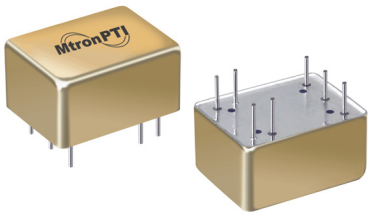
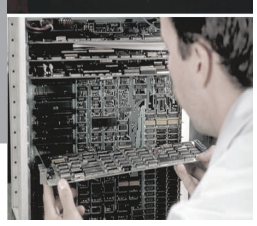
MtronPTI

...when timing matters

RoHS Compliant





Introduces

XO5120 Series
1.4 x 1 inch, HCMOS or Sinewave OCXO

Features:

- Stability to ±2 ppb (commercial temperature) and ±3 ppb (industrial temperature)
- Excellent phase noise performance (-155 dBc at 10kHz offset)
- RoHS 5/6 now - RoHS 6/6 in development

Applications:

- The basis for all reference timing sources. With stability to +/-2ppb, this device even replaces Double OCXOs (DOCXO) in some applications. It can be used in:
  - Microwave radios
  - Base stations
  - Test and Measurement equipment
  - Reference timing circuits

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Applications Note

XO5120 Series

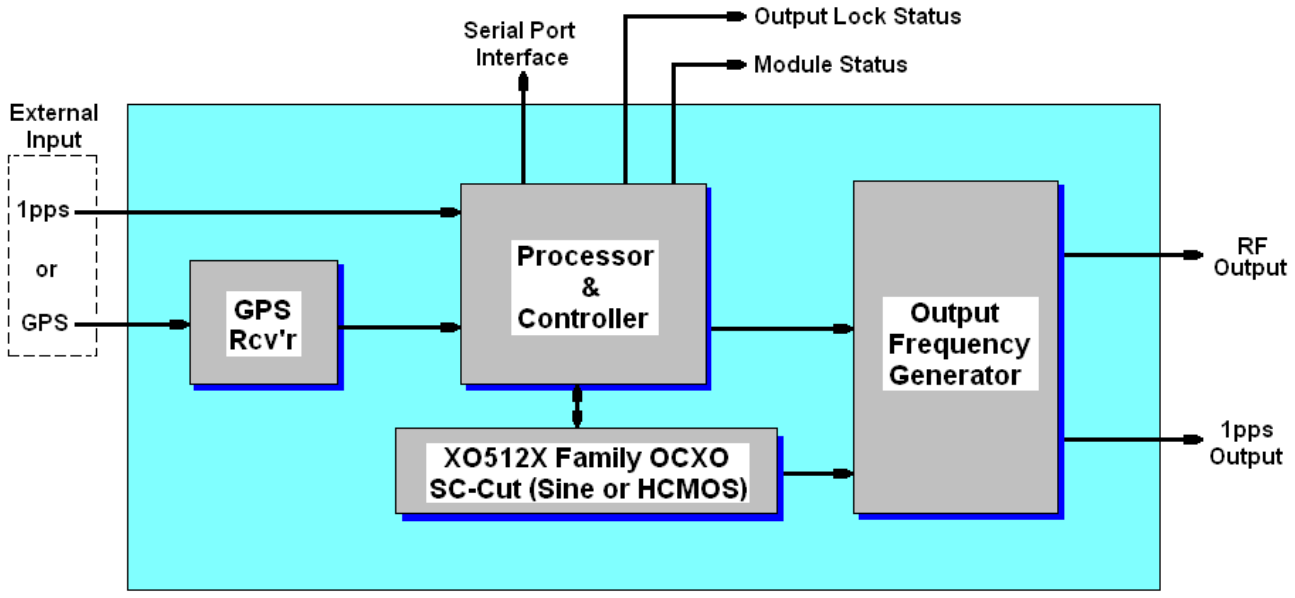
HCMOS or Sinewave OCXO – 1.4 x 1 inch

The MtronPTI XO5120 Series OCXO provides the systems designer with an extremely stable single oven OCXO platform upon which they can design time and frequency control subassemblies for a wide variety of applications. The XO5120 Series exhibits superior SSB phase noise performance across a wide variety of frequencies and is available in AT-based and SC-based configuration.

The XO5120 is ideally suited to applications in a wide array of applications environments. The SSB phase noise performance of the XO5120 Series makes it an ideal selection as the reference oscillator for RF ATE systems or as a synthesizer reference for the most demanding test instrumentation applications.

It is particularly well suited to applications as the reference OCXO for disciplined oscillator modules for basestations, particularly for mobile WiMax networks. Whether you are an OEM supplier of disciplined oscillator module subsystems or a basestation manufacturer designing this critical subsystem in-house, the XO5120 Series gives you the frequency stability, low jitter performance and excellent phase noise required to meet the demands of the WiMax standards.

The XO5120 Series is offered in both a through hole (5-pin or 6-pin) and SMD package configurations. With support for supply voltages from +3.3VDC to +12VDC, the XO5120 Series can be configured to meet any OEM customers requirements.



Disciplined Oscillator Module - Block Diagram

Product Specifications

Product Features:

- Most precise single OCXO in the industry
- Stability to ±2 ppb (commercial temperature) and ±3 ppb (industrial temperature)
- Excellent phase noise performance (-155 dBc at 10kHz offset)
- Custom capabilities for specific application optimization
- RoHS 5/6 now - RoHS 6/6 in development

Description:

The XO5120 series is an industry standard 1" x 1.4" single OCXO which offers the best in phase noise combined with stability over a wide range of operating temperatures. With output logic (HCMOS/TTL) or sinewave, this product fits most applications. The XO5120 series is based on a standard design platform that can then be tailored to the customer's specific requirements with little extra effort. Standard frequencies of 10.00, 12.80, 13.00, 16.384, and 20.00MHz are available as standard designs. Other frequencies between 10 and 100MHz can be developed in a short time.

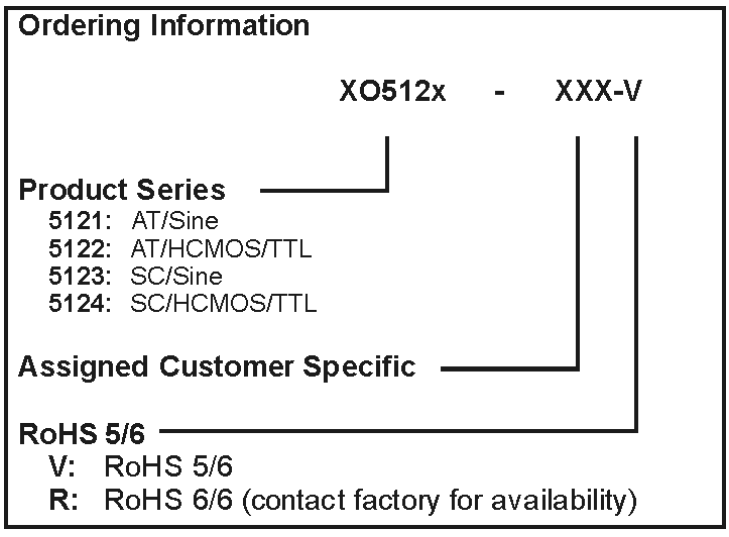
Applications:

The basis for all reference timing sources. With stability to +/-2ppb, this device even replaces Double OCXOs (DOCXO) in some applications. It can be used in:

- Microwave radios
- Base stations
- Test and Measurement equipment
- Reference timing circuits

Ordering Information:

Part Number Example: **XO5121** **40.000000MHz** **-V**



Part Number Example: XO5121 – 40.000000 MHz - V

Performance Characteristics:

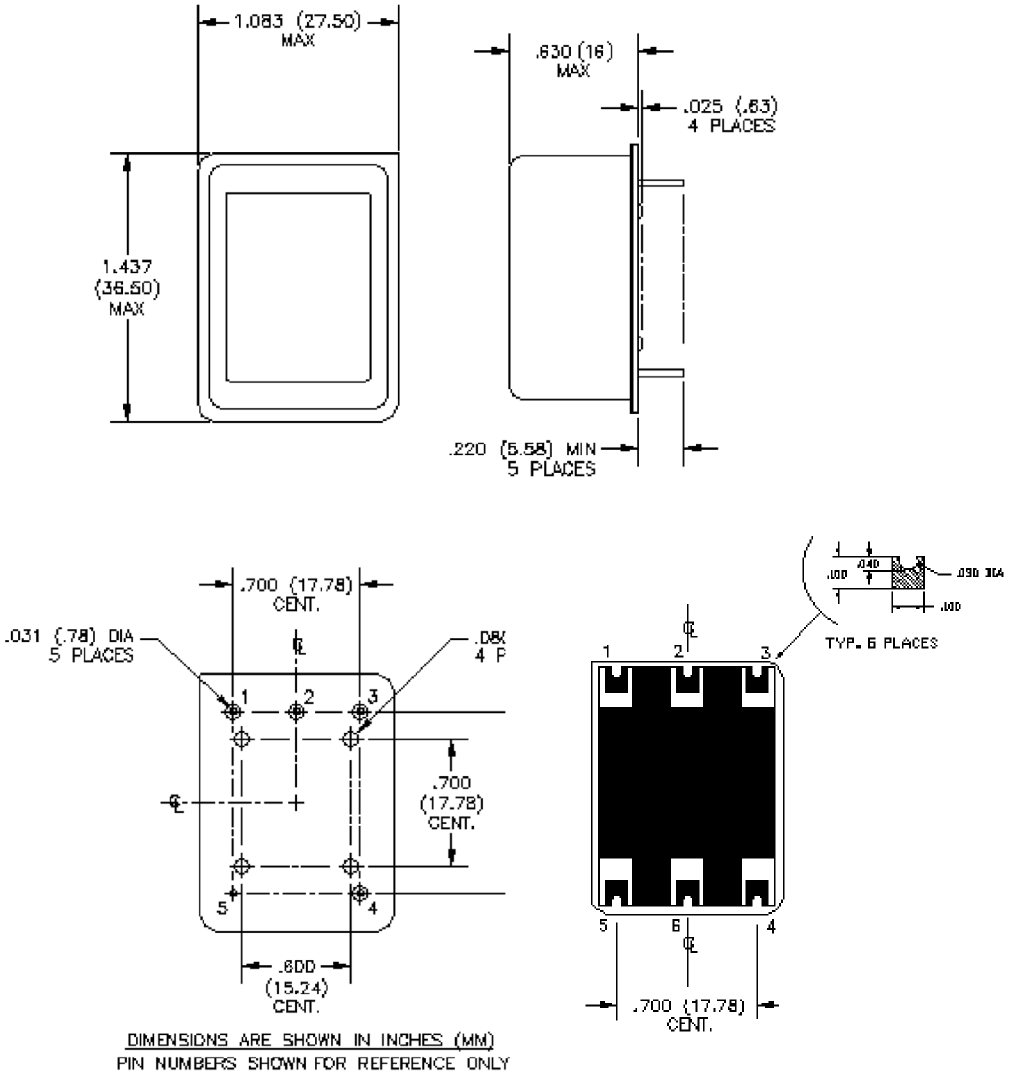
Optional Temperature Ranges and Frequency Stabilities (F/T)		
OTR °C	**SC-Cut**	**AT-Cut**
0 to +50	$\pm 2 \times 10^{-9}$	$\pm 2 \times 10^{-8}$
0 to +70	$\pm 2 \times 10^{-9}$	$\pm 2 \times 10^{-8}$
-10 to +70	$\pm 3 \times 10^{-9}$	$\pm 2 \times 10^{-8}$
-30 to +70	$\pm 3 \times 10^{-9}$	$\pm 3 \times 10^{-8}$
-40 to +70	$\pm 3 \times 10^{-9}$	$\pm 3 \times 10^{-8}$
-40 to +85	$\pm 3 \times 10^{-9}$	$\pm 4 \times 10^{-8}$

	PARAMETER	Symbol	Minimum	Typical	Maximum	Units	Condition
Electrical Specifications	Frequency Range	F_{ON}	10		100	MHz	
	Operating Temperature	T_A	-40 to +85			°C	Consult Factory
	Stability Over Temperature	ΔF/F	±20	±30		ppb	AT-Cut
		ΔF/F	±5	±10		ppb	SC-Cut
	Short Term Stability			0.1		ppb	AT-Cut
				0.01		ppb	SC-Cut
	Daily Aging			±1.0		ppb	AT-Cut
	Yearly Aging			±0.5		ppm	AT-Cut
	Daily Aging			±0.1		ppb	SC-Cut
	Yearly Aging			±0.3		ppm	SC-Cut
	Frequency vs. Supply			±1		ppb	
	Frequency vs. Load			±1		ppb	
	Supply Voltage	V_S	3.3 to 12			Volts	Consult Factory
	Power Consumption						
	@ Warm-Up				3.5	Watts	
	Steady Sate @ 25°C				1.25	Watts	
	Warm-Up Time @ 25°C		To within $\pm 1 \times 10^{-7}$ in 3 minutes			Minutes	
	HCMOS Output Signal		V_S = +3.3V or +5V				
	Rise/Fall Time			3nsec	7nsec		
	Logic "0" Level		0.2			Volts	
	Logic "1" Level				V_S - 0.2	Volts	
	Symmetry		40		60	%	
	Output Load			10		*pF*	
	Sinewave Output Signal						
	Level			+3		dBm	
	Output Load			50		Ω	
	Frequency Adjustment (Pin 7)						
	Slope			Positive			
	External Voltage	V_C	0		10	Volts	Consult Factory
	Range			±4		ppm	AT-Cut
	Range			±4		ppm	SC-Cut
	Input Impedance (Pin 7)		20			KΩ	
	Phase Noise		AT-Cut	SC-Cut			
	Typical @ 10MHz						
	1 Hz		-80	-90		dBc/Hz	
	10 Hz		-115	-120		dBc/Hz	
	100 Hz		-140	-140		dBc/Hz	
	1 kHz		-145	-150		dBc/Hz	
	10 kHz		-150	-155		dBc/Hz	

Environmental	Mechanical Shock	Per MIL-STD-202, Method 213, Condition C
	Vibration	Per MIL-STD-202, Method 201 & 204
	Storage Temperature	-55°C to 125°C
	Hermeticity	Per MIL-STD-202, Method 112
	Solderability	Per EIAJ-STD-002
	Max. Wave Soldering Cond.	+260°C for 10 seconds

HCMOS Load – see load circuit diagram #2. Sinewave Load - see load circuit diagram #8

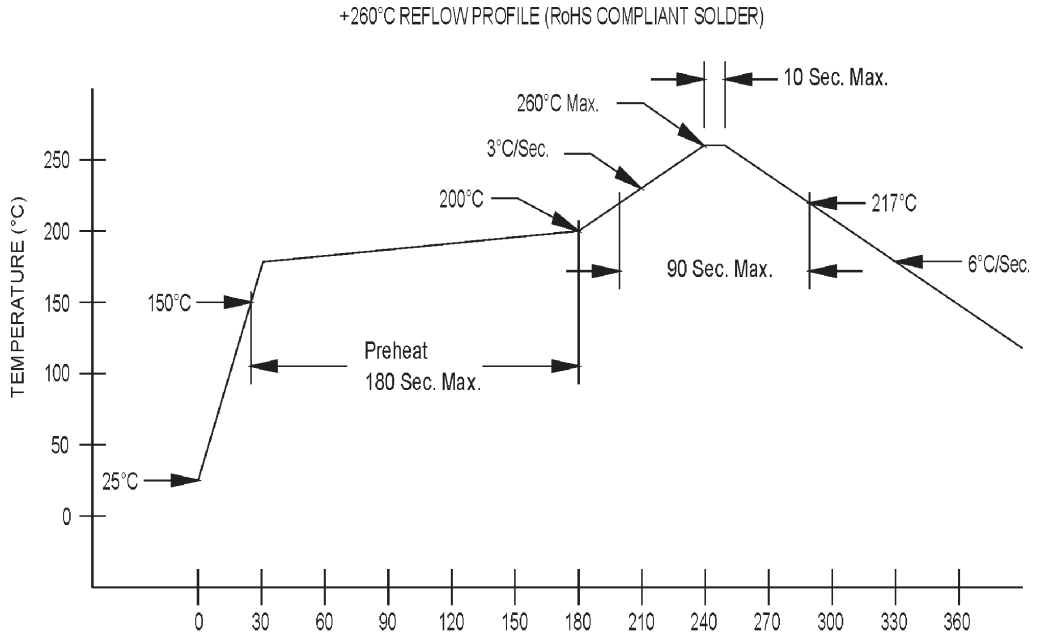
Product Dimensions & Pinout Information:



Pin	Function
1	Vtune
2	Vref
3	Supply
4	RF Out
5	Ground
6*	OvenReady (Option) or N/C

* Pin #6 may be enabled as “Oven Ready”, No Connection, or re-moved entirely.

Solder Profile:



Solder Conditions

Note: Exceeding these limits may damage the device.

Quality Parameters:

Environmental Specifications/Qualification Testing Performed on the XO5120 OCXO		
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, 6 ms
Vibration	MIL-STD-202, Method 201-204	10 g 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
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

Handling Information:

Although protection circuitry has been designed into the XO5120 Series 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 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, 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-833D, Method 3015, Class 1

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