

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

## XO5166 and XO5167 Series

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

#### Performance Characteristics

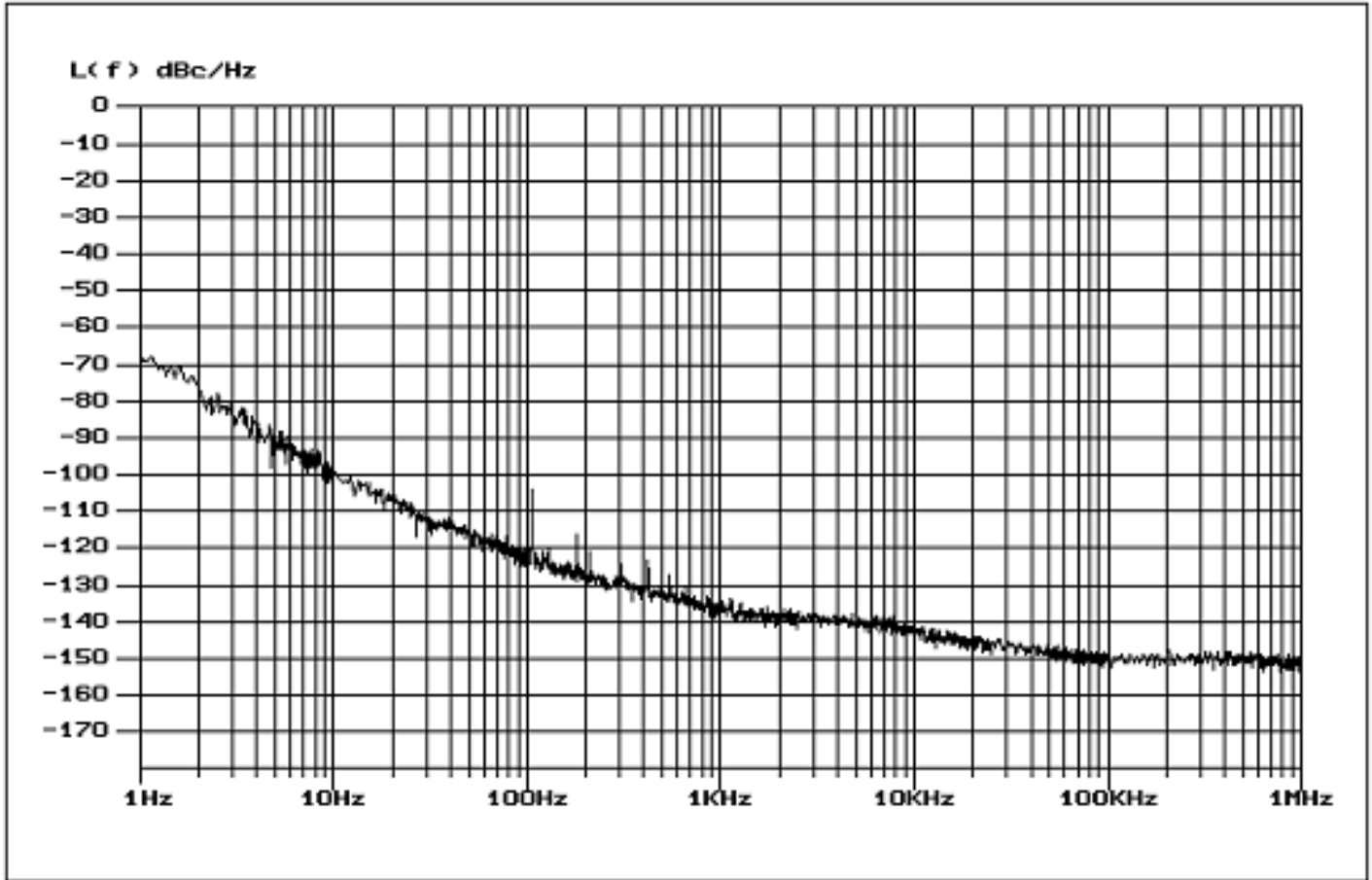
PARAMETER	Symbol	Min.	Typ.	Max.	Units	Condition	
Frequency Range*	F <sub>o</sub>	10		53	MHz		
Operating Temperature	T <sub>A</sub>	(See ordering information)			°C		
Frequency Stability		(See ordering information)					
Stratum 3 Free Run Stability				±4.6	ppm	All causes for 20 years	
Stratum 3 Holdover Stability				±0.280	ppm	For 24 hours (temperature only)	
Short-Term Stability				5 x 10 <sup>-10</sup>		Tau = 0.1 to 30 seconds	
Frequency vs. Supply				2 x 10 <sup>-8</sup>		Per percentage of voltage change	
Frequency vs. Aging				7 x 10 <sup>-7</sup>		First year	
Frequency vs. Load				±0.01	ppm		
Supply Voltage	V <sub>dd</sub>	3.15	3.30	3.45	V	XO5166 only	
	V <sub>dd</sub>	4.80	5.00	5.20	V	XO5167 only	
Supply Current	I <sub>dd</sub>			110	mA	3.3 VDC at +30°C (XO5166)	
	I <sub>dd</sub>			170	mA	3.3 VDC at -20°C (XO5166)	
	I <sub>dd</sub>			80	mA	5.0 VDC at +30°C (XO5167)	
	I <sub>dd</sub>			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 <sub>T</sub>	0	1.65	3.3	V	XO5166 (See circuit diagrams)	
	V <sub>T</sub>	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 <sub>dd</sub>	
Output Load				15	pF		
Rise/Fall Time (10% to 90%)	Tr/Tf			6	nS		
Logic Level "0"	V <sub>OL</sub>			10% V <sub>dd</sub>	V		
Logic Level "1"	V <sub>OH</sub>	90% V <sub>dd</sub>			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.

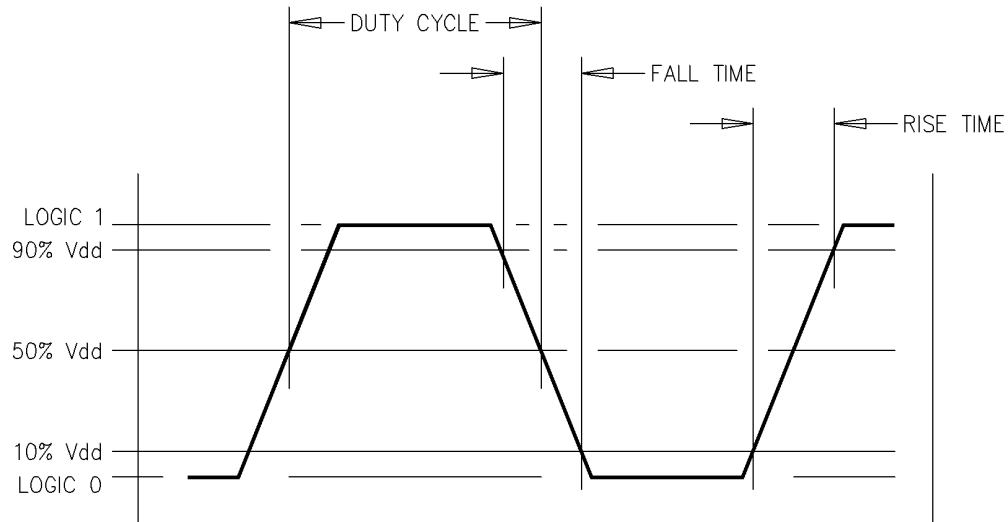
\*For frequencies of greater than 53 MHz (54-100 MHz), contact the factory.

**Phase Noise Plot**

**Typical Phase Noise Graph, 20 MHz XO5167**

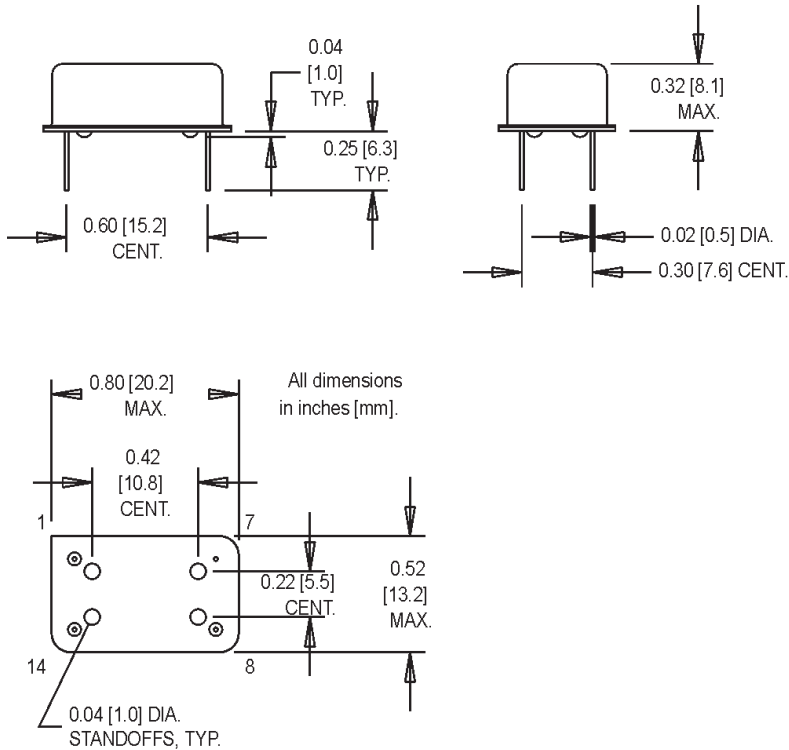


**Output Waveform**



### Product Dimension & Pinout Information

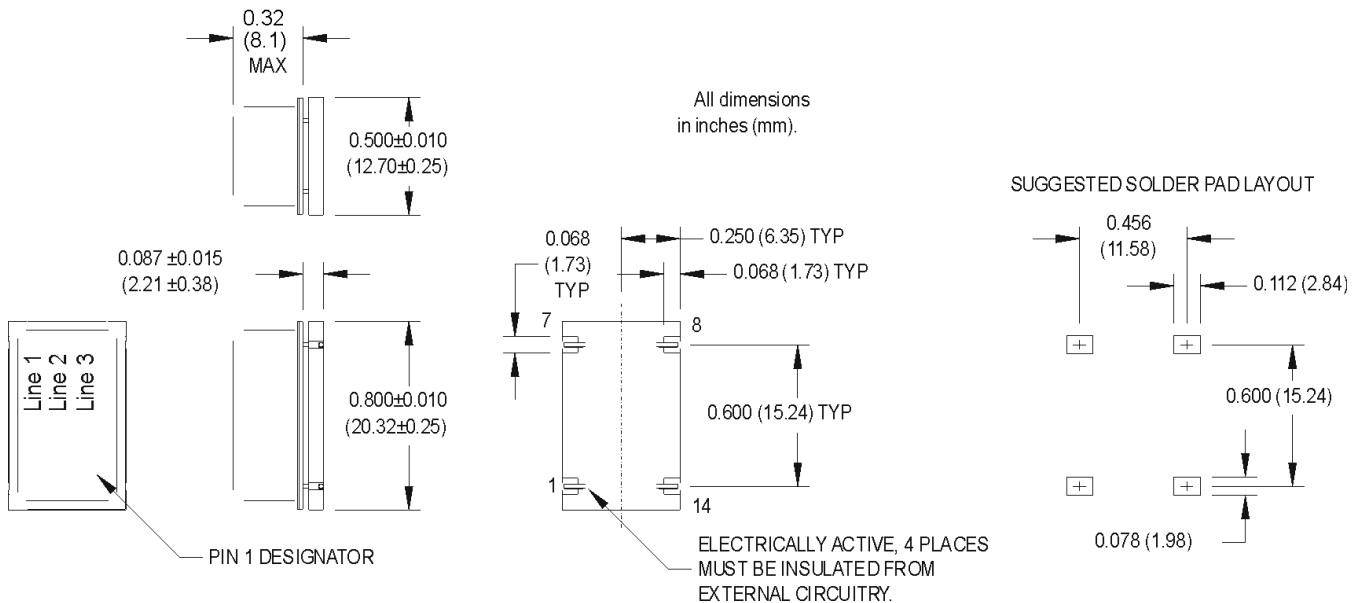
#### PTH Package



#### Pin Connections

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

#### SMT Package



#### 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.

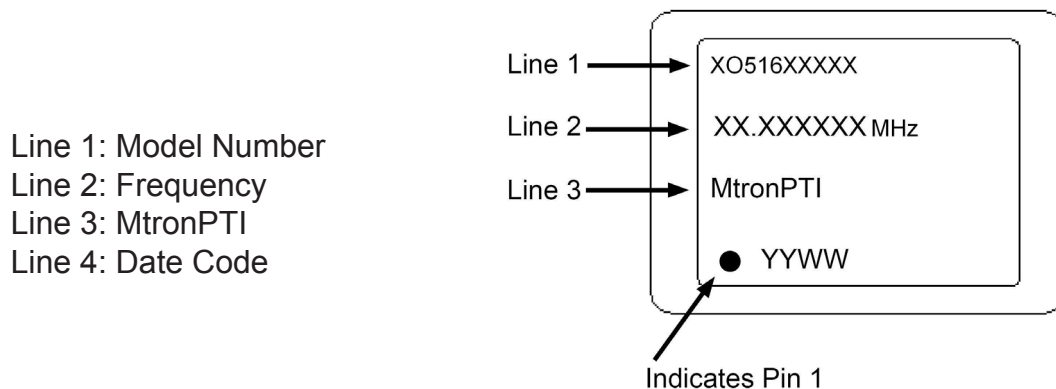
Model	ESD Threshold, Minimum	Unit
Human Body	2000	V
Machine Model	200	V



#### Quality Parameters

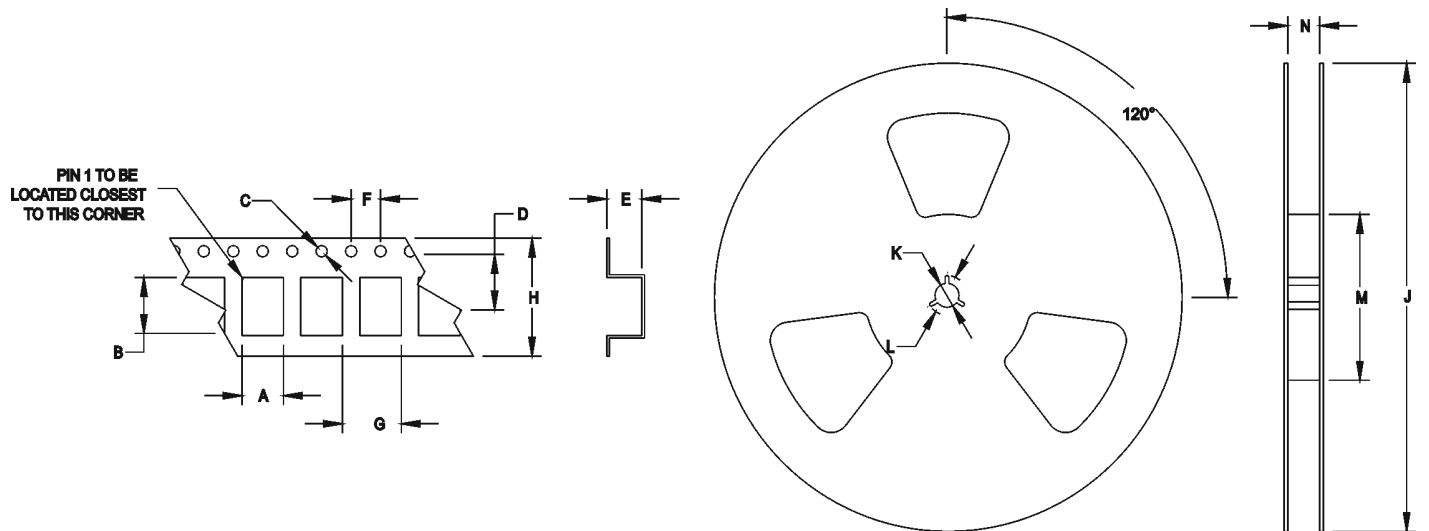
Environmental Specifications/Qualification Testing Performed on the XO5166/XO5167 OCXO		
Test	Test Method	Test Condition
Electrical Characteristics	Internal Specification	Per Specification
Frequency vs. Temperature	Internal Specification	Per Specification
Mechanical Shock		2000 g, 0.3 mS, ½ sine
Vibration		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 1x10 <sup>-8</sup>
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



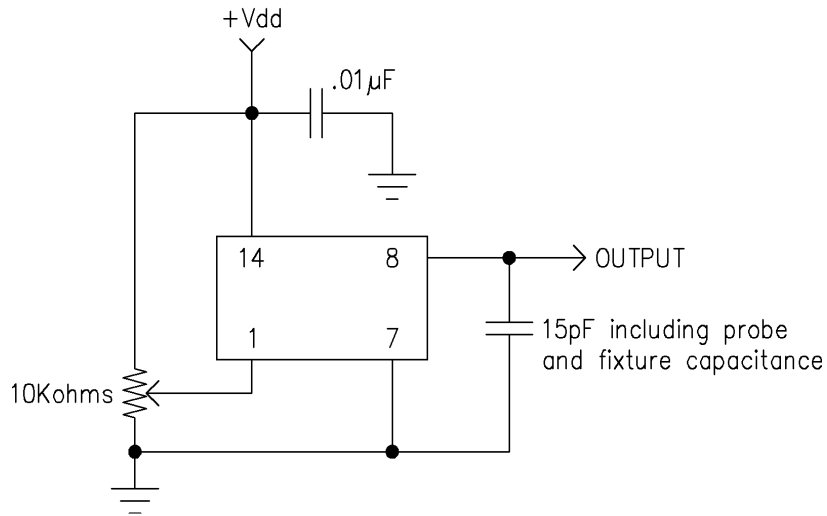
**Standard Tape and Reel:** 250 parts per reel

**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](http://www.mtronpti.com)**