CRYSTAL OSCILLATORS

Data Sheet 0635A

OC-X87XXXXX-X Series

Micro-miniature OCXO

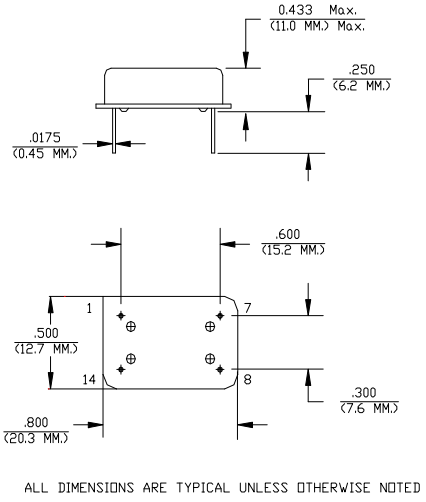
Rev. P

Features

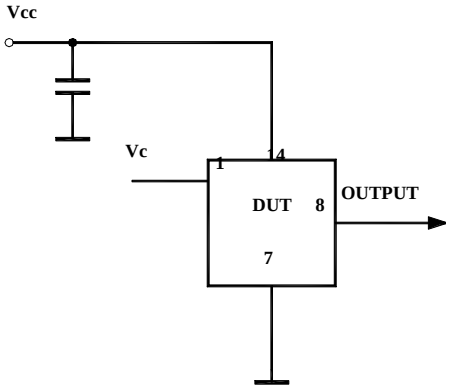
- **Low Cost DIL 14 package**
- **High Vacuum Sealed Crystal**
- **Low Power Consumption (500 mW)**
- **Fast Warm-up Time (2 minutes)**
- **Stratum3 or better Stability**
- **Low Aging < 3 ppm over life**
- **Very Low Phase Noise (-155dBc/Hz TYP)**
- **HCMOS/TTL or Sine-Wave output**
- **8 MHz to 160 MHz Frequencies Available**
- **Voltage Control Optional**
- **Good Performance**
- **COTS/Dual use**

Applications

- **Telecommunications**
- **Data Communications**
- **Instrumentation**



ALL DIMENSIONS ARE TYPICAL UNLESS OTHERWISE NOTED



NEL FREQUENCY CONTROLS, INC.

357 Beloit Street, Burlington, WI 53105 U.S.A. Phone 262/763-3591 FAX 262/763-2881

Email: nelsales@nelfc.com www.nelfc.com

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Specifications:

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
Absolute Maximum Ratings							
Input Break Down Voltage	Vcc		-0.5		5.5	V	3.3V or 5V Vcc
Storage temper.	Ts		-40		85	°C	
Control Voltage	Vc		-1		6	V	
Electrical *(3)*							
Frequency	F		8	10.000	160	MHz	1*
Frequency stability	ΔF/F	vs. Temp.		±100	±280	ppb	See chart below
		vs. Supply		10	50	ppb/V	
Aging		per day first year 15 years		5E-9 3E-7	 3E-6		after 30 days
Allan Deviation		.1s to 100s		5E-11			
Calibration		No voltage control		± 0.5	± 2	ppm	
Vcc sensitivity				5E-8/V			
Load sensitivity		For 10% change			5E-8		
SSB Phase Noise		10 Hz 100 Hz 1 KHz 10 KHz >100 KHz		-100 -130 -140 -150 -155		dBc/Hz	2*
Retrace		After 30 minutes			±100	ppb	
G-sensitivity		worst direction			±2.0	ppb/G	
Input Voltage	Vcc		4.75 3.15	5.0 3.3	5.25 3.45	V	See chart below
Power consumption	P	steady state, 25°C steady state, -30°C start-up		0.5	0.7 1.5 2.5	W	Upper operating temperature < 70°C, add 20% for UOT 85°C
Load	10KOhm//15pF Internally AC coupled 50 Ohm						CMOS Output Sine-wave output
Warm-up time	τ	to 0.3 ppm accuracy		2	3	min	
Sub-Harmonics				-50	-40	dBc	At higher F 1*
Output Waveform	3.3V HCMOS/TTL compatible, 4 ns Tr/Tf, 40/60% duty cycle Sine-wave, + 7 dBm ±3 dBm into 50 Ohm, -30 dBc harmonics						See chart below
Control voltage	Vc		0		4.0	V	
Pull range		from nominal F	±5	±10		ppm	Customer specified
Deviation slope		Monotonic, posit		5		ppm/V	Customer specified
Setability	Vc0	@25°C, Fnom.	1.0	2.0	3.0	V	5V/3.3 supply
Modulation Bandwidth	Fm		DC		1	KHz	Note 4

All parameters for 10 MHz

Environmental and Mechanical	
Operating temp. range	-30°C to 70°C Standard, Other options – see chart below
Mechanical Shock	Per MIL-STD-202, 30G, 11ms
Vibration	Per MIL-STD-202, 5G to 2000 Hz
Soldering Conditions	Leads Temperature 260°C, for 10s, Max
Hermetic Seal	Leak rate less than $1x10^{-8}$ atm.ccm/s of helium

Electrical Connections	
Pin Out	Pin 1- Vc; Pin 7- Case, GND; Pin8 – Output; Pin 14 - Vcc

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OC-X87XXXXX-X Series

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Rev. P

Creating a Part Number

OC – X 87 X X XX X -- X **FREQUENCY, MHz**

Package Code

OC 0.8x0.5" 4pin (14pin)

Supply Voltage

Code	Specification
0	5V ± 5%
A	3.3V ± 5%

Voltage Control

Code	Specification
V	Voltage Control
0	No Voltage Control

Output

Code	Specification
T	TTL/ CMOS
S	Sine

Temperature Range

Code	Specification
A	0°C to 50°C
B	0°C to 70°C
C	-20°C to 70°C
D	-40°C to 85°C
E	-10°C to 60°C
F	-40°C to 80°C
G	-30°C to 70°C
9	Customer Specific

Temperature Stability

Code	Specification
58	$5x10^{-8}$
17	$1x10^{-7}$
S3	$2.8x10^{-7}$
37	$3x10^{-7}$
57	$5x10^{-7}$
YZ	$Yx10^{-Z}$

Environmental

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

Not all combinations are available. Consult Factory.

Notes:

1* Higher frequencies can be achieved either by using higher frequency crystals or by low noise analog harmonic multiplication. Both methods have advantages and drawbacks. If lowest possible phase noise on the noise floor is most important – high frequency crystal will be used. If phase noise close to the carrier and aging are more important – multiplication will be used. Please consult factory for your specific requirement.

2* Phase noise deteriorates with frequencies going higher. If analog multiplication is used to achieve higher frequency the phase noise roughly follows the formula of additional 20LogN, where N is a multiplication factor across entire frequency offset range. If higher frequency is achieved by using higher frequency crystal phase noise close to the carrier deteriorates due to the lower Q of the crystal and is usually worse, compared to multiplied solution. On the noise floor, however it remains more or less the same.

3 All parameters, unless otherwise specified, are at nominal conditions, ie: T=25°C, Nominal Vcc & Nominal Load.

4 Older and stock units may have MBW of 150 Hz Max.

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