Precision Sub-Miniature 3.2x5.0mm TCXO / VCTCXO

CONNOR WINFIELD

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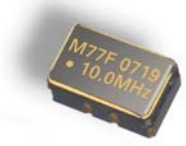


Description

The Connor-Winfield 3.2x5.0mm Temperature Compensated Crystal Oscillators and Voltage Controlled Temperature Compensated Crystal Oscillators are designed for use in applications requiring tight frequency stability in a small package. Through the use of Analog Temperature Compensation, this device is capable of holding sub 1-ppm stabilities over wide temperature ranges.

Features:

2.5V or 3.3V Operation
Clipped Sinewave Output Logic
Sub-Miniature 3.2x5.0mm SMT Package
Frequency Stabilities Available:
±0.50ppm, ±1.00ppm or ±2.00ppm
Temperature Ranges Available:
0 to 70°C
-20 to 70°C
-30 to 85°C
Low Power <2mA
Low Jitter <1pS RMS
Tape and Reel Packaging
RoHS Compliant / Lead Free
Recommended for new designs

Applications

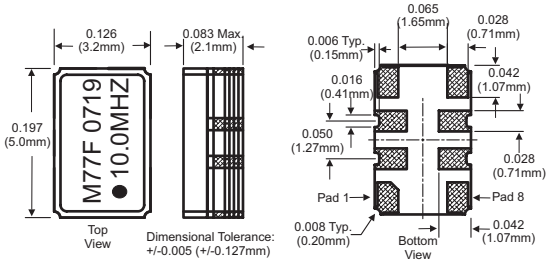
GPS Receivers
Instrumentation
Femtocells
FTTH, FTTC

Ordering Information

M77F - 010.0M

TCXO SERIES — Example Part Number — CENTER FREQUENCY

Package Layout



Pin Connections

Pad	Connection
1	Voltage Control or N/C
2	N/C
3	Do not connect
4	Ground
5	Output
6	N/C
7	Do not connect
8	Supply, Vcc

Ordering Information

M	7	7	F	-	010.0M
Type: Precision TCXO VCTCXO 3.2x5mm	Features: 4 = TCXO, Clipped Sinewave, 2.5Vdc. 7 = TCXO, Clipped Sinewave, 3.3Vdc. 8 = VCTCXO, Clipped Sinewave, 2.5Vdc. 9 = VCTCXO, Clipped Sinewave, 3.3Vdc.	Temperature Range: 5 = 0 to 70° C 7 = -20 to 70° C 8 = -30 to 85° C	Frequency Stability: E = ± 0.50 ppm F = ± 1.00 ppm G = ± 2.00 ppm		Output Frequency: Frequency Format -xxx.xM Min.* -xxx.xxxxxxM Max.* *Amount of numbers after the decimal point. M = MHz

Example:
M77F-010.0M = 3.2x5mm, TCXO, Clipped Sinwave, 3.3Vdc, -20 to 70C, +/-1.00ppm, Output Frequency 10.0MHz

To order an M77F with an output frequency of:
6.4 MHz = M77F-006.4M
20 MHz = M77F-020.0M
38.88 MHz = M77F-038.88M

RoHS COMPLIANT

Standard Frequencies Available *

6.4 MHz 9.72 MHz 10.0 MHz 10.24 MHz 12.5 Mhz 12.8 MHz
13.5 MHz 19.44 MHz 20.0 MHz 20.48 MHz 25 MHz 27 MHz 38.88 MHz

* Available frequencies from the factory for small quantity orders or quick delivery. Additional frequencies are available.

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Model Specifications

Model Number	M45E	M75E	M85E	M95E	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±0.50ppm			1
Temperature Range		0 to 70°C			

Model Number	M47E	M77E	M87E	M97E	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±0.50ppm			1
Temperature Range		-20 to 70°C			

Model Number	M48E	M78E	M88E	M98E	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±0.50ppm			1
Temperature Range		-30 to 85°C			

Model Number	M45F	M75F	M85F	M95F	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±1.00ppm			1
Temperature Range		0 to 70°C			

Model Number	M47F	M77F	M87F	M97F	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±1.00ppm			1
Temperature Range		-20 to 70°C			

Model Number	M48F	M78F	M88F	M98F	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±1.00ppm			1
Temperature Range		-30 to 85°C			

Model Number	M45G	M75G	M85G	M95G	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±2.0ppm			1
Temperature Range		0 to 70°C			

Model Number	M47G	M77G	M87G	M97G	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±2.0ppm			1
Temperature Range		-20 to 70°C			

Model Number	M48G	M78G	M88G	M98G	Note
TCXO / VCTCXO	TCXO	TCXO	VCTCXO	VCTCXO	
Supply Voltage	2.5Vdc	3.3Vdc	2.5Vdc	3.3Vdc	
Frequency Stability		±2.0ppm			1
Temperature Range		-30 to 85°C			

Note:
1) Frequency stability vs. change in temperature. [±(Fmax – Fmin)/2.Fo].

Features

2.5V or 3.3V Operation
Clipped Sinewave Output Logic
Sub-Miniature 3.2x5.0mm SMT Package
Frequency Stabilities Available:
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Temperature Ranges Available:
0 to 70°C
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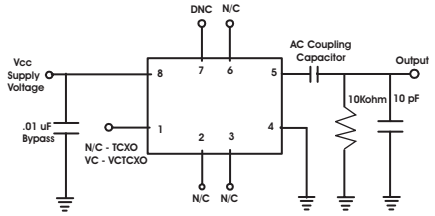
Low Power <2mA
Low Jitter <1pS RMS
Tape and Reel Packaging
RoHS Compliant / Lead Free
Recommended for new designs

Test Circuit



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Electrical Specifications for all Models

ABSOLUTE MAXIMUM RATINGS

PARAMETER	UNITS	MINIMUM	NOMINAL	MAXIMUM	UNITS	NOTE
Storage Temperature		-55	-	125	°C	
Supply Voltage	(Vcc)	-0.5	-	6.0	Vdc	
Input Voltage	(Vc)	-0.5	-	Vcc+0.5	Vdc	

OPERATING SPECIFICATIONS

PARAMETER			MINIMUM	NOMINAL	MAXIMUM	UNITS	NOTE
Frequency Range			6.4	-	40	MHz	
Frequency Calibration	(TCXO Models)		-1.00	-	1.00	ppm	1
Aging First Year			-1.0	-	1.0	ppm	
Total Aging for 10 years			-4.6	-	4.6	ppm	
Supply Voltage Variation. (Vcc±5%)			-0.025	-	0.025	ppm	
Load Coefficient, ±5pF			-0.025	-	0.025	ppm	
Static Temperature Hysteresis			-0.4	-	0.4	ppm	2
Frequency shift after reflow soldering			-1.00	-	1.00	ppm	3
Supply Voltage	2.5v Models	(Vcc)	2.375	2.500	2.625	Vdc	4
	3.3V Models	(Vcc)	3.135	3.300	3.465	Vdc	4
Supply Current		(Icc)	-	-	2	mA	
Jitter (BW=10Hz to 20MHz)			-	-	5	ps rms	
Jitter (BW=12kHz to 20MHz)			-	-	1	ps rms	
SSB Phase Noise at 10Hz offset			-	-80	-	dBc/Hz	
SSB Phase Noise at 100Hz offset			-	-110	-	dBc/Hz	
SSB Phase Noise at 1KHz offset			-	-130	-	dBc/Hz	
SSB Phase Noise at ≥10KHz offset			-	-145	-	dBc/Hz	

INPUT CHARACTERISTICS for VOLTAGE CONTROL (Pad 1)

PARAMETER			MINIMUM	NOMINAL	MAXIMUM	UNITS	Notes
Control Voltage Range	2.5v Models	(Vc)	0.2	1.2	2.2	Vdc	
	3.3v Models	(Vc)	0.5	1.5	2.5		
Frequency Tuning			±10	-	-	ppm	
Linearity			±5	-	-	%	
Slope			Positive				

CLIPPED SINEWAVE OUTPUT CHARACTERISTICS (Pad 6)

PARAMETER	MINIMUM	NOMINAL	MAXIMUM	UNITS	Notes
Output Voltage	1.00	-	-	V pk-pk	
Load					5
Output Load Resistance	-	10K	-	Ohms	
Output Load Capacitance	-	10	-	pF	

PACKAGE CHARACTERISTICS

Package	Ceramic Surface Mount Package.

ENVIRONMENTALS

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:	RoHS compliant, lead free. See solder profile page 4.
Sollderability	Sollderability per Mil Std 883E Method 2003

Note:

1) TCXO: Initial calibration @ 25 C. Specifications at time of shipment after 48 hours of operation.
2) Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25ºC.
3) Within two hours after reflow.
4) For best in application performance, careful selection of an external power source is critical. Select an external regulator that meets or exceeds to following specifications regarding voltage regulation tolerance, initial accuracy, temperature coefficient, voltage noise, and low voltage noise density. **Factory Test Conditions:** Initial Accuracy ±2mv, Noise (0.1Hz to 10 KHz) 15uV p-p, Voltage Noise Density = 50nV/sqrt Hz, Temperature Coefficient < 5ppm/°C.
5) Output is DC coupled

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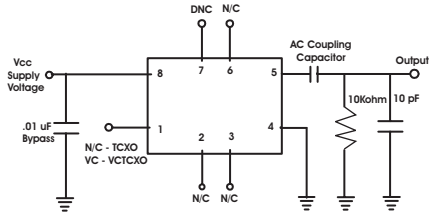

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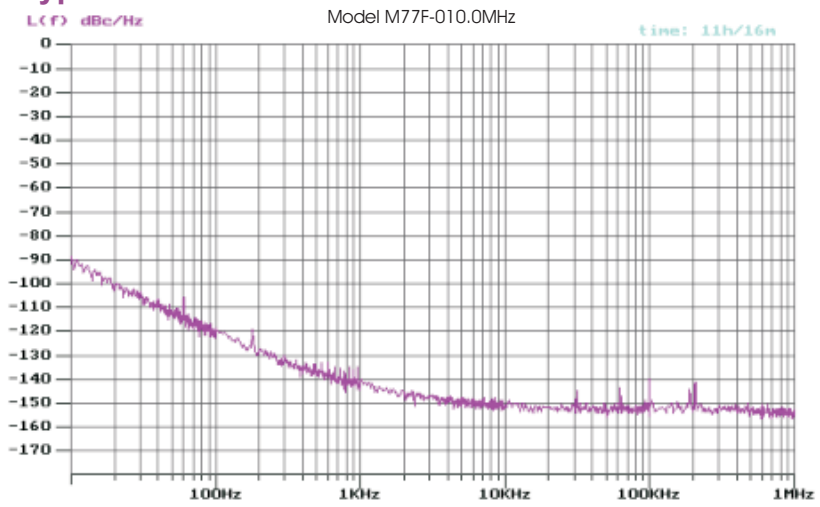
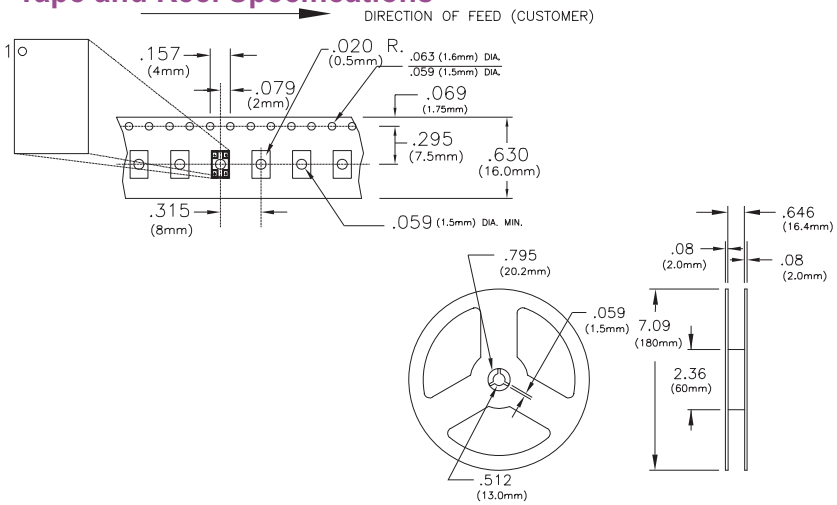
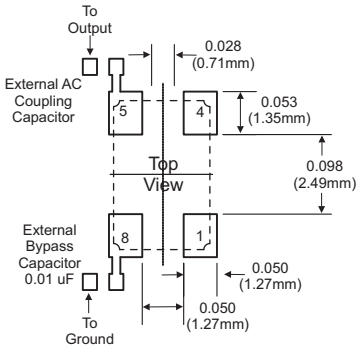
Typical Phase Noise



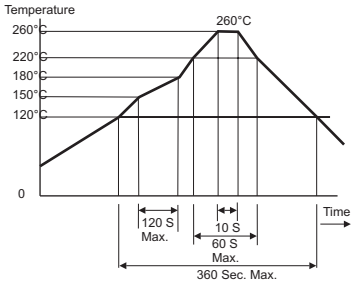
Tape and Reel Specifications



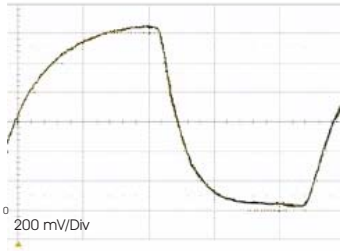
Suggested Pad Layout



Solder Profile



Output Waveform



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