

## Precision Ultra Low Phase Noise OCXO in 36x27 mm “Europack” with OSC Disable and Oven Alarm features for Instrumentation



36.1 x 27.2 x 16 mm  
Datasheet #0913C

### Features

- SC-cut crystal
- High Stability
- Low Aging
- Ultra Low Phase Noise Options:
  - Standard(L) - 140 dBc/Hz at 10Hz;  
-172 dBc/Hz on the floor
  - Premium(P) -143 dBc/Hz at 10Hz;  
-172 dBc/Hz on the floor
  - Ultimate(U) -145 dBc/Hz at 10Hz;  
-172 dBc/Hz on the floor
  - Extraordinary(E) -120 dBc/Hz at 1 Hz;  
-148 dBc/Hz at 10Hz;  
-172 dBc/Hz on the floor

### Applications

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

### Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	V <sub>cc</sub>	12 V supply 5 V supply	-0.5 -0.5		13.0 5.5	V	
Storage temper.	T <sub>s</sub>		-40		85	°C	
Control Voltage	V <sub>c</sub>		-1 -5 -1		5.5 5 11	V	Slope option “P” Slope option “N” Slope option “L”

### Electrical (4\*)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes	
Frequency	F		8	10.000	13	MHz		
Frequency stability	ΔF/F	vs. Temp.		±10		ppb	See chart below	All parameters for 10 MHz
		vs. Supply		0.2	0.3	ppb/10%V <sub>cc</sub>		
Aging		Per day		5E-10			after 30 days 5E-8 available	
		per year, first year second year		1E-7 3E-8				
Allan Deviation		0.1s		5E-13			Premium version, option P	
		1.0s		2E-12				
		10s		5E-12				
SSB Phase Noise (achieved after 10 minutes warm-up)		1Hz			-110	dBc/Hz	Standard version, option L	
		10Hz			-140			
		100Hz			-155			
		1KHz			-162			
		10KHz 100KHz			-170 -172			

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### Electrical (cont.)

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
SSB Phase Noise (achieved after 10 minutes warm-up)		1Hz			-112	dBc/Hz	Premium version, option P
		10Hz			-143		
		100Hz			-155		
		1KHz			-162		
		10KHz			-170		
		100KHz			-172		
		1Hz			-115	dBc/Hz	Ultimate version, Option U
		10Hz			-146		
		100Hz			-156		
1KHz			-163				
10KHz			-170				
100KHz			-172				
1Hz			-120	dBc/Hz	Extraordinary version, option E, available with slope options N or L		
10Hz			-148				
100Hz			-160				
1KHz			-168				
10KHz			-170				
100KHz			-172				
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	P	steady state, 25°C steady state, -30°C start-up @ -30°C		1.2 1.5 2.5	1.5 3.2	W	Still air
Spectral Purity		Spurious Harmonics/Sine		-35	-80 -30	dBc	Non-harmonic
Load	Internally AC-coupled 50 Ohm						
Warm-up time	τ	to 0.1ppm accuracy to 10ppb accuracy		3	5 10	minutes	Off time <24 hrs Aging rate was reached
Output Waveform	HCMOS/TTL compatible or Sinewave						
Output Power			+10	+13		dBm	Output Code S
Logic 1 (CMOS)	Voh		0.7Vref			V	Output Code T
Logic 0 (CMOS)	Vol				0.1 Vref	V	Output Code T
Control voltage	Vc	No internal bias	0 -4.0 0		Vref 4.0 10	V	Slope option “P” Slope option “N” Slope option “L”
Reference Voltage	Vref	Vcc = 12V Vcc = 5V		5 or 4.5 4.5		V	N/A w/slope options “N” and “L”
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		1.0/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”
Oven Ready		V pin #7	3.3		0.5	V	Ready Not Ready

All parameters for 10 MHz

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*Electrical(cont.)*

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Output Enable		CMOS Logic “1” (4.5V>V>2.5) or floating Logic “0” (V<0.5V)		Enabled		V	Pout< -30 dBm
				Disabled			
Modulation Bandwidth	Fm		DC		1	KHz	5*

*Environmental and Mechanical*

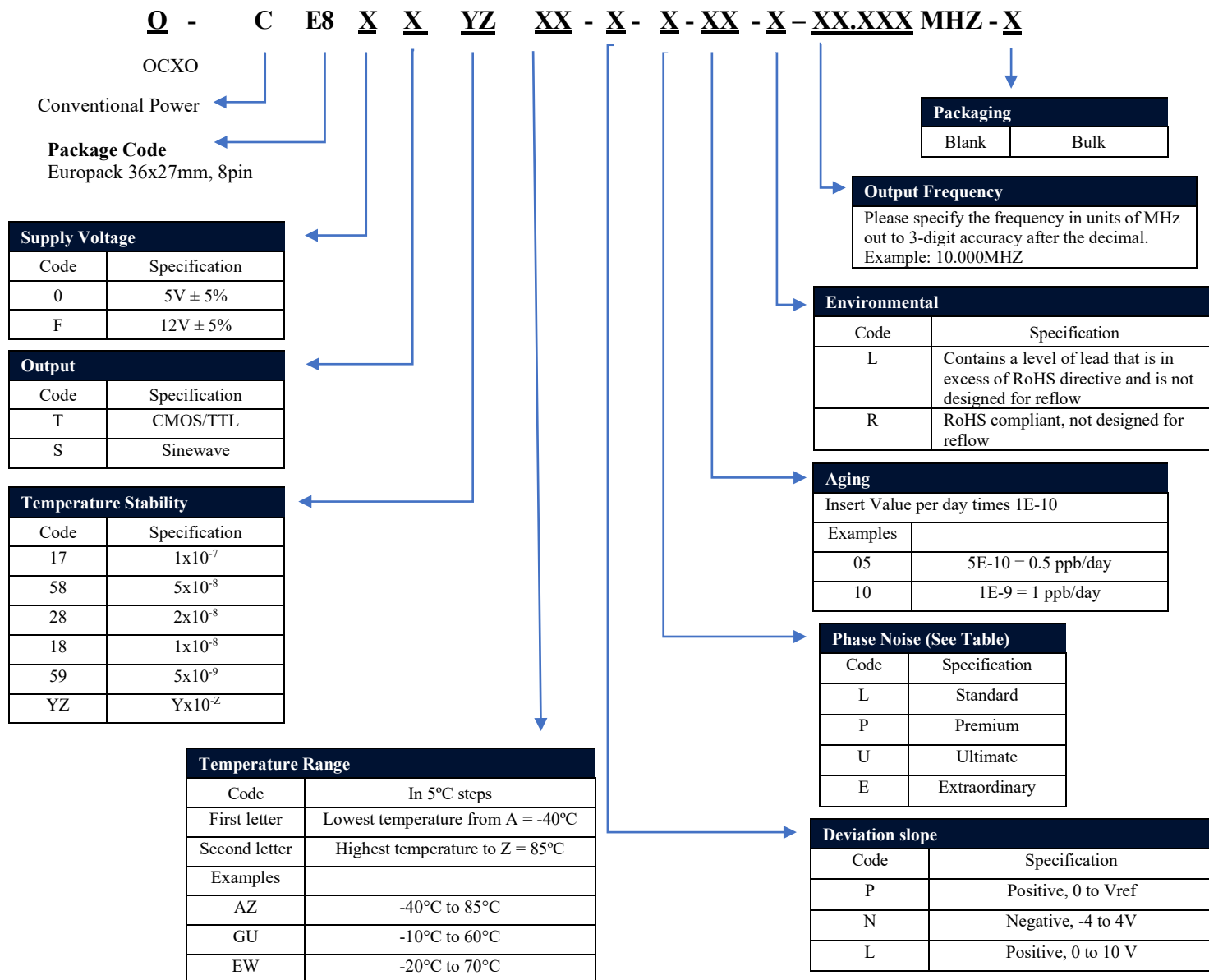
Parameter	Description
Operating temp. range	-30°C to 70°C Standard, Other options – see chart below
Mechanical Shock	Per MIL-STD-202, 30G, 11ms
Vibration	Per MIL-STD-202, 5G to 2000 Hz
Soldering Conditions	260°C for 10s Max leads only

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## Creating a Part Number



Not all combinations are available. Consult Factory.

### 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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### Notes:

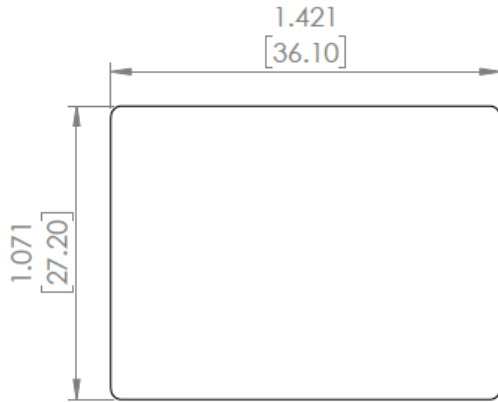
- 1) For highest operating temperature higher than 70°C the power consumption will be higher ( about 20% for 85°C ). Values listed are for test in still air environment, the values will go up while testing in the temperature chamber.
- 2) It is recommended to specify Slope option “N” for Ultimate Phase 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 a 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.
- 6\* Pin 2 is connected to Vref only for Slope Option “P”.

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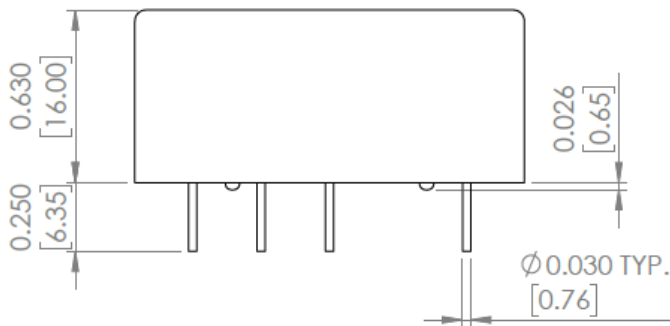


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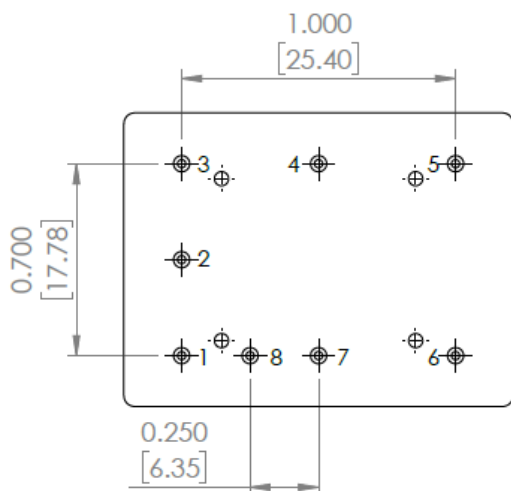
## Mechanical Dimensions



**TOP VIEW**



**FRONT VIEW**



**BOTTOM VIEW**

Pin #	Function
1	Vc
2	Vref or N/C (6*)
3	Vcc
4	Output Enable
5	RF Output
6	GND
7	Oven-ready indicator
8	For internal use – do not connect

Dimensions: inches [mm]