Rev U

O-CEH-XXYZXX-X-X-XX-X
Precision Ultra Low Phase Noise OCXO in 36x27 mm "Europack"

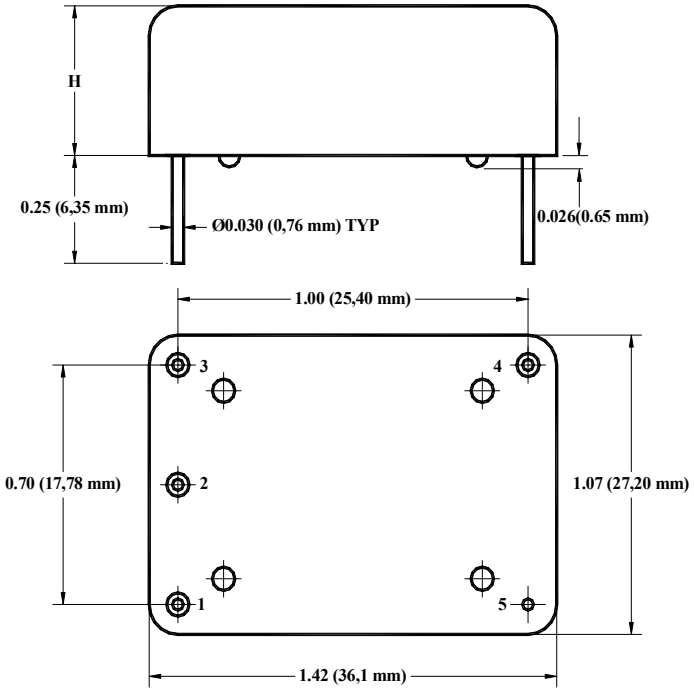
Product Data Sheet

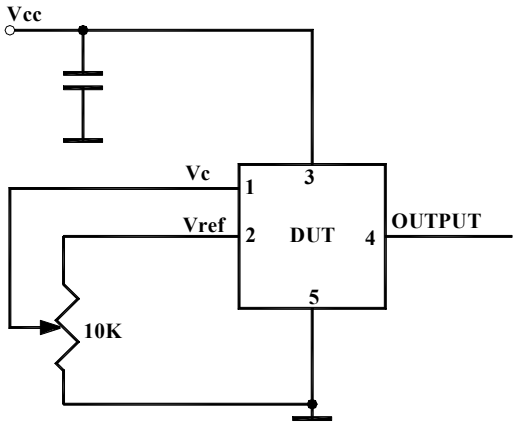
Features

- SC-cut crystal
- High Stability
- Low Aging
- Ultra Low Phase Noise Option:
  - Standard(L) -140dBc/Hz at 10Hz; -169dBc/Hz on the floor
  - Premium(P) -145dBc/Hz at 10Hz; -170dBc/Hz on the floor
  - Ultimate(U) -115 dBc/Hz at 1 Hz -146dBc/Hz at 10Hz; -170dBc/Hz on the floor
  - Extraordinary(E) -120 dBc/Hz at 1 Hz -148 dBc/Hz at 10 Hz -170 dBc/Hz on the floor
- Sine Wave or HCMOS/TTL output

Applications

- Instrumentation
- GPS
- Telecommunication Systems
- Radar
- COTS/Dual use





H code	Height, inches, TYP
5	0.5 (12.7 mm)
6	0.63 (16 mm)
7	0.75 (19 mm)

Code 6 is standard unless code 5 is requested. Code 7 is for special requirements.

NEL FREQUENCY CONTROLS, INC.

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OVEN-CONTROLLED CRYSTAL OSCILLATORS

Data Sheet 0835A

Parameter	Symb	Condition	Min	Typ	Max	Unit	Note
Absolute Maximum Ratings							
Input Break Down Voltage	Vcc	12 V supply 5 V supply	-0.5 -0.5		13.0 5.5	V	
Storage temper.	Ts		-50		90	°C	
Control Voltage	Vc		-1 -5 -1		5.5 5 11	V	Slope option ñPò Slope option ñNò Slope option ñLò
Electrical (6)							
Frequency	F		8	10.000	13	MHz	
Frequency stability	ΔF/F	vs. Temp.		±20		ppb	See chart below
		vs. Supply		0.2	0.3	ppb/10%Vcc	
Aging		per day per year, first year second year 10 years 15 years		5E-10 1E-7 3E-8 2.5E-7 2.7E-7			after 30 days 5E-8 available
Allan Deviation		0.1s 1s 10s		5E-13 2E-12 5E-12			Premium version, Option ñPò
SSB Phase Noise (achieved after 10 minutes warm-up)		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz		-105	 -140 -155 -162 -168 -169	dBc/Hz	Standard version, option L
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-112 -145 -155 -162 -169 -170		Premium version, option P
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-115 -146 -156 -163 -169 -170		Ultimate version, option U
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-120 -148 -160 -168 -170 -170		Extraordinary version, option E, available with slope options N or L
Retrace		After 30 minutes			±10	ppb	24 Hours off 3*
G-sensitivity		worst direction			±1.0	ppb/G	
Input Voltage	Vcc		4.75 11.4	5.0 12.0	5.25 12.6	V	See chart below to specify
Power consumption, Still air	P	steady state, 25°C steady state, -30°C start-up @ -30°C		1.0 1.7 2.5	1.4 3.2	W	Standard Operating Temperature*
Spectral Purity		Subharmonics Spurious Harmonics		none -35	 -80 -30	dBc	
Load		10KOhm//15pF (HCMOS/TTL), AC-coupled 50 Ohm (Sine-wave)					Output Code T Output Code S
Warm-up time	τ	to 0.1ppm accuracy		3	5	minutes	

All parameters for 10 MHz

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Output Waveform		HCMOS/TTL compatible or Sinewave					
Output Power			+10	+13		dBm	Output Code S
Logic 1 (CMOS)	Voh		0.7 Vref			V	Output Code T
Logic 0 (CMOS)	Vol				0.1 Vref	V	Output Code T
Control voltage	Vc		0 -4.0 0		Vref 4.0 10.0	V	Slope option ñPò Slope option ñNò Slope option ñLò
Input impedance	Zin	At Vc pin	10			Kohm	
Modulation bandwidth	Fm		DC		1	KHz	Note 8
Reference Voltage	Vref	Vcc = 12V Vcc = 5V		5 or 4.5 4.5		V	N/A with slope options ñNò and ñLò
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	±0.4	±0.6		ppm	
Deviation slope		Monotonic, positive Monotonic, negative Monotonic, positive		1.2/Vref -0.15 0.14		ppm/V	Slope option ñPò Slope option ñNò Slope option ñLò
Setability	Vc0	@25°C, Fnom. No internal bias for slope option ñLò	Vref/2 ± 0.5 0 ± 0.5 5 ±0.5			V	Slope option ñPò 3* Slope option ñNò Slope option ñLò

Notes:

*. For highest operating temperature higher than 70ºC the power consumption will be higher (about 20% for 85ºC). Values listed are for test in still air environment, the values will go up while testing in the temperature chamber.

3*. Longer storage time, especially at low temperatures, may affect both retrace and setability parameters. It may \ require few days on power for re-stabilization.

5*. Pin 2 is connected to Vref only for Slope Option ñPò.

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

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

Environmental and Mechanical

Operating temp. range	-30°C to 70°C Standard, Other options ï see chart below
Storage Temperature	-50°C to 90°C
Mechanical Shock	Per MIL-STD-202, 30G, 11ms
Vibration	Per MIL-STD-202, 5G to 2000 Hz
Soldering Conditions	260°C for 10s Max leads only

Electrical Connections

Pin Out	Pin #1-Vc ; Pin#2 ï Vref or N/C (5*); Pin #3 ï Vcc; Pin #4- Output ; Pin #5- GND;

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Data Sheet 0835A

Creating a Part Number

O - C E H _ _ _ _ _ _ XX - X FREQ

O = **OCXO**

C = **Conventional Power**

E = **Package Code**

E 5 pin 36x27mm

H = **Height code per dwg**

Supply Voltage

Code	Specification
0	5V ± 5%
F	12V± 5%

Output

Code	Specification
T	CMOS/TTL
S	Sinewave

Temperature Stability 4*

Code	Specification
17	$1x10^{-7}$
58	$5x10^{-8}$
28	$2x10^{-8}$
18	$1x10^{-8}$
YZ	$Yx10^{-Z}$

Temperature Range

Code	In 5ºC steps 7*
First letter	Lowest temperature from A = -40ºC
Second letter	Highest temperature to Z = 85ºC
Examples	
IS	0°C to 50°C
GU	-10°C to 60°C
EW	-20°C to 70°C

Deviation slope

Code	Specification
P	Positive, 0 to Vref
N	Negative, -4 to 4V
L	Positive, 0 to 10 V

Phase Noise (See Table)

Code	Specification
L	Standard
P	Premium
U	Ultimate
E	Extraordinary

Aging

Insert Value per day times 1E-10	
Examples	
5	5E-10 = 0.5 ppb/day
10	1E-9 = 1 ppb/day

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.

7*Temperature Code Table

Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C	Letter	Temp °C
A	-40	**F**	-15	**K**	10	**P**	35	**U**	60	**Z**	85
B	-35	**G**	-10	**L**	15	**Q**	40	**V**	65		
C	-30	**H**	-5	**M**	20	**R**	45	**W**	70		
D	-25	**I**	0	**N**	25	**S**	50	**X**	75		
E	-20	**J**	5	**O**	30	**T**	55	**Y**	80		

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