2111 Comprehensive Drive

Aurora, Illinois 60505

Phone: 630-851-4722

Fax: 630-851-5040

www.conwin.com

US Headquarters:
630-851-4722
European Headquarters:
+353-61-472221

STRATUM 3E High Stability
Oven Stabilized Oscillator
OH100 Series
OCXO / VCOCXO

CONNOR WINFIELD
HCW

Description

Connor-Winfield's high stability OH100 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 / VCOCXO oscillators provide temperature stabilities in the range of ±5 ppb to ±50 ppb, over the commercial, extended commercial or the industrial temperature range. Power requirements are 1.1W over the commercial temperature range and 1.5W over the industrial temperature range after warm-up. Additionally, excellent aging is achieved through the use of overtone SC cut crystals.

The OH100 series is available with CMOS logic or Sinewave output along with Voltage Controlled Option. These oscillators provide outstanding phase noise that varies depending on frequency. 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 to 40 MHz
- OCXO - Fixed Frequency
- VCOCXO - Voltage Controlled Option
- 3.3 Vdc or 5.0 Vdc Operation
- Available Frequency Stabilities:
- ±5.0 ppb, ±10.0 ppb, ±20 ppb or ±50 ppb
- Available Temperature Ranges:
  0 to 70°C, -20 to 70°C, -20 to 75°C,
  -40 to 70°C or -40 to 85°C
- Low Phase Noise / Phase Jitter
- Output: CMOS Logic or Sinewave
- Package: 1.0" x 1.0" x 0.500"
- RoHS Compliant / Lead Free   ✓RoHS

** Not all available at Digi-Key

Ordering Information

OH100-	6	10	03	C	F	- 010.0M
Package OH100- = 1.0"x1.0"x0.5" OCXO Through Hole Package	Temperature Range 5 = 0 to 70°C 6 = -40 to 85°C 7 = -20 to 70°C 8 = -40 to 70°C 9 = -20 to 75°C	Frequency Stability 05 = ±5.0 ppb* 10 = ±10.0 ppb 20 = ±20.0 ppb 50 = ±50.0 ppb	Supply Voltage 03 = 3.3 Vdc 05 = 5.0 Vdc	Output Type C = CMOS S = Sinewave	OCXO Type F = Fixed Freq. V = Voltage Controlled Option	Output Frequency Frequency Format -xxx.xM Min -xxx.xxxxxxM Max *Amount of numbers after the decimal point. M = MHz

*±5.0ppb stability models are only available over the 0 to 70°C and -20 to 70°C temperature ranges.

Example Part Number:

OH100-61003CF-010.0M = 1.0" x 1.0" x 0.445" package, -40 to 85°C temperature range, ±10.0 ppb frequency stability, 3.3 Vdc supply voltage, CMOS square wave output, fixed output frequency OCXO, 10.0 MHz output frequency.

OH100-52005CV-010.0M = 1.0" x 1.0" x 0.445" package, 0 to 70°C temperature range, ±20.0 ppb frequency stability, 5.0 Vdc supply voltage, CMOS square wave output, voltage controlled option, VCOCXO, 10.0 MHz output frequency.

OH100-71005SV-010.0M = 1.0" x 1.0" x 0.445" package, -20 to 70°C temperature range, ±10.0 ppb frequency stability, 5.0 Vdc supply voltage, Sinewave output, voltage controlled ooption, VCOCXO 10.0 MHz output frequency.

HCW
RoHS COMPLIANT

Bulletin	**Cx205**
Page	**1 of 4**
Revision	**09**
Date	**25 Oct 2016**

Attention: System Designers please review Application Note AN2093: System Design Information and Printed Circuit Board Layout Guidelines for OCXO Oscillators. @ www.conwin.com/technologies.html

Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	125	°C	
Supply Voltage	-0.5	-	7.0	Vdc	
Control Voltage (Vc)	-0.5	-	7.0	Vdc	
Operating Supply Voltage 3.3 Vdc (Vcc)	3.13	3.30	3.47	Vdc	
Operating Supply Voltage 5.0 Vdc (Vcc)	4.75	5.00	5.25	Vdc	

Absolute Ratings: Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only. The functional operation of the device at those or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to conditions outside the "recommended operating conditions" for any extended period of time may adversely impact device reliability and result in failures not covered by warranty.

Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Center Frequency: (Fo)	5	-	40	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	
Temperature Code 9	-20	-	75	°C	
Frequency Calibration:	-0.1	-	0.1	ppm	@ 25°C
Frequency Stability vs. Change in Temperature:					
Stability Code 05	-5.0	-	5.0	ppb	1, 2
Stability Code 10	-10.0	-	10.0	ppb	2
Stability Code 20	-20.0	-	20.0	ppb	2
Stability Code 50	-50.0	-	50.0	ppb	2
Frequency Stability vs. Load	-2.0	-	2.0	ppb	±5%
Frequency Stability vs. Voltage	-2.0	-	2.0	ppb	±5%
Aging: Daily:					
5 MHz to 20 MHz	-1.0	-	1.0	ppb/day	3
>20 MHz to 40 MHz	-2.0	-	2.0	ppb/day	3
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	4
>20 MHz to 40 MHz	-500	-	500	ppb	4
Supply Voltage: (Vcc)					
Voltage Code 03	3.13	3.30	3.47	Vdc	5
Voltage Code 05	4.75	5.00	5.25	Vdc	5
Power Consumption: Turn-On					
0 to 70°C Models	-	-	3.00	W	6
-20 to 70°C Models	-	-	3.20	W	6
-20 to 75°C Models	-	-	3.30	W	6
-40 to 85°C Models	-	-	3.80	W	6
Power Consumption: Steady State @ 25°C					
0 to 70°C Models	-	-	1.10	W	6
-20 to 70°C Models	-	-	1.15	W	6
-20 to 75°C Models	-	-	1.20	W	6
-40 to 85°C Models	-	-	1.50	W	6
Phase Jitter: (BW: 10 Hz to Fo/2)	-	-	1.0	ps rms	
Short Term Allan Deviation (1s)	-	1.0E-11	-		
Start-Up Time:	-	-	500	ms	
Warm Up Time @ 25°C:	-	-	5	minutes	7

Notes:
1. ±5.0ppb stability models are only available over 0 to 70°C and -20 to 70°C temperature ranges.
2. Frequency vs change in temperature, calculated as [(Fmax-Fmin)/(2*Fo)]. Control voltage at nominal value.
3. At time of shipment after 48 hours of operation.
4. Inclusive of calibration, operating temperature, supply voltage change, load change and 20 years aging.
5. Supply voltage must reach Vcc levels monotonically within a ramp-up time of <12 ms.
6. Measured with Vcc = Nominal, in calm air.
7. Measured @ 25°C, within ±100 ppb, referenced one hour after turn-on.
8. To ensure proper operation of VCOCXO's the control voltage input must be biased the nominal control voltage. Failure to bias the Vc input will cause an unstable output condition.

Phase Noise Characteristics

Typical Phase Noise for OH100-series with CMOS Output

Parameter					Units	Notes
SSB Phase Noise	5 - 12 MHz	>12- 20 MHz	>20 - 30 MHz	>30 - 40 MHz		
@ 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	

Input Characteristics - Voltage Controlled Option (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
Frequency Pullability:	±0.4	-	-	ppm	8
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		
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	-	+10	dBm	
Harmonics	-	-	-30	dBc	
Spurious	-	-	-80	dBc	

Package Characteristics

OH100 Package	Hermetically sealed, resistive welded package with grounded case.

Environmental Characteristics

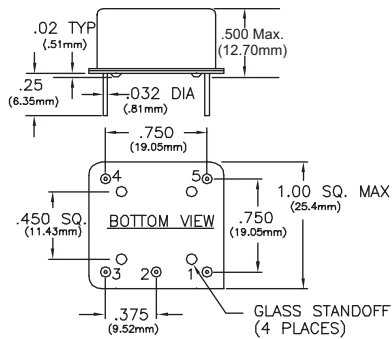|	
Shock	500 G's 1ms, Halfsine, 3 shocks per direction, per MIL-STD 202G, Method 213B Test Condition D.
Sinusoidal Vibration	0.06" D.A. or 10G's Peak, 10 to 500 Hz, per MIL-STD-202G, Method 204D, Test Condition A.
Random Vibration	5.35 G's rms. 20 to 2000 Hz per MIL-STD-202G, Method 214,Test Condition 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.

Bulletin	**Cx205**
Page	**3 of 4**
Revision	**09**
Date	**25 Oct 2016**

CONNOR WINFIELD

Re-Stabilization Time

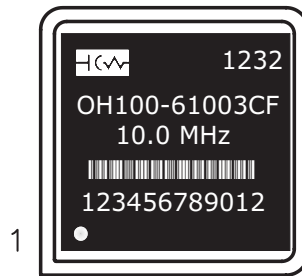| Off Time	Re stabilization Time
<1 Hour	<2 Hours *
<6 Hour	<12 Hours *
<24 Hour	<48 Hours *
1 to 16 Days	48 Hours + 1/4 Off Time *
>16 Days	<6 Days *

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

Package Outline

.02 TYP (.51mm)
.500 Max. (12.70mm)
.25 (6.35mm)
.032 DIA (.81mm)
.750 (19.05mm)
4
5
1.00 SQ. MAX (25.4mm)
BOTTOM VIEW
.450 SQ. (11.43mm)
.750 (19.05mm)
3
2
1
.375 (9.52mm)
GLASS STANDOFF (4 PLACES)

Dimensional Tolerance:
±.005 (.127mm)

Package Marking

HCW   1232

OH100-61003CF

10.0 MHz

||||||||||||||||

123456789012

●

1

Date Code (YYWW)

Model Number
Output Frequency
Serial # Barcode
Serial Number

Pin Connections

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

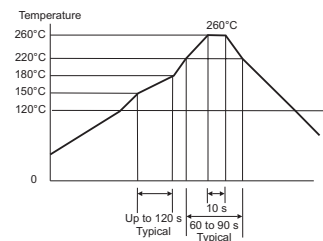Keep Out Area: Under the OCXO is a keep out area, do not place any parts in this area.

Attention: System Designers please review Application Note AN2093:
System Design Information and Printed Circuit Board Layout Guidelines for OCXO Oscillators.
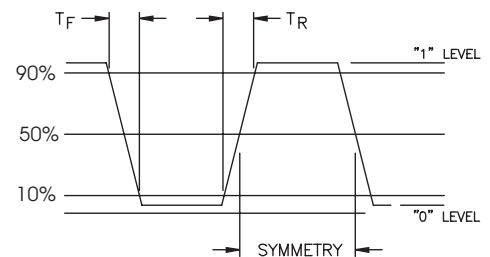*@ www.conwin.com/technologies.html*

Test Circuit

POWER SUPPLY
Vcc
A
V
10 uF to 100 uF
Voltage Control or N/C
0.01 uF
3
2
1
4
5
N/C
15 pF
FREQ COUNTER
SCOPE
GROUND

Solder Profile

Temperature
260°C   260°C
220°C
180°C
150°C
120°C
0
Up to 120 s Typical
60 to 90 s Typical
10 s
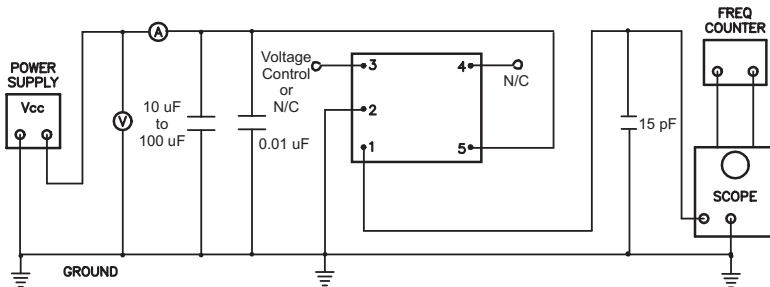
Meets IPC/JEDEC J-STD-020C

CMOS Output Waveform

T_F
T_R
"1" LEVEL
90%
50%
10%
"0" LEVEL
SYMMETRY

Revision History

Revision	Date	Changes
00	03/01/11	New issue
01	07/27/11	Updated power consumption
02	03/22/12	Added sinewave models
03	08/22/12	Updated marking information
04	09/18/12	Added +10 dB Max to sinewave output characteristics
05	12/07/12	Added application note AN2093 information
06	04/03/13	Added ±5ppb models
07	05/13/13	Changed note 5 and removed note from power supply line, added absolute note
08	11/19/13	Added Voltage Controlled Option
09	10/25/16	Removed units rms from Short Term Stability specification.