CRYSTAL OSCILLATOR (SPXO)

OUTPUT : CMOS

SG - 210 S*B

- Frequency range : 2 MHz to 60 MHz
- Supply voltage : 1.5 V Typ. / 1.8 V Typ. / 2.5 V Typ. / 3.3 V Typ.
- Current consumption : 0.9 mA Typ. (SEB: 1.8 V No load condition 48 MHz)
- Function : Standby($\overline{ST}$)
- External dimensions : 2.5 × 2.0 × 0.8 mm
- Operation temperature : +105 °C / +125 °C

Pb Free RoHS Compliant

Product Number (please contact us)
Q33210Bx0xxxx00

Actual size

Specifications (characteristics)

Item	Symbol	SG-210SGB	SG-210SEB	SG-210SDB	SG-210SCB	Conditions / Remarks
Output frequency range	f_0	2 MHz to 32 MHz	2 MHz to 60 MHz			Please contact us about available frequencies
Supply voltage	V_{CC}	1.5 V Typ. 1.3 V to 1.7 V	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	
Storage temperature	T_stg	-40 °C to +125 °C				Storage as single product.
Operating temperature	T_use	-40 °C to +85 °C / -40 °C to +105 °C / -40 °C to +125 °C				
Frequency tolerance	f_tol	F: ±20 × 10^{-6}				-10 °C to +60 °C, $f_0 \leq$ 32 MHz, V_{CC} ±10%, except reflow drift.
		B: ±50 × 10^{-6}, C: ±100 × 10^{-6}				-20 °C to +70 °C
		L:±50 × 10^{-6},M:±100 × 10^{-6}				-40 °C to +85 °C
		–	Y:±50 × 10^{-6},W:±100 × 10^{-6}			-40 °C to +105 °C
		–	Z:±100 × 10^{-6},X:±150 × 10^{-6}			-40 °C to +125 °C
Current consumption	I_{CC}	1.0 mA Max.	1.6 mA Max.	2.4 mA Max.	3.0 mA Max.	No load condition
		–	2.0 mA Max	3.0 mA Max.	4.0 mA Max.	No load condition +105 °C,+125 °C
Stand-by current	I_std	0.3 µA Max.	0.5 µA Max.	1.0 µA Max.	1.0 µA Max.	$\overline{ST}$ =GND
		–	1.6 µA Max.	2.4 µA Max.	3.0 µA Max.	$\overline{ST}$ =GND +105 °C,+125 °C
Symmetry	SYM	45 % to 55 %	45 % to 55 %	45 % to 55 %	45 % to 55 %	2 MHz≤f_0≤16 MHz / 16 MHz<f_0≤32 MHz / 32 MHz<f_0≤60 MHz: 50 % V_{CC} level, L_CMOS ≤ 15 pF
		40 % to 60 %				
		–	40 % to 60 %	40 % to 60 %		
		–	40 % to 60 %			+105 °C,+125 °C
Output voltage	V_{OH}	90 % V_{CC} Min.				I_{OH}=-1 mA
	V_{OL}	10 % V_{CC} Max.				I_{OL}= 1 mA
Output load condition(CMOS)	L_CMOS	15 pF Max.				
Input voltage	V_{IH}	80 % V_{CC} Min.				$\overline{ST}$ terminal
	V_{IL}	20 % V_{CC} Max.				
Rise time and Fall time	t_r/ t_f	5 ns Max.	4 ns Max.	3 ns Max.		+85 °C: 20 % V_{CC} to 80 % V_{CC} level, L_CMOS=15 pF
		–	7 ns Max			+105 °C,+125 °C
Start-up time	t_str	3 ms Max.				t=0 at 90 % V_{CC} (+105 °C,+125 °C : 5 ms Max.)
Frequency aging	f_aging	±3 × 10^{-6} / year Max.				+25 °C, First year, V_{CC}=1.5 V,1.8 V, 2.5 V, 3.3 V

Product Name (Standard form)

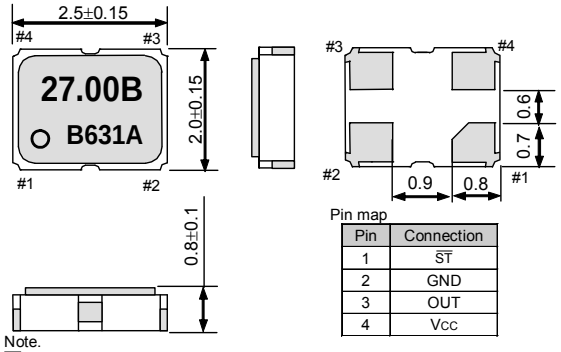
SG-210 S G B 27.000000MHz L
① ②③ ④ ⑤

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

③Supply voltage	
G	1.5 V Typ.
E	1.8 V Typ.
D	2.5 V Typ.
C	3.3 V Typ.

⑤Frequency tolerance	*Except for SGB
F	±20 × 10^{-6} / -10 to +60°C($f_0 \leqq$ 32 MHz)
B	±50 × 10^{-6} / -20 to +70°C
C	±100 × 10^{-6} / -20 to +70°C
L	±50 × 10^{-6} / -40 to +85°C
M	±100 × 10^{-6} / -40 to +85°C
Y*	±50 × 10^{-6} / -40 to +105°C
W*	±100 × 10^{-6} / -40 to +105°C
Z*	±100 × 10^{-6} / -40 to +125°C
X*	±150 × 10^{-6} / -40 to +125°C

External dimensions (Unit:mm)

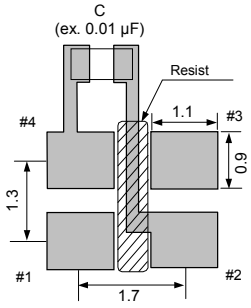


Pin map

Pin	Connection
1	$\overline{ST}$
2	GND
3	OUT
4	V_{CC}

Note.
$\overline{ST}$ pin = HIGH or "open" : Specified frequency output.
$\overline{ST}$ pin = LOW : Output is high impedance, oscillation stops.

Footprint (Recommended) (Unit:mm)



To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

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	►Pb free.
RoHS Compliant	►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.)
For Automotive	►Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
Automotive Safety	►Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc).

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