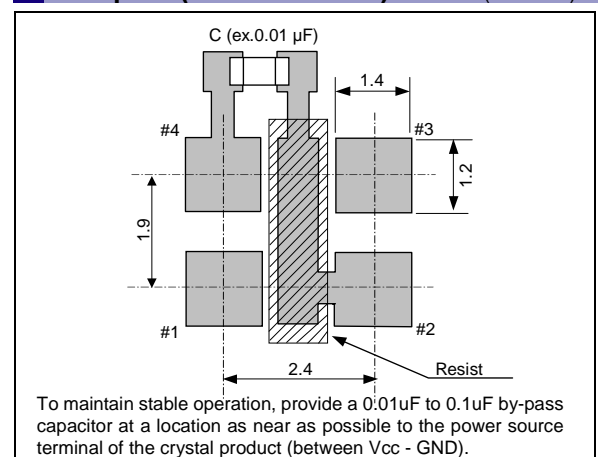
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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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In order provide high quality and reliable products and services than meet customer needs,

Seiko Epson made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

ISO/TS16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

► Explanation of the mark that are using it for the catalog

	► 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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