

Helping Customers Innovate, Improve & Grow



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

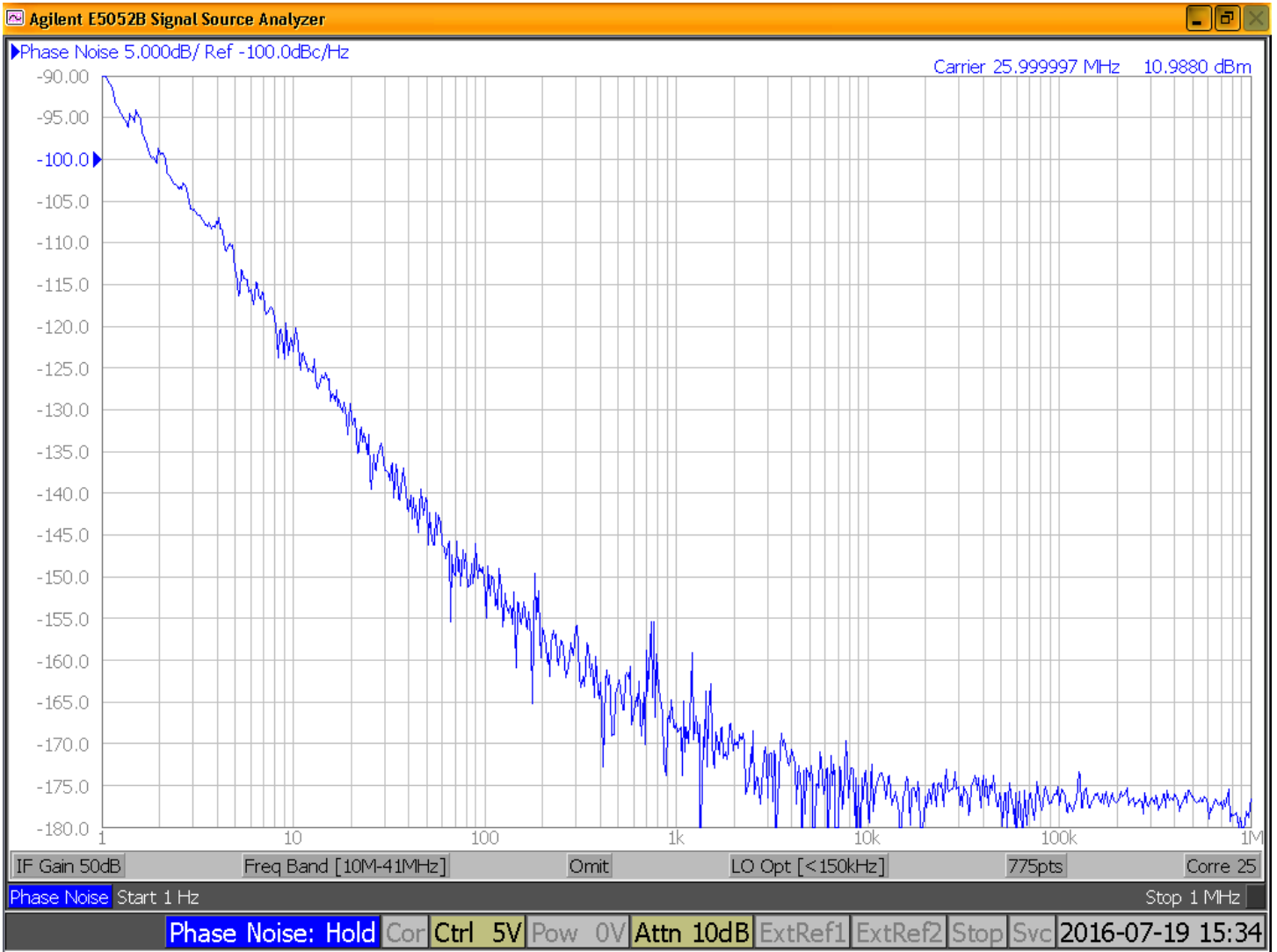
- Military Radar
- Instrumentation and Test Equipment
- Synthesizers
- Military Communication Equipment
- DRO reference
- Satellite Communications

Performance Specifications

| Phase Noise at 20-35 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 20-35 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 / 1 st 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 |

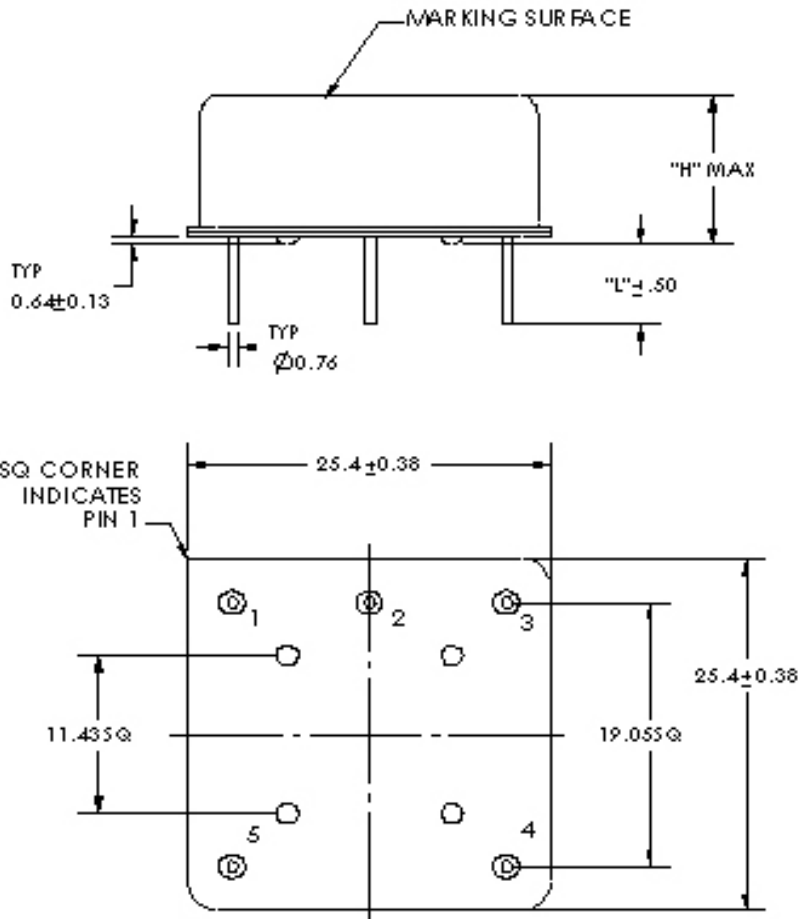
Phase Noise



Performance Specifications

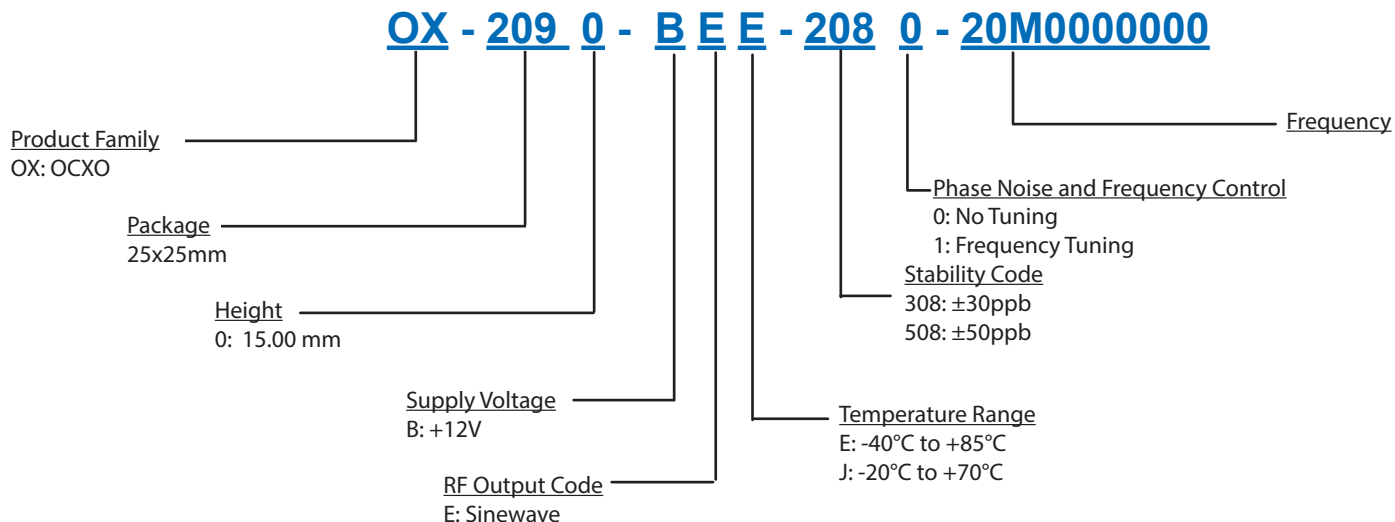
| Supply Voltage (Vs) | | | | | |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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



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.

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Rev:08/04/2016 dmc