

# OD100LP-Series Low Phase Noise VCOCXO

# CONNOR WINFIELD



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## Description:

The Connor-Winfield OD100LP-series is a low phase noise VCOCXO in a 1x1 inch metal package. The OD100LP-series is designed for those applications that demand extremely low noise frequency sources.



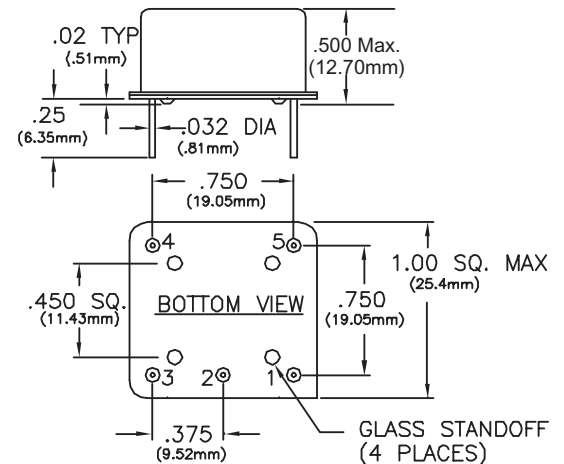
## Features:

- VCOCXO
- 5Vdc or 12Vdc operation
- 1x1" Metal Package
- Frequency Stability Options:  $\pm 200$ ,  $\pm 100$ ,  $\pm 50$ ,  $\pm 20$  and  $\pm 10$ ppb
- Temperature Range Options: 0 to 70°C, -40 to 85°C, -20 to 70°C
- Sinewave or HCMOS Output
- Reference Voltage Output Pin 4
- RoHS Compliant / Lead Free

## Pin Connections

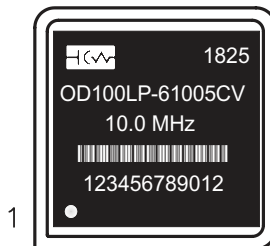
1:	Output
2:	Ground (Case)
3:	Voltage Control
4:	Reference Voltage
5:	Supply Voltage (Vdd)

## Package Outline



Dimensional Tolerance:  
 $\pm .005$  (.127mm)

## Marking Configuration



1825 Date Code (YYWW)  
 OD100LP-61005CV Model Number  
 10.0 MHz Output Frequency  
 Barcode Serial # Barcode  
 123456789012 Serial Number

## Ordering Information

OD100LP-	5	12	12	S	V	- 010.0M
Package OD100LP- = 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 75°C	Frequency Stability 10 = $\pm 10$ ppb 20 = $\pm 20$ ppb 50 = $\pm 50$ ppb 12 = $\pm 100$ ppb 22 = $\pm 200$ ppb	Supply Voltage 05 = 5.0 Vdc 12 = 12.0 Vdc	Output Type S = Sinewave C = CMOS	OCXO Type V = Voltage Controlled V1 = Voltage Control*	Output Frequency Frequency Format -xxx.xM Min -xxx.xxxxxM Max *Max 6 digits after the decimal point. M = MHz

Note: See page 2 for frequencies available at each stability level. Not all combinations of supply voltage and temperature ranges are available.

\* V1 specifies 0 to +5V CV range on +12V 100MHz model

### Example Part Number:

OD100LP-51212SV-010.0M = 1.0" x 1.0" x 0.445" package, 0 to 70°C temperature range,  $\pm 100$  ppb frequency stability, 12V Vdc supply voltage, Sinewave output, VCOCXO, 10.0 MHz output frequency.



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](http://www.conwin.com/technologies.html)



## Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	125	°C	
Supply Voltage (5V Models)	-0.5	-	7.0	Vdc	
(12V Models)	-0.5	-	12.6	Vdc	
Control Voltage (Vc)	-0.5	-	9.0	Vdc	

## Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Center Frequency: (Fo)	-	10 and 100	-	MHz	
Frequency Calibration					
Fo=10 MHz	-200	-	200	ppb	1
Fo=100 MHz	-800	-	800	ppb	1
Frequency Stability vs Temperature					2
Stability Code 10:	-10	-	10	ppb	10MHz only
Stability Code 20:	-20	-	20	ppb	10MHz only
Stability Code 50:	-50	-	50	ppb	10MHz only
Stability Code 12:	-100	-	100	ppb	10MHz & 100MHz
Stability Code 22:	-200	-	200	ppb	10MHz & 100MHz
vs. Supply Voltage Change					
Fo = 10MHz:	-0.3	-	0.3	ppb	Vcc ±5%
Fo = 100MHz	-10	-	10	ppb	Vcc ±5%
vs. Load Change					
Fo = 10MHz:	-0.3	-	0.3	ppb	Load ±5%
Fo = 100MHz	-10	-	10	ppb	Load ±5%
vs. Aging per day					
Fo = 10MHz	-0.5	-	0.5	ppb	3
Fo = 100MHz	-10	-	10	ppb	3
vs. Aging 1st Year					
Fo = 10MHz	-50	-	50	ppb	
Fo = 100MHz	-500	-	500	ppb	
Operating Temperature Range:					
Temperature Code 5:	0	-	70	°C	
Temperature Code 6:	-40	-	85	°C	4
Temperature Code 7:	-20	-	70	°C	
Temperature Code 8:	-40	-	75	°C	
Warm-up Time at 25°C	-	-	2	Minutes	5
Short Term Stability (ADEV at 1s)					
Fo = 10MHz	-	1.0E-11	-		6
Fo = 100MHz	-	2.0E-11	-		6

## Typical Phase Noise

Parameter	Fo=10MHz	Fo=100MHz	Units	Notes
	CMOS Output	Sinewave Output		
@1Hz offset	-95	-65	dBc/Hz	
@ 10Hz offset	-125	-95	dBc/Hz	
@ 100Hz offset	-145	-125	dBc/Hz	
@ 1KHz offset	-160	-155	dBc/Hz	
@ 10KHz offset	-165	-165	dBc/Hz	
@ 100KHz offset	-165	-170	dBc/Hz	



### Supply Voltage (Vdd)

Parameter	Minimum	Nominal	Maximum	Units	Notes
Supply Voltage:					
Option 05:	4.75	5.00	5.25	Vdc	
Option 12:	11.4	12.0	12.6	Vdc	
Supply Current (Idd)					
Turn On (Vdd=5V)	-	700	-	mA	
Turn On (Vdd=12V)	-	300	-	mA	
Steady State at 25C (Vdd=5V)	-	220	-	mA	
Steady State at 25C (Vdd=12V)	-	100	-	mA	

### Reference Voltage

Parameter	Minimum	Nominal	Maximum	Units	Notes
Reference Voltage (Vdd=5V)	3.8	4.0	4.2	Vdc	
Reference Voltage (Vdd=12V, Fo=10.0MHz)	3.8	4.0	4.2	Vdc	
Reference Voltage (Vdd=12V, Fo=100.0MHz)	8.5	9.0	9.5	Vdc	

### Input Characteristics - Voltage Control (Vc)

Parameter	Minimum	Nominal	Maximum	Units	Notes
Tuning Range (Fo=10MHz)	±0.5	-	±1.5	ppm	
Tuning Range (Fo=100MHz)	±1.5	±3.0	±4.5	ppm	
Linearity	-	-	20	%	
Control Voltage Range Vdd=5V	0.0	2.0	4.0	Vdc	
Vdd=12V, (Fo=10.0M):	0.5	2.5	4.5	Vdc	
Vdd=12V, (Fo=100.0M): Standard	0.5	4.5	8.5	Vdc	
Vdd=12V, (Fo=100.0M): Option V1	0.0	2.5	5.0	Vdc	
Tuning Slope		Positive			
Input Impedance	100K	-	-	Ohms	

### CMOS Output Characteristics (Output Code C)

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load	-	15	-	pF	
Output Voltage:					
5.0 Vdc 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	

### Sinewave Output Characteristics (Output Code S)

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load	-	50	-	Ohms	
Output Power	7	9	11	dBm	
Harmonics	-	-	-30	dBc	
Spurious	-	-	-80	dBc	

### Package Characteristics

OD100LP-Series Package      Hermetically sealed, resistive welded package with grounded case.

### Environmental Characteristics

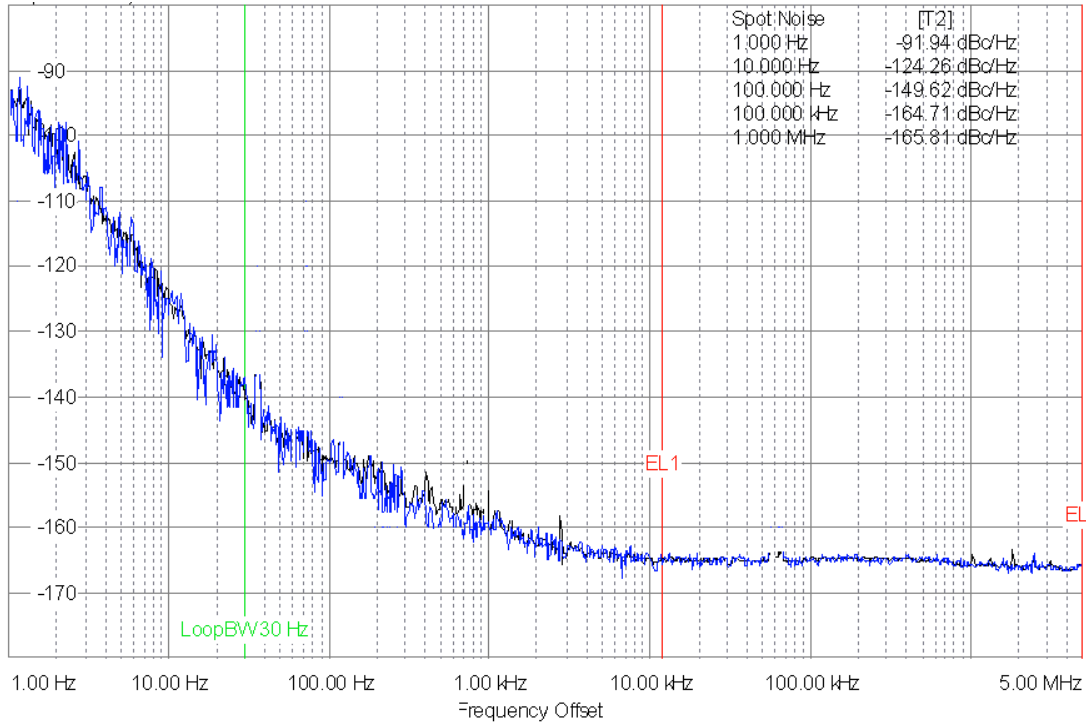
Shock	500 G's 1ms, Halfsine, 3 shocks per direction, per MIL-STD 202F, Method 213B Test Condition D.
Sinusoidal Vibration	0.06" D.A. or 10G's Peak, 10 to 500 Hz, per MIL-STD-202F, Method 204D, Test Condition A.
Random Vibration	5.35 G's rms, 20 to 2000 Hz per MIL-STD-202F, Method 214, Test Condition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

#### Notes:

1. At time of shipment after 60 minutes of operation, @25°C.
2. Frequency stability vs. change in temperature  $[\pm(F_{max}-F_{min})/(2 \cdot F_0)]$ .
3. At time of shipment after 48 hours of operation.
4. The 100MHz frequency at 12V supply voltage is not available with temperature range -40 to 85C
5. Measured at 25°C, after 2 minutes will be within ±200ppb of the reference frequency measured 1 hour after turn-on.
6. The part is shielded from airflow during this measurement.

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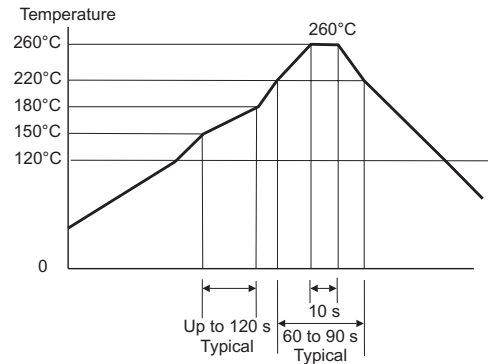
### Typical Phase Noise Fo=10MHz CMOS Output



### Short Term Stability (ADEV) Fo = 10MHz

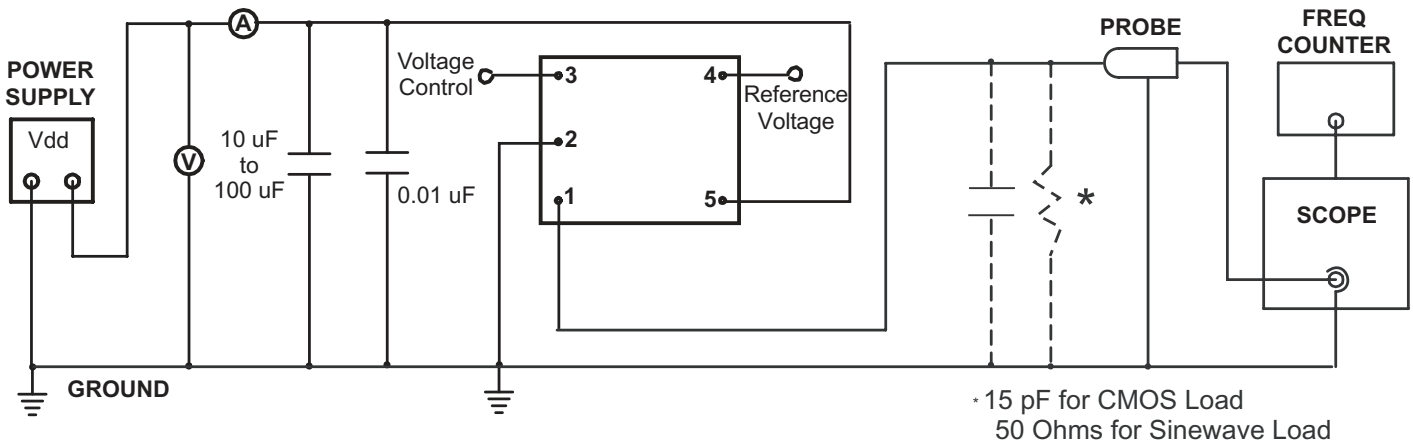


## Solder Profile



Meets IPC/JEDEC J-STD-020C

## Test Circuit



## Revision History

Revision	Date	Description
00	08/30/17	New issue
01	09/13/17	Added 10MHz phase noise and ADEV data.
02	09/14/17	Updated Operating Specifications
03	07/03/18	Expanded frequency stability table and updated supply current.
04	12/18/18	Updated calibration specifications, reference voltages, and control voltage ranges.
05	02/06/19	Updated Tuning Ranges
06	04/30/20	Added Input Impedance specification
07	01/21/21	Updated Voltage Control - adding V1 option
08	07/21/21	Updated Voltage Control adding "Standard" and Changed Vref on 12V 10MHz part from 5V to 4Vdc

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