

# OX-204 at 10 MHz

Ultra Low Phase Noise Oven Controlled Crystal Oscillator



The OX-204 is an Ultra Low Phase Noise Ovenized Crystal Oscillator with a noise floor as low as -175 dBc/Hz. Designed for applications that demand extremely low noise sources, including the reference oscillator for a phase-locked loop in the microwave spectrum. Custom frequencies available upon request.

#### **Features**

- -140 dBc/ Hz at 10 Hz offset
- -175 dBc/Hz at 10 kHz offset
- 10 MHZ standard, other frequencies available

## Applications

- Military Radar
- Instrumentation and Test Equipment
- Synthesizers
- Military Communication Equipment
- DRO reference
- Satellite Communications

## **Performance Specifications**

Phase Noise Ordering Codes at 10 MHz							
Frequency Offset (Hz)	А	В	C (12V only	D (12V only)	E (5V only)	Unit	Condition
1	-95	-100	-105	-110	-105		
10	-125	-130	-135	-140	-135		
100	-150	-155	-157	-157	-157		Maximum values
1000	-160	-165	-167	-165	-167		All EFC settings
10,000	-170	-170	-175	-170	-172		
100,000	-170	-170	-175	-170	-173		
Frequency Stabilities at 10 MHz							
Parameter	Min	Typical	Max	Unit	Condition		
vs. operating temperature range	-10		+10	ppb	-20 to +70°C (referenced to +25°C)		
	-20		+20	ppb	-40 to +85	°C (referend	ced to +25°C)
vs. Initial Tolerance	-100		+100	ppb	at time of shipment and 5V efc		
Allan Deviation			5	E-12	0.1 to 1 second tau		
vs. supply voltage change	-2		+2	ppb	±5% change		
vs. load change	-2		+2	ppb	5% change in load		
vs. aging / 1 day	-0.5		+0.5	ppb	after 7 days of operation		
vs. aging / 1 <sup>st</sup> year	-100		+100	ppb	after 7 days of operation		
vs. aging / year	-30		+30	ppb	after first year of operation		
Warm up time			5	minutes	to ±10 ppb of 2-hour frequency @+25°C		



# Performance Specifications

Supply Voltage (Vs)							
Parameter	Min	Typical	Max	Unit	Condition		
	11.4	12.0	12.6	VDC			
Supply Voltage	4.75	5	5.25	VDC			
Power Consumption			4.0 1.8	Watts Watts	during warm-up steady state @ +25°C		
Defense es Velte es		10		VDC	12 V version		
Reference voltage		4.35		VDC	5 V version		
RF Output							
Signal Sinewave							
Load		50		Ohms			
Output Power	+7.0		+13.0	dBm	50 Ohm load @ Vs=12V		
	+4.0		+7.0	dBm	50 Ohm load @ Vs=5V		
Harmonics			-30	dBc	50 Ohm load		
Spurious			-80	dBc	50 Ohm load		
		Freque	ncy Tuning	(EFC)			
Tuning Range	±400		±800	ppb	enough for aging over 15 year lifetime		
Linearity			15	%			
Tuning Slope	Positive						
Control Voltage Range	0		10	VDC	Vs=12V		
	0		4.35		Vs=5V		
Input Impedance		100		kOhm			
Modulation Bandwidth	150			Hz			
		Additio	onal Param	eters			
g-sensitivity			1.5	ppb/g			
Weight			20	grams			
		Absolute	Maximum	Ratings			
Parameter	Min	Typical	Max	Unit	Condition		
Supply Voltage (Vs)			15 7	V V	12V version 5V version		
Output Load			25	Ohms			
Operable Temperature Range	-55		+95	°C	Device will not sustain damage when operated at temperatures between the operating range and the operable range, but will not be specification compliant		
	Environmental and Product Classification						
Shock (Endurance)	MIL-STD-202, Method 213, Condition J, 30g 11 ms						
Sine Vibration (Endurance)	MIL-STD-202, Method 201 and 204, Condition A, except 5g to 500 Hz, 1 sweep each axis						
Random Vibration (Endurance)	MIL-STD-202, Method 214, Condition I-D						
Humidity	MIL-STD-202, Method 103, Condition B, 100% rh						
Seal	MIL-STD-202, Method 112, Condition D						
Altitude	MIL-STD-202, Method 105, sea level to space						
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition A,B,C						
Terminal Strength	MIL-STD-202, Method 11, Condition C (5 bends at 45°, 2 lbs)						
Moisture Sensitive Level	1						
RoHS	6 (fully compliant) - no pure tin options available upon request, the device will be assigned a customer part number , not orderable through ordering codes						
Storage Temperature Range	-55		+125	°C			

## **Outline Drawing**

#### **Dimensions in mm**



Code	Height "H"	Pin Length "L" Min			
0	15.0	6.2			
Pin Connections					
1	RF Output				
2	Ground (Case)				
3	Electronic Frequency Control Input (EFC)/ No Connect				
4	Reference Voltage				
5	Supply Voltage Input (VS)				



**Dimensions in inches** 



Code	Height "H"	Pin Length "L" Min				
1	17.0 mm	na				
Pin Connections						
1	RF Output					
4	Ground (Case)					
7	Electronic Frequency Control Input (EFC) No Connect for Fixed frequency Oscillators					
8	Reference Voltage					
14	Supply Voltage Input (VS)					



#### Notes:

- 1. Contact factory for improved stabilities or additional product options including no pure tin options.
- 2. Certain codes available for sampling and short lead time requests. Please review website for codes.
- 3. Unless otherwise stated, all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, and temperature (25°C).
- 4. Contact factory for other frequencies. Phase noise degrades for frequencies greater than 10 MHz.
- 5. Subject to technical modification.
- 6. Contact factory for availability.

### **Contact Information**

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