

OX-210

Ultra-Low Phase Noise

Oven-Controlled Crystal Oscillator (OCXO)



Summary

The OX-210 is an ultra-low phase noise, high-stability, ovenized crystal oscillator in a 25 × 25 mm package. With close-in phase noise of -118 dBc/Hz @ 1 Hz and a phase noise floor of -170 dBc/Hz, the OX-210 is an excellent choice for all low phase noise applications.

Features

- Temperature stability to 10 ppb
- Standard frequency of 10 MHz
- Sine wave output
- Small package size
- 5e-13 ADEV @ 1 second tau
- Phase noise of -118 dBc/Hz @ 1 Hz and -170 dBc/Hz @ 100 kHz

Applications

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

Performance Specifications

Phase Noise at 10 MHz, Sine Wave Output			
Frequency Offset (Hz)	Max	Unit	Condition
1	-118	dBc/Hz	Maximum values All EFC settings
10	-145	dBc/Hz	
100	-160	dBc/Hz	
1000	-165	dBc/Hz	
10,000	-168	dBc/Hz	
100,000	-170	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)	-10		+10	ppb	-40°C to +85°C
Initial Tolerance	-100		+100	ppb	At time of shipment
vs. Supply Voltage Change	-2		+2	ppb	VS ± 5%
vs. Load Change	-4		+4	ppb	Load ± 5%
vs. Aging/Day	-0.2		+0.2	ppb	After 7 days operation
vs. Aging/Year (Year 1)	-100		+100	ppb	After 7 days operation
vs. Aging/Year (Following Years)	-30		+30	ppb	
Retrace ²	-10		+10	ppb	
Warm-up Time			5	minutes	To ±10 ppb of final frequency (1 hour) @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
Reference Voltage		10		VDC	12V version
		4.35		VDC	5V version
RF Output					
Start Time		2		s	Time required to achieve 90% of amplitude
Signal	Sine Wave				
Load		50		Ohm	
Output Power	+6		+10	dBm	50 Ohm load @ VS = 12 VDC
	+4		+8	dBm	50 Ohm load @ VS = 5 VDC
Harmonics			-30	dBc	50 Ohm load
Spurious			-80	dBc	50 Ohm load

Frequency Tuning (EFC)					
Parameter	Min	Typical	Max	Units	Condition
Tuning Range	±400		±800	ppb	Enough for aging over 15-year lifetime
Linearity		15		%	
Tuning Slope	Positive				
Input Impedance		100		kOhm	
Bandwidth Modulation	150			Hz	
Control Voltage Range	0.0		4.35	VDC	With Vs = 5.0 VDC
	0.0		10	VDC	With Vs = 12.0 VDC

Additional Parameters					
Parameter	Min	Typical	Max	Units	Condition
Allan Deviation			5	E-13	1 s tau
			8	E-13	10 s tau
			3	E-12	100 s tau
g-Sensitivity			1.5	ppb/g	@ 10 MHz
Weight			25	g	

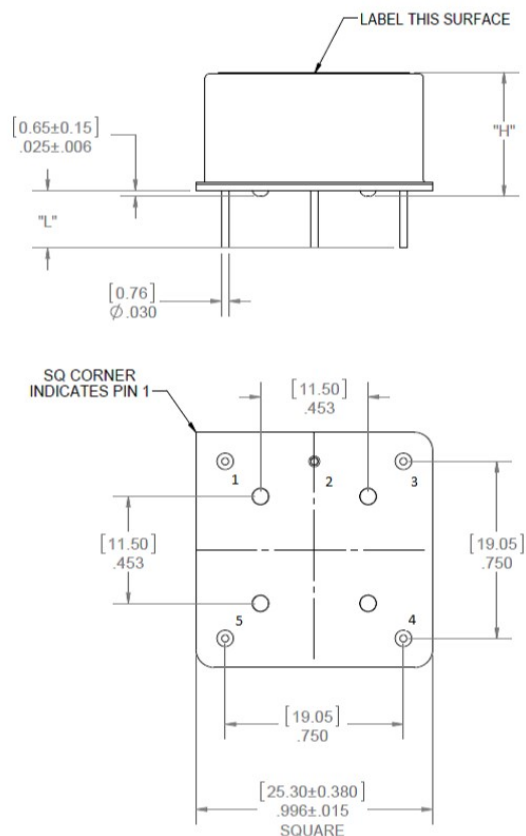
Absolute Maximum Ratings					
Supply Voltage			7.0	VDC	With VS = 5.0 VDC
			15.0	VDC	With VS = 12.0 VDC
Output Load	25		Open	Ohms	Sine wave
Operable Temperature Range	-55		+95	°C	Operable temperature range implies the device will continue to operate with no long- term damage to unit; however, it will 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°C to +125°C

Outline Drawing/Enclosure

Dimensions in [mm] and inches



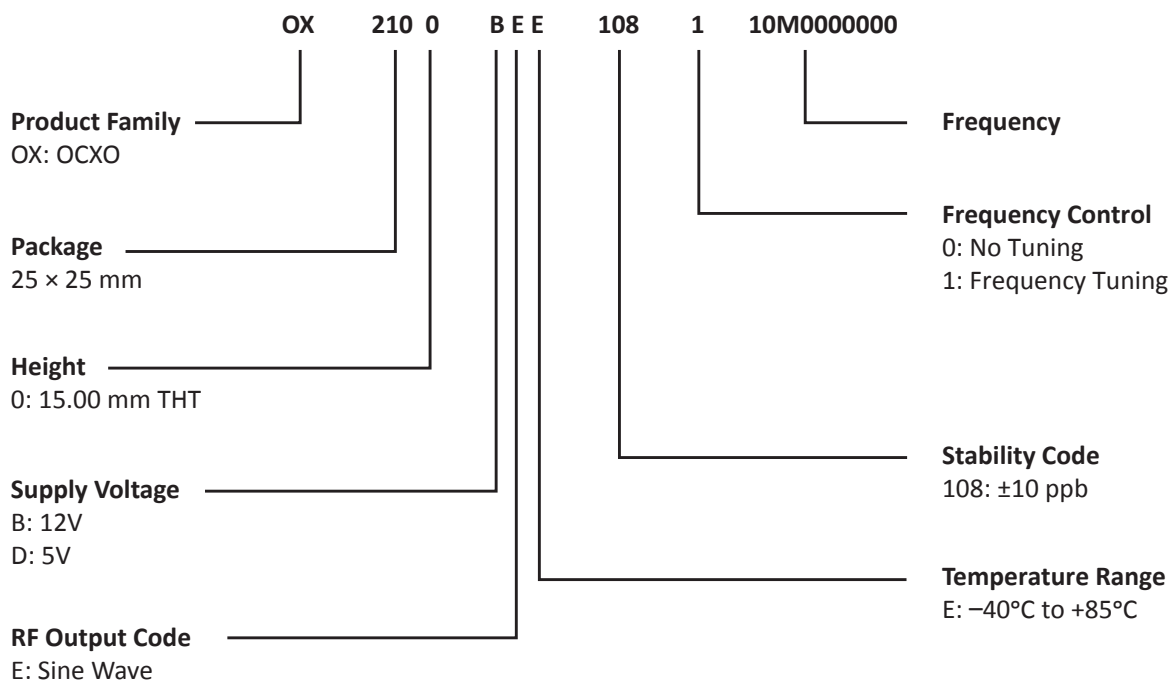
Pin Connections

1	RF Output
2	Ground (case)
3	Electronic Frequency Control Input (EFC) No Connect for Fixed Frequency Option
4	Reference Voltage
5	Supply Voltage Input (Vs)

Through Hole Package configuration A

Height "H"	Pin Length "L"
15.0 mm max	6.2 mm min

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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