

High Precision TCXO / VCTCXO Oscillators

CONNOR WINFIELD



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Description:

The Connor-Winfield's M100 and M200, series have very high frequency stability with excellent phase noise performance. Available in a 5x3.2 mm surface mount package. These TCXO's and VCTCXO's through the use of Analog Temperature Compensation are capable of holding sub 100-ppb or 200-ppb stabilities over the commercial or industrial temperature ranges. The surface mount package is designed for high-density mounting and is optimum for mass production.

Applications:

Basestation, Communications, DSL / ADSL, Femtocell, IP Timing, LTE, Precision GPS, SONET / SDH, WiMAX / WiBro, WLAN.

Features:

Models: M100 - M200 Series

Package: 5 x 3.2mm, 8 Pads
Frequencies Available: 10, 12.8, 19.2 or 20 MHz
3.3 Vdc Operation
Output Logic: LVCMOS
Frequency Stability:
M100: +/-100 ppb, 0 to 70°C
M200: +/-200 ppb, -40 to 85°C
Fixed Frequency - TCXO
Optional Control Voltage - VCTCXO
Low Jitter <0.50 ps RMS
Low Phase Noise
Tape and Reel Packaging
RoHS Compliant / Lead Free

Ordering Information

M	100	F	- 012.8M
Type / Package TCXO / VCTCXO Series M = 5.0x3.2 mm	Frequency Stability and Temperature Range 100 = ±100 ppb, 0 to 70°C 200 = ±200 ppb, -40 to 85°C Supply Voltage = 3.3 Vdc Output Logic = LVCMOS	TCXO or VCTCXO F = TCXO V = VCTCXO	Output Frequency Frequency Format -xxx.xM Min -xxx.xxxxxM Max *Amount of numbers after the decimal point. M = MHz

Example: Part Number

M100F-012.8M = 5x3.2mm package, ±100 ppb, 0 to 70 °C, 3.3 Vdc, LVCMOS Output, TCXO, 12.8 MHz
M100V-019.2M = 5x3.2mm package, ±100 ppb, 0 to 70 °C, 3.3 Vdc, LVCMOS Output, TVCCXO, 19.2 MHz
M200F-010.0M = 5x3.2mm package, ±200 ppb, -40 to 85 °C, 3.3 Vdc, LVCMOS Output, TCXO, 10 MHz
M200V-020.0M = 5x3.2mm package, ±200 ppb, -40 to 85 °C, 3.3 Vdc, LVCMOS Output, VCTCXO, 20 MHz



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Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-40	-	85	°C	
Supply Voltage (Vcc)	-0.5	-	4.6	Vdc	
Input Voltage (Vc)	-0.5	-	Vcc + 0.5	Vdc	

Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Output Frequency (Fo)	-	10, 12.8, 19.2 or 20	-	MHz	
Frequency Calibration @ 25 °C	-1.0	-	1.0	ppm	1
Frequency Stability	(See Ordering Information for full part number)				
Model M100x	-100	-	100	ppb	2
Model M200x	-200	-	200	ppb	2
Frequency vs. Load Stability	-0.20	-	0.20	ppm	±5%
Frequency vs. Voltage Stability	-0.20	-	0.20	ppm	±5%
Static Temperature Hysteresis	-	-	0.40	ppm	3
Freq. shift after reflow soldering	-1.0	-	1.0	ppm	4
Long Term Stability	-1.0	-	1.0	ppm	5
Aging					
per Life (20 Years)	-3.0	-	3.0	ppm	
per Day	-40	-	40	ppb	
per Second	-	4.63E-13			
Operating Temperature Range (See Ordering Information for full part number)					
Model M100x	0	-	70	°C	
Model M200x	-40	-	85	°C	
Supply Voltage (Vcc)					
Supply Current (Icc)	3.135	3.30	3.465	Vdc	
Jitter:					
Period Jitter	-	3.0	5.0	ps RMS	
Integrated Phase Jitter (12K to 20M)	-	0.5	1.0	ps RMS	6
SSB Phase Noise for Fo=12.8 MHz					
@ 10 Hz offset	-	-90	-	dBc/Hz	
@ 100 Hz offset	-	-120	-	dBc/Hz	
@ 1 KHz offset	-	-140	-	dBc/Hz	
@ 10 KHz offset	-	-150	-	dBc/Hz	
@ 100 KHz offset	-	-150	-	dBc/Hz	
@ 1 MHz offset	-	-152	-	dBc/Hz	
Start-Up Time					
	-	-	-	10	ms



Control Voltage Input Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Control Voltage	0.3	1.65	3.0	V	
Frequency Pullability	±10	-	-	ppm	
Control Voltage Slope		Positive Slope			
Monotonic Linearity	-	-	10	%	
Input Impedance	100K	-	-	Ohm	
Modulation Bandwidth (3dB)	10	-	-	KHz	

LVC MOS Output Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load (CL)	-	15	-	pF	7
Voltage (High) (Voh)	90%Vcc	-	-	Vdc	
Voltage (Low) (Vol)	-	-	10%Vcc	Vdc	
Duty Cycle at 50% of Vcc	45	50	55	%	
Rise / Fall Time 10% to 90%	-	4	8	ns	

Package Characteristics

Package	Hermetically sealed ceramic package with grounded metal cover
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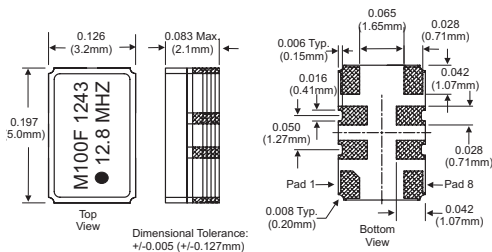
Environmental Characteristics

Vibration:	Vibration per Mil Std 883E Method 2007.3 Test Condition A.
Shock:	Mechanical Shock per Mil Std 883E Method 2002.4 Test Condition B.
Soldering Process:	RoHS compliant lead free. See soldering profile on page 2.

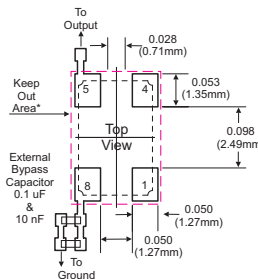
Notes:

- Initial calibration @ 25°C. ±2°C, for VCTCXO's Vc = 1.65V. Specifications at time of shipment after 48 hours of operation.
- Frequency stability vs. change in temperature. [$\pm(F_{max}-F_{min})/2.F_0$]. For VCTCXO's - Vc = 1.65V
- Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C
- Two consecutive reflows after 1 hour recovery @ 25°C.
- Frequency drift over 1 year @ 25°C.
- BW = 12 KHz to 20 MHz
- 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 TCXO 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..

M100 - M200 Package Outline



M100 - M200 Suggested Pad Layout



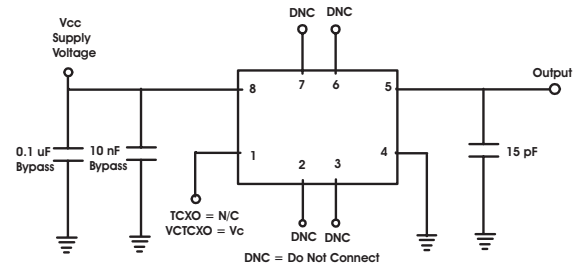
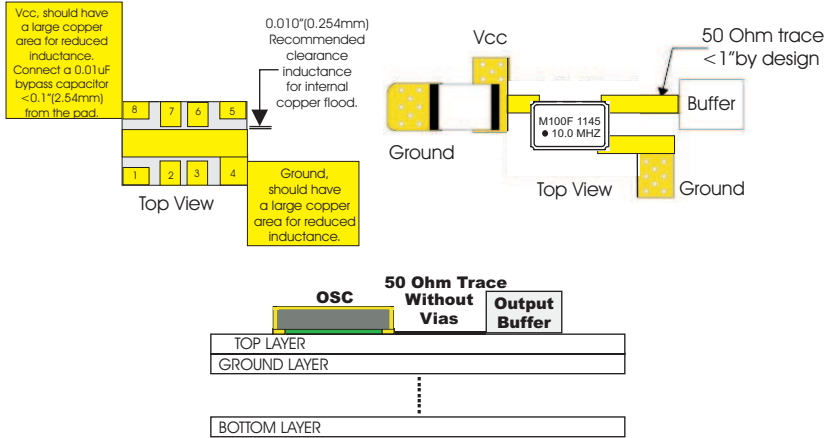
M100 - M200 Pad Connections

1:	VCTCXO: Control Voltage (Vc)
2:	TCXO: N/C
3:	Do Not Connect
4:	Ground
5:	Output
6:	Do Not Connect
7:	Do Not Connect
8:	Supply Voltage (Vcc)

* Do not route any traces in the keep out area. It is recommended the next layer under the keep out area is to be ground plane.

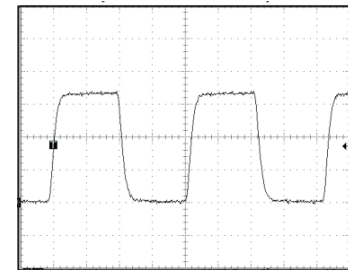
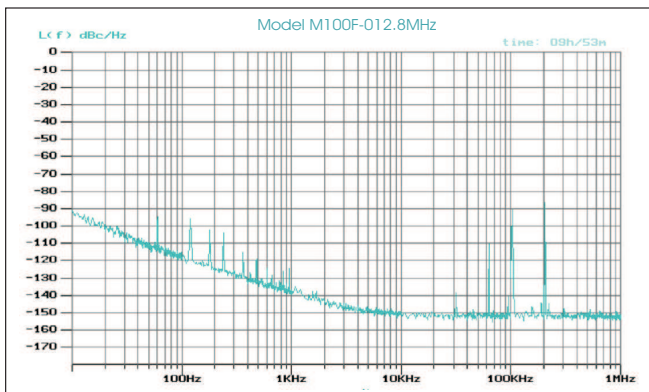
M100 - M200 Design Recommendations

M100 - M200 Test Circuit



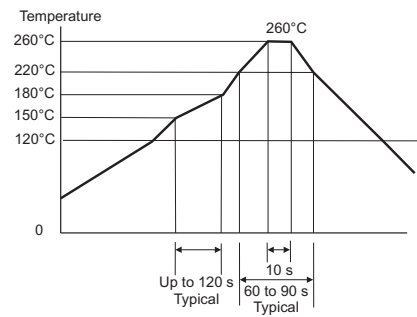
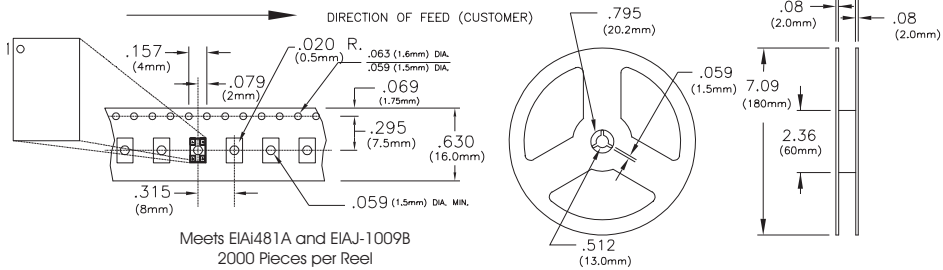
Phase Noise Information

LVC MOS Output Waveform



Tape and Reel Information

Solder Profile



Meets IPC/JEDEC J-STD-020C

Revision History

Revision 00

Data sheet released 10/31/12

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