



High Frequency 9x14mm Oven Stabilized Oscillator DOXP Series

OCXO or VCOCXO

CONNOR WINFIELD



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Description:

Connor-Winfield's DOXP Series is an exceptionally precise frequency standard. It integrates an SC cut OCXO with an analog PLL and low jitter VCXO to provide output frequencies up to 156.25MHz.

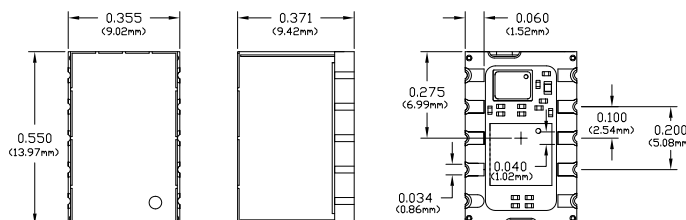
Based on a low frequency SC-cut crystal, the DOXP Series offers the benefits of low aging, excellent short term stability, low phase noise and tight stability in a small 9x14mm surface mount package.



Features:

- OCXO or VCOCXO
- 3.3 Vdc Operation
- SMT Package
- Frequency Stability: ± 20 ppb or ± 50 ppb
- Temperature Ranges:
0 to 70°C, -20 to 75°C or -40 to 85°C
- Low Phase Noise
- LVC MOS Output
- RoHS Compliant / Lead Free

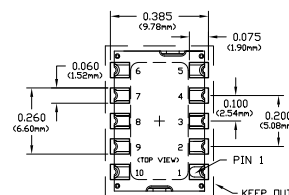
Package Outline



Dimensional Tolerance:

 ± 0.005 inches (0.127mm) unless otherwise shown

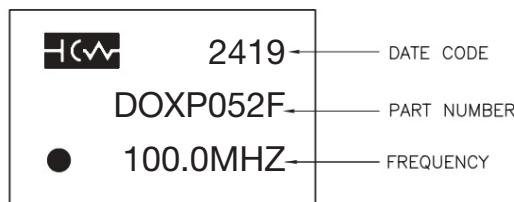
Suggested Pad Layout



Keep-Out Area:

Do not place any parts in this area

Marking Diagram



Pad Connections

- | | |
|-----|------------------------|
| 1: | DNC* |
| 2: | N/C or Voltage Control |
| 3: | DNC* |
| 4: | Ground |
| 5: | DNC* |
| 6: | DNC* |
| 7: | Output |
| 8: | DNC* |
| 9: | Supply Voltage (Vdd) |
| 10: | DNC* |

*DO NOT connect "DNC" pads to ground or supply rails.

** Not all options
available at
Digi-Key

Ordering Information

DOXP	02	0	F	-100.0M
Oscillator Type 3.3 Vdc LVC MOS Output Surface Mount OCXO	Frequency Stability 02 = ± 20 ppb 05 = ± 50 ppb 10 = ± 100 ppb	Temperature Range 0 = 0 to 70°C 1 = -20 to 75°C 2 = -40 to 85°C	Voltage Control Option F = OCXO (Fixed Freq.) V = VCOCXO (Voltage Controlled)	Output Frequency Frequency Format -xxx.xM Min * -xxx.xxxxxM Max *

* Number of allowable digits after the decimal point.
M = MHz

Order Part Number Example: DOXP020F-100.0M



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Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	125	°C	
Supply Voltage - 3.3 Vdc (Vdd)	-0.5	-	4.5	Vdc	
Control Voltage (Vc)	-0.5	-	Vdd+0.5	Vdc	

Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Center Frequency (Fo)	1	-	156.25	MHz	
Frequency Stability vs. Change in Temperature					
Option 02	-20	-	20	ppb	1
Option 05	-50	-	50	ppb	1
Option 10	-100	-	100	ppb	1
Operating Temperature Range					
Option 0	0	-	70	°C	
Option 1	-20	-	75	°C	
Option 2	-40	-	85	°C	
Frequency Calibration	-1.0	-	1.0	ppm	2
Frequency Stability vs Load	-20	-	20	ppb	±5%
Frequency Stability vs Voltage	-20	-	20	ppb	±5%
Aging: Daily	-	±2	±5	ppb/day	3
Aging: First Year	-0.3	-	0.3	ppm	
Total Frequency Tolerance (20 Years)	-3.0	-	3.0	ppm	4
Supply Voltage (Vdd)	3.13	3.30	3.47	Vdc	5
Power Consumption Vdd = Nominal Voltage					
Turn On	-	-	3.0	W	
Steady State @ 25°C	-	-	1.3	W	
Integrated Phase Jitter for Fo=100MHz (12kHz to 20MHz)	-	0.1	-	ps RMS	
Allan Deviation (Tau=1s) Fo=100MHz	-	5.0E-11	-		
Start-Up Time	-	-	10	ms	6
Warm Up Time (Within Specification @ 25°C)	-	-	60	s	
Warm Up Time (Within Specification @ -40°C)	-	-	90	s	

CMOS Output Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load	-	15	-	pF	7
Output Voltage					
Output Voltage: High (Voh)	2.7	-	-	V	
Low (Vol)	-	-	0.3	V	
Output Current: High (Ioh)	-4	-	-	mA	
Low (Iol)	-	-	4	mA	
Duty Cycle at 50% of Vcc	45	50	55	%	
Rise / Fall Time: 10% to 90%	-	-	5.0	ns	

Typical Phase Noise Characteristics

Parameter	Fo=10 MHz	Fo=20.0MHz	Fo=100.0MHz	Units	Notes
@ 1 Hz offset			-55	dBc/Hz	
@ 10 Hz offset			-64	dBc/Hz	
@ 100 Hz offset			-90	dBc/Hz	
@ 1 KHz offset			-128	dBc/Hz	
@ 10 KHz offset			-145	dBc/Hz	
@ 100 KHz offset			-153	dBc/Hz	
@ 1MHz offset			-158	dBc/Hz	



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Bulletin **Cx329**
Page **2 of 4**
Revision **01**
Date **08 May 2024**

Input Characteristics - Voltage Controlled Option

Parameter	Minimum	Nominal	Maximum	Units	Notes
Control Voltage Range:	0.30	1.65	3.00	V	8
Frequency Pullability:	±3.0	±5.0	±10.0	ppm	9
Input Impedance	100K	-	-	Ohms	
Linearity	-	-	±5	%	

Package Characteristics

DOXP Series Package	Non-hermetic package consisting of a FR-4 substrate and grounded metal cover.
Moisture Sensitivity Level	MSL-3

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.
ESD	HBM Class 1C
Moisture	10 cycles, 95% RH, Per MIL-STD-202G, Method 112.
Marking Permanency	Per MIL-STD-202G, Method 215J.
Solder Process Recommendations:	RoHS compliant, lead free. See solder profile on page 4.
In-line reflow:	Refer to recommended reflow pre-heat and reflow temperatures on page 5. Component solder is Pb free high temperature eutectic alloy with a melting point of 221°C.
In-line oven profile:	We recommend using KIC profiler or similar device placing one of the thermocouples on the device to insure that the internal package temperature does not exceed 221°C.
Removal of device:	If for any reason the device needs to be removed from the board, use a temperature controlled repair station with profile monitoring capabilities. Following a monitored profile will insure the device is properly pre-heated prior to reflow. Refer to IPC 610E for inspection guidelines.

Recommended Cleaning Process: (If required)

Device is non-hermetic. We recommend in-line warm water wash with air knife and drying capabilities. If cleaner does not have drying capability, then use hot air circulated oven. Boards should be placed in the oven vertically for good water runoff.

Device must be dried properly prior to use!

Note: If saponifier is used make sure the device is rinsed properly to insure all residues are removed. PH of saponifier should not exceed 10.

Drying Temperature: Between 85 to 100°C.

Drying Time: Time will vary depending on the board size.

Caution: Do not submerge the device!

Notes:

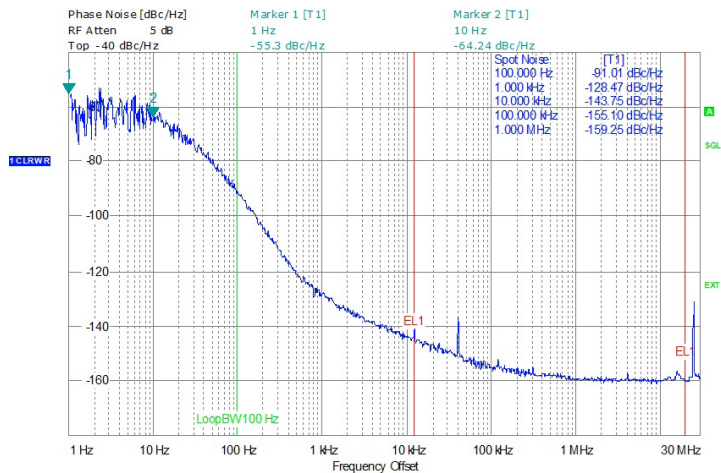
1. Frequency stability vs. change in temperature. $[\pm(F_{max} - F_{min})/(2 \cdot F_0)]$.
2. Initial calibration @ 25°C. For OCXO with voltage control option, the control voltage must be fixed.
3. After 10 days of operation
4. Inclusive of calibration @ 25°C, frequency vs. change in temperature, change in supply voltage (±5%), load change (±5%), shock and vibration and 20 years aging
5. Minimum "Power On Time" after rail rises from 0 to within +/-5% of Vdd = 1 second. Supply voltage must reach Vdd level monotonically.
6. 10ms start time is guaranteed when supply voltage reaches Vdd level monotonically.
7. Attention: To achieve optimal frequency stability, and in some cases to meet the specification stated on this data sheet, it is required that the circuit connected to this OCXO output must have the equivalent input capacitance that is specified by the nominal load capacitance. Deviations from the nominal load capacitance will have a graduated effect on the stability of approximately 20 ppb per pF load difference.
8. Positive slope. (Frequency increases as Vc voltage increases). To ensure proper operation of VCOCXO's, the control voltage input must be biased the nominal control voltage. Failure to bias the Vc input may cause an unstable output condition.
9. Referenced to F₀.



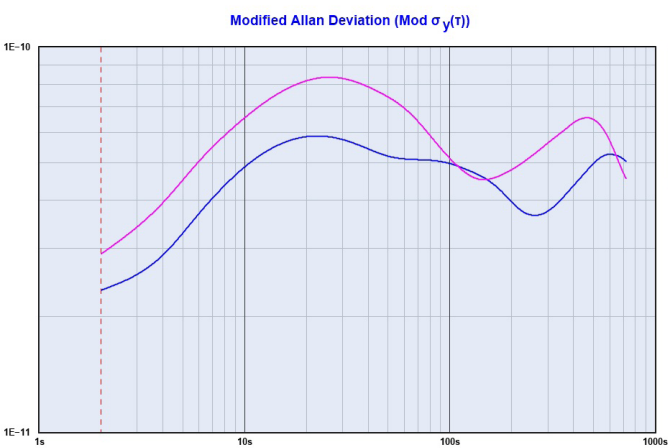
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Bulletin	Cx329
Page	3 of 4
Revision	01
Date	08 May 2024

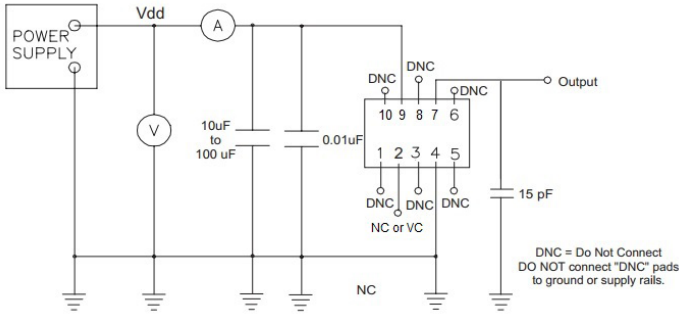
Typical Phase Noise (Fo=100MHz)



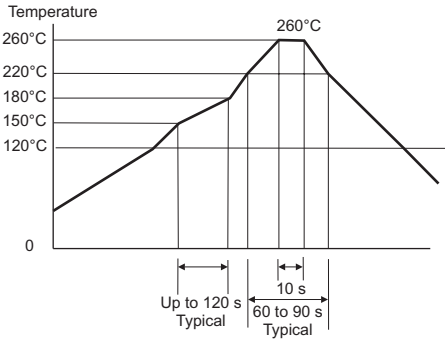
Typical ADEV (Fo=10MHz)



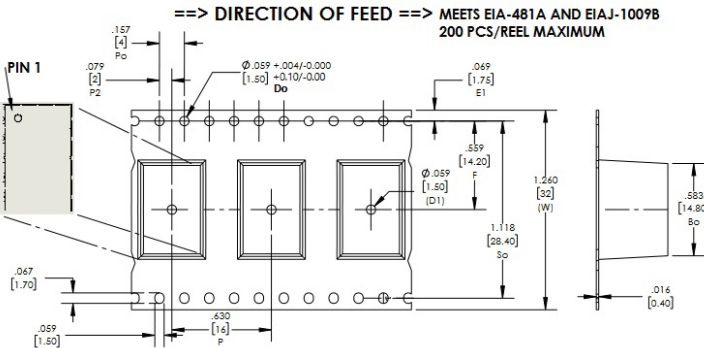
LVC MOS Test Circuit



RoHS Solder Profile

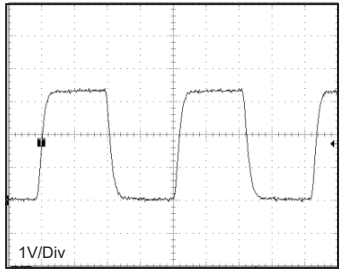


Tape and Reel Information



Meets IPC/JEDEC J-STD-020C

CMOS Output Waveform



Revision History

Revision	Date	Note
00	04/24/24	New issue
01	05/08/24	Update pad connection table, pin numbers, and test circuit



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Bulletin	Cx329
Page	4 of 4
Revision	01
Date	08 May 2024