

Product Features

- 3.3 V or 5.0 V Supply
- Wide Frequency Range of 10 to 53 MHz
- Vectron EX-380 Alternative
- RoHS Compliant
- Full Stratum 3 Compliance (including short term hold-over stability)
- SMT Surfboard Option



Product Description

The MtronPTI XO5166 and XO5167 OCXO series is an excellent alternative to the Vectron EX-380 series. The XO5166 and XO5167 series offers full Stratum 3 compliance per GR-1244-CORE and hermeticity per MIL-STD-202, Method 112. The series is offered in leaded through hole and SMT surfboard mounting options. The XO5166 has a supply voltage of 3.3 Vdc, and the XO5167 has a supply voltage of 5.0 Vdc with HCMOS compatible output.

Product Applications

- Digital switching networks
- Telecom transmission equipment
- Wireless communications
- SONET / SDH / DWDM / FDM / ATM / 3G / WiMAX
- Airborne and military equipment
- Instrumentation

Product Ordering Information

Ordering Information		XO516x	C	1	D	00.0000 MHz
Product Series						
XO5166 = 3.3 V						
XO5167 = 5.0 V						
Temperature Range						
A: 0°C to +70°C						
B: -20°C to +70°C						
C: -40°C to +85°C						
Stability						
A: ±0.1 ppm (0.2 ppm pk-pk)						
F: ±0.2 ppm (0.4 ppm pk-pk)						
1: Stratum 3						
Package Configuration						
D: 14 pin DIP						
S: Surfboard						
Frequency (Customer Specified)						

XO5166 and XO5167 Series

14 DIP, 3.3 or 5.0 Volt, HCMOS Compatible Output, OCXO

Performance Characteristics

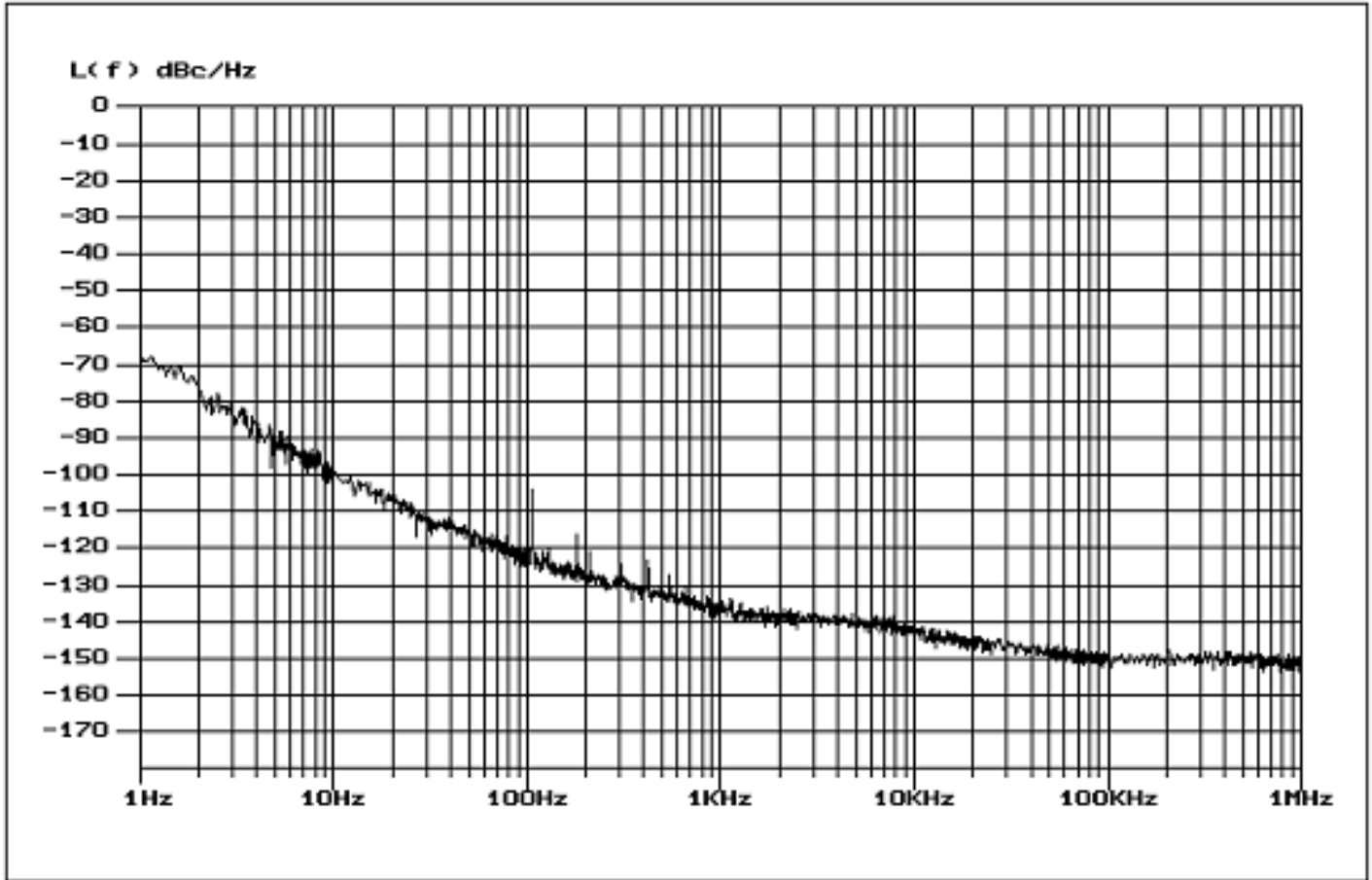
PARAMETER	Symbol	Min.	Typ.	Max.	Units	Condition	
Frequency Range*	F _o	10		53	MHz		
Operating Temperature	T _A	(See ordering information)			°C		
Frequency Stability		(See ordering information)					
Stratum 3 Free Run Stability				±4.6	ppm	All causes for 20 years	
Stratum 3 Holdover Stability				±0.280	ppm	For 24 hours (temperature only)	
Short-Term Stability				5 x 10 ⁻¹⁰		Tau = 0.1 to 30 seconds	
Frequency vs. Supply				2 x 10 ⁻⁸		Per percentage of voltage change	
Frequency vs. Aging				7 x 10 ⁻⁷		First year	
Frequency vs. Load				±0.01	ppm		
Supply Voltage	V _{dd}	3.15	3.30	3.45	V	XO5166 only	
	V _{dd}	4.80	5.00	5.20	V	XO5167 only	
Supply Current	I _{dd}			110	mA	3.3 VDC at +30°C (XO5166)	
	I _{dd}			170	mA	3.3 VDC at -20°C (XO5166)	
	I _{dd}			80	mA	5.0 VDC at +30°C (XO5167)	
	I _{dd}			120	mA	5.0 VDC at -20°C (XO5167)	
Turn-On Current				250	mA	3.3 VDC (XO5166) (first 30s after power-on @ 30°C)	
				250	mA	5.0 VDC (XO5167) (first 10s after power-on @ 30°C)	
Warm-Up (Restabilization) Time @ +25°C following 24 hour off time				120	s	Time for frequency to be within ±0.1 ppm of the frequency after 1 hour of operation	
Tuning Voltage	V _T	0	1.65	3.3	V	XO5166 (See circuit diagrams)	
	V _T	0.5	2.50	5.0	V	XO5167 (See circuit diagrams)	
Frequency Adjustment		±4.0			ppm	Over tuning voltage range	
Output Logic Type		HCMOS Compatible					
Symmetry	Sym	45	50	55	%	Ref. To ½ V _{dd}	
Output Load				15	pF		
Rise/Fall Time (10% to 90%)	Tr/Tf			6	nS		
Logic Level "0"	V _{OL}			10% V _{dd}	V		
Logic Level "1"	V _{OH}	90% V _{dd}			V		
Phase Noise (Typical) 10 MHz	1 Hz -70	10 Hz -100	100 Hz -130	1kHz -140	10 kHz -145	100 kHz -150	Units dBc/Hz
Mechanical Shock	2000 g, 0.3 mS, ½ sine						
Vibration	20 Hz – 2 kHz, 10 g max						
Storage Temperature	-55°C to +125°C						
Hermeticity	Per MIL-STD-202, Method 112						
Solderability	Per EIAJ-STD-002						
Max Soldering Conditions	+245°C for 10 seconds max (DIP version only)						
Max Soldering Conditions	+220°C for 10 seconds max (SMT version only)						

HCMOS Load – see load circuit diagram #2.

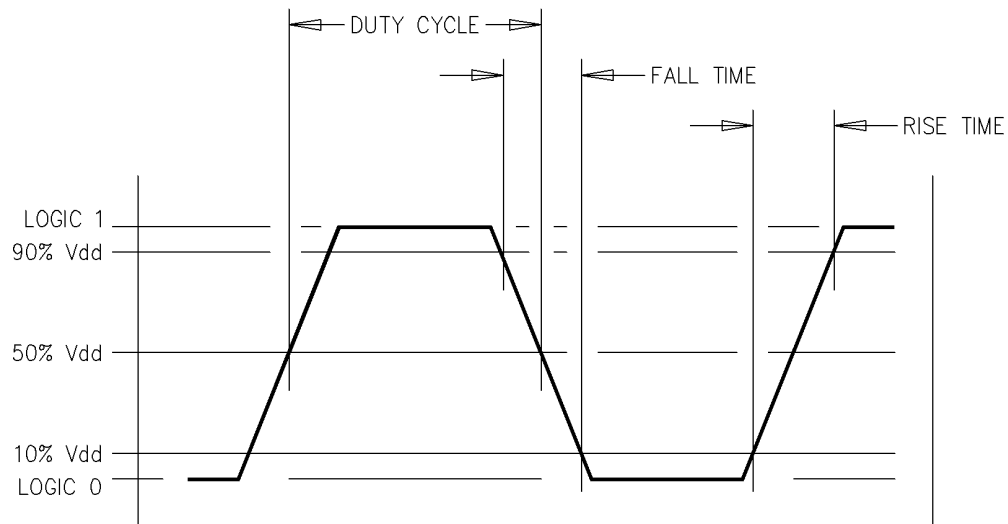
*For frequencies of greater than 53 MHz (54-100 MHz), contact the factory.

Phase Noise Plot

Typical Phase Noise Graph, 20 MHz XO5167

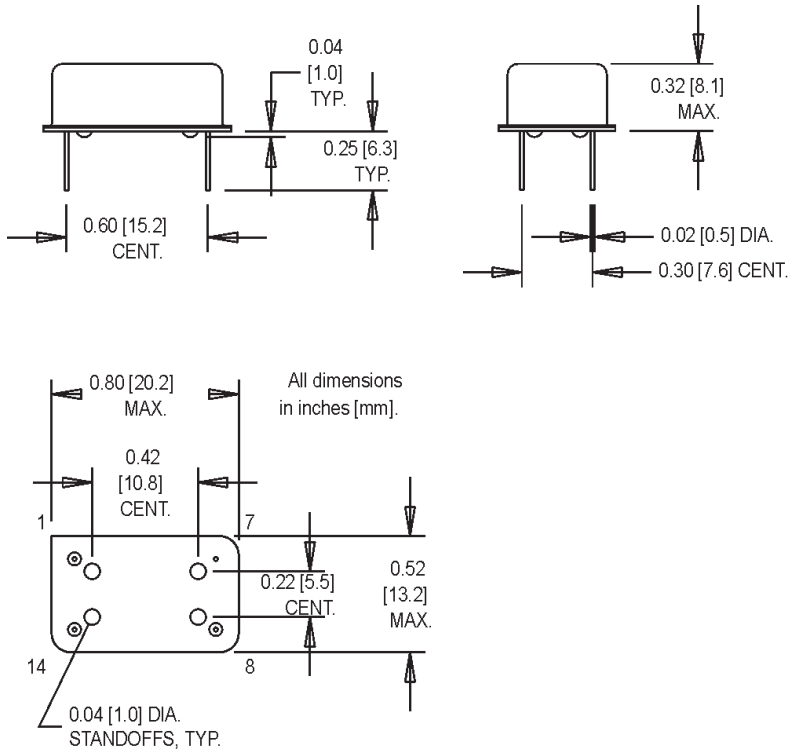


Output Waveform



Product Dimension & Pinout Information

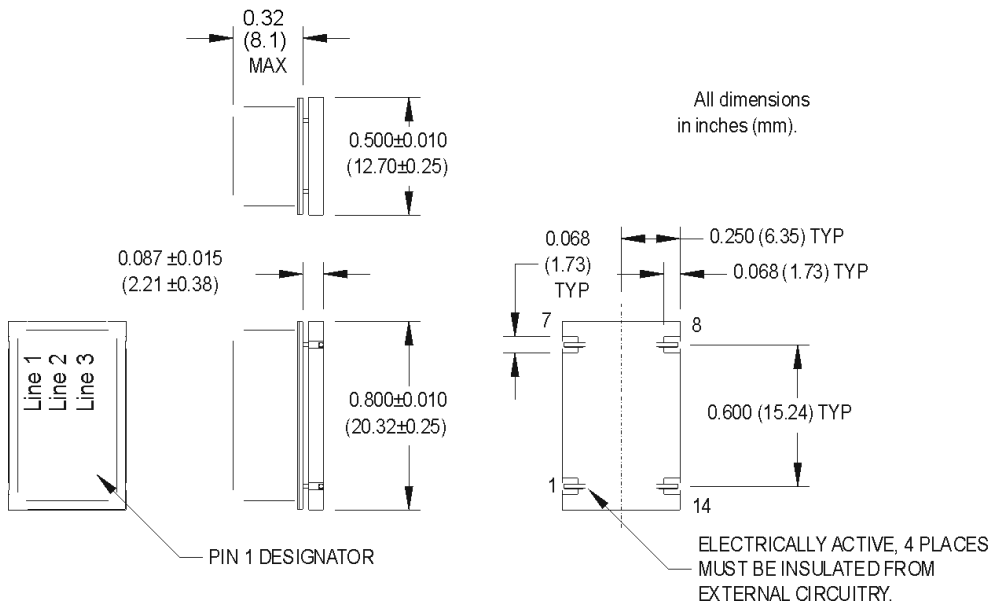
PTH Package



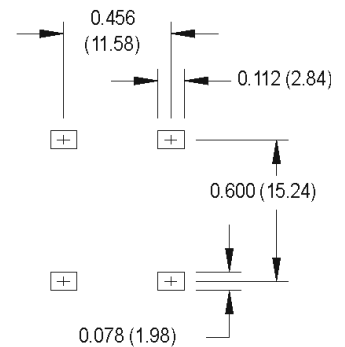
Pin Connections

PIN	FUNCTION
1	Frequency Adjust
7	Case ground & supply return
8	R.F. Output
14	Supply (+)

SMT Package



SUGGESTED SOLDER PAD LAYOUT



Handling Information

Although protection circuitry has been designed into the XO5166 & XO5167 OCXO, 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 machine model (MM) for ESD-susceptibility testing and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used to define the model. A standard HBM (resistance = 1500 Ω , capacitance = 100 pF) and a MM (capacitance = 200 pF) were used for ESD threshold testing of this product.

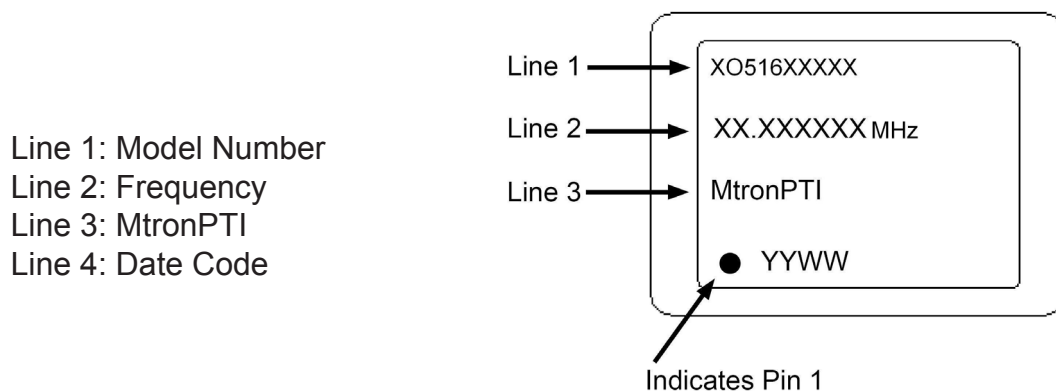
Model	ESD Threshold, Minimum	Unit
Human Body	2000	V
Machine Model	200	V



Quality Parameters

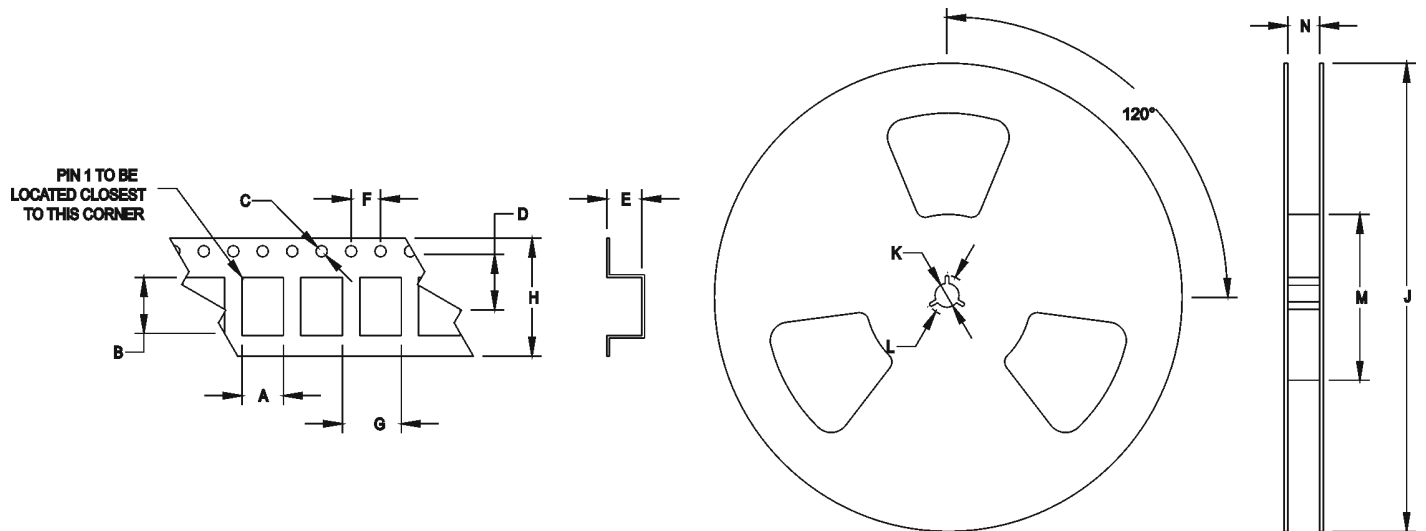
Environmental Specifications/Qualification Testing Performed on the XO5166/XO5167 OCXO		
Test	Test Method	Test Condition
Electrical Characteristics	Internal Specification	Per Specification
Frequency vs. Temperature	Internal Specification	Per Specification
Mechanical Shock		2000 g, 0.3 mS, 1/2 sine
Vibration		20 Hz – 2 kHz, 10 g max
Gross Leak	MIL-STD-202, Method 112	30 Second Immersion
Fine Leak	MIL-STD-202, Method 112	Must meet 1×10^{-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
Terminal Pull	MIL-STD-883, Method 2004, A	2 Pounds
Lead Bend	MIL-STD-883, Method 2004, B1	1 Bending Cycle
Physical Dimensions	MIL-STD-883, Method 2016	Per Specification
Internal Visual	Internal Specification	Per Internal Specification

Part Marking Guide



Tape & Reel Specifications (Surface Mount Package)

(all measurements are in mm)	A	B	C	D	E	F	G	H	J	K	L	M	N
XO5166/XO5167	13.36	20.83	1.55	14.20	10.97	2.00	20.00	32.00	330	13.00	20.20	100	32.40



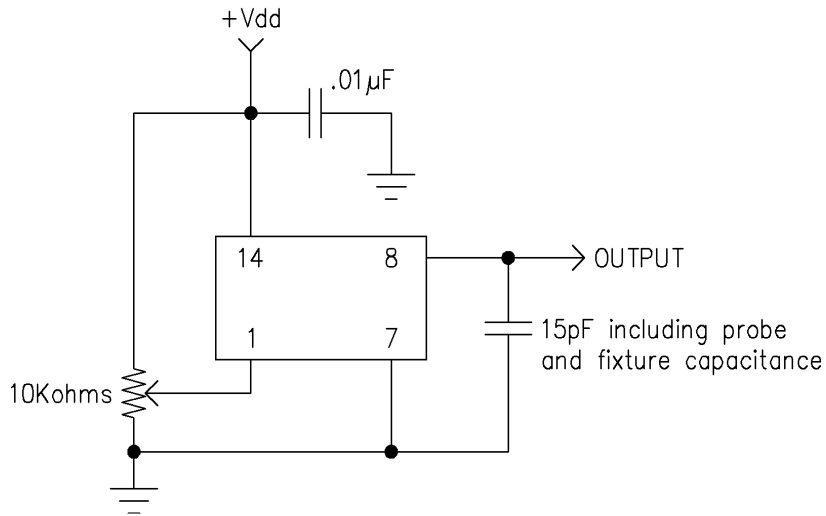
Standard Tape and Reel: 250 parts per reel

Maximum Soldering Conditions

- +245 °C for 10 seconds max (DIP version only)**
- +220 °C for 10 seconds max (SMT version only)**

Note: Exceeding these limits may damage the device.

Typical Test Circuit & Load Circuit



Product Revision Table

Date	Revision	PCN Number	Details of Revision

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