# XO5503 Series Low G-sensitivity OCXO with Vibration Compensation

## KEY FEATURES

**10 MHz Output**

**<2 x $10^{-11}$/g, g-sensitivity, any axis**

**Electronic Vibration Compensation**

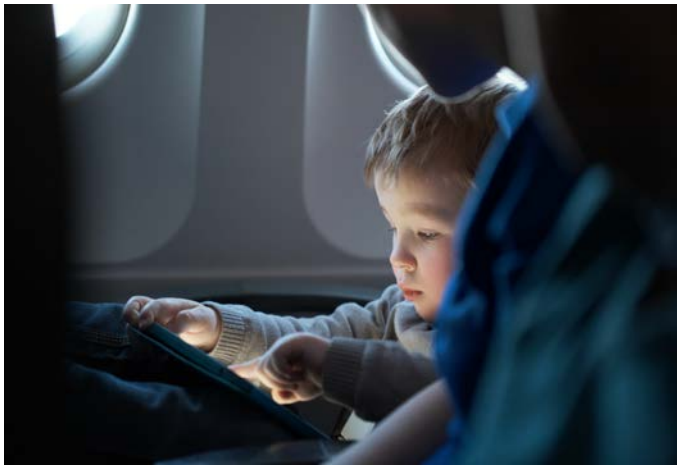
**-133 dBc/Hz @ 100 Hz offset under vibration**

**2.0”x2.0”x0.8”max, excluding mounting brackets**

## APPLICATIONS

**Airborne and shipboard radar**

**Airborne Satellite communications**



### Low g-sensitivity Vibration Compensated OCXOs for Radar and Satcom

In high rel communications and radar applications, reliability comes first. The communication link must stay up; the picture must be clear even when conditions are less than ideal. Radars and satellite tuners use high performance crystal oscillators to keep frequencies quiet for clear pictures and exact for good channel lock but it’s often a difficult tradeoff: size, weight and power constraints versus ultimate noise performance when looking for small slow moving targets from shaking platforms. The MtronPTI XO5503 Series incorporates a SC-cut quartz resonator and electronic vibration compensation resulting in 0.02 ppb/g g-sensitivity

The XO5503 Series OCXO replaces bulkier references, raising system performance while lowering size and weight.

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## Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| Nominal Frequency | $F_O$ | | 10.000000 | | MHz | |
| Initial Tolerance | | -100 | | +100 | ppb | At time of shipment, $V_{TUNE}$ = 2.5V |
| **Frequency Stability** | | | | | | |
| Over Temperature Range | | -30 | | +30 | ppb | -40°C to + 85°C, Ref. 25 °C |
| vs Supply Voltage Change | | | | +5 | ppb | ±5% change in $V_S$ |
| vs Load Change | | | | +5 | ppb | ±5% change in Load |
| Aging [After 72-hours of operation] | | | | ±0.3 | ppb | Per day |
| | | | | ±100 | ppb | 1st year |
| | | | | ±800 | ppb | All Causes over the life of the product |
| Short Term Stability | | | | 1E-11 | | Allan Deviation, Tau = 1*sec* |
| **RF Output** | | | | | | |
| Output Type | | | Sinewave | | | |
| Output Level | | +5.0 | +7.0 | +9.0 | dBm | Into a nominal 50Ω load |
| Output Load | | | 50 | | Ω | ±5% |
| Harmonics | | | | -30 | dBc | |
| **Frequency Adjustment** | | | | | | |
| Adjustment Method | | | External Voltage | | | |
| Tuning Voltage | $V_{TUNE}$ | 0 | | +5.0 | $V_{DC}$ | |
| Tuning Range | | ±0.8 | | | ppm | |
| Tuning Bandwidth | | 500 | | | Hz | |
| Tuning Linearity | | | | 10 | % | |
| Input Impedance | | 50 | | | KΩ | |
| Tuning Slope | | | Positive | | | |
| **Phase Noise** | | | | | | |
| SSB Phase Noise – Static | | | | -120 | dBc/Hz | @ 10Hz Offset |
| | | | | -140 | | @ 100Hz Offset |
| | | | | -155 | | @ 1kHz Offset |
| | | | | -155 | | @ 10kHz Offset |
| | | | | -155 | | @ 100kHz Offset |
| SSB Phase Noise – With Random Vibration (operational) (any axis)<br><br>Note: The max specs from 10Hz to 500Hz are based on a g-sensitivity of 2E-11/g. | | | | -116 | dBc/Hz | @ 10Hz Offset |
| | | | | -128 | | @ 40Hz Offset |
| | | | | -128 | | @ 52Hz Offset |
| | | | | -133 | | @ 100Hz Offset |
| | | | | -148 | | @ 500Hz Offset |
| | | | | -152 | | @ 1kHz Offset |
| | | | | -155 | | @ 2kHz Offset |
| | | | | -155 | | @ 10kHz Offset |
| | | | | -155 | | @ 100kHz Offset |
| **Random Vibration (operational)** | | | | | | |
| Power Spectral Density | | | 0.012 | | $g^2$/Hz | @ 10Hz |
| | | | 0.012 | | | @ 40Hz |
| | | | 0.020 | | | @ 52Hz |
| | | | 0.020 | | | @ 500Hz |
| | | | 0.00126 | | | @ 2000Hz |
| **Additional Parameters** | | | | | | |
| Supply Voltage | $V_S$ | 11.4 | 12.0 | 12.6 | $V_{DC}$ | |
| Power Consumption | | | | 5 | Watts | @ Start-up |
| | | | | 3 | watts | @ +25˚C Steady State |
| PIN 4 Oven Not Ready | | | | 0.5 | $V_{DC}$ | 3.3V HCMOS Compatible |
| PIN 4 Oven Ready | | 2.7 | | | $V_{DC}$ | |
| Warm-up Time | | | | 5 | Minutes | @ ±10ppb of the frequency @ 1 hour @ 25˚C |



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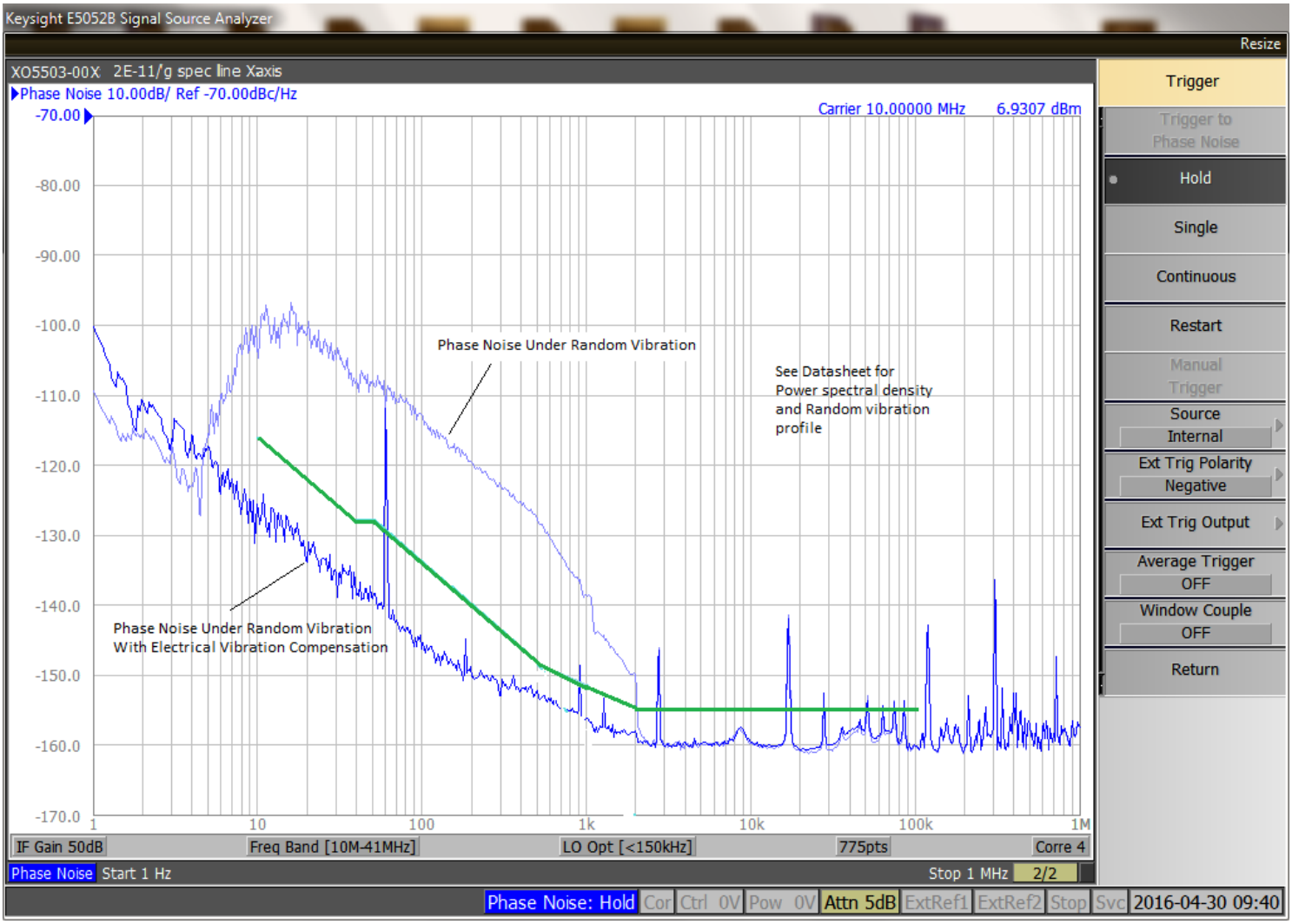
## Environmental

| Parameter | Symbol | Min. | Typ. | Max. | Units | Conditions |
|---|---|---|---|---|---|---|
| Operating Temperature | OTR | -40 | | +85 | °C | |
| Storage Temperature | STR | -55 | | +95 | °C | |
| RoHS | Full RoHS Compliance [1] | | | | | |

Note 1: Contact factory for specific material requirements

## Representative Dynamic Phase Noise Performance



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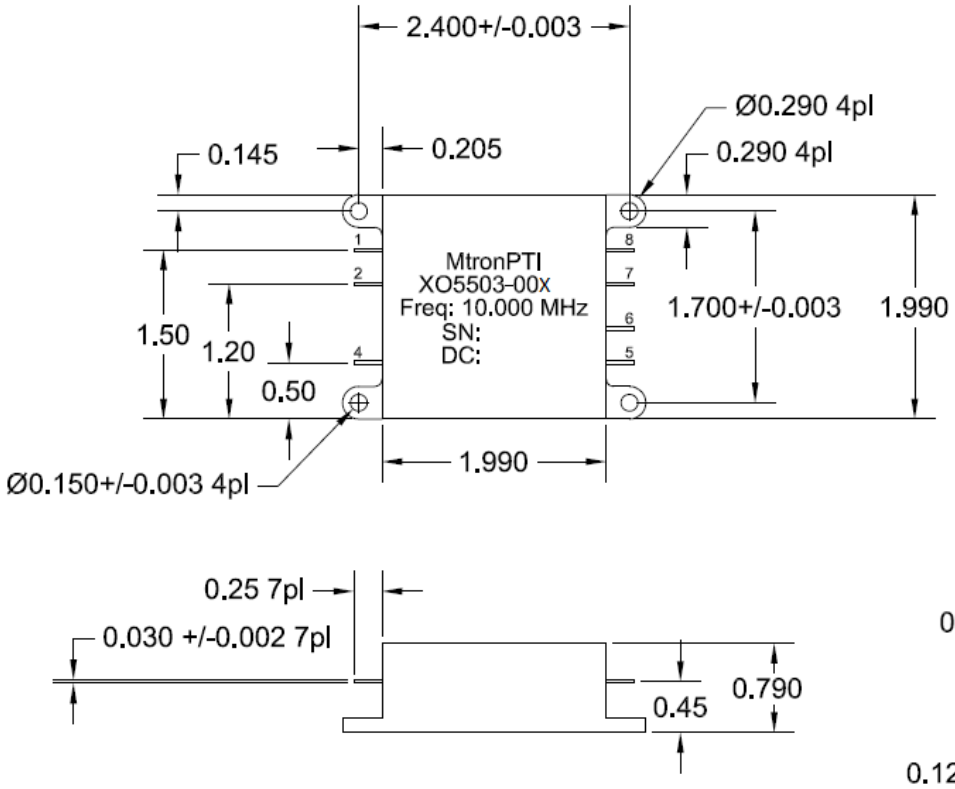
## Mechanical, Pinout and Marking




| PIN | FUNCTION |
|---|---|
| 1 | +12V |
| 2 | GND/CASE |
| 4 | OVEN READY |
| 5 | GND/CASE |
| 6 | RF OUT |
| 7 | GND/CASE |
| 8 | Vtune |

Dimensions are in inches

Tolerance (unless noted otherwise)

x.xxx —> +/-0.005

x.xx —> +/-0.01

| **Part Marking** | |
|---|---|
| Line 1 | MtronPTI |
| Line 2 | *'Model Number'* |
| Line 3 | *'Center Frequency'* |
| Line 4 | Serial Number |
| Line 5 | Date Code |

## Revision History

| Date | Rev. | Orig. | Details of Revision |
|---|---|---|---|
| 20160510 | A | MWM/DPD | Preliminary release |





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