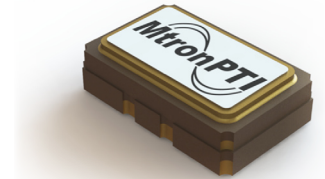


Product Features

- Stratum 3 performance with holdover stability (0.30 ppm) over industrial temperature range (-40 °C to +85 °C)
- 3.0 V, 3.3 V and 5.0 V versions
- Low phase noise and great g-sensitivity performance
- Tristate Function standard



Product Description

MtronPTI's M617x Series TCXO's and TCVCXO's provide design engineers with low voltage, surface mount products with extremely tight stability over temperature and time. MtronPTI's unique approach to crystal compensation enables these devices to achieve full Stratum 3 temperature stability including holdover from -40 °C to +85 °C. Specially processed crystals enable the M617x to achieve consistent long-term stability and minimal frequency shift after reflow. This processing also achieves excellent g-sensitivity (1.2 ppb/g). The low phase noise (-156 dBc/Hz at 100 kHz) makes the M617x ideal for the design engineer working on high data-rate, low BER data communication network products.

Product Applications

The M617x Series is ideally suited for a wide range of applications such as SONET, SDH, SERDES, GSM, CDMA, 3G, 4G, Gig-Ethernet, 10G and 40G systems. Standard output for the M617x series is either HCMOS compatible or clipped sine wave. Additionally the M617x draws as little as 1.5 mA with a 3.3 volt supply at 13 MHz. This low power consumption provides a distinct advantage over similarly specified ovenized oscillators for power-sensitive remote applications. The M617x series offers ± 9.2 ppm minimum pull range with excellent tuning linearity performance for critical PLL applications. This series is available in selective frequencies from 8 MHz to 52 MHz.

Ordering Information

	M6171	2	S	T	C	N	00.0000 MHz
Product Series							
M6170 = 5.0 V							
M6171 = 3.3 V							
M6172 = 3.0 V							
Temperature Range							
1: 0 °C to +70 °C	8: 0 °C to +50 °C						
2: -40 °C to +85 °C	F: -30 °C to +75 °C						
6: -20 °C to +70 °C							
Stability							
S: ± 4.6 ppm w/ Holdover							
Output Type							
T: Voltage Controlled With Tristate							
F: No Voltage Control With Tristate							
Output Waveform							
C: HCMOS							
S: Clipped Sine Wave							
Package/Lead Configurations							
N: Leadless Ceramic							
Frequency (customer specified)							

M6170Sxxx, M6171Sxxx & M6172Sxxx - Custom datasheets.

M617x Series Stratum 3

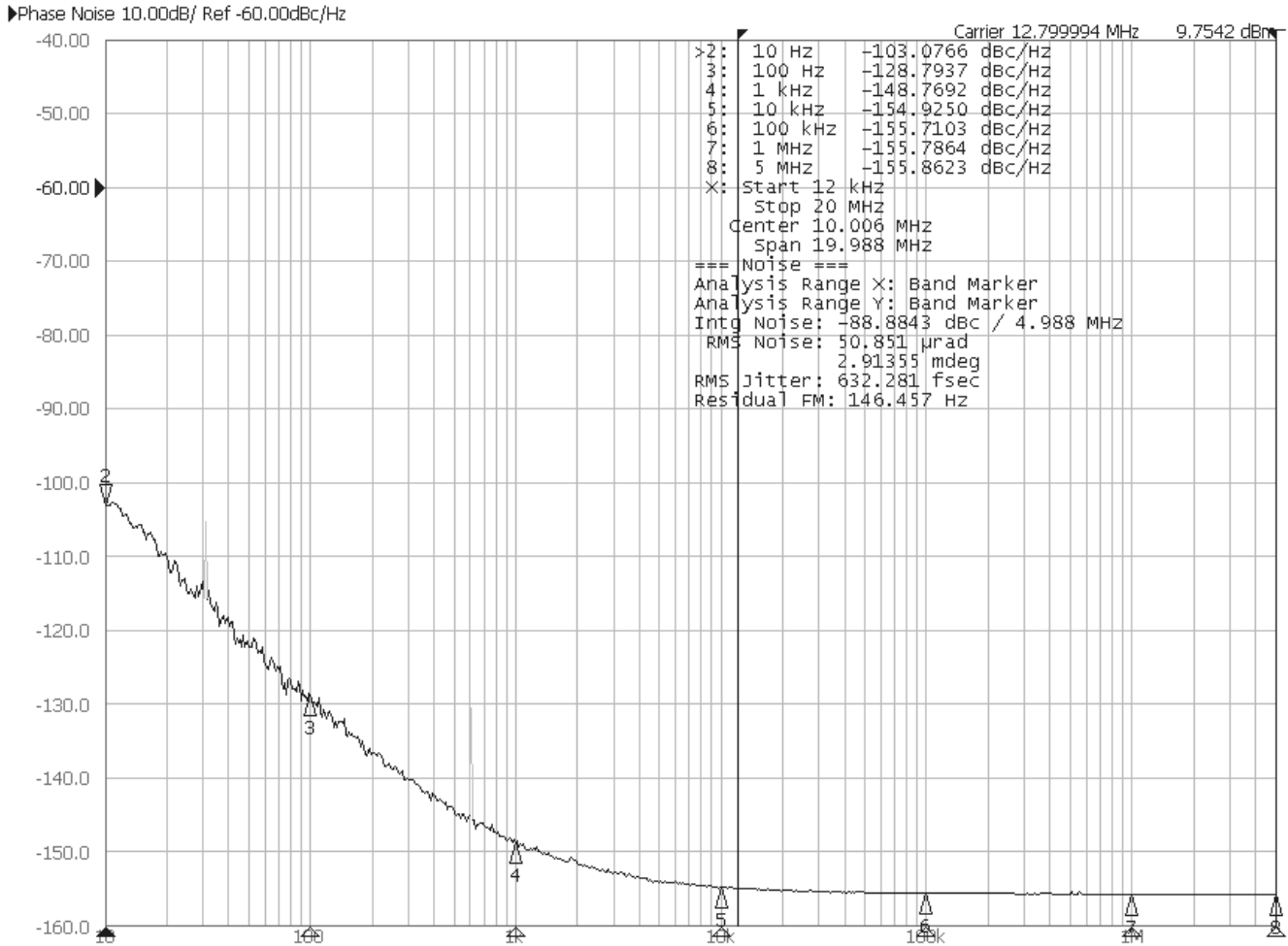
3.2 x 5.0 mm, 3.0, 3.3 & 5.0 V, HCMOS or Clipped Sine Wave
Precision TCXO/TCVCXO

Performance Characteristics

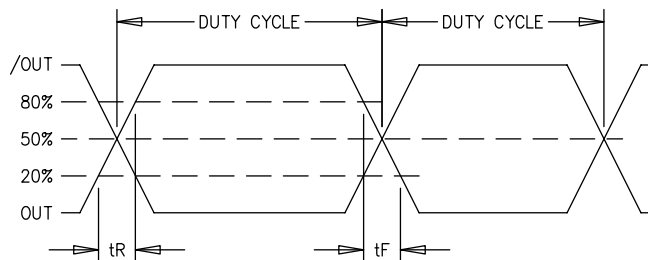
Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions/Notes
Frequency Range	F_R	8		52	MHz	
Operating Temperature	T_A	(See Ordering Information)			°C	
Storage Temperature	T_{STG}	-55		+125	°C	
Frequency Tolerance @ +25 °C	$\Delta F/F$	-1.0		+1.0	ppm	For TCXO only
Frequency Stability	$\Delta F_T/F$	-0.30		+0.30	ppm	Stability vs. Temperature $(F_{MIN}-F_{MAX})/2$
		-4.6		+4.6	ppm	Overall stability for 10 years
		-0.34		+0.34	ppm	Holdover stability for 24 hrs over operating temperature
Stability vs. Reflow		-1.0		+1.0	ppm	
Frequency vs. Supply	$\Delta F_{VDD}/F$		± 0.02	± 0.1	ppm	For $\pm 5\%$ supply voltage variation
Frequency vs. Load	$\Delta F_{LOAD}/F$		± 0.02	± 0.1	ppm	For $\pm 5\%$ load variation
Aging (First Year)		-1.0		+1.0	ppm	$F_0 \leq 20$ MHz
Aging (First Year)		-2.0		+2.0	ppm	$F_0 > 20$ MHz
Aging (10 Year)		-3.0		+3.0	ppm	$F_0 \leq 20$ MHz (includes first year)
Aging (10 Year)		-5.0		+5.0	ppm	$F_0 > 20$ MHz (includes first year)
Supply Voltage	V_{DD}	(See Ordering Information)			V	$\pm 5\%$ voltage tolerance
Supply Current (Reference to $V_{DD} = 3.3$ V)	I_{DD}	2.0		3.0	mA	HCMOS output at 13 MHz
		3.0		4.0	mA	HCMOS output at 26 MHz
		5.5		6.5	mA	HCMOS output at 52 MHz
		1.3		1.9	mA	Clipped Sine Wave output at 13 MHz
		1.7		2.3	mA	Clipped Sine Wave output at 26 MHz
		2.8		3.5	mA	Clipped Sine Wave output at 52 MHz
Output Logic Levels (HCMOS)	V_{OL} V_{OH}			20	% V_{DD} % V_{DD}	$I_{OH}/I_{OL} = \pm 4$ mA, $V_{DD} = +3.0$ V $I_{OH}/I_{OL} = \pm 4$ mA, $V_{DD} = +3.0$ V
Output Level (Clipped Sine Wave)	V_{OUT} V_{OUT}	1.0 0.8			V_{pk-pk} V_{pk-pk}	$F_0 \leq 40$ MHz $F_0 > 40$ MHz
Symmetry (Duty Cycle)	t_{DC}	40	50	60	%	Ref. to $\frac{1}{2} V_{DD}$ HCMOS Only
Rise/Fall Time	t_R/t_F			6.5	ns	Ref. 10% to 90% HCMOS only
Output Load		15 pF 10 k Ω 10 pF				HCMOS Output Clipped Sine Wave Output
Frequency Adjustment		-10		+10	ppm	Over Control Voltage Range
Control Voltage Range		0.3	1.50	2.7	V	For $V_{DD} = 3.0$ V
		0.3	1.65	3.0	V	For $V_{DD} = 3.3$ V
		0.5	2.50	4.5	V	For $V_{DD} = 5.0$ V
Input Leakage Current		-50		+50	μ A	
Input Resistance		100			k Ω	
Linearity				5	%	
Modulation Bandwidth		2 kHz				
Tristate Function		70			% V_{DD} % V_{DD}	Output enabled. Logic "1" or "Open" Output disabled. Logic "0" or "GND"
Tristate Leakage Current		-100		+100	μ A	
Phase Noise (Typical 12.8 MHz HCMOS)			-102 -129 -149 -155 -156		dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	@ 10 Hz Offset @ 100 Hz Offset @ 1 kHz Offset @ 10 kHz Offset @ 100 kHz Offset
Environmental	Shock	MIL-STD-202, Method 213, Condition C (100 g)				
	Vibration	MIL-STD-202, Methods 201 & 204 (10 g from 10 Hz to 2000 Hz)				
	Solderability	EIAJ-STD-002				
	Package	3.2 mm x 5.0 mm x 1.58 mm, SMT (RoHS Compliant)				
	Max Soldering Conditions	See solder profile				

Phase Noise Plot

M617x 12.8 MHz Phase Noise



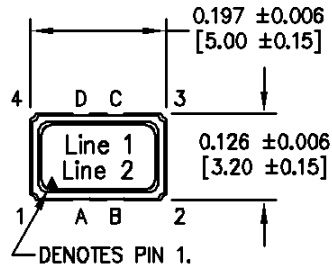
Output Waveform (HCMOS Output)



M617x Series Stratum 3

3.2 x 5.0 mm, 3.0, 3.3 & 5.0 V, HCMOS or Clipped Sine Wave
Precision TCXO/TCVCXO

Product Dimension & Pinout Information

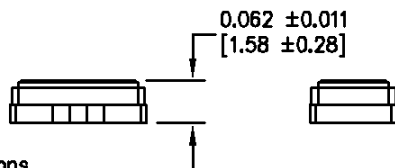


Pad Connections:

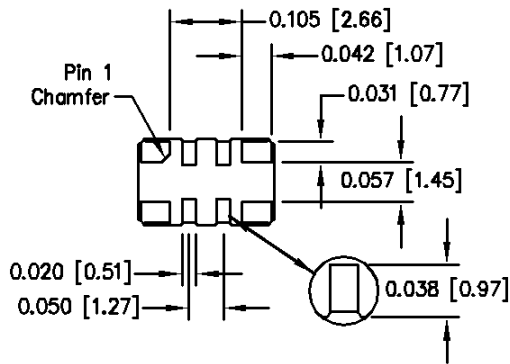
- 1= EFC or n/c
- A= n/c
- B= n/c
- 2= Ground
- 3= Output
- C= Enable/Disable or n/c
- D= Low Phase Noise capacitor or n/c
- 4= Supply Voltage

Marking

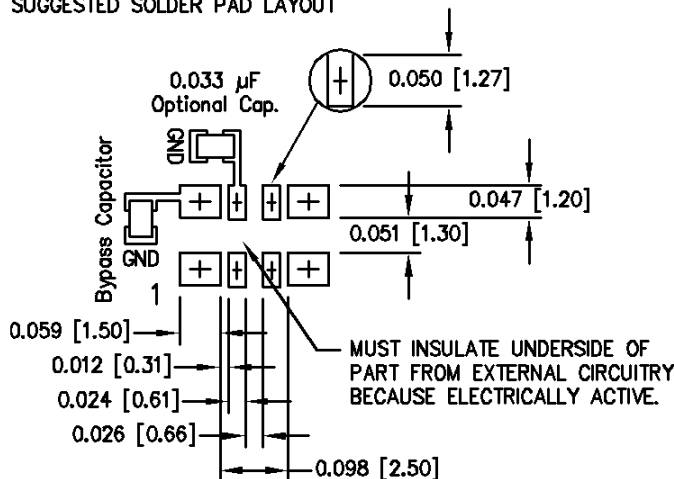
- Line 1: M61 YM
- Line 2: XXMXXXX



All dimensions
in inches [mm].



SUGGESTED SOLDER PAD LAYOUT



M617x Series Stratum 3

3.2 x 5.0 mm, 3.0, 3.3 & 5.0 V, HCMOS or Clipped Sine Wave
Precision TCXO/TCVCXO

Handling Information

Although protection circuitry has been designed into the M617x oscillator, proper precautions should be taken to avoid exposure to electrostatic discharge (ESD) during handling and mounting. MtronPTI utilizes a human-body model (HBM) and a charged-device model (CDM) for ESD-susceptibility testing and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used to define the mode. Although no industry-wide standard has been adopted for the CDM, a standard HBM (resistance = 1500 Ω , capacitance = 100 pF) is widely used and therefore can be used for comparison purposes. The HBM ESD threshold presented here was obtained using these circuit parameters.

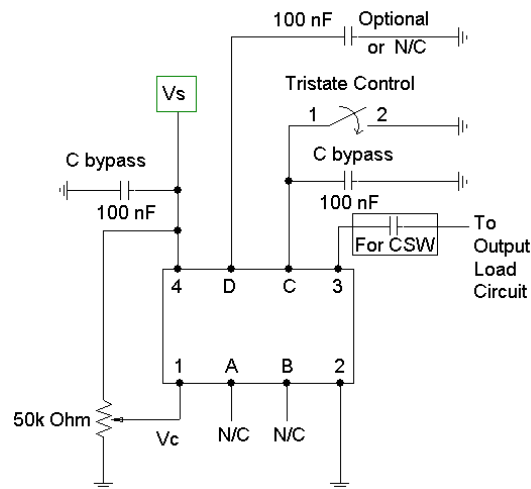
Model	ESD Threshold, Minimum	Unit
Human Body	1500*	V
Charged Device	1500*	V

* MIL-STD-883D, Method 3015, Class 1



ATTENTION
Static Sensitive Devices
Handle only at Static
Safe Work Stations

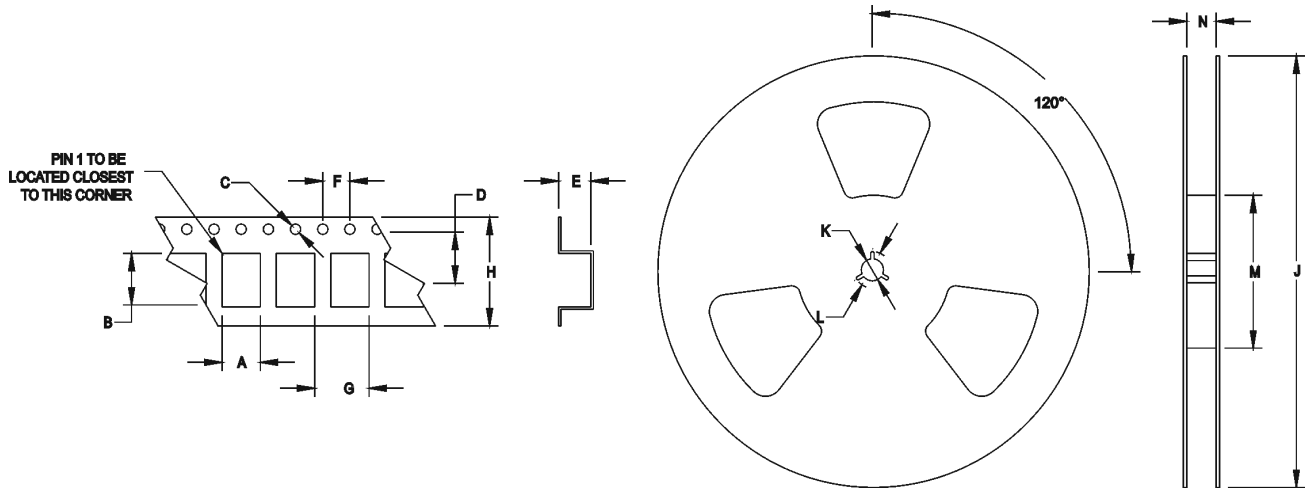
Typical Test Circuits



Test Circuit - N Package
With Tristate

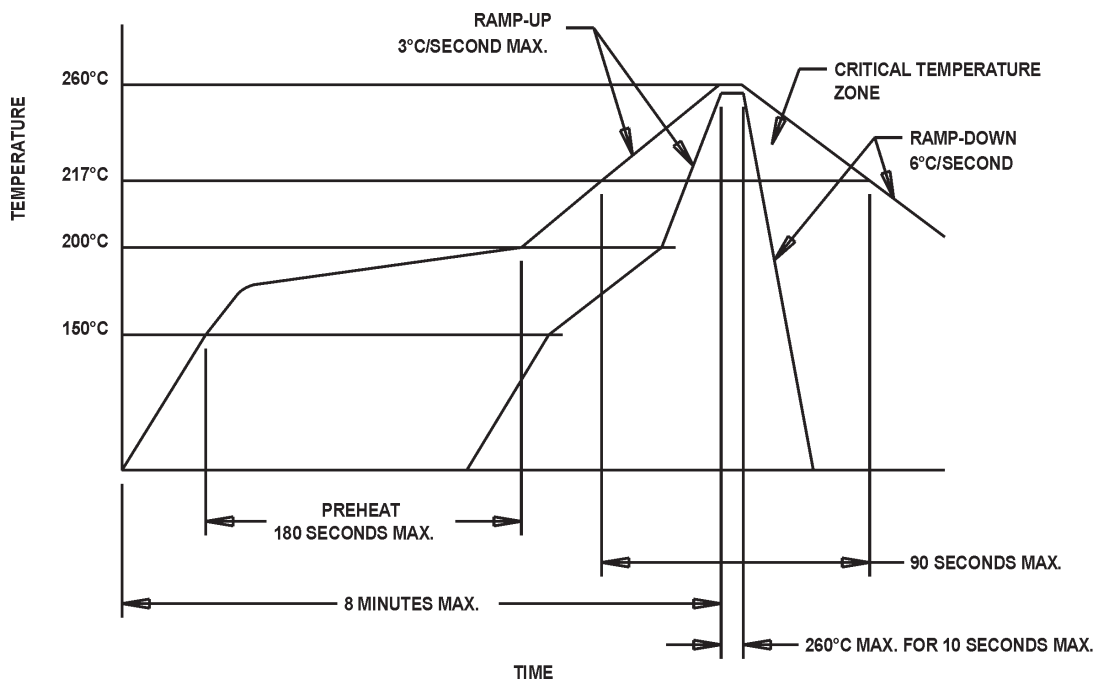
Tape & Reel Specifications

(all measurements are in mm)	A	B	C	D	E	F	G	H	J	K	L	M	N
M617x	3.6	5.4	1.5	5.5	1.9	4	8	12	180	13	20.2	60	12



Standard Tape and Reel: 1000 parts per reel

Maximum Soldering Conditions



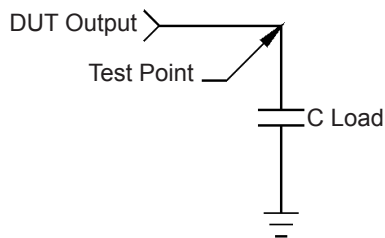
Note: Exceeding these limits may damage the device.

Quality Parameters

Environmental Specifications/Qualification Testing Performed		
Test	Test Method	Test Condition
Electrical Characteristics	Internal Specification	Per Specification
Frequency vs. Temperature	Internal Specification	Per Specification
Mechanical Shock	MIL-STD-202, Method 213, C	100 g's
Vibration	MIL-STD-202, Method 201-204	10 g's from 10-2000 Hz
Thermal Cycle	MIL-STD-883, Method 1010, B	-55 Deg. C to +125 Deg. C, 15 minute Dwell, 10 cycles
Aging	Internal Specification	168 Hours at 105 Degrees C
Gross Leak	MIL-STD-202, Method 112	30 Second Immersion
Fine Leak	MIL-STD-202, Method 112	Must meet 1x10 ⁻⁸
Solderability	MIL-STD-883, Method 2003	8 Hour Steam Age – Must Exhibit 95% coverage
Resistance to Solvents	MIL-STD-883, Method 2015	Three 1 minute soaks
Physical Dimensions	MIL-STD-883, Method 2016	Per Specification
Internal Visual	Internal Specification	Per Internal Specification

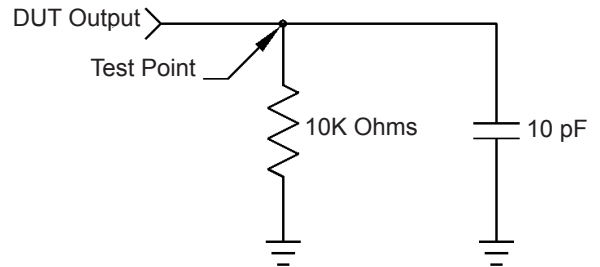
Load Circuit

Load Circuit #2 - HCMOS Output



Note: C Load includes probe and fixturing.

Load Circuit #7 - Clipped Sine Wave Output



For custom products or additional specifications contact our sales team at
800.762.8800 (toll free) or 605.665.9321

For more information on this product visit the MtronPTI website at
www.mtronpti.com