CRYSTAL OSCILLATOR (SPXO)

OUTPUT : LV-PECL, LVDS

Pb Free RoHS Compliant

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 : ±20 × 10^{-6}
- Operating temperature range : -40 °C to +85 °C, -40 °C to +105 °C
- Function : Output enable (OE) or Standby ($\overline{ST}$)
- Phase jitter : 50 fs Max.
  (391 MHz < fo ≤ 500 MHz, V_{CC} = 2.5 V, 3.3 V)

SG2016EHN
SG2016VHN
(2.0 × 1.6 × 0.63 mm)

SG2520EHN
SG2520VHN
(2.5 × 2.0 × 0.74 mm)

Specifications (characteristics)

Item	Symbol	Specifications			Conditions / Remarks	
		LV-PECL	LVDS			
		SG2016EHN / SG2520EHN	SG2016VHN / SG2520VHN			
Output frequency range	fo	25 MHz to 500 MHz			Please contact us for available frequencies.	
Supply voltage	V_{CC}	C: 3.3 V ± 5 % D: 2.5 V ± 5 %		E: 1.8 V ± 5 %		
Storage temperature range	T_stg	-55 °C to +125 °C				
Operating temperature range	T_use	G: -40 °C to +85 °C, H: -40 °C to +105 °C				
Frequency tolerance	f_tol	C: ±20 × 10^{-6} Max.			Includes initial frequency tolerance, frequency / temperature characteristics, frequency / voltage coefficient and 10 years aging (+25 °C)	
Current consumption	I_{CC}	60 mA Max.	–		OE or $\overline{ST}$ = V_{CC}, L_ECL = 50 Ω	
		–	25 mA / 30 mA / 25 mA Max.	25 mA / – / 25 mA Max.	25 MHz ≤ fo < 212 MHz	OE or $\overline{ST}$ = V_{CC}, Output option: A / B / C
			28 mA / 35 mA / 28 mA Max.		212 MHz ≤ fo < 392 MHz	
			28 mA / 35 mA / 30 mA Max.		392 MHz ≤ fo ≤ 500 MHz	
Disable current	I_dis	35 mA Max.	20 mA Max.		OE = GND	
Stand-by current	I_std	30 µA Max.			$\overline{ST}$ = GND, T_use Max. = +85 °C	
		60 µA Max.			$\overline{ST}$ = GND, T_use Max. = +105 °C	
Symmetry	SYM	45 % to 55 %			At output crossing point	
Output voltage (LV-PECL)	V_{OH}	V_{CC} - 1.1 V Min.	–		Output option: A, DC characteristic	
	V_{OL}	V_{CC} - 1.5 V Max.				
Differential swing	V_{SW}	0.8 V to 2.0 V	500 mV to 900 mV	500 mV to 900 mV	Output option: A	
		–	800 mV to 1 600 mV	–	Output option: B	
		–	600 mV to 1 200 mV	600 mV to 1 200 mV	Output option: C	
Output voltage (LVDS)	V_{OD}	–	250 mV to 450 mV	250 mV to 450 mV	Output option: A	Differential output voltage, V_{OD1}, V_{OD2}
			400 mV to 800 mV	–	Output option: B	
			300 mV to 600 mV	300 mV to 600 mV	Output option: C	
	dV_{OD}	–	50 mV Max.		dV_{OD} = | V_{OD1} - V_{OD2} |	
	V_{OS}	–	1.15 V to 1.35 V	0.65 V to 0.85 V	Offset voltage, V_{OS1}, V_{OS2}	
	dV_{OS}	–	50 mV Max.		dV_{OS} = | V_{OS1} - V_{OS2} |	
Output load condition	L_ECL	50 Ω	–		Terminated to V_{CC} - 2.0 V	
	L_LVDS	–	100 Ω		Connected between OUT and $\overline{OUT}$	
Input voltage	V_{IH}	70 % V_{CC} Min.			OE or $\overline{ST}$ terminal	
	V_{IL}	30 % V_{CC} Max.				
Rise/Fall times	tr/tf	0.35 ns Max.			LV-PECL: 20 % - 80 % (V_{OH} - V_{OL}) LVDS: 20 % - 80 % differential output peak to peak	
Start-up time	t_str	10 ms Max.			t = 0 at 90 % V_{CC}	
Phase jitter	t_{PJ}	250 fs Max.	250 fs Max.	400 fs Max.	25 MHz ≤ fo < 100 MHz	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.	100 MHz ≤ fo ≤ 156 MHz	
		70 fs Max.	60 fs Max.	70 fs Max.	156 MHz < fo ≤ 212 MHz	
		60 fs Max.	50 fs Max.	60 fs Max.	212 MHz < fo ≤ 391 MHz	
		50 fs Max.			391 MHz < fo ≤ 500 MHz	

Product Name (Standard form): SG2016 EHN 156.250000MHz C C H P Z A
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.

* "E" is only for SG2016VHN and SG2520VHN

⑤Freq. tolerance	
C	±20 × 10^{-6}

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

⑦Function	
P	OE
S	$\overline{ST}$

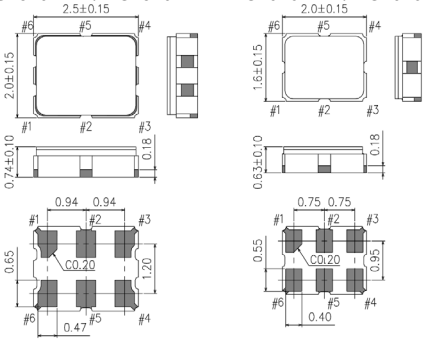
⑨Output option		
	SG2016EHN / SG2520EHN	SG2016VHN / SG2520VHN
A	Default	V_{OD} = 250 mV to 450 mV
B*	–	V_{OD} = 400 mV to 800 mV
C	–	V_{OD} = 300 mV to 600 mV

*Not available for V_{CC} = 1.8 V Typ.

External dimensions (Unit:mm)

Footprint (Recommended) (Unit:mm)

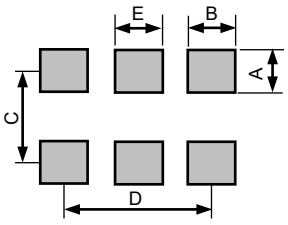
SG2520EHN / SG2520VHN SG2016EHN / SG2016VHN



Pin map

Pin	Connection
1	OE or $\overline{ST}$
2	N.C. (Open or V_{CC})
3	GND
4	OUT
5	$\overline{OUT}$
6	V_{CC}

Note:
OE or $\overline{ST}$ pin = HIGH or "Open":
Specified frequency output.
OE or $\overline{ST}$ pin = LOW:
Output is high impedance



	SG2520EHN SG2520VHN	SG2016EHN SG2016VHN
A	0.88	0.85
B	0.76	0.574
C	1.38	1.15
D	1.99	1.564
E	0.63	0.574

In order to achieve optimum jitter performance, it is recommended that 0.1 µF and 10 µF bypass capacitors should be connected between V_{CC} and GND and placed as close to the V_{CC} pin as possible.

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.

WORKING FOR HIGH QUALITY

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).