Voltage Controlled Crystal Oscillator

Data Sheet 0717A

S9-X36HXX-X Series
CMOS VCXO

Rev. H

Description

The S9-X36HXX Series of voltage controlled crystal oscillators (VCXO) provides low phase noise CMOS output. The device packaged in a miniature, low profile, leadless FR-4 based package with gold plated pads, which enhances compatibility with PCB material.

Applications and Features

- Low Phase Noise
- Wimax, Fiber Channel; 10 GbE; Infiniband; Network Processors; SOHO Routing
- High Reliability – NEL HALT/HASS qualified for crystal oscillator start-up conditions
- Low cost
- COTS/Dual use

Creating a Part Number

S9 - X 36H X X - X - FREQ

Package code
S9 4 pad 7.5x5.2mm SMD

Operating Voltage
0 5.0 V ± 5%
A 3.3 V ± 5%

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

Absolute Pull Range (APR), ppm
E ±20
F ±32
G ±50
H ±100
9 Customer specific

Environmental
L Contains a level of lead that is in excess of RoHS directive
R RoHS compliant

NEL FREQUENCY CONTROLS, INC.
357 Beloit Street, Burlington, WI 53105 U.S.A. Phone 262/763-3591 FAX 2626262/763-2881
Email: nelsales@nelfc.com www.nelfc.com

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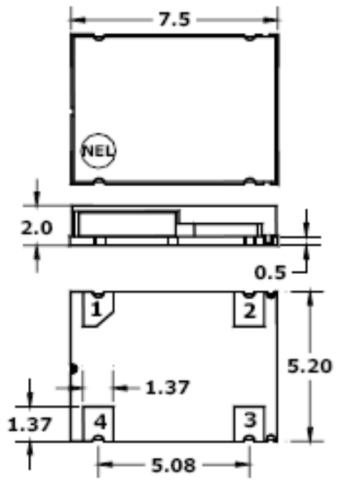
Drawing Specification



OUTLINE TOLERANCE:
Dimension are typical in mm

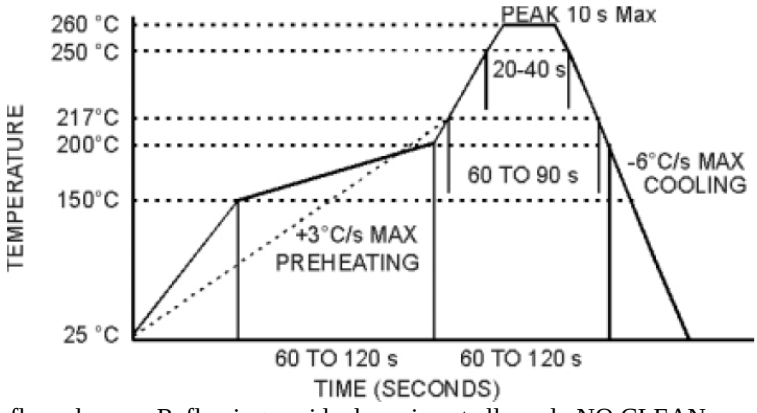
PIN FUNCTIONS:
[1] Vc
[2] Gnd
[3] OUTPUT
[4] Vcc

MARKING (EXAMPLE):
S9-XXXX

Environmental and Mechanical Characteristics

Operating temp. Range	see part # table
Mechanical Shock	Per MIL-STD-202, Method 213, Cond. A
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.

MAX Reflow Profile



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Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Operating Temperature Range	To	-40 to +85	ºC
Storage Temperature Range	Tst	-50 to +90	ºC
Supply Voltage	Vcc	-0.5 to 5.5	V
Control Voltage	Vc	-0.5 to 5.5	

Electrical Parameters (2)

Parameter		Symb	Conditions, Note		MIN	TYP	MAX	Unit
Nominal Frequency		Fo			1		220	MHz
Supply Voltage		Vcc	Code 0 Code A		4.75 3.135	5.0 3.3	5.25 3.465	V
Supply current		Icc	@155 MHz, 3.3V			40	60	mA
Output Logic Type						CMOS		
Load						15 pF/10 KOhm		Ohm
Output Levels		Voh Vol	overall		0.9Vcc		 0.1 Vcc	V
Duty Cycle (Symmetry)			At 50% Vcc		45/55	50/50	55/45	%
Rise/Fall Time		Tr/Tf	0.2Vcc to 0.8 Vcc; F< 70 MHz 70 MHz<F< 125 MHz 125MHz<F<220 MHz			 3 2 1.5	 5 3 2.5	ns
Jitter	Integrated	J	Integrated from Phase Noise, 12 KHz to 20 MHz , RMS			0.1	0.2	ps
			100Hz to 80KHz,RMS				1.0	ps
			50 KHz to 80 MHz			0.3		ps
	Wavecrest characterized		Random period,			2.5		ps
			Accumul., pk-to-pk			17		ps
			Determin.	F>52 MHz		6		ps
Sub-harmonics			F > 52 MHz			-50	-42	dBc
Phase Noise (1)		£(Δf)	155.52 MHz,	@ 10 Hz @100 Hz @1 KHz @10KHz @100KHz @>1MHz		-70 -100 -125 -140 -145 -145		dBc/Hz
Frequency Stability, usually not specified – unless necessary, APR is specified to incorporate stability		ΔF/F	Overall, including temperature, aging 10 years, shock and vibration @Vc=Vcc/2; APR 50 ppm, or less		±20	±30		ppm
Control Voltage Range		Vc			0V		Vcc	V
Setability		Vcs	Vc to set the F at Fo; T, Vcc, load – nominal, as shipped		0.4 Vcc	0.5 Vcc	0.6 Vcc	V
Absolute Pull Range		APR	Over all conditions, see part # creation		20, 32, 50, 100			ppm
Input impedance		Zin	@ Fmod < 100 KHz		50			KOhm
Modulation Bandwidth			At Vc = Vcc/2, -3dB		20			KHz

Footnote: 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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