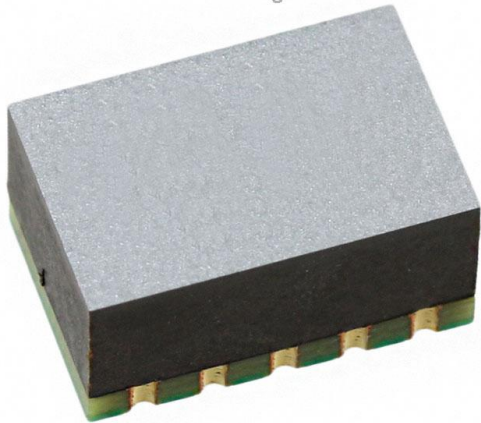


DOC100V-010.0M Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

| | |
|------------------------------|--|
| DiGi Electronics Part Number | DOC100V-010.0M-DG |
| Manufacturer | Connor Winfield |
| Manufacturer Product Number | DOC100V-010.0M |
| Description | XTAL OSC VCOCXO 10.0000MHZ LVCMO |
| Detailed Description | 10 MHz VCOCXO LVC MOS Oscillator 3.3V 6-SMD, No Lead |

This model DOC100V-010.0M is available at DiGi Electronics.

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Purchase and inquiry

Manufacturer Product Number:

DOC100V-010.0M

Series:

DOC

Base Resonator:

Crystal

Frequency:

10 MHz

Output:

LVC MOS

Frequency Stability:

±100ppb

Operating Temperature:

0°C ~ 70°C

Ratings:

-

Package / Case:

6-SMD, No Lead

Height - Seated (Max):

0.307" (7.80mm)

Manufacturer:

Connor Winfield

Product Status:

Obsolete

Type:

VCOXO

Function:

-

Voltage - Supply:

3.3V

Absolute Pull Range (APR):

-

Current - Supply (Max):

-

Mounting Type:

Surface Mount

Size / Dimension:

0.555" L x 0.358" W (14.10mm x 9.10mm)

Current - Supply (Disable) (Max):

-

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



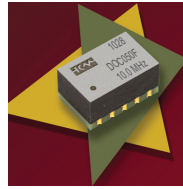
Surface Mount Oven Stabilized Oscillator DOC Series OCXO / VCOCXO



2111 Comprehensive Drive
Aurora, Illinois 60505
Phone: 630-851-4722
Fax: 630-851-5040
www.conwin.com

Description:

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



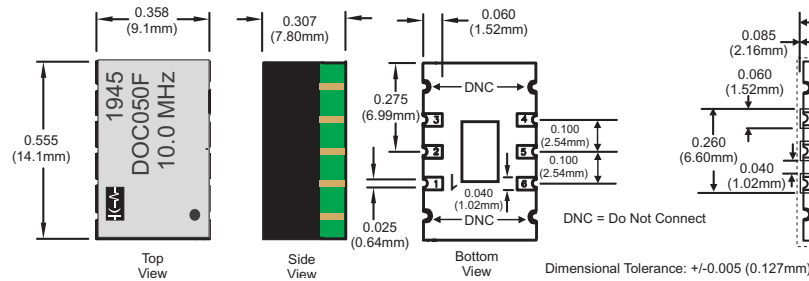
These true surface mount OCXO / VCOCXO oscillators provide frequency stabilities in the range of ± 20 ppb to ± 250 ppb, over the commercial, extended commercial or the industrial temperature range.

The DOC series is available with a CMOS output and a Voltage Controlled Option. These oscillators provide outstanding phase noise characteristics that will meet the most stringent requirements.

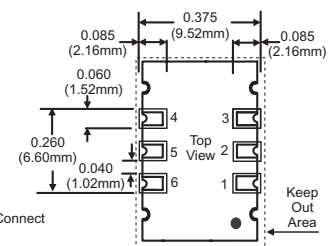
Features:

- OCXO - Fixed Frequency
VCOCXO - Voltage Controlled Option
- 3.3 Vdc Operation
- SMT Package
- Frequency Stabilities Available:
 ± 20 ppb, ± 50 ppb, ± 100 ppb, ± 140 ppb, ± 250 ppb
- Temperature Ranges Available:
0 to 70°C, -20 to 75°, -40 to 85°C
or -40 to 70°C
- Low Phase Noise
- LVCMOS Output
- Optional Electronic Frequency Tuning
- RoHS Compliant / Lead Free

Package Outline



Suggested Pad Layout



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

Pad Connections

- 1: N/C or Voltage Control (Vc)
- 2: Do Not Connect*
- 3: Ground
- 4: Output
- 5: Do Not Connect*
- 6: Supply Voltage (Vcc)

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

Ordering Information

** Not all options available at Digi-Key

| | | | | |
|--|---|---|---|--|
| DOC | 05 | 0 | F | -010.0M |
| Oscillator Type 3.3 Vdc LVCMOS Output Surface Mount OCXO | Frequency Stability 02 = ± 20 ppb 05 = ± 50 ppb 10 = ± 100 ppb 14 = ± 140 ppb 25 = ± 250 ppb | Temperature Range 0 = 0 to 70°C 1 = -20 to 75°C 2 = -40 to 85°C 3 = -40 to 70°C | Voltage Control Option F = OCXO (Fixed Freq.) V = VCOCXO (Voltage Controlled) | Output Frequency Frequency Format -xxx.xM Min.* -xxx.xxxxxxM Max* |

*Amount of numbers after the decimal point.
M = MHz

Example Part Numbers:

DOC050F-010.0M = 9x14mm package, ± 50 ppb, 0 to 70°C, 3.3 Vdc, CMOS Output, OCXO, Output Frequency 10.0 MHz
DOC022V-020.0M = 9x14mm package, ± 20 ppb, -40 to 85°C, 3.3 Vdc, CMOS Output, VCOCXO, 20.0 MHz





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 | |
| Control Voltage (Vc) | -0.5 | - | Vcc+0.5 | Vdc | |

Operating Specifications

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|---|---|---------|----------|---------|-------|
| Center Frequency: (Fo) | 10, 12.8, 19.44, 20, 25, 38.88, 40, or 49.152 | | | MHz | |
| Frequency Stability vs. Change in Temperature: (See Ordering Information) | | | | | |
| Stability Code 02 | -20 | - | 20 | ppb | 1 |
| Stability Code 05 | -50 | - | 50 | ppb | 1 |
| Stability Code 10 | -100 | - | 100 | ppb | 1 |
| Stability Code 14 | -140 | - | 140 | ppb | 1 |
| Stability Code 25 | -250 | - | 250 | ppb | 1 |
| Operating Temperature Range: (See Ordering Information) | | | | | |
| Temperature Code 0 | 0 | - | 70 | °C | |
| Temperature Code 1 | -20 | - | 75 | °C | |
| Temperature Code 2 | -40 | - | 85 | °C | |
| Temperature Code 3 | -40 | - | 70 | °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: | -10 | - | 10 | ppb/day | 3 |
| Aging: First Year: | -300 | - | 300 | ppb | 3 |
| Total Frequency Tolerance (20 Years) | -4.60 | - | 4.60 | ppm | 4 |
| Supply Voltage: (Vcc) | 3.13 | 3.30 | 3.47 | Vdc | 5 |
| Power Consumption: Vcc = Nominal Voltage | | | | | |
| Commercial Temperature Range, 0 to 70 °C | | | | | |
| Turn On | - | - | 2.5 | W | |
| Steady State @ 25°C | - | - | 1.1 | W | |
| Industrial Temperature Range, -40 to 85 °C | | | | | |
| Turn On | - | - | 3.0 | W | |
| Steady State @ 25°C | - | - | 1.3 | W | |
| Phase Jitter: (BW: 12 KHz to 5MHz @ Fo=49.152MHz) | - | 0.3 | 0.35 | ps RMS | |
| Short Term Stability | - | - | 1.0E-9/s | | |
| Start-Up Time (when Vcc ramp is <= 500us) | - | - | 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 | |
| Output Voltage: Low (Vol) | - | - | 0.3 | V | |
| Output Current: | | | | | |
| Output Current: High (Ioh) | - | - | -4 | mA | |
| Output Current: Low (Iol) | 4 | - | - | mA | |
| Duty Cycle at 50% of Vcc | 45 | 50 | 55 | % | |
| Rise / Fall Time: 10% to 90% | - | - | 6.5 | ns | |

Input Characteristics - Voltage Controlled Option

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



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Phase Noise Characteristics

Typical Phase Noise for DOC050F - 010.0M

| Parameter | Minimum | Nominal | Maximum | Units | Notes |
|------------------|---------|---------|---------|--------|-------|
| @ 1 Hz offset | - | -67 | - | dBC/Hz | |
| @ 10 Hz offset | - | -100 | - | dBC/Hz | |
| @ 100 Hz offset | - | -130 | - | dBC/Hz | |
| @ 1 KHz offset | - | -148 | - | dBC/Hz | |
| @ 10 KHz offset | - | -154 | - | dBC/Hz | |
| @ 100 KHz offset | - | -155 | - | dBC/Hz | |

Package Characteristics

| | |
|-------------|---|
| DOC Package | Package consisting of a FR-4 substrate and Ryton-R-4 cover. Water Resistant package, non-hermetic seal. (Engineering Properties of Ryton R-4 Application Note AN2100) |
|-------------|---|

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. |

| | |
|---------------------------------|--|
| Solder Process Recommendations: | RoHS compliant, lead free. See solder profile on page 4. |
| In-line oven profile: | We recommend using KIC profiler or similar device placing one of the thermocouples on the device to insure that the package temperature does not exceed 235°C for more than 20 seconds. |
| 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, water resistance with four weep holes, one in each corner to allow moisture to be removed during the drying cycle. 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 EFT, the control voltage must be fixed.
3. After 30 days of operation.
4. Inclusive of calibration @ 25°C, frequency vs. change in temperature, change in supply voltage ($\pm 5\%$), load change ($\pm 5\%$), shock and vibration and 20 years aging.
5. Minimum "Power On Time" after rail rises from 0 to within $\pm 5\%$ of $V_{cc} = 1$ second. Supply voltage must reach V_{cc} level monotonically.
6. 10ms start time is guaranteed when supply voltage reaches V_{cc} level in $\leq 500\mu s$. If supply ramp is greater than 500us, then start times as long as 1s are possible.
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. Loads higher than the nominal value will have a graduated effect on the stability of approximately 20ppb per pf of load difference.
8. Positive slope (frequency increases as V_c voltage increases). To ensure proper operation of VCOCXO's, the control voltage input must be biased to the nominal control voltage. Failure to bias the V_c input may result in an unstable output condition.
9. Referenced to F_0 .



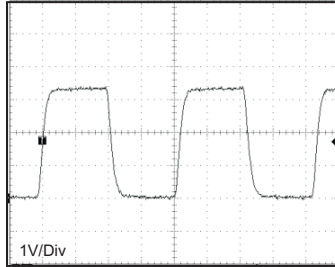
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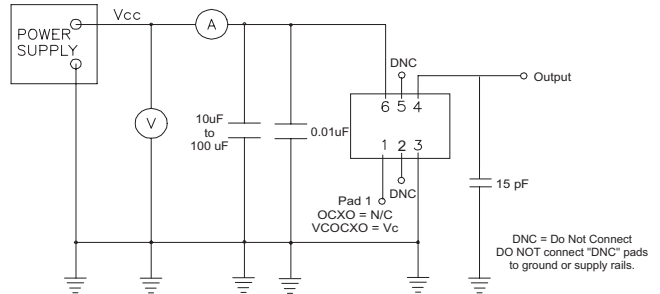


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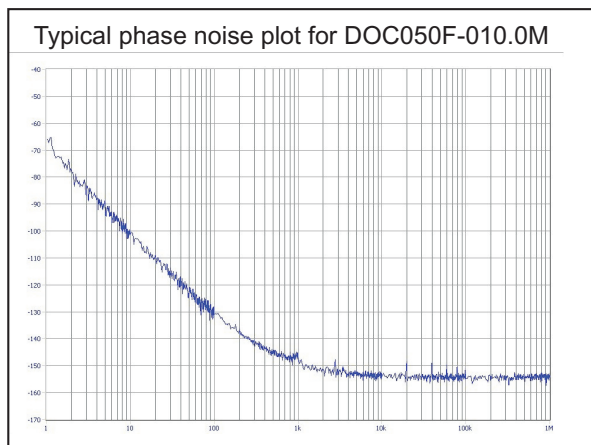
CMOS Output Waveform



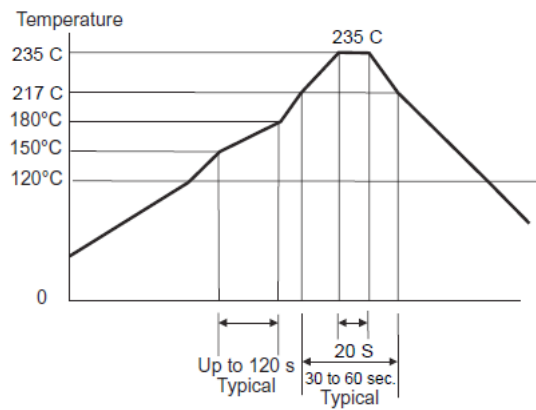
CMOS Test Circuit



Phase Noise Plot



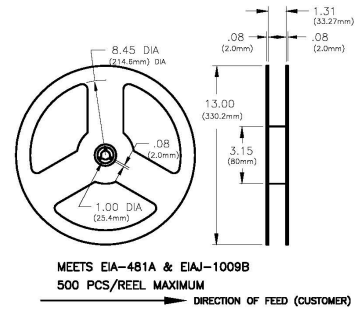
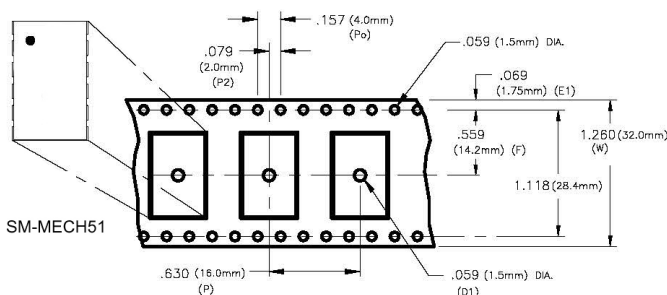
RoHS Solder Profile



Tape and Reel Information

MEETS EIA-481A & EIAJ-1009B
 500 PCS/REEL MAXIMUM

DIRECTION OF FEED (CUSTOMER)



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