Rev K

O-CXM-XXYZXX-X-X-XX-X
Precision Ultra Low Phase Noise OCXO in 36x27 mm "Europack" with optional Adapter to 2"x2"

Product Data Sheet

Description

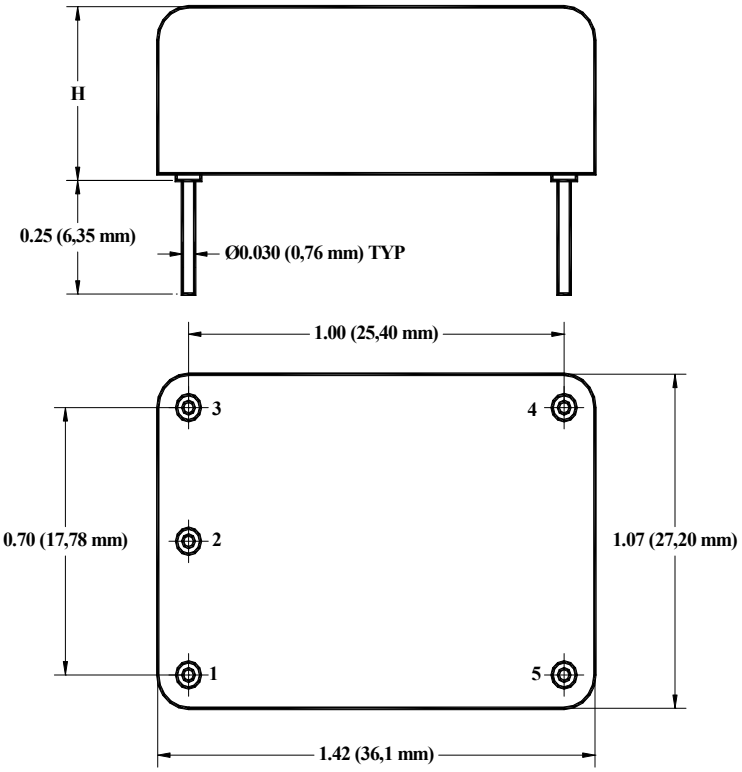
O-CX…Series is based on Ultra Low Noise 10 MHz reference OCXO and low noise analog multiplier to achieve higher frequencies multiple of 10 MHz

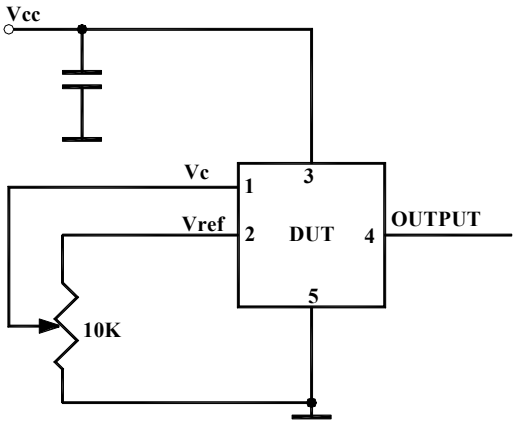
Features

- **SC-cut crystal**
- **High Stability**
- **Ultra Low Aging**
- **Ultra Low Phase Noise**
- **Sine Wave or HCMOS/TTL output**

Applications

- **Instrumentation**
- **Telecommunication Systems**
- **Data Communications**
- **GPS**
- **COTS/Dual use**





Height H is 0.75" TYP – standard.
For special requirements 0.63" TYP height can be considered – consult factory

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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		5.5 5	V	Slope option "P" Slope option "N"
Electrical (4)							
Frequency	F		20		100	MHz	
Frequency stability	ΔF/F	vs. Temp.		±10		ppb	See chart below
		vs. Supply		0.2	0.3	ppb/10%Vcc	
Aging		per day per year, first year second year per day per first year Following years		5E-10 1E-7 3E-8 1E-10 2E-8 1E-8			after 30 days 5E-8 available Option 01 Option 01 Option 01
Allan Deviation		.1s to 1s		1E-12			PN grade "U"
SSB Phase Noise of 10 MHz reference. Values at actual operating frequency are higher by approximately 20LogN (N = F, MHz/10) at all frequency offsets from the carrier (achieved after 10 minutes warm-up). Example: for F = 50 MHz at 10 Hz offset of the standard version Sφ = -126 dBc/Hz	Sφ	1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-110 -140 -155 -162 -170 -172	dBc/Hz	Standard version, option L
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-112 -145 -158 -165 -170 -172		Premium version, option P
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-115 -146 -158 -165 -170 -172		Ultimate version, option U 2*
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-120 -148 -160 -168 -170 -173		Extraordinary version, Option E, available with slope options N or L
SSB Phase Noise, F = 100.000 MHz	Sφ	1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-90 -120 -135 -142 -150 -152	dBc/Hz	Standard version, option L
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-92 -125 -138 -145 -150 -152		Premium version, option P

Phase Noise values are converted back to 10 MHz reference. Values at actual frequency are higher by approximately 20LogN (N = F, MHz/10) at all frequency offsets from the carrier

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		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-95 -126 -138 -145 -150 -152		Ultimate version, option U 2*
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-100 -128 -140 -148 -150 -153		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		Sub-harmonics Spurious Harmonics/Sine		-50 -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	
Output Waveform		HCMOS/TTL compatible or Sinewave					
Output Power			+5	+10		dBm	Output Code S
Logic 1 (CMOS)	Voh		0.9 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	V	Slope option "P" Slope option "N" Slope option "L"
Input impedance	Zin	At Vc pin	10			KOhm	
Modulation bandwidth	Fm		DC		1	KHz	Note 5
Reference Voltage	Vref	Vcc = 12V Vcc = 5V		5 or 4.5 4.5		V	
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	±0.3 ±0.4	±0.5 ±0.6		ppm	Slope option "P" Slope option "N"
Deviation slope		Monotonic, positive Monotonic, negative Monotonic, positive		1.0/Vref -0.13 -0.12		ppm/V	Slope option "P" Slope option "N" Slope option "L"
Setability	Vc0	@25°C, Fnom. No internal bias for slope option "L"	Vref/2 ± 0.5 0 ± 0.5 5 ± 0.5			V	Slope option "P" 3* Slope option "N" Slope option "L"

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.

2*. It is recommended to specify Slope option "N" for Ultimate Phase noise performance. For recommended phase noise test, contact factory. It's assumed that phase noise test is performed under static conditions (no vibration), in still air, and care is taken for minimizing EMI.

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.

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

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

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OVEN-CONTROLLED CRYSTAL OSCILLATORS

Data Sheet 0837A

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	260°C for 10s Max leads only

Electrical Connections

Pin Out	Pin #1-Vc ; Pin#2 – Vref; Pin #3 – Vcc; Pin #4- Output ; Pin #5- GND;

Creating a Part Number

O - C X M X X YZ XX - X - X - XX - X FREQ

OCXO

Conventional Power

Multiplied

Package Code

E 5 pin 36x27mm

A for adapter

Supply Voltage

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

Output

Code	Specification
T	CMOS/TTL
S	Sinewave

Temperature Stability

Code	Specification
17	$1x10^{-7}$
58	$5x10^{-8}$
28	$2x10^{-8}$
18	$1x10^{-8}$
59	$5x10^{-9}$
YZ	$Yx10^{-Z}$

Temperature Range

Code	In 5ºC steps **
First letter	Lowest temperature from A = -40ºC
Second letter	Highest temperature to Z = 85ºC
Examples	
AZ	-40°C to 85°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 10V

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
01	1E-10 = 0.1 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.

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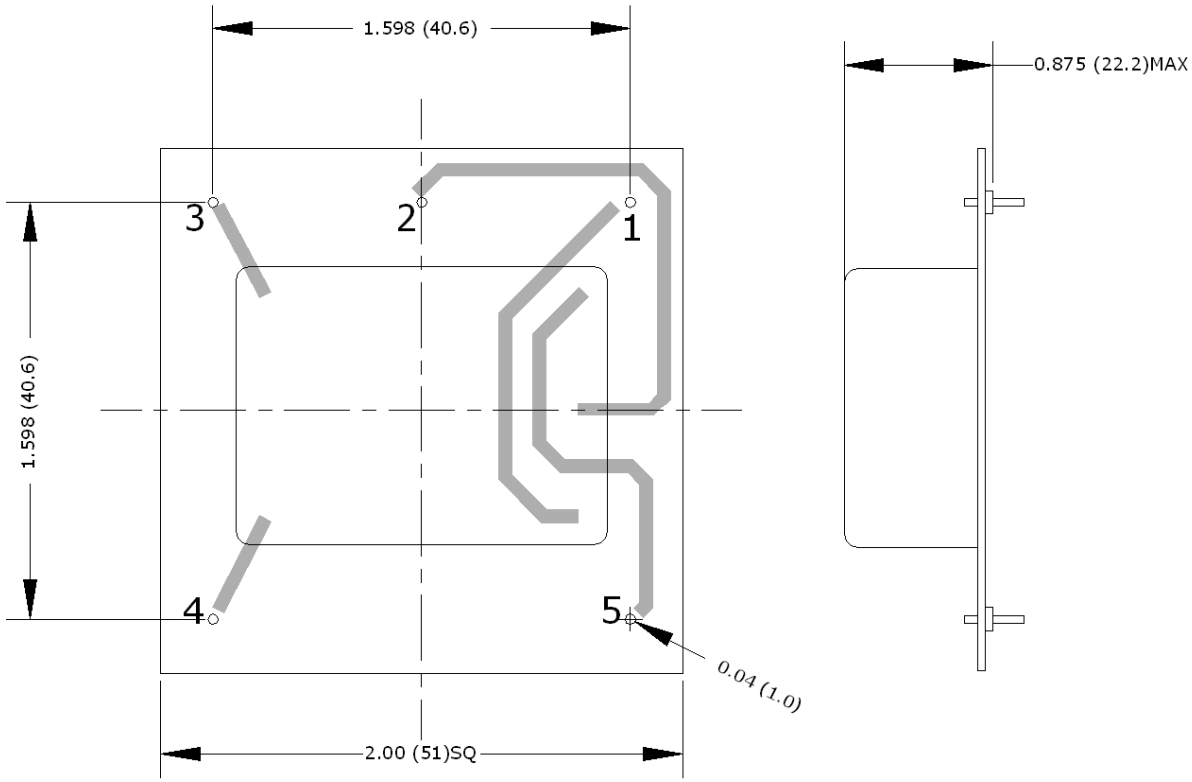
**Temperature Code Table

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		

Optional adapter for 2"x 2" compatibility:



Adapter Pin Out	Pin #1-Vc ; Pin#2 – Vref; Pin #3 – Output; Pin #4- GND ; Pin #5- Vcc;

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