



# Low Phase Noise OCXOs

10 MHz, phase noise down to -115 dBc/Hz @ 1Hz / -146 dBc/Hz @ 10 Hz

## XO5123 Series

### FEATURES

Stress compensated crystal cut  
High stability –  $5 \times 10^{-12}$  Allan deviation  
Low aging –  $\pm 0.1$  ppm/year

#### Ultra-low phase noise

Standard	-140 dBc/Hz @ 10 Hz -169 dBc/Hz floor
Low	-145 dBc/Hz @ 10 Hz -170 dBc/Hz floor
Ultra	-115 dBc/Hz @ 1 Hz -146 dBc/Hz @ 10 Hz -172 dBc/Hz floor

Sine output  
Oven monitor, enable, low g-sensitivity options  
Thru-hole Europack – 36 x 27 mm

### APPLICATIONS

Lab instrumentation  
Satellite communications  
Radar  
COTS

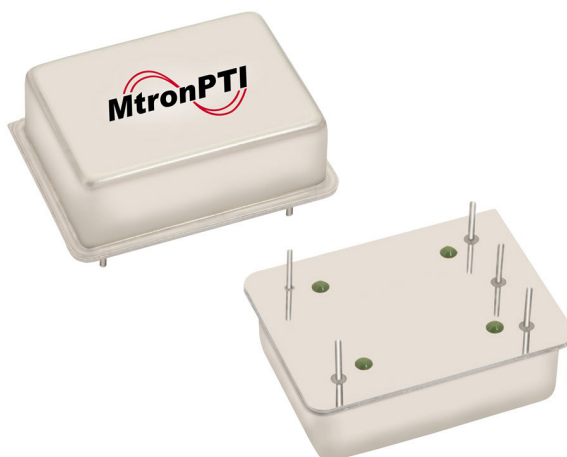
### SOLID FOUNDATION

*Precision measurement and reliable communications need a solid reference*

Network analyzer measurements are only as good as the noise they themselves generate. Satellite communication terminals and radar need low noise to hold the channel and provide a clear image. MtronPTI's [XO5123 Series Low Phase Noise OCXOs](#) bring the ultra-low phase noise and high stability these systems need.

In the near past, low noise reference oscillators were bulky multi-cubic-inch boxes, perhaps designed by system builders themselves. No more. MtronPTI's [XO5123 Series](#) delivers down to -115 dBc/Hz @ 1 Hz and -172 dBc/Hz noise floor in a small, 36 x 27 mm, 'Europack' package. Consuming only 2.5 Watts steady state and with  $\pm 0.1$  ppm/year aging, the [XO5123 Series](#) also meets SWaP (low size, weight and power) requirements as well as ensuring long, accurate equipment life.

Nearly fifty years of crystal science and high performance oscillator design and manufacturing helps MtronPTI's [XO5123 Series](#) make measurements a bit more accurate, data links more reliable and situational awareness more complete.



## Electrical Characteristics

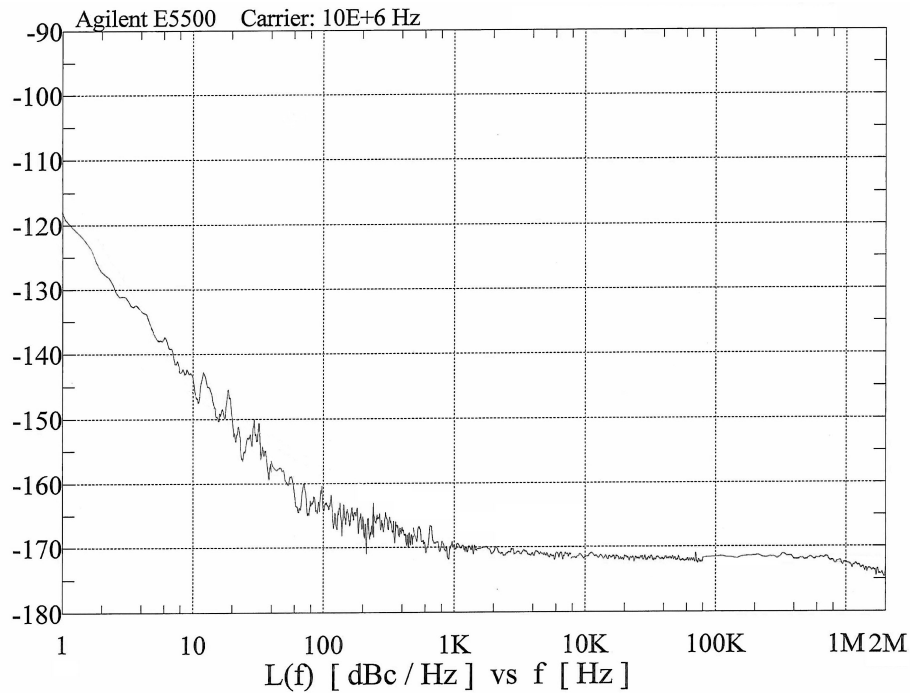
Parameter	Symbol	Min.	Typ.	Max.	Units	Comment
OUTPUT FREQUENCY						
Nominal	$F_o$		10.000000		MHz	
Initial Frequency Accuracy		-0.1		+0.1	ppm	At time of shipment
vs. Temperature Range		-10		+10	ppb	-20 °C to +70 °C, other ranges available
vs. Supply Voltage		-2.0		+2.0	ppb	±5 % change in voltage
vs. Load		-2.5		+2.5	ppb	±5 % change in load
Aging/Day		-0.5		+0.5	ppb	After 30 days power on
Aging/Year		-0.1		+0.1	ppm	
Short Term Stability (Allan deviation)				5	$\times 10^{-12}$	Per second
RF OUTPUT						
Output Type			Sinewave		$\Omega$	
Output Load	$V_{OH}$		50		dBm	Into 50 $\Omega$
Level			+10			
Frequency Adjustment Method			External Voltage Tuned			
Tuning Slope			Positive			Other slope ranges available
Tuning Voltage	$V_{TUNE}$	0	2.5	+5	$V_{DC}$	
Modulation bandwidth		1			kHz	
TUNING						
Method			Digital control		$V_{DC}$	
Steps			250			
Data			8 bit			Parallel word
Tuning speed				25	$\mu s$	
PHASE NOISE						Standard Phase Noise Version
SSB Phase Noise (static) achieved after warm-up			-105			@ 1 Hz Offset
				-140		@ 10 Hz Offset
				-155		@ 100 Hz Offset
				-162	dBc/Hz	@ 1 kHz Offset
				-169		@ 10 kHz Offset
				-169		@ 100 kHz Offset
						Low Phase Noise Version
				-112		@ 1 Hz Offset
				-145		@ 10 Hz Offset
				-155		@ 100 Hz Offset
				-162	dBc/Hz	@ 1 kHz Offset
				-170		@ 10 kHz Offset
				-170		@ 100 kHz Offset
						Ultra-low Phase Noise Version
				-115		@ 1 Hz Offset
				-146		@ 10 Hz Offset
				-158		@ 100 Hz Offset
				-165	dBc/Hz	@ 1 kHz Offset
				-170		@ 10 kHz Offset
				-172		@ 100 kHz Offset
OTHER PARAMETERS						
Warm-up Time	$\Delta F/F$			5	Minutes	To be within ±100 ppb @ 25 °C, referenced to the frequency after 24-hour power on
Harmonics				-30	dBc	
Spurious				-80	dBc	
Supply Voltage and Power						
Supply Voltage	$V_S$	4.75	5.0	5.25	$V_{DC}$	12 volt and other options available
Power Consumption				2.5	Watts	Steady state @ 25 °C in still air
				4.5	Watts	In still air @ turn on

## Environmental &amp; Physical

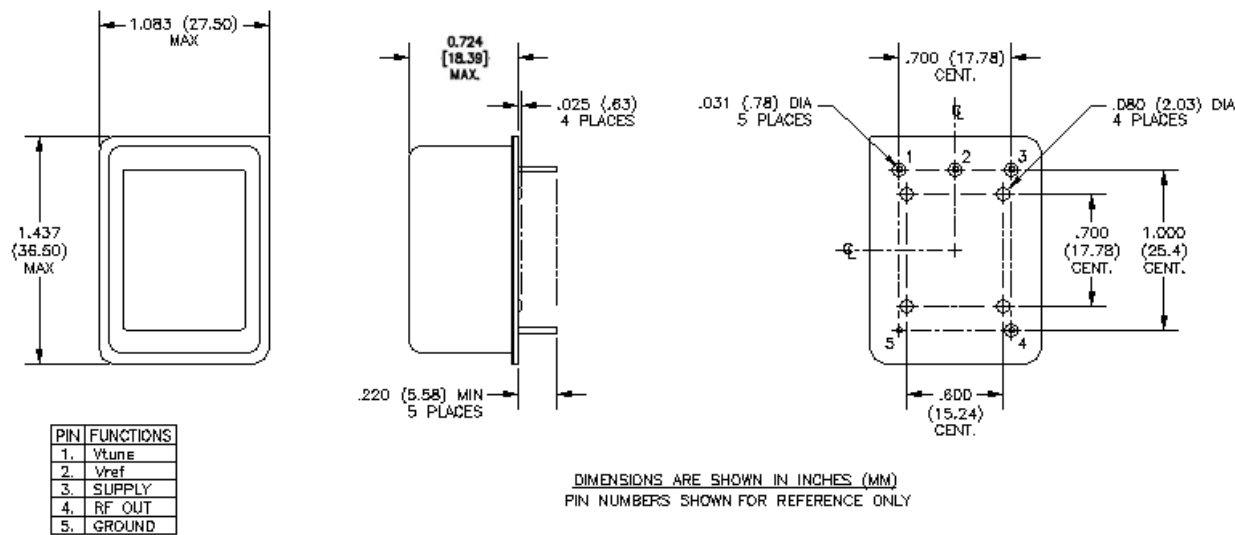
Parameter	Symbol	Min.	Typ.	Max.	Units	Comment
Operating Temperature	OTR	-20		+70	°C	
Storage Temperature	STR	-55		+85	°C	
Vibration (survival)	Per MIL-STD 202G, Method 204, Condition A					
Shock (survival)	Per MIL-STD 202G, Method 213, Condition C					
Solderability	Per EIAJ-STD-002					
RoHS	Full RoHS Compliance					



Typical Phase Noise Plot (Ultra-low phase noise version)



Mechanical, marking and pin out



Revision History

Date	Rev.	Orig.	Details of Revision
20141217	1	DPD	Preliminary

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