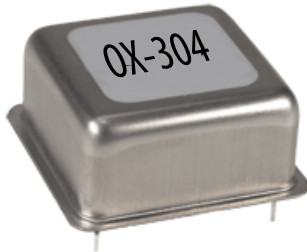


Helping Customers Innovate, Improve & Grow



**OX-304**

The OX-304 is an Ultra Low Phase Noise Ovenized Crystal Oscillator with a noise floor as low as -173 dBc/Hz in a compact 0.8" x 0.8" enclosure. 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

- -135 dBc/ Hz at 10 Hz offset
- -173 dBc/Hz at 10 kHz offset
- 10 MHz standard, other frequencies available
- Compact 0.8" x 0.8" hermetic enclosure

### Applications

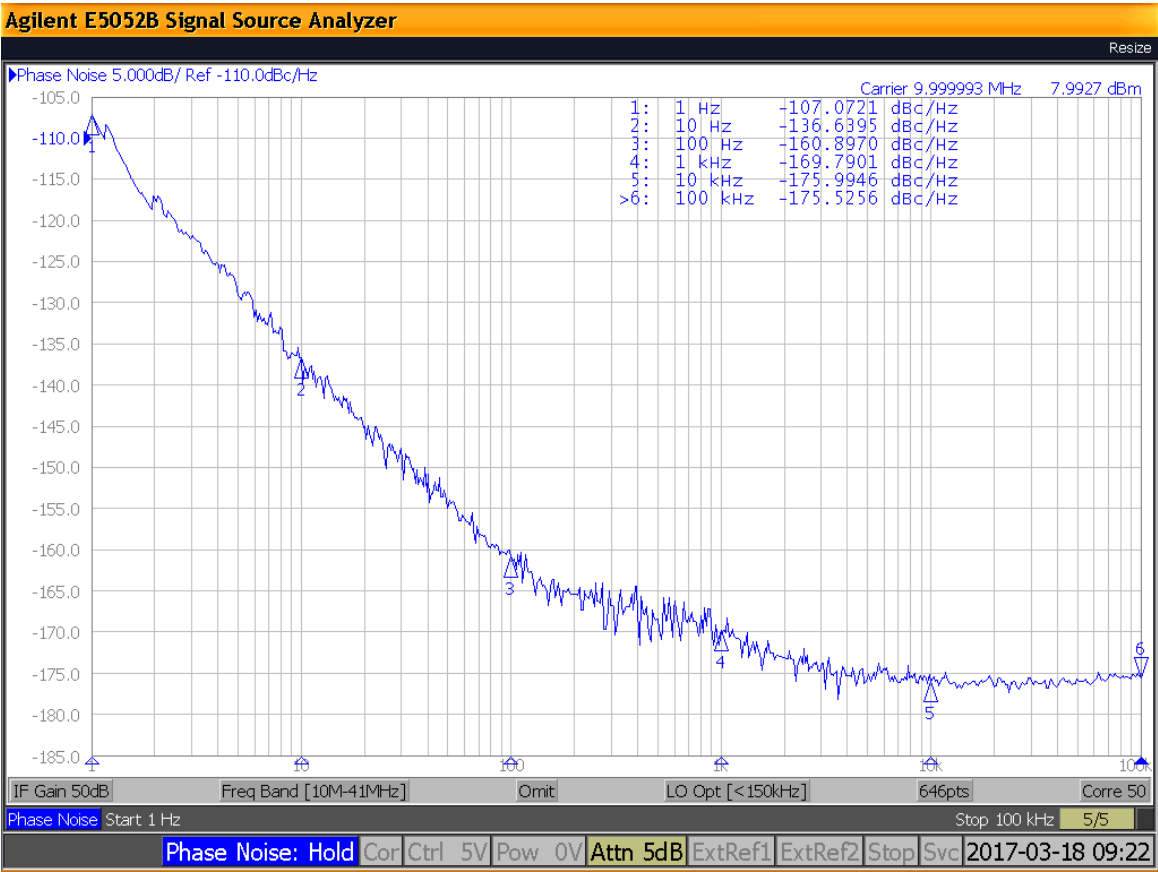
- Military Radar
- Instrumentation and Test Equipment
- Synthesizers
- Military Communication Equipment
- DRO reference
- Satellite Communications

### Performance Specifications

Phase Noise Ordering Codes at 10 MHz					
Frequency Offset (Hz)	A	B	C	Unit	Condition
1	-95	-100	-103	dBc/Hz	Maximum values All EFC settings
10	-125	-130	-135		
100	-150	-155	-157		
1000	-160	-165	-167		
10,000	-170	-170	-173		
100,000	-170	-170	-173		
Frequency Stabilities at 10 MHz					
Parameter	Min	Typical	Max	Unit	Condition
vs. operating temperature range	-15		+15	ppb	-20 to +70°C (referenced to +25°C)
	-20		+20	ppb	-40 to +85°C (referenced 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 ±15ppb of 2-hour frequency @+25°C

Product Performance Data

Phase Noise

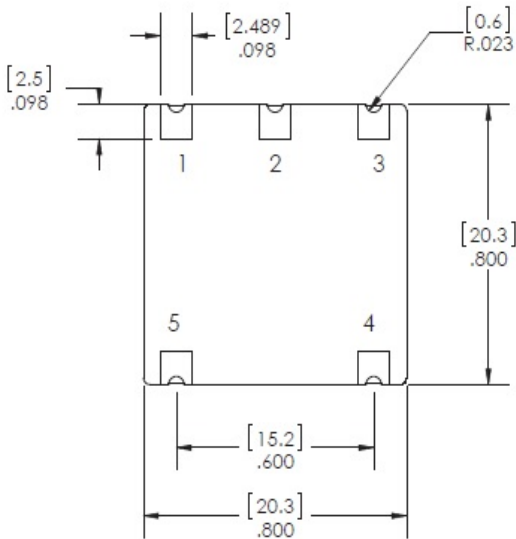
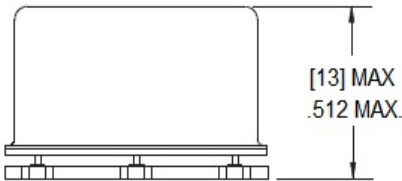
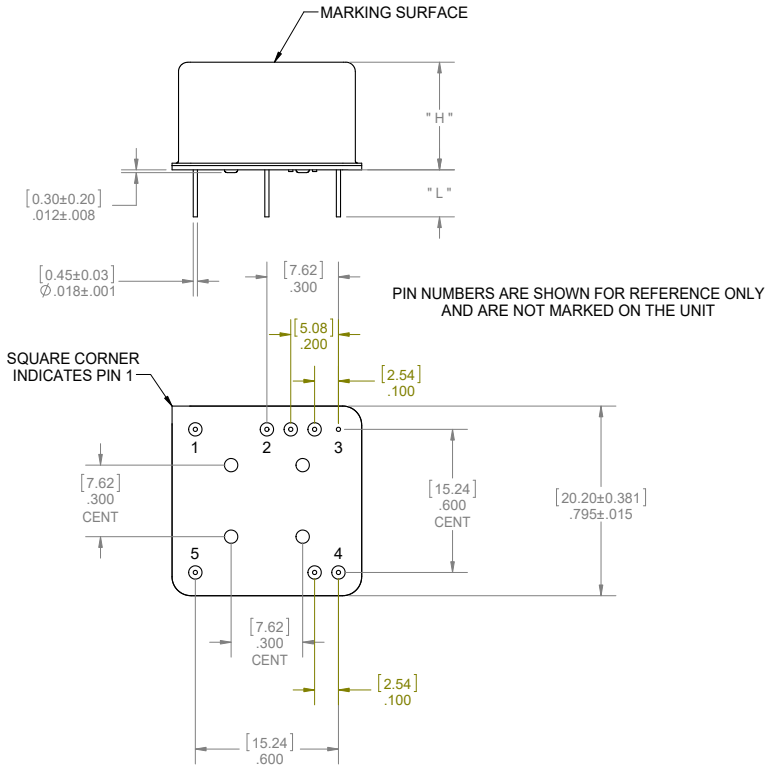


## Performance Specifications

Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Unit	Condition
Supply Voltage	11.4	12.0	12.6	VDC	
Power Consumption			4.0 1.8	Watts Watts	during warm-up steady state @ +25°C
Reference Voltage		10		VDC	12 V version
RF Output					
Signal	Sinewave				
Load		50		Ohms	
Output Power	+7.0		+13.0	dBm	50 Ohm load @ Vs=12V
Harmonics			-30	dBc	50 Ohm load
Spurious			-80	dBc	50 Ohm load
Frequency 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
Input Impedance		100		kOhm	
Modulation Bandwidth	150			Hz	
Additional Parameters					
g-sensitivity			1.5	ppb/g	
Weight			20	grams	

Absolute Maximum Ratings					
Parameter	Min	Typical	Max	Unit	Condition
Supply Voltage (Vs)			15	V	12V 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



Code	Height "H"	Pin Length "L" Min
0	13.0	5.0
Pin Connections		
1	Supply Voltage Input (VS)	
2	RF Output	
3	Ground (case)	
4	Electronic Frequency Control (EFC)	
5	Reference Voltage (Vref)	

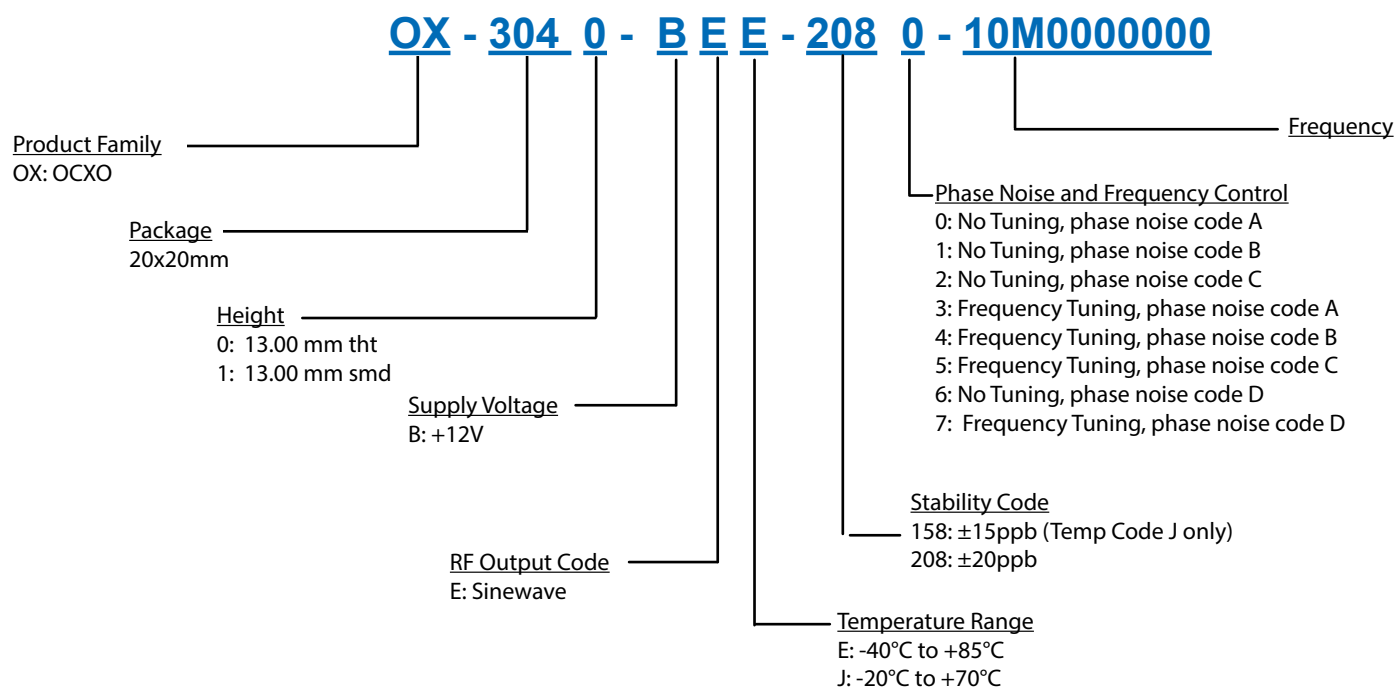
Dimensions in [mm] inches

unnumbered pins are no connects and are removed at the factory.

Code	Height "H"	Pin Length "L" Min
1	13.0 mm	na
Pin Connections		
1	Electronic Frequency Control (EFC)	
2	Reference Voltage (Vref)	
3	Supply Voltage Input (Vs)	
4	RF output	
5	Ground (case)	

Dimensions in [mm] inches

## Ordering Information



### 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.



**Microsemi Headquarters**  
One Enterprise, Aliso Viejo, CA 92656 USA  
Within the USA: +1 (800) 713-4113  
Outside the USA: +1 (949) 380-6100  
Sales: +1 (949) 380-6136  
Fax: +1 (949) 215-4996  
email: sales.support@microsemi.com  
www.microsemi.com

Microsemi, a wholly owned subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Learn more at [www.microsemi.com](http://www.microsemi.com).

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

©2018 Microsemi, a wholly owned subsidiary of Microchip Technology Inc. All rights reserved. Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.