OX-209

Ultra Low Phase Noise
Oven Controlled Crystal Oscillator



The OX-209 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

- -115 dBc/ Hz at 10 Hz offset
- -175 dBc/Hz at 10 kHz offset
- 20 to 35 MHZ standard, other frequencies available

Applications

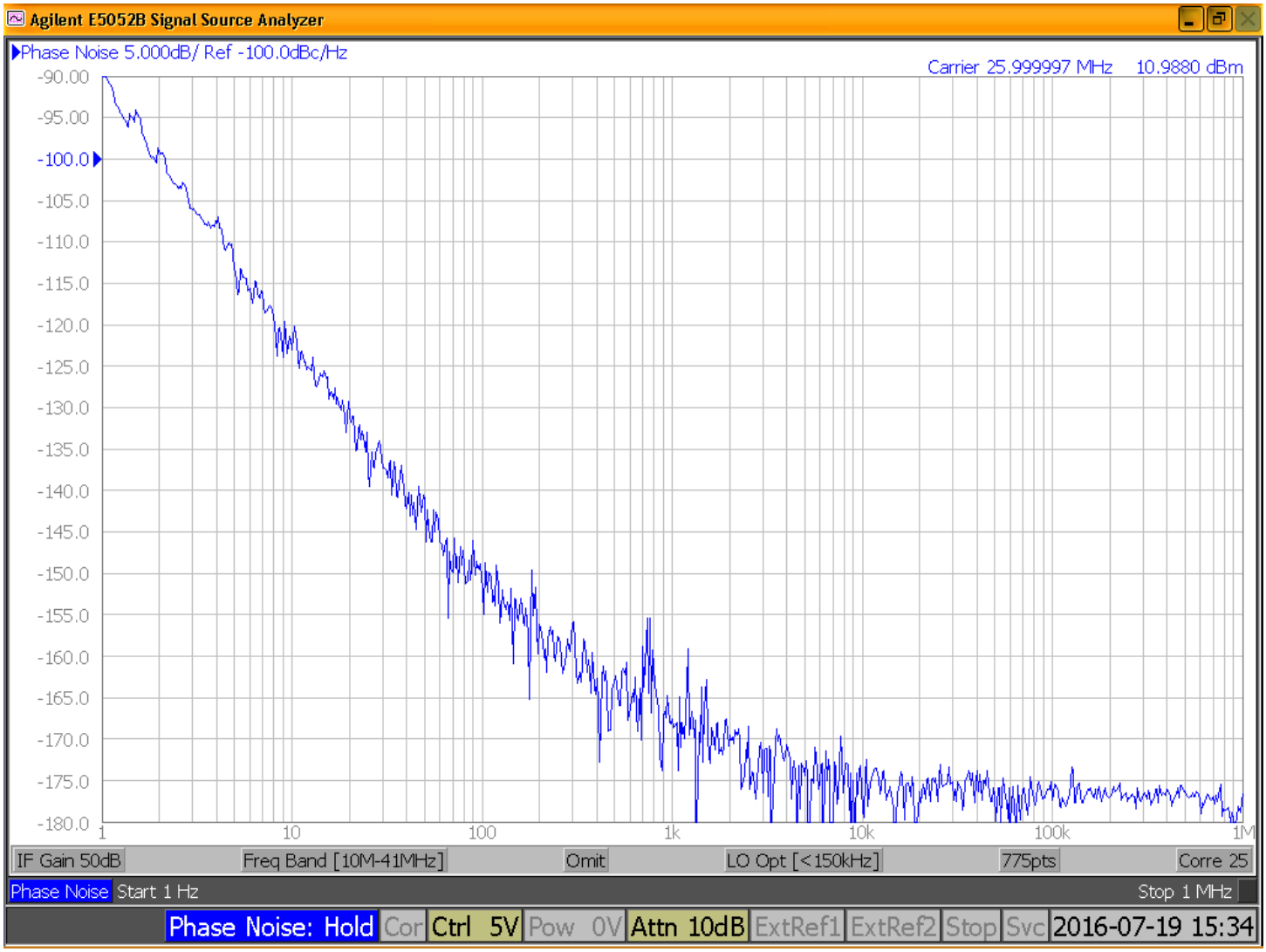
- Military Radar
- Instrumentation and Test Equipment
- Synthesizers
- Military Communication Equipment
- DRO reference
- Satellite Communications

Performance Specifications

Phase Noise at 25 MHz					
Frequency Offset (Hz)	Min	Typical	Max	Unit	Condition
1			-85	dBc/Hz	All EFC settings
10			-115		
100			-145		
1000			-160		
10,000			-170		
100,000			-175		

Frequency Stabilities at 25 MHz					
Parameter	Min	Typical	Max	Unit	Condition
vs. operating temperature range	-30		+30	ppb	-20 to +70°C (referenced to +25°C)
	-50		+50	ppb	-40 to +85°C (referenced to +25°C)
vs. Initial Tolerance	-500		+500	ppb	at time of shipment and 5V efc
Allan Deviation			8	E-12	0.1 to 1 second tau
vs. supply voltage change	-5		+5	ppb	±5% change
vs. load change	-5		+5	ppb	5% change in load
vs. aging / 1 day	-1		+1	ppb	after 30 days of operation
vs. aging / 1st year	-100		+100	ppb	after 30 days of operation
vs. aging / Year	-50		+50	ppb	after first year of operation
Warm up time			5	minutes	to ±20 ppb of 2-hour frequency @+25°C

Phase Noise


Agilent E5052B Signal Source Analyzer
Phase Noise 5.000dB/ Ref -100.0dBc/Hz
Carrier 25.999997 MHz 10.9880 dBm
-90.00
-95.00
-100.0
-105.0
-110.0
-115.0
-120.0
-125.0
-130.0
-135.0
-140.0
-145.0
-150.0
-155.0
-160.0
-165.0
-170.0
-175.0
-180.0
1
10
100
1k
10k
100k
1M
IF Gain 50dB
Freq Band [10M-41MHz]
Omit
LO Opt [<150kHz]
775pts
Corre 25
Phase Noise
Start 1 Hz
Stop 1 MHz
Phase Noise: Hold
Cor
Ctrl 5V
Pow 0V
Attn 10dB
ExtRef1
ExtRef2
Stop
Svc
2016-07-19 15:34

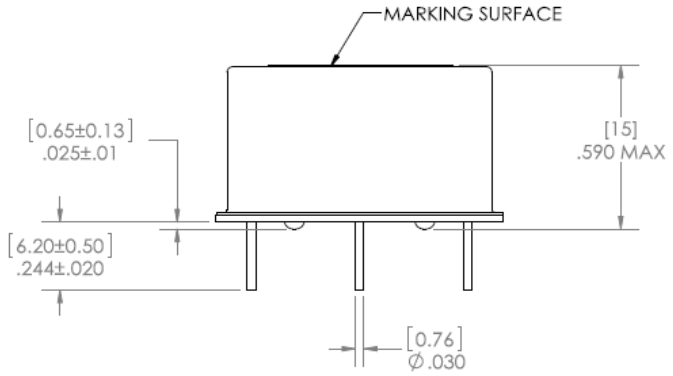
Performance Specifications

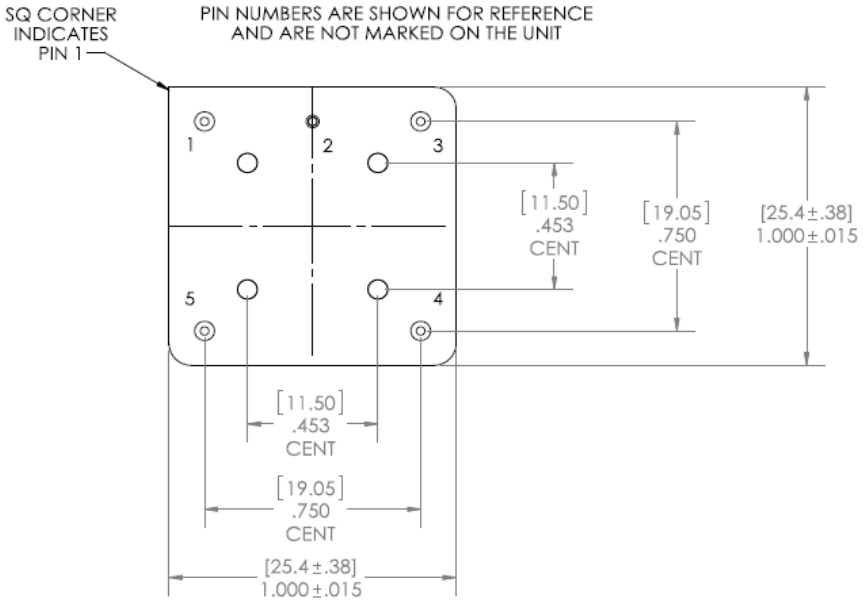
Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Unit	Condition
Supply Voltage	11.4	12.0	12.6	VDC	
Power Consumption			4.0 1.8	Watts Watts	during warm-up steady state @ +25°C
Reference Voltage		10		VDC	
RF Output					
Signal	Sinewave				
Load		50		Ohms	
Output Power	+7.0		+13.0	dBm	50 Ohm load
Harmonics			-30	dBc	50 Ohm load
Spurious			-80	dBc	50 Ohm load
Frequency Tuning (EFC)					
Tuning Range	±600		±2000	ppb	enough for aging over 10 year lifetime
Linearity			15	%	
Tuning Slope	Positive				
Control Voltage Range	0		10	VDC	
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	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)	

Ordering Information

OX - 209 0 - B E E - 208 0 - 20M0000000

- Product Family: OX: OCXO
- Package: 25x25mm
- Height: 0: 15.00 mm
- Supply Voltage: B: +12V
- RF Output Code: E: Sinewave
- Temperature Range: E: -40°C to +85°C; J: -20°C to +70°C
- Stability Code: 308: ±30ppb; 508: ±50ppb
- Phase Noise and Frequency Control: 0: No Tuning; 1: Frequency Tuning
- Frequency

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 as frequency increases.
5. Subject to technical modification.
6. Contact factory for availability.

Contact Information

USA:
100 Watts Street
Mt Holly Springs, PA 17065
Tel: 1.717.486.3411
Fax: 1.717.486.5920

Europe:
Landstrasse
74924 Neckarbischofsheim
Germany
Tel: +49 (0) 7268.801.0
Fax: +49 (0) 7268.801.281

Vectron™ a Microchip company

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your reasonability to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATION OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING, BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly, or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks
The Microchip and Vectron names and logos are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

Rev: 4-24-2026 jar