

OH-174

Harsh Environment, Ultra-Low Phase Noise Oven-Controlled Crystal Oscillator (OCXO)



Summary

The OH-174 is an ultra-low phase noise, low g-sensitivity OCXO in a 28 × 38 mm package with a phase noise floor as low as -175 dbc/Hz and g-sensitivity of 0.075 ppb/g. The OH-174 achieves a temperature stability of ±100 ppb over the wide temperature range of -55°C to 90°C and an aging rate of ±5 ppb/day. This device uses active g-sensitivity cancellation to achieve low g-sensitivity and can operate in harsh environments.

Features

- Temperature stability to 100 ppb
- Standard frequency of 100 MHz
- Sine wave output
- Ultra-low phase noise
- Excellent shock and vibration performance

Applications

- Military radar
- Instrumentation and test equipment
- Synthesizers
- Military communication equipment
- DRO references
- Satellite communications

Performance Specifications

Phase Noise Ordering Codes at 100 MHz, Sine Wave Output				
Frequency Offset (Hz)	A (12V only)	B (5V only)	Unit	Condition
10	-102	-102	dBc/Hz	Maximum values All EFC settings
100	-132	-132	dBc/Hz	
1000	-159	-157	dBc/Hz	
10,000	-170	-170	dBc/Hz	
100,000	-175	-172	dBc/Hz	

Frequency Stabilities ¹ (Stabilities listed for 10 MHz; for stabilities above 10 MHz, values may degrade, so please contact factory)					
Parameter	Min	Typ	Max	Units	Condition
vs. Operating Temperature Range (referenced to +25°C)	-100		+100	ppb	-55°C to 90°C
Initial Tolerance	-500		+500	ppb	At time of shipment, nominal EFC
vs. Supply Voltage Change	-10		+10	ppb	VS ±5%
vs. Load Change	-10		+10	ppb	Load ±5%
vs. Aging/Day	-5		+5	ppb	After 7 days of operation
vs. Aging/Year	-200		+200	ppm	After 7 days of operation
vs. Aging/10 Years	-1.5		+1.5	ppb	
Retrace ²	-50		+50	ppb	
Warm-up Time			5	minutes	To ±100 ppb of final frequency (1 hour reading) @ 25°C

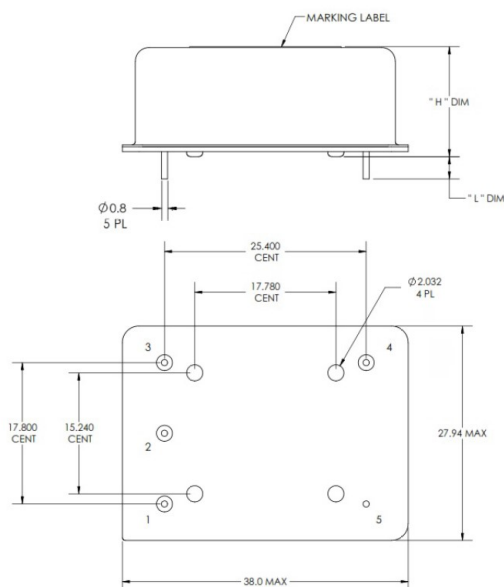
Supply Voltage (Vs)					
Supply Voltage	4.75	5.0	5.25	VDC	Ordering option D
	11.4	12.0	12.6	VDC	Ordering option B
Power Consumption			5.0	Watts	During warm-up, all temperatures
			2.0	Watts	Steady state @ +25°C
		4.0		Watts	Steady state @ -55°C
		0.5		Watts	Steady state @ +90°C
RF Output					
Start Time		2		s	Time required to achieve 90% of amplitude
Signal	Sine Wave				
Load		50		Ohm	
Output Power	+9	+10	+13	dBm	Vs = 12 VDC
	+5	+6	+9	dBm	Vs = 5 VDC
Harmonics			-30	dBc	
Spurious			-80	dBc	

Frequency Tuning (EFC)					
Parameter	Min	Typical	Max	Units	Condition
Tuning Range	±1.5		±3.0	ppm	Fixed-frequency option available
Linearity		20		%	
Tuning Slope	Positive				
Input Impedance		20		kOhm	
Control Voltage Range	0.0		4.4	VDC	With Vs = 5 VDC
	0.0		10	VDC	With Vs = 12 VDC

Additional Parameters					
Parameter	Min	Typical	Max	Units	Condition
Allan Deviation		1		E-11	1 s tau
g-Sensitivity			0.075	ppb/g	10 Hz to 100 Hz
			0.100	ppb/g	100 Hz to 200 Hz
			0.375	ppb/g	1 kHz to 2 kHz
					(Linear slope 100 Hz to 200 Hz)
					(Linear slope 200 Hz to 1 kHz)
Weight			25	g	

Absolute Maximum Ratings					
Supply Voltage			7.0	VDC	With Vs = 5.0 VDC
			15.0	VDC	With Vs = 12.0 VDC
Output Load	25		Open	Ohms	Sine wave
Operable Temperature Range	-55		+90	°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.
Storage Temperature Range	-55		+125	°C	
Environmental and Product Classification					
Shock (Endurance)	MIL-STD-202, Method 213, Condition C, 100g, 6 ms				
Sine Vibration (Endurance)	MIL-STD-202, Method 201 and 204, Condition D				
Random Vibration (Endurance)	MIL-STD-202, Method 214, Condition I-F				
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)				
Reliability	MTBF = 39,808 hrs/Ground mobile				
Moisture Sensitive Level	1				
RoHS	6 Compliant				

Outline Drawing/Enclosure



Dimensions in mm

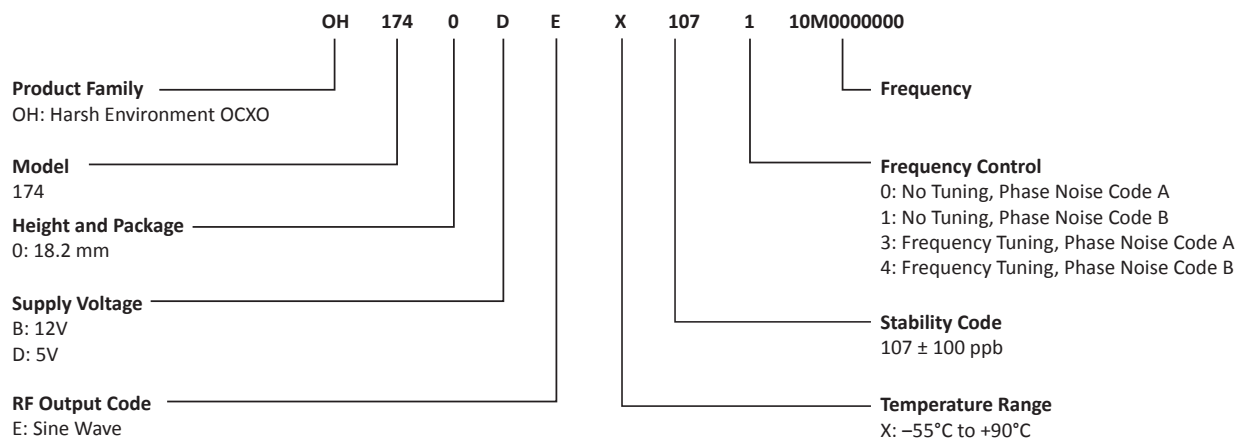
Through Hole Package Configuration A

Height "H"	Pin Length "L"
18.2 mm max	4.5 mm min

Pin Connections

1	Electronic Frequency Control (EFC) No Connect for fixed-frequency oscillators
2	No connect
3	Supply voltage input (Vs)
4	RF output
5	Ground (case)

Ordering Information³



Design Tools

Microchip stocks the following evaluation board for this product:

- OCXO Evaluation Board

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 $f_1 - f_0$ where f_0 is the reading after the unit has been on power for 24 hours, and f_1 is the frequency after it is off for 24 hours followed by on for 60 minutes
3. Not all options and codes available at all frequencies

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