# Stratum 3E High Stability Oven Stabilized Oscillator OH200-Series

**OCXO – OCVCXO**

CONNOR WINFIELD

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## Description

Connor-Winfield's high stability OH200-series are exceptionally precise frequency standards, excellent for use in cellular base stations, test equipment, Synchronous Ethernet, VSAT and Stratum 3E applications

These unique OCXO and OCVCXO products provide temperature stabilities in the range of ±3 ppb to ±25 ppb, over the commercial, extended commercial or the industrial temperature range. Power requirements are 3W over the commercial temperature range and 4.5W over the industrial temperature range. Additionally, excellent aging is achieved through the use of overtone SC cut crystals.

The OH200 series is available with CMOS logic or Sinewave output along with Electronic Frequency Tuning. These oscillators provide outstanding phase noise that varies depending on frequency. Frequencies are available from 5.0 to 40.0 MHz. Allan Variance specifications are rated for primary reference standards. Warm up times are on the order of 5 minutes to 0.10 ppm of final frequency.


## Features

- Frequency Range: 5.0 to 40.0 MHz
- OCXO - Fixed Frequency
- OCVCXO - Voltage Controlled Frequency
- 3.3 Vdc, 5.0 Vdc or 12.0 Vdc Operation
- Available Frequency Stabilities:
  ±3 ppb, ±5 ppb, ±10 ppb or ±25 ppb
- Available Temperature Ranges:
  0 to 70°C, -20 to 70°C, -40 to 70°C or -40 to 85°C
- Low Phase Noise / Phase Jitter
- Available Outputs:
  CMOS or Sinewave
- Package: 1.1" x 1.4" x 0.5" (CO-8)
- RoHS Compliant / Lead Free

## Ordering Information

| OH200- | 6 | 10 | 03 | C | F | - 012.8M |
|---|---|---|---|---|---|---|
| Package<br>OH200- = 1.1x1.4 CO8 | Temperature Range<br>5 = 0 to 70°C<br>6 = -40 to 85°C<br>7 = -20 to 70°C<br>8 = -40 to 70°C | Frequency Stability<br>06 = ±3 ppb<br>10 = ±5 ppb<br>20 = ±10 ppb<br>50 = ±25 ppb<br>{±(Fmax-Fmin)/2.Fo} | Supply Voltage<br>03 = 3.3 Vdc<br>05 = 5.0 Vdc<br>12 = 12.0 Vdc | Output Type<br>C = CMOS<br>S = Sinewave | OCXO Type<br>F = Fixed Freq.<br>V = Voltage Controlled Freq. | Output Frequency<br>Frequency Format<br>-xxx.xM Min<br>-xxx.xxxxxxM Max<br>*Amount of numbers after the decimal point.<br>M = MHz |

**Example Part Number:**

*OH200-61003CF-012.8M = 1.1" x 1.4" x 0.5" CO-8 package, -40 to 85°C temperature range, ±5.0 ppb frequency stability, 3.3 Vdc supply voltage, CMOS square wave output, fixed frequency OCXO, 12.8 MHz output frequency.*

*To order a OH200-61003CF with an output frequency of: 6.4 MHz = OH200-61003CF-006.4M*
*To order a OH200-61003CF with an output frequency of 16.384 MHz = OH200-61003CF-016.384M.*

*OH200-712005SV-040.0M = 1.1" x 1.4" x 0.5" CO-8 package, -20 to 70°C temperature range, ±10.0 ppb frequency stability, 5.0 Vdc supply voltage, Sinewave output, voltage controlled output frequency OCVCXO, 40 MHz output frequency.*

RoHS COMPLIANT

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|---|---|
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## Absolute Maximum Ratings

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Storage Temperature | -55 | - | 125 | °C | |
| Supply Voltage - 3.3 Vdc (Vcc) | -0.5 | - | 4.5 | Vdc | |
| Supply Voltage - 5.0 Vdc (Vcc) | -0.5 | - | 7.0 | Vdc | |
| Supply Voltage - 12 Vdc (Vcc) | -0.5 | - | 13.5 | Vdc | |
| Control Voltage (Vc) | -0.5 | - | 7.0 | Vdc | |

## Operating Specifications

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Center Frequency: (Fo) | 5.0 | - | 40.0 | MHz | |
| Operating Temperature Range: | | | | | |
| Temperature Code 5 | 0 | - | 70 | °C | |
| Temperature Code 6 | -40 | - | 85 | °C | |
| Temperature Code 7 | -20 | - | 70 | °C | |
| Temperature Code 8 | -40 | - | 70 | °C | |
| Frequency Calibration: | -0.1 | - | 0.1 | ppm | @ 25°C |
| Frequency Stability vs. Change in Temperature: | | | | | |
| Stability Code 06 | -3.0 | - | 3.0 | ppb | 1 |
| Stability Code 10 | -5.0 | - | 5.0 | ppb | 1 |
| Stability Code 20 | -10.0 | - | 10.0 | ppb | 1 |
| Stability Code 50 | -25.0 | - | 25.0 | ppb | 1 |
| Frequency Stability vs Load | -5.0 | - | 5.0 | ppb | ±5% |
| Frequency Stability vs Voltage | -5.0 | - | 5.0 | ppb | ±5% |
| Aging: Daily: | | | | | |
| 5 MHz to 20 MHz | -1.0 | - | 1.0 | ppb/day | 2 |
| >20 MHz to 40 MHz | -2.0 | - | 2.0 | ppb/day | 2 |
| Aging: First Year: | | | | | |
| 5 MHz to 20 MHz | -50 | - | 50 | ppb | |
| >20 MHz to 40 MHz | -100 | - | 100 | ppb | |
| Lifetime Tolerance: (20 Years) | | | | | |
| 5 MHz to 20 MHz- | -300 | - | 300 | ppb | 3 |
| >20 MHz to 40 MHz | -500 | - | 500 | ppb | 3 |
| Supply Voltage: (Vcc) (Note: Power supply turn-on ramp time must be > 5 ms to 90% of Vcc.) | | | | | |
| Voltage Code 03 | 3.13 | 3.30 | 3.47 | Vdc | |
| Voltage Code 05 | 4.75 | 5.00 | 5.25 | Vdc | |
| Voltage Code 12 | 11.40 | 12.00 | 12.60 | Vdc | |
| Power Consumption: Turn-On | | | | | |
| 0 to 70°C Models | - | - | 3.00 | W | 4 |
| -20 to 70°C Models | - | - | 3.20 | W | 4 |
| -20 to 75°C Models | - | - | 3.30 | W | 4 |
| -40 to 85°C Models | - | - | 3.80 | W | 4 |
| Power Consumption: Steady State @ 25°C | | | | | |
| 0 to 70°C Models | - | - | 1.10 | W | 4 |
| -20 to 70°C Models | - | - | 1.10 | W | 4 |
| -20 to 75°C Models | - | - | 1.20 | W | 4 |
| -40 to 85°C Models | - | - | 1.50 | W | 4 |
| Phase Jitter: (BW: 10 Hz to Fo/2) | | | | | |
| Models with Fo: 5 MHz to 20 MHz | - | - | 1.0 | ps RMS | |
| Models with Fo: >20 MHz to 40 MHz | - | - | 2.0 | ps RMS | |
| Short Term Allan Deviation (1s) | - | 1.0E-11 | - | RMS | |
| Start-Up Time: | - | - | 500 | ms | |
| Warm Up Time @ 25°C: | - | - | 5 | minutes | 5 |

**Notes:**

*1.Frequency stability vs. change in temperature [±(Fmax-Fmin)/2.Fo].*
*2.At time of shipment after 48 hours of operation.*
*3. Inclusive of calibration, operating temperature, supply voltage change, load change and 20 years aging.*
*4. Measured with Vcc = Nominal, in calm air.*
*5. Measured @ 25°C, within 5 minutes, referenced one hour after turn-on.*

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## Phase Noise Characteristics

Typical Phase Noise for OXCO's with CMOS Output

| SSB Phase Noise | 5 - 12 MHz | 12.1- 20 MHz | 20.1 - 30 MHz | 30.1 - 40 MHz | Units |
|---|---|---|---|---|---|
| @1Hz offset | -85 | -80 | -70 | -65 | dBc/Hz |
| @ 10Hz offset | -115 | -110 | -100 | -95 | dBc/Hz |
| @ 100Hz offset | -140 | -135 | -125 | -120 | dBc/Hz |
| @ 1KHz offset | -145 | -140 | -140 | -140 | dBc/Hz |
| @ 10KHz offset | -150 | -150 | -150 | -150 | dBc/Hz |
| @ 100KHz offset | -150 | -150 | -150 | -150 | dBc/Hz |

## OCVCXO Input Characteristics (OCXO Type Code V)

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Control Voltage Range: | | | | | |
| 3.3 Vdc Models | 0.30 | 1.65 | 3.00 | V | Vcc = 3.3 Vdc |
| 5.0 Vdc Models | 0.50 | 2.50 | 4.50 | V | Vcc = 5.0 Vdc |
| 12.0 Vdc Models | 0.50 | 2.50 | 4.50 | V | Vcc = 12.0 Vdc |
| Frequency Pullability: | | | | | |
| Models with Fo 5 to 20 MHz | ±0.4 | - | - | ppm | |
| Models with Fo >20 to 40 MHz | ±0.6 | - | - | ppm | |
| Input Impedance | 100K | - | - | Ohms | |

## CMOS Output Characteristics (Output Code C)

| Parameter | | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---|---|---|---|---|
| Load | | - | 15 | - | pF | |
| Output Voltage: | | | | | | |
| 3.3 Vdc Models | High (Voh) | 3.0 | - | - | V | |
| | Low (Vol) | - | - | 0.4 | | |
| 5.0 Vdc Models | High (Voh) | 4.7 | - | - | V | |
| | Low (Vol) | - | - | 0.4 | | |
| 12.0 Vdc Models | High (Voh) | 4.7 | - | - | V | |
| | Low (Vol) | - | - | 0.4 | | |
| Duty Cycle at 50% of Vcc | | 45 | 50 | 55 | % | |
| Rise / Fall Time: 10% to 90% | | - | - | 6 | ns | |
| Spurious Output | | - | - | -80 | dBc | |

## Sinewave Output Characteristics (Output Code S)

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Load | - | 50 | - | Ohms | |
| Output Power | 5.0 | - | - | dBm: | |
| Harmonics | - | - | -30 | dBc | |
| Spurious | - | - | -80 | dBc | |

## Package Characteristics

| | |
|---|---|
| OH200 Package | Hermetically sealed, resistive welded package with grounded case. |

## Environmental Characteristics

| | |
|---|---|
| Shock | 500 G's 1ms, Halfsine, 3 shocks per direction, per MIL-STD 202G, Method 213B Test Condition D. |
| Sinusoidal Vibration | 0.06" D.A. or 10G's Peak, 10 to 500 Hz, per MIL-STD-202G, Method 204D, Test Condition A. |
| Random Vibration | 5.35 G's rms. 20 to 2000 Hz per MIL-STD-202G, Method 214,Test Condition 1A, 15 minutes each axis. |
| Moisture | 10 cycles, 95% RH, Per MIL-STD-202G, Method 112. |
| Marking Permanency | Per MIL-STD-202G, Method 215J. |
| Attachment Method PCB | Through Hole Mounted |
| Resistance to Solder Heat | Per MIL-STD-202G, Method 210, Condition E. |
| Solder Process | RoHS compliant, lead free. See solder profile. |

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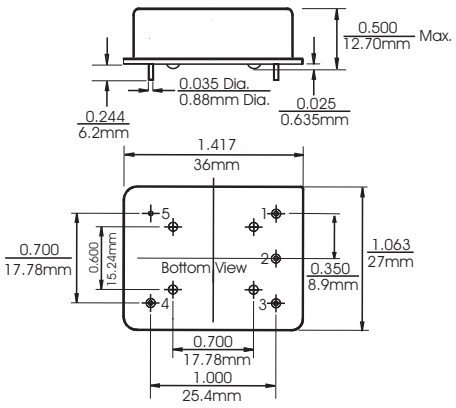
## Re stabilization Time

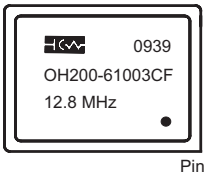
| Off Time | Re stabilization Time |
|---|---|
| <1 Hour | <2 Hours * |
| <6 Hour | <12 Hours * |
| <24 Hour | <48 Hours * |
| 1 to 16 Days | 48 Hours + 1/4 Off Time * |
| >16 Days | <6 Days * |

* For a given off time, the time required to meet daily aging, short term stability and TEV requirements.

## Package Outline

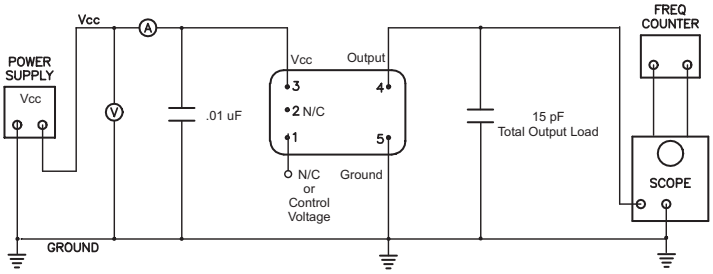



## Package Marking




Keep Out Area: Under the OCXO is a keep out area, do not place any parts in this area.

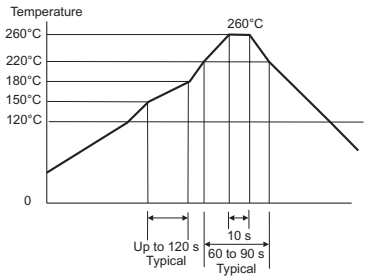
## Test Circuit




## Pin Connections

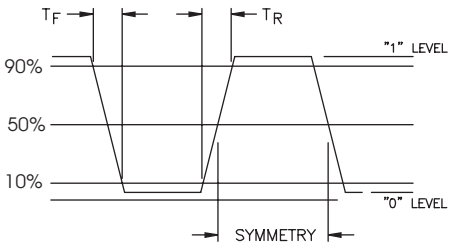
Pin Connection
1: Control Voltage or N/C
2: N/C
3: Supply Voltage (Vcc)
4: Output
5: Ground (Case)

## Solder Profile




Meets IPC/JEDEC J-STD-020C

## CMOS Output Waveform

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