OX-175

Ultra Low Noise
Oven Controlled Crystal Oscillator

The OX-175 is a low phase noise, high-frequency ovenized crystal oscillator in a 28 x 38 mm package. The oscillator has a noise floor of -176dBc/Hz, and typical ADEV below 5E-12 for t=0.1 to 10 s. The OX-175 is a member of the OX-17 oscillator series. Other oscillators in the series include the OX-170 standard oscillator, OX-171 high stability oscillator, OX-172 optimized for 1588 solutions, and the OX-174 low phase noise oscillator. The Microsemi design team will also help develop custom solutions where performance optimization is required for specific applications. Please contact the factory for customization options.

Features

- Reflow Process Compatible
- Temperature Stability to 50 ppb
- Frequency Range 50 to 130 MHz
- Standard Frequencies: 50, 60, 80, 100,120 MHz

Applications

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

Performance Specifications

Phase Noise Ordering Codes at 100 MHz

Frequency Offset (Hz)	A	B	C	Unit	Condition
10	-100	-102	-105	dBc/Hz	Maximum values All EFC settings
100	-130	-132	-135	dBc/Hz	
1000	-150	-156	-159	dBc/Hz	
10,000	-165	-168	-170	dBc/Hz	
100,000	-175	-175	-176	dBc/Hz	

Parameter	Min	Typical	Max	Units	Condition	
Allan Deviation		2.3 3.3 4 7 3.25	5 10 10 50 10	E-12 E-12 E-12 E-12 E-11	0.1 s tau 1 s tau 10 s tau 100 s tau 1000 s tau	@ 100MHz

For oscillators with TDEV and MTIE requirements please review the OX-172 datasheet.

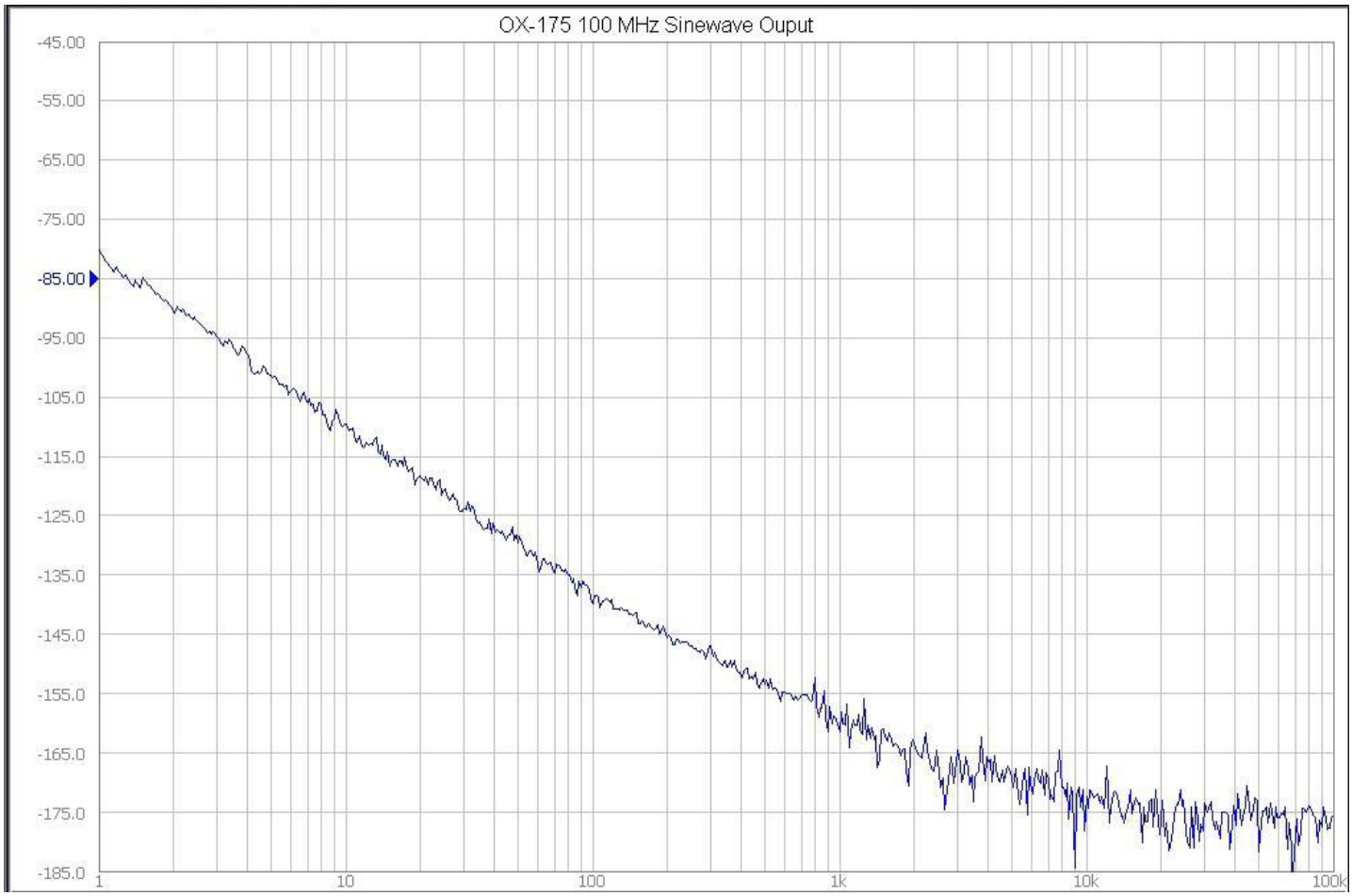
Performance Specifications

Frequency Stabilities[1] (Stabilities listed for 100 MHz, for stabilities above 100 MHz values may degrade, please contact factory)					
Parameter	Min	Typical	Max	Units	Condition
vs. Operating Temperature Range (referenced to +25°C)	-50 -100		+50 +100	ppb ppb	-20 to +70°C -40 to +85°C
vs. Supply Voltage Change vs. Load Change vs. Aging / Day vs. Aging / 1st Year vs. Aging / 10 Years	-10 -10 -5 -200 -1.5		+10 +10 +5 +200 +1.5	ppb ppb ppb ppb ppm	V_S ±5% Load ±5% after 7 days operation after 7days operation after 7days operation
Retrace[2]	-100		+100	ppb	
Warm-up Time			5	minutes	to ±100ppb of final frequency (1 hour reading) @ +25°C
Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Units	Condition
	11.4	12.0	12.6	VDC	
Power Consumption			4.5	Watts	during warm-up, all temperatures
			1.8	Watts	steady state @ +25°C
		3.3		Watts	steady state @ -40°C
		0.5		Watts	steady state @ +85°C
RF Output					
Start Time		1		s	time required to achieve 90% of amplitude
Signal	Sine Wave				
Load		50		Ω	
Output Power	+7	+10	+13	dBm	
Harmonics			-30	dBc	
Spurious			-80	dBc	

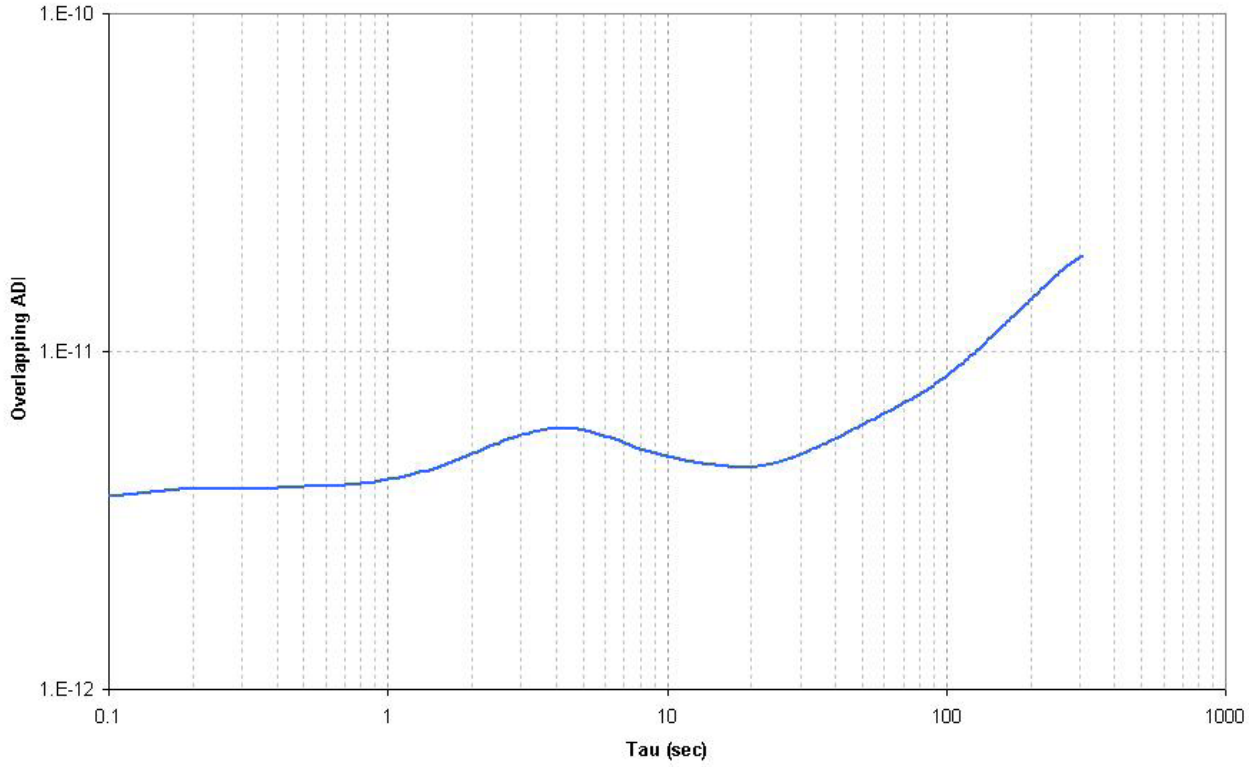
Frequency Tuning (EFC)					
Parameter	Min	Typical	Max	Units	Condition
Tuning range	±1.5		±3.0	ppm	Note - each oscillator is guaranteed to have sufficient pull range for 10 years of operation
Linearity		20		%	
Tuning Slope	Positive				
Input Impedance		20		kΩ	
Bandwidth Modulation	150			Hz	
	0.0		10	VDC	
Reference Voltage Output (Vref)					
	9.8	10	10.2	VDC	
The OX-175 series can be configured without a voltage reference. Please contact the factory for ordering information.					

Additional Parameters						
Parameter	Min	Typical	Max	Units	Condition	
g-sensitivity			1	ppb/g		
g-sensitivity of 0.5 ppb/g available in this package size. Please contact factory for ordering information. For g-sensitivity <0.5 ppb/g please review the OX-046 series.						
Weight			25	g		

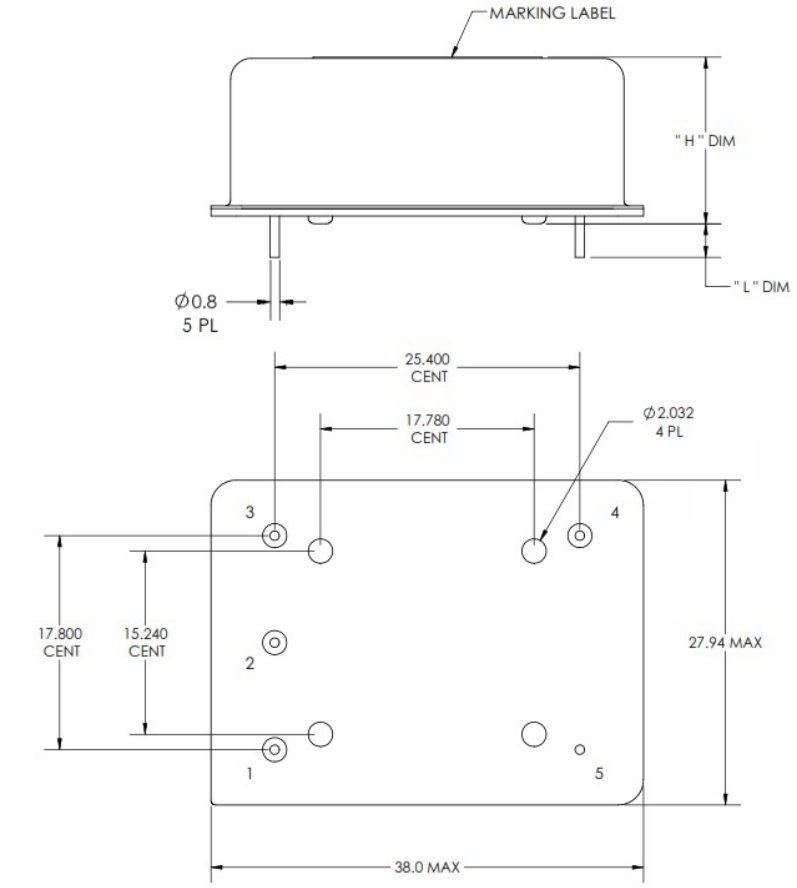
Absolute Maximum Ratings					
Supply Voltage (Vs)			15.0	VDC	
Output Load	25		open	Ω	
Operable Temperature Range	-55		+95	°C	Operable temperature range implies the device will continue to operate with no long-term damage to unit; however, it will not be specification compliant outside the operating temperature range
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, hermetic, washable				
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 211, Condition C (5 bends at 45°, 2 lbs)				
Moisture Sensitive Level	1				
RoHS	6 (fully compliant)				
Storage Temperature Range	-55		+125	°C	



OX-175 100 MHz Output - Typical ADEV



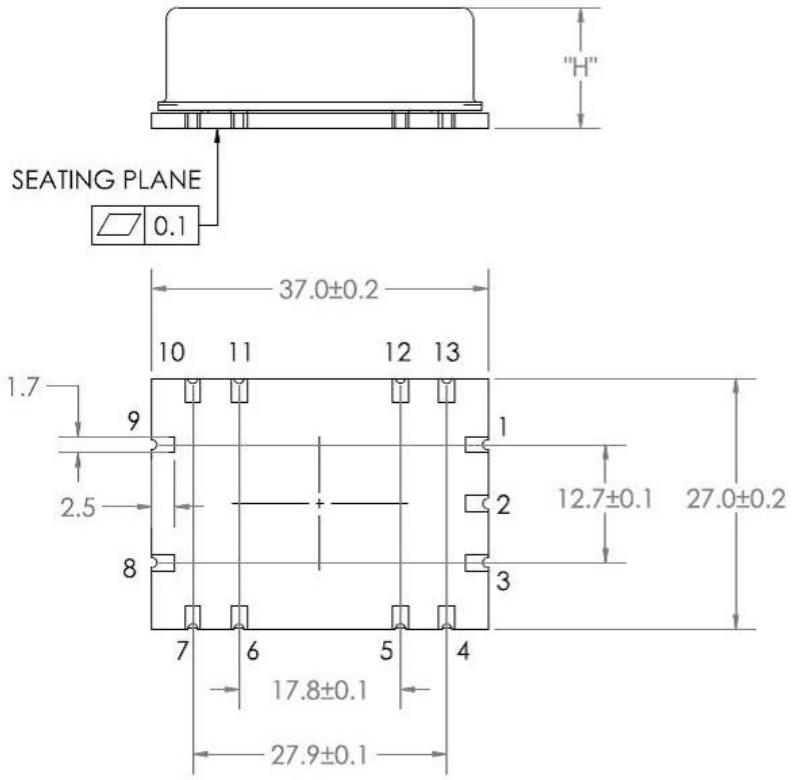
Outline Drawing / Enclosure



Through hole Package configuration A		
	Height "H"	Pin Length "L"
0	18.2 max	4.5 mm min
Additional height options available - contact factory . Note - lower height reduces stability		

Pin Connections	
1	Electronic Frequency Control Input (EFC) No Connect for Fixed Frequency Oscillators
2	Reference Voltage (Vref)
3	Supply Voltage Input (Vs)
4	RF Output
5	Ground (Case)

Dimensions in mm



Surface mount Package configuration B		
	Height "H"	Pin Length "L"
1	20.3 max	n/a
Additional height options available - contact factory . Note - lower height reduces stability		

Pin Connections	
4,5,6,7, 11,12,13	No Connect
1	Electronic Frequency Control Input (EFC) No Connect for Fixed Frequency Oscillators
2	Reference Voltage (Vref)
3	Supply Voltage Input (Vs)
8	RF Output
9,10	Ground (Case)

Ordering Information[3]

OX - 175 0 - B E E - 107 1 - 100M000000

Product Family
OX: OCXO

Model
175

Height and Package
0: 18.2 mm, package A - THT
1: 20 mm, package B - SMD

Supply Voltage
B: 12V

RF Output Code
E: Sinewave

Temperature Range
E: -40°C to +85°C
J: -20°C to +70°C
T: 0°C to +70°C

Stability Code
508: ± 50 ppb
107 ± 100 ppb

Frequency Control
0:No Tuning, phase noise code A
1:No Tuning, phase noise code B
2:No Tuning, phase noise code C
3:Frequency Tuning, phase noise code A
4:Frequency Tuning, phase noise code B
5:Frequency Tuning, phase noise code C

Frequency
50M0000000
60M0000000
80M0000000
100M000000
120M000000
(others available on request)

Additional Ordering Options

Additional ordering options available include custom aging rates, custom temperature ranges, custom temperature stabilities, custom phase noise requirements, improved g-sensitivity, and oscillators with no voltage reference output on pin 2. These modifications require a custom dash number - please contact the factory for additional information.

Design Tools

Microsemi stocks the following items for small orders and prototype development:
OX-1750-BEE-1075-100M00000000
Microsemi stocks the following evaluation board for this product:
OCXO Evaluation Board
Application Notes:
None

Notes:

1. 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).
2. Retrace is defined as the frequency difference between the end of two 24 hour on power periods with a 24 hour off period in between while at a constant temperature.
3. Not all options and codes available at all frequencies.

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