CMOS HF CLOCK (XO)
S9-X13AXXX-X Series

Description

The **S9-X13AXXX Series** of quartz crystal oscillators provide high frequency with CMOS/LVCMOS output. The output can be tri-stated for test automation or combining multiple clocks. The device is based on low noise analog harmonic multiplication, and packaged in a miniature, low profile leadless FR4 based package with gold plated pads, which enhances compatibility with PCB material.

Applications and Features

- High Frequency - 125MHz to 220MHz
- Fiber Channel: 10 GbE; Infiniband; Network Processors; SOHO Routing
- High Reliability - NEL HALT/HASS qualified for crystal oscillator start-up conditions
- Low Phase Noise, Low Jitter
- Tight frequency stability - ±20 ppm overall available
- Low cost
- COTS/Dual use

Creating a Part Number

S9 - X 13A X X X - X - FREQ

Package Code
S9 4 pad 7.5mm x 5.2mm SMD

Operating Voltage
A 3.3V±5%
B 2.5V±5%

Enable Option
T Tri-state
N N/C

Temperature Range, °C
A 0 to 50
B 0 to 70
C -20 to 70
D -40 to 85
9 Customer specific

Overall Frequency Stability, ppm
E ±20
F ±25
G ±50
H ±100
9 Customer specific

Environmental
L Contains a level of lead that is in excess of RoHS directive and is not designed for reflow
R RoHS compliant

NEL FREQUENCY CONTROLS, INC.
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S9-X13AXXX-X Series Continued
CMOS HF CLOCK (XO)

Rev. G

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Operating Temperature Range	To	-40 to +85	°C
Storage Temperature Range	Tst	-50 to +90	°C
Supply Voltage	Vcc	-0.5 to 4.5	V
Enable/Disable Voltage	Ven/dis	0 to Vcc	V

Electrical Parameters (2)

Parameter	Sym	Conditions	MIN	TYP	MAX	Unit
Nominal Frequency	Fo		125		220	MHz
Supply Voltage	Vcc	Code A Code B	3.135 2.375	3.3 2.5	3.465 2.625	V
Supply Current	Icc	@155.520MHz		20	40	mA, no load
Load		C MOS	15pf/10K ohm			
Output Levels	V_{OL}				0.1Vcc	V
	V_{OH}		0.9Vcc			V
Duty Cycle (Symmetry)		Vcc/2	45/55	50/50	55/45	%
Rise/Fall Time	Tr/Tf	20 to 80, 80 to 20%, 15pf		2	3	ns
Jitter, Integrated	J	Integrated from Phase Noise, 12KHz to 20MHz, RMS		0.2		ps
Jitter, Wavecrest characterized		Random , period		2.5		ps
		Accuml, pk to pk		25		ps
		Deterministic		6	18	ps
Sub-harmonics				-45	-40	dBc
Phase Noise (1)	£(Δf)	@10 Hz @100 Hz @1 KHz @10KHz @100KHz @>1mHz		-75 -105 -130 -145 -145 -148		dBc/Hz
Frequency Stability	ΔF/F	Overall, including initial calibration, temperature, aging 10 years, shock and vibration	See "Creating a Part Number", Not all combinations available, consult factory			ppm
Enable High Option Pin 1 Disabled Pin 1 Enabled		 CMOS Logic "0" CMOS Logic "1"	 0 0.7Vcc		 0.3Vcc Vcc	V

Footnotes: 1) If phase noise data at a particular frequency is needed, contact factory.
2) All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal Load.

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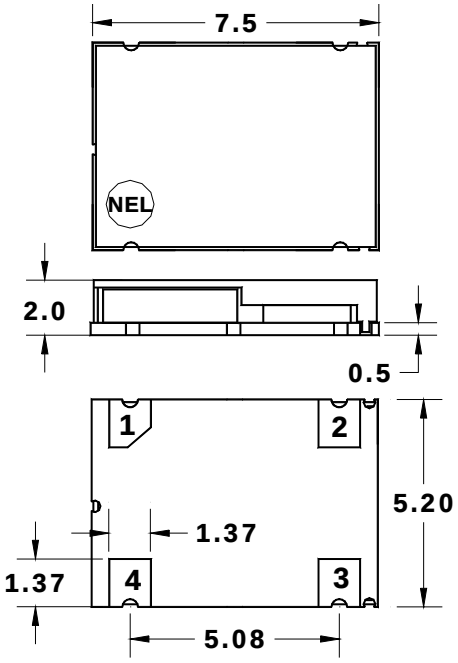
Electrical Connection

Pin	Connection
1	Tri-state or No Connect
2	Gnd
3	OUT
4	Vcc

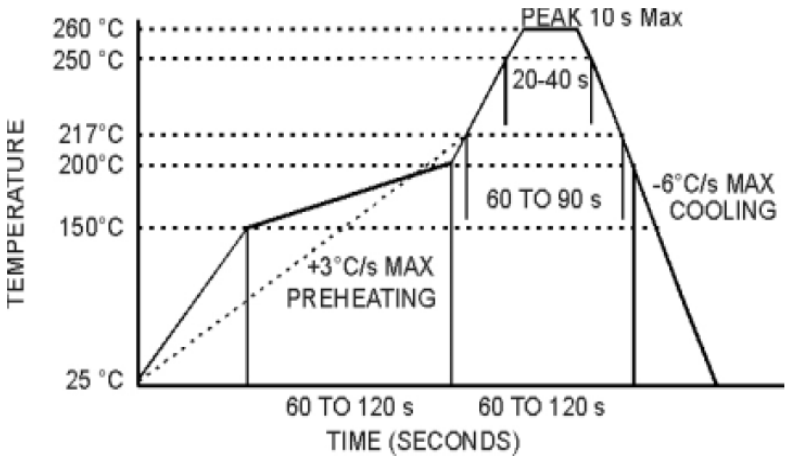
Dimension are typical in mm



Environmental and Mechanical Characteristics

Operating temp. range	See part Number Table
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. E
Thermal Shock	Per MIL-STD-883, Method 1011, Cond. A
Vibration	Per MIL-STD-883, Method 2007, Cond. A
Hermetic Seal	Leak rate less than $1x10^{-8}$ atm.cc/s of helium (crystal only)
Soldering conditions	See MAX reflow profile below; The device may be reflowed once. Reflowing upside down is not allowed. NO CLEAN assembly is recommended.

Maximum Reflow Profile



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