

Precision Ultra Low Phase Noise OCXO in 22x22mm Package



ESD Sensitive

20.4 x 20.4 x 13.5 mm
Datasheet #2101A

Features

- SC-cut crystal
- High Stability
- Very Low Power consumption (0.3W)
- Low Aging
- Ultra-Low ADEV 3E-13 @ 1s
- Ultra-Low Phase Noise
Extraordinary(E) -120dBc/Hz at 1Hz
-148dBc/Hz at 10Hz
-170dBc/Hz on the floor
- Sine Wave or HCMOS/TTL output

Applications

- Instrumentation, Test and Measurement
- Battery Powered Equipment
- Radar
- Tele/Data Communications
- GPS

Absolute Maximum Ratings

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Input Break Down Voltage	Vcc	5 V supply	-0.5		5.5	V	
Storage temper.	Ts		-50		90	°C	
Control Voltage	Vc		-1		5.5 11	V	Slope option "P" Slope option "L"

Electrical

Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Frequency	F			10.000		MHz	
Frequency Stability	$\Delta F/F$	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		5E-10 5E-8 3E-8			after 30 days of continuous operation
Allan Deviation		0.1s 1s 10s			2E-13 3E-13 2E-12		E grade
		1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz			-120 -148 -160 -168 -170 -170		Extraordinary version, option E, available with slope option L
Retrace		After 30 minutes			± 10	ppb	24 Hours off 3*
G-sensitivity		worst direction			± 1.0	ppb/G	
Input Voltage	Vcc		4.75	5.0	5.25	V	

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Electrical (cont.)

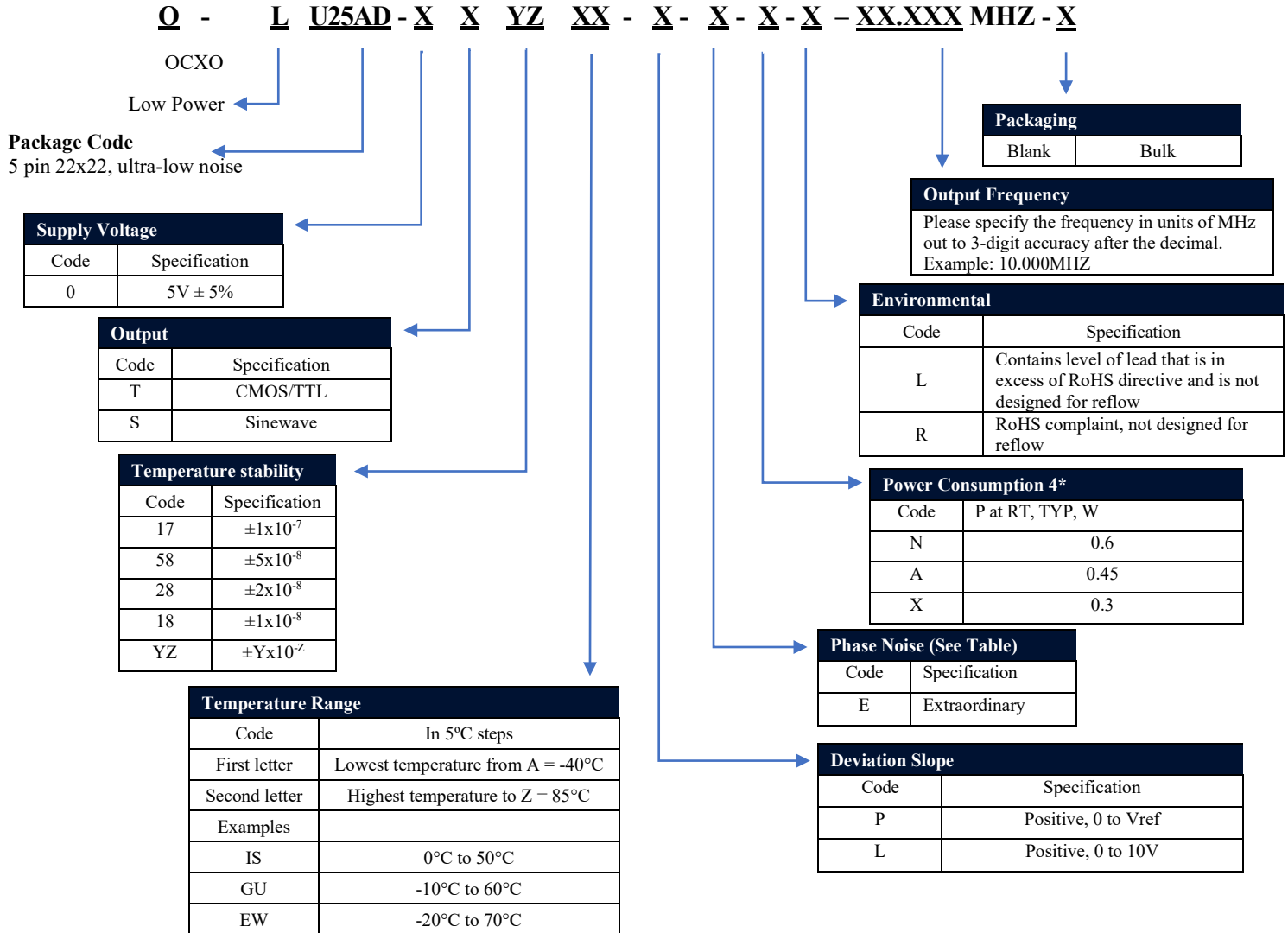
Parameters	Symbol	Condition	Min	Typ	Max	Unit	Notes
Power consumption, Still air 4*	P	steady state, 25°C, Operating temp range to 70°C start-up @ -30°C		0.6 0.45 0.3 2.0	0.7 0.55 0.4 2.5	W	Grade "N" Grade "A" Grade "X"
Spectral Purity		Subharmonics Spurious Harmonics		none -35	-80 -30	dBc	
Load		10KOhm/15pF (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	
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"
Input impedance	Zin	At Vc pin	10			KOhm	
Modulation bandwidth	Fm				1,000	Hz	
Reference Voltage	Vref			4.5		V	
Output Impedance		At Vref pin		100		Ohm	
Pull range		from nominal F	±0.4	±0.6	±0.8	ppm	
Deviation slope		Monotonic, positive Monotonic, positive		1.0/Vref 0.12		ppm/V	Slope option "P" Slope option "L"
Setability	Vc0	@25°C, Fnom. NO Internal Bias		2.25 ± 0.5 5 ± 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



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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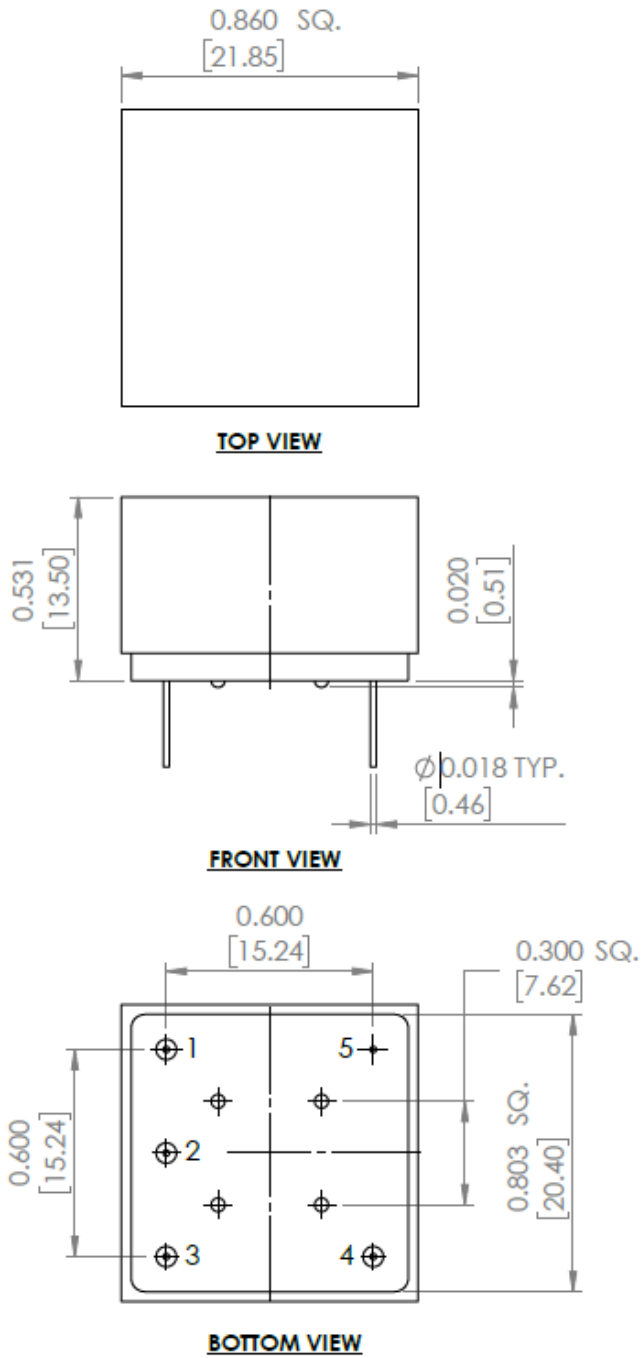
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Notes:

- 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 “L” for Ultimate Phase noise performance. Recommended test equipment- Symmetricom (Microchip) 5120A-01 Phase noise and Allan Deviation Test Set (be aware of limitations on the floor). “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. The Vc port should be either grounded or connected to extremely low noise source (for example NiCd battery)
- 3* Longer storage time, especially at low temperatures, may affect retrace, stability and long averaging times ADEV parameters. It may require a few days on power 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.



Mechanical Dimensions



Pin #	Function
1	Vc
2	Vref
3	Vcc
4	Output
5	GND

Dimensions: inches [mm]