

## Precision Ultra Low Phase Noise OCXO in 1"x1" package



ESD Sensitive 25.4 x 25.4 x 12.7 mm  
Datasheet #1439A

### Features

- SC-cut Crystal
- High Stability
- Compact Package
- Low Aging
- Ultra Low Phase Noise Option:  
Premium (P) -145dBc/Hz at 10Hz;  
-172dBc/Hz on the floor  
Ultimate (U) -115dBc/Hz at 1Hz  
-146dBc/Hz at 10Hz;  
-172dBc/Hz on the floor
- Sine Wave or HCMOS/TTL output

### Applications

- Instrumentation
- Tele/Data Communications
- GPS

### Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	V <sub>cc</sub>		-0.5 -0.5		13.0 6.5	V	V <sub>cc</sub> option F V <sub>cc</sub> option 0
Storage temper.	T <sub>s</sub>		-50		90	°C	
Control Voltage	V <sub>c</sub>		-1 -1		5.5 11	V	Slope option "P" Slope option "L"

### Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Frequency	F		8	10.000	13	MHz	
Frequency stability	ΔF/F	vs. Temp. from 25°C		±20		ppb	See chart below
		vs. Supply		0.2	0.3	ppb/10 %V <sub>cc</sub>	
Aging		per day		5E-10			after 30 days of continuous operation
		per year, first year		5E-8			
		second year		3E-8			
Allan Deviation		0.1s		5E-13			Premium version, Option "P"
		1s		2E-12			
		10s		5E-12			
SSB Phase Noise (achieved after 10 minutes warm-up)	S <sub>φ</sub>	1Hz			-112	dBc/Hz	Premium version, option "P"
		10 Hz			-145		
		100 Hz			-155		
		1 KHz			-162		
		10 KHz			-169		
		100 KHz			-172		
		1Hz		-115	-114	dBc/Hz	Ultimate version, option "U" 2*
		10 Hz			-146		
		100 Hz			-156		
		1 KHz			-163		
		10 KHz			-169		
		100 KHz			-172		
Retrace		After 30 minutes			±10	ppb	24 Hours off 3*
G-sensitivity		worst direction			±1.0	ppb/G	
Input Voltage	V <sub>cc</sub>	12V±5%	11.4	12.0	12.6	V	Option "F"
		5V±5%	4.75	5.0	5.25	V	Option "0"
Power consumption, Still air 4*	P	steady state, 25°C, start-up @ -30°C		0.7 2.0	0.9 2.5	W	Operating temp range to 70°C
Spectral Purity		Subharmonics		none		dBc	
		Spurious			-80		
		Harmonics		-35	-30		

All parameters for 10 MHz

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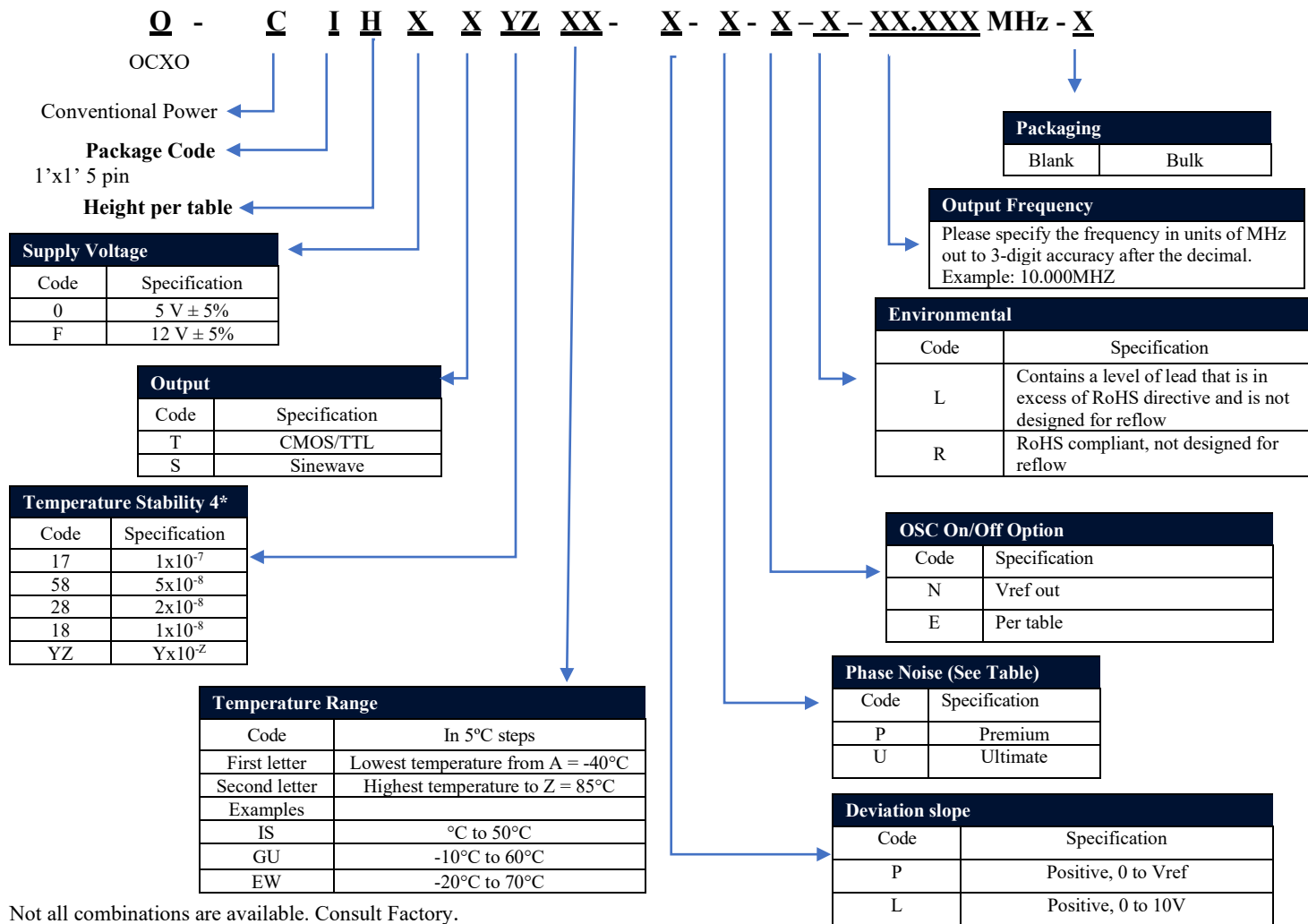
### Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Load		10KOhm//15pF (HCMOS/TTL), AC-coupled 50 Ohm (Sine-wave)					Output Code T Output Code S
Warm-up time	$\tau$	to 0.1ppm accuracy		3	5	minutes	
Output Waveform		HCMOS/TTL compatible or Sinewave					
Output Power			+10	+13		dBm	Output Code S
Logic 1 (CMOS)	Voh		3.3			V	Output Code T
Logic 0 (CMOS)	Vol				0.1	V	Output Code T
Control voltage	Vc		0 0		4.5 10.0	V	Slope option "P" Slope option "L"
Oscillator On/Off Control		Optional on Pin 4 with Vcc option F	0 11.4		1.5 13	V V	Oscillator Off 5* Oscillator On
Input impedance	Zin	At Vc pin	10			KOhm	
Modulation bandwidth	Fm				1,000	Hz	
Reference Voltage	Vref			4.5		V	Vcc option "0" 5*
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	$\pm 0.4$	$\pm 0.6$		ppm	
Deviation Slope		Monotonic, positive Monotonic, positive		1.0/Vref 0.12		Ppm/V	Slope option "P" Slope option "L"
Setability	Vc0	@25°C, From. Internal bias is optional, specify on PO 2.25 V for "P", 4.5 V for "L"		2.25 $\pm$ 0.5 5 $\pm$ 0.5		V	Slope option "P" 3* Slope option "L"

### Environmental and Mechanical

Parameter	Description
Operating temp. range	0°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

## Creating a Part Number



### 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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ESD Sensitive

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### Notes:

\*. 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\*. This specification is preliminary. It is recommended to specify Slope option “L” for Ultimate Phase noise performance. Recommended test equipment – Symmetricom 5120A-01 Phase Noise and Allan Deviation Test Set (be aware of limitations on the floor, especially if the DUT frequency is not 10.000 MHz), Noise XT DCNTS, or Holtzworth HA7000B series. “Clean” analog power supply i.e. HP E3610A or equivalent. It’s assumed that phase noise test is performed under static conditions (no vibration), in still air, and care is taken for minimizing EMI.

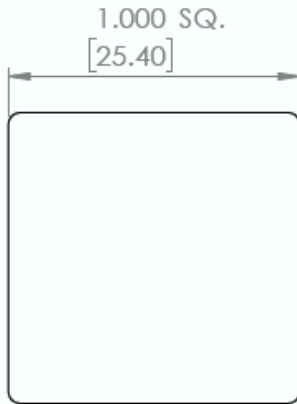
3\*. Longer storage time, especially at low temperatures, may affect both retrace and setability parameters. It may require few days on power for re-stabilization.

4\*. The power consumption is affected by the operating temperature range (the higher the highest temperature – the higher the power consumption. The values in the table are for high operating temperature at 70°C.

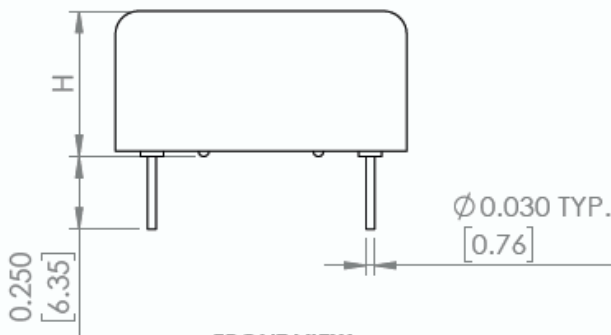
5\*. Vref out is available at Vcc option “0”, while Oscillator on/off function available at Vcc option “F”. Applies to assignment of Pin 4 function.



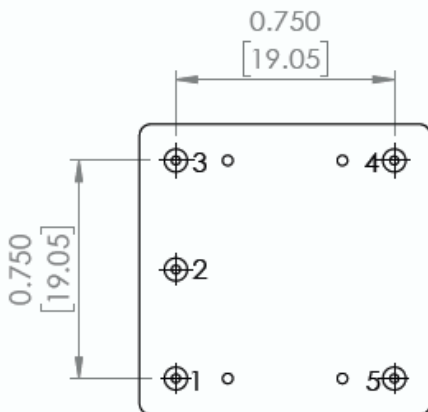
## Mechanical Dimensions



**TOP VIEW**



**FRONT VIEW**



**BOTTOM VIEW**

H Code #	Height, inches (mm) TYP
4	0.4 (10.2 mm)
5	0.5 (12.7 mm)

Code 5 is standard unless Code 4 is requested.

Pin #	Function
1	Output
2	GND
3	Vc
4	On/Off Control or Vref
5	Vcc

Stand-off position may vary.

Dimensions: inches [mm]