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TCXO Specification Model ML602

CONNOR WINFIELD



Description:

The Connor-Winfield ML602 is a surface mount 5x3.2mm, 3.3V, LVCMOS Temperature Compensated Crystal Oscillator (TCXO) designed for application compliance to Telcordia Stratum 3, ITU-T G.813 Option 2, and ITU-T G.8262 Option 2.



Features:

- 3.3 Vdc Operation
- Frequency Stability: ± 0.14 ppm
- Temperature Range: -40 to 85°C
- LVCMOS Output
- Ceramic Surface Mount Package
- Tape and Reel Packaging
- RoHS Compliant / Pb Free

Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	85	°C	
Supply Voltage (Vdd)	-0.6	-	4.6	Vdc	
Input Voltage	-0.5	-	Vdd+0.5	Vdc	

Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Nominal Frequency (Fo)	-	10, 20, and 24.576	-	MHz	
Frequency Calibration @ 25 °C	-1.0	-	1.0	ppm	1
Frequency Stability vs. Temperature	-140	-	140	ppb	2
Frequency vs. Load Stability	-50	-	50	ppb	$\pm 5\%$
Frequency vs. Voltage Stability	-50	-	50	ppb	$\pm 5\%$
Static Temperature Hysteresis	-	-	0.40	ppm	3
Short Term Allan Variance (1 second)	-	1.0E-10	-	RMS	
Constant Temperature Stability	-40	-	40	ppb	24 Hours
Aging 1st Year	-1.0	-	1.0	ppm	
Total Tolerance	-4.6	-	4.6	ppm	
Operating Temperature Range:	-40	-	85	°C	
Supply Voltage (Vdd)	3.135	3.3	3.465	Vdc	$\pm 5\%$
Supply Current (Idd)	-	-	6	mA	
Period Jitter	-	3	5	ps rms	
Integrated Phase Jitter	-	0.5	1.0	ps rms	4
SSB Phase Noise for Fo=10.0MHz					
@ 10 Hz offset	-	-98	-	dBc/Hz	
@ 100 Hz offset	-	-121	-	dBc/Hz	
@ 1 KHz offset	-	-143	-	dBc/Hz	
@ 10 KHz offset	-	-156	-	dBc/Hz	
@ 100 KHz offset	-	-157	-	dBc/Hz	
Start-up Time	-	-	10	ms	

LVCMOS Output Characteristics

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

Package Characteristics

Package	Hermetically sealed crystal mounted on a ceramic package
Moisture Sensitivity Level	MSL-1

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 3.

Ordering Information

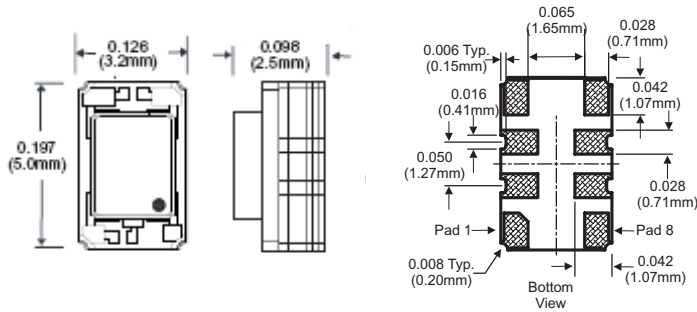
** Not all options available at Digi-Key ML602-010.0M, ML602-020.0M, ML602-024.576M

Notes:

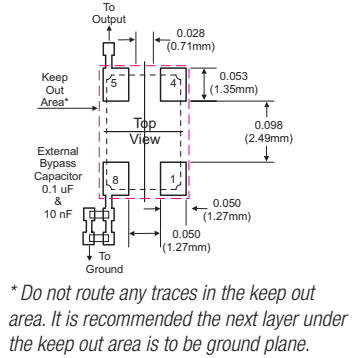
1. Frequency referenced to Fo. @ 25°C. Specification at time of shipment after 48 hours operation
2. Frequency stability vs. change in temperature. $[\pm(F_{max} - F_{min})/2.F_0]$.
3. Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C.
4. Bandwidth = 12KHz to Fo/2 MHz.



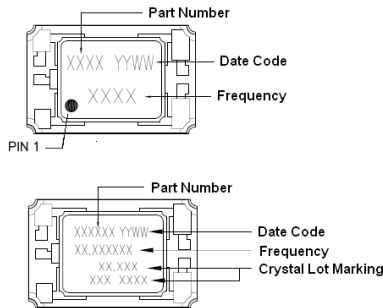
Package Layout



Suggested Pad Layout



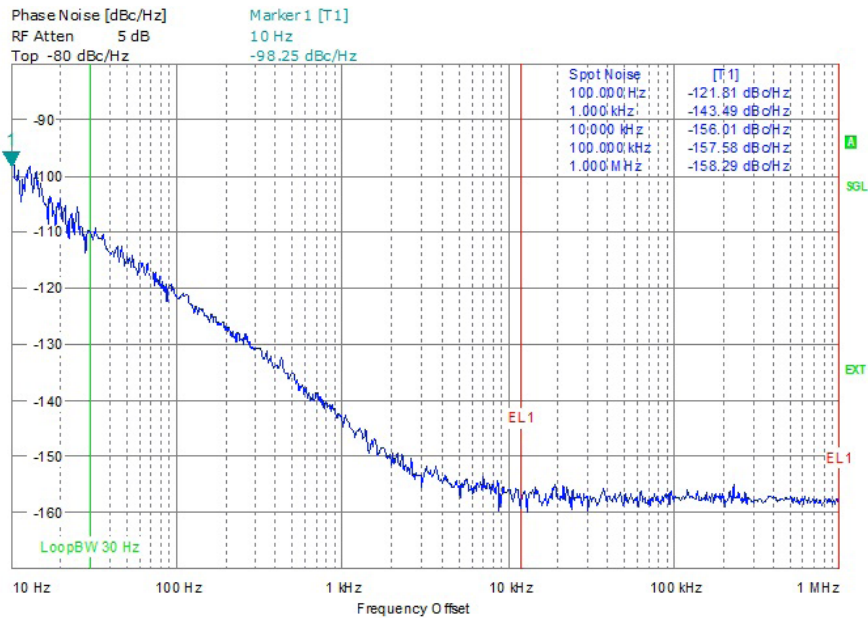
Marking Configurations



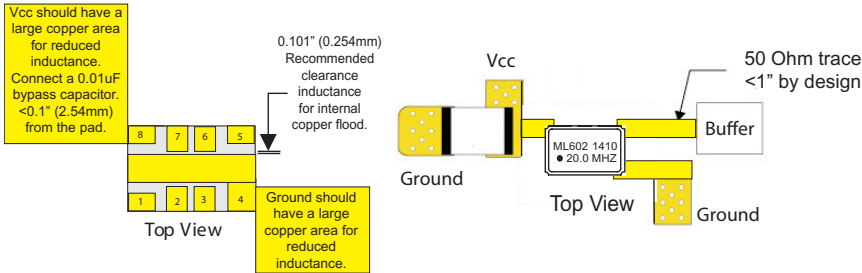
Pad Connections

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

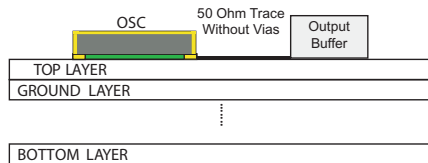
ML602-010.0M Typical Phase Noise



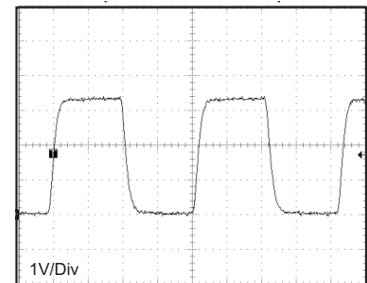
Design Recommendations



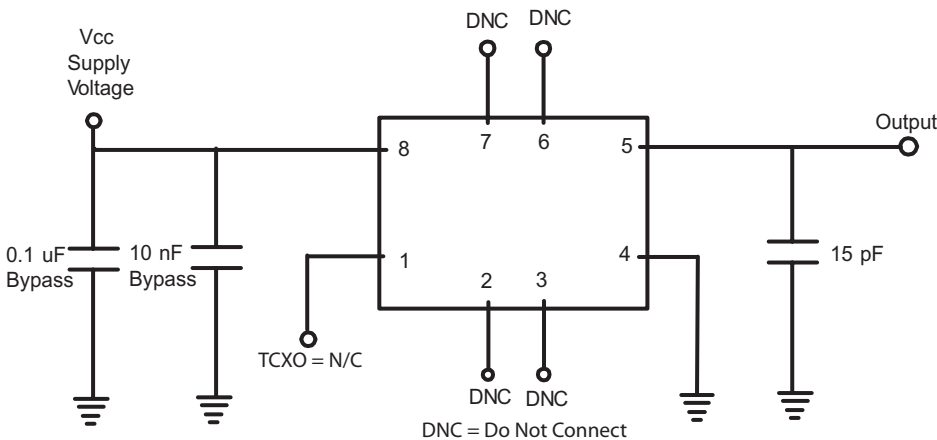
Attention: To achieve optimal frequency stability, and in some cases to meet the specification stated on this data sheet, it is required that the circuit connected to this TCXO output must have the equivalent input capacitance that is specified by the nominal load capacitance. Deviations from the nominal load capacitance will have a graduated effect on the stability of approximately 20 ppb per pF load difference.



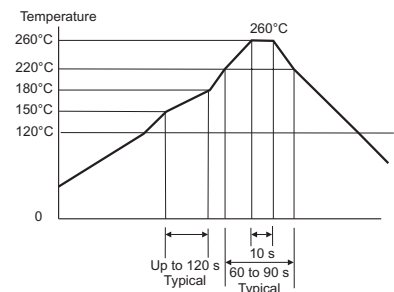
Output Waveform



Test Circuit



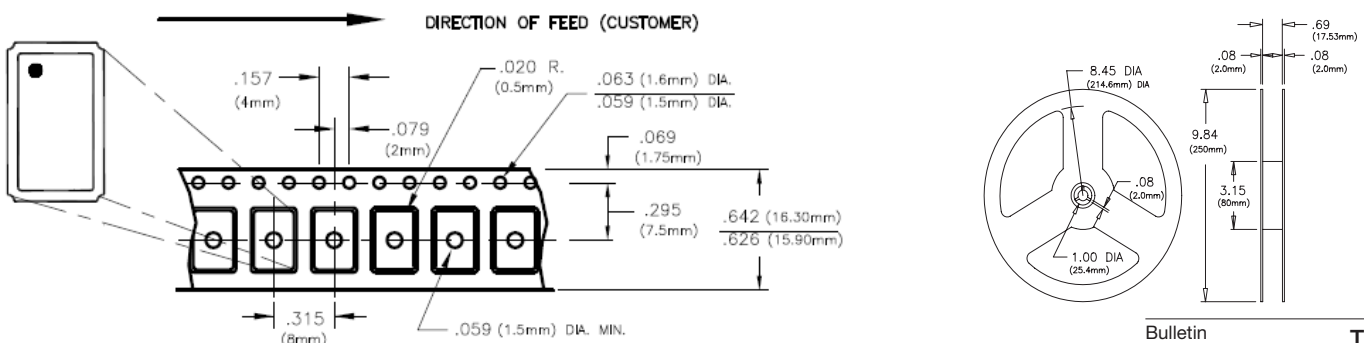
Solder Profile



Meets IPC/JEDEC J-STD-020C

Tape and Reel Dimensions

MEETS EIA-481A AND EIAJ-1009B
 700 PCS/REEL MAXIMUM.



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