

**CRYSTAL OSCILLATOR (SPXO)**  
OUTPUT : LV-PECL, LVDS



**Product Number**  
**SG2016EHN: X1G006141xxxx15**  
**SG2016VHN: X1G006121xxxx15**  
**SG2520EHN: X1G005921xxxx15**  
**SG2520VHN: X1G005941xxxx15**

**SG2016EHN/VHN**  
**SG2520EHN/VHN**

- Frequency range : 25 MHz to 500 MHz
- Supply voltage : 1.8 V Typ. (LVDS only) / 2.5 V Typ. / 3.3 V Typ.
- Frequency tolerance :  $\pm 20 \times 10^{-6}$
- Operating temperature : -40 °C to +85 °C, -40 °C to +105 °C
- Function : Output enable (OE) or Standby (ST)
- Phase jitter : 50 fs Max. (391 MHz < fo ≤ 500 MHz, V<sub>CC</sub> = 2.5 V, 3.3 V)



**Specifications (characteristics)**

Item	Symbol	Specifications		Conditions / Remarks	
		LV-PECL SG2016EHN / SG2520EHN	LVDS SG2016VHN / SG2520VHN		
Output frequency range	f <sub>o</sub>	25 MHz to 500 MHz		Please contact us for available frequencies.	
Supply voltage	V <sub>CC</sub>	C: 3.3 V ± 5 % D: 2.5 V ± 5 %	E: 1.8 V ± 5 %		
Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C			
Operating temperature	T <sub>use</sub>	G: -40 °C to +85 °C, H: -40 °C to +105 °C			
Frequency tolerance	f <sub>tol</sub>	C: $\pm 20 \times 10^{-6}$ Max.		Includes initial frequency tolerance, frequency / temperature characteristics, frequency / voltage coefficient and 10 years aging (+25 °C)	
Current consumption	I <sub>CC</sub>	60 mA Max.	-	OE or ST = V <sub>CC</sub> , L ECL = 50 Ω	
		-	25 mA / 30 mA / 25 mA Max. 28 mA / 35 mA / 28 mA Max. 28 mA / 35 mA / 30 mA Max.	25 mA / - / 25 mA Max.	25 MHz ≤ fo < 212 MHz 212 MHz ≤ fo < 392 MHz 392 MHz ≤ fo ≤ 500 MHz
Disable current	I <sub>dis</sub>	35 mA Max.	20 mA Max.	OE = GND	
Stand-by current	I <sub>std</sub>	30 μA Max. 60 μA Max.		ST = GND, T <sub>use</sub> Max. = +85 °C ST = GND, T <sub>use</sub> Max. = +105 °C	
Symmetry	SYM	45 % to 55 %		At output crossing point	
Output voltage (LV-PECL)	V <sub>OH</sub>	V <sub>CC</sub> - 1.1 V Min.	-	Output option: A, DC characteristic	
	V <sub>OL</sub>	V <sub>CC</sub> - 1.5 V Max.	-		
Differential swing	V <sub>sw</sub>	0.8 V to 2.0 V	500 mV to 900 mV	500 mV to 900 mV	
		-	800 mV to 1 600 mV	-	
Output voltage (LVDS)	V <sub>OD</sub>	-	600 mV to 1 200 mV	600 mV to 1 200 mV	
		-	250 mV to 450 mV	250 mV to 450 mV	
		-	400 mV to 800 mV	-	
	dV <sub>OD</sub>	-	50 mV Max.	-	
	V <sub>OS</sub>	-	1.15 V to 1.35 V	0.65 V to 0.85 V	
	dV <sub>OS</sub>	-	50 mV Max.	-	
Output load condition	L ECL	50 Ω	-	Terminated to V <sub>CC</sub> - 2.0 V	
	L LVDS	-	100 Ω	Connected between OUT and $\overline{\text{OUT}}$	
Input voltage	V <sub>IH</sub>	70 % V <sub>CC</sub> Min.		OE or ST terminal	
	V <sub>IL</sub>	30 % V <sub>CC</sub> Max.			
Rise/Fall times	tr/tf	0.35 ns Max.		LV-PECL: 20 % - 80 % (V <sub>OH</sub> - V <sub>OL</sub> ) LVDS: 20 % - 80 % differential output peak to peak	
Start-up time	t <sub>str</sub>	10 ms Max.		t = 0 at 90 % V <sub>CC</sub>	
Phase jitter	t <sub>PJ</sub>	250 fs Max.	250 fs Max.	400 fs Max.	Offset frequency fo < 50 MHz: 12 kHz to 5 MHz fo ≥ 50 MHz: 12 kHz to 20 MHz
		90 fs Max.	100 fs Max.	130 fs Max.	
		70 fs Max.	60 fs Max.	70 fs Max.	
		60 fs Max.	50 fs Max.	60 fs Max.	
		50 fs Max.	50 fs Max.	60 fs Max.	

Product Name **SG2016 EHN 156.250000MHz C C H P Z A**

(Standard form)

① ② ③ ④⑤⑥⑦⑧⑨

①Model ②Output (E: LV-PECL, V: LVDS) ③Frequency ④Supply voltage ⑤Frequency tolerance

⑥Operating temperature ⑦Function ⑧Output disable type (Z: High impedance) ⑨Output option

④Supply voltage	
C	3.3 V Typ.
D	2.5 V Typ.
E*	1.8 V Typ.

⑤Freq. tolerance	
C	$\pm 20 \times 10^{-6}$

⑥Operating temp.	
G	-40 °C to +85 °C
H	-40 °C to +105 °C

⑦Function	
P	OE
S	ST

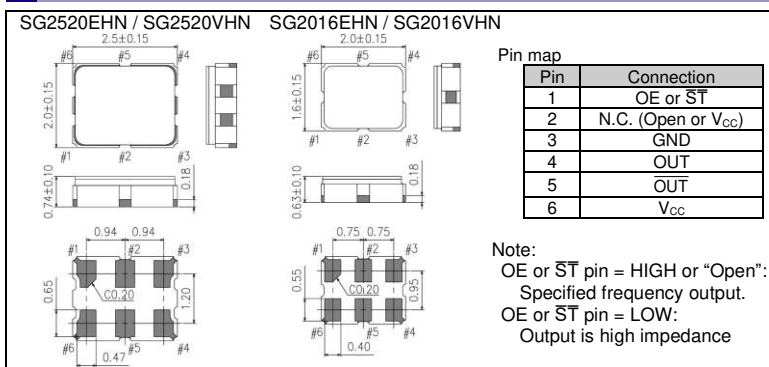
⑨Output option		
	SG2016EHN / SG2520EHN	SG2016VHN / SG2520VHN
A	Default	V <sub>OD</sub> = 250 mV to 450 mV
B*	-	V <sub>OD</sub> = 400 mV to 800 mV
C	-	V <sub>OD</sub> = 300 mV to 600 mV

\*E\* is only for SG2016VHN and SG2520VHN

\*Not available for V<sub>CC</sub> = 1.8 V Typ.

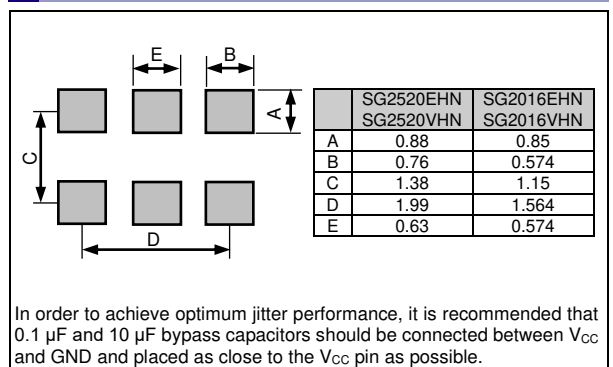
**External dimensions**

(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 IATF 16949 certification that is requested strongly by major automotive manufacturers as standard.

IATF 16949 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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