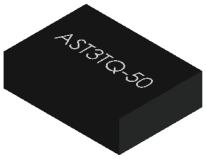
# Precision SMD TCXO/VCTCXO




7.0 x 5.0 x 1.9mm

**AST3TQ-50**

**ESD Sensitive**

**RoHS/RoHS II Compliant**

Moisture Sensitivity Level (MSL) – 3

## FEATURES:

- Standard available frequencies: 10.00, 12.80, 16.384, 19.20, 19.44, 20.00, 24.576, 25.00, 26.00, 30.72, 40.00 MHz
- LVCMOS Output or Clippled Sine Wave output
- Frequency stability: ±50ppb over -40ºC to +85ºC operating temperature range
- Excellent Phase Noise, Harmonics and Spurious content
- Typical rms jitter of 400fs @ 40MHz carrier & 1.0ps @ 10MHz carrier over 12kHz to 20MHz BW

## APPLICATIONS:

- COTS Military Radios & other Communication Hardware
- WiMax,
- LTE, BTS
- CATV, LAN, LMDS
- GPS Tracking with Hold-Over accuracy
- Test & Measurement Equipment
- Point-to-Point communication networks

## STANDARD SPECIFICATIONS:

### Maximum Rating

| Parameters | Rating |
|---|---|
| Storage Temperature Range | -55 to +125°C |
| Supply Voltage | -0.5 to 6V |
| Control Voltage | 0 to 3V |
| ESD, HBM/CDM/MM | 4kV/2kV/200V |

### Key Electrical Specifications

| Parameters | Minimum | Typical | Maximum | Units | Notes |
|---|---|---|---|---|---|
| Frequency Range | 10 | | 40 | MHz | |
| Standard Frequencies | 10.00, 12.80, 16.384, 19.20, 19.44, 20.00, 24.576, 25.00, 26.00, 30.72, 40.00 | | | MHz | |
| Initial Frequency Tolerance (@+25°C) at shipping | | | ±500 | ppb | Relative to carrier |
| **Frequency Stability Options** | | | | | |
| -40°C to +85°C | | | ±50 | ppb | |
| Frequency Stability vs. Supply Voltage Change (Vdd±5%) | | | ±100 | ppb | |
| Frequency Stability vs. Load Change (Load±5%) | | | ±200 | ppb | |
| Aging (first year @+25°C) | | | ±1.0 | ppm | |
| Aging (20 years @+25°C) | | ±3.0 | ±4.6 | ppm | |
| Supply Voltage (Vdd) | +3.135 | +3.3 | +3.465 | V | |
| Supply Current (Icc) | | 3.0 | 4.0 | mA | @10MHz carrier |
| | | 5.5 | 7.0 | | @40MHz carrier |
| **Control Port ( *Applicable for VCTCXO only*)** | | | | | |
| Control Voltage Range (Vc) | +0.5 | +1.5 | +2.5 | V | |
| Center Control Voltage (Vc) | | +1.5 | | V | To be with-in ±500 ppb of Fc @ 25°C (at shipping) |
| Frequency Tuning Range | ±5.00 | ±7.00 | <±13.00 | ppm | (Vc = 1.5V±1.0V) |
| Tuning Slope | | Positive | | | |
| Linearity | | | ±1 | % | |
| Port Impedance | 100 | | | kΩ | |

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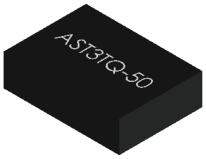


7.0 x 5.0 x 1.9mm

## STANDARD SPECIFICATIONS:

**(Continued)**

| Parameters | Minimum | Typical | Maximum | Unites | Notes |
|---|---|---|---|---|---|
| Phase Noise (10MHz carrier frequency @25℃): | | | -95 | dBc/Hz | Offset @10Hz |
| | | | -120 | | Offset @100Hz |
| | | | -140 | | Offset @1kHz |
| | | | -145 | | Offset @10kHz |
| | | | -150 | | Offset @100kHz |
| RMS Jitter (@12kHz~5MHz BW) | 0.4 | | 1.3 | ps | Carrier Dependent |
| **Clipped Sine Wave** | | | | | |
| Output Level | 0.8 | | | Vp-p | |
| Output Load | 10kΩ//10pF | | | | |
| **LVCMOS Output (Square Wave)** | | | | | |
| $V_{OH}$ | 2.4 | | | V | Output Load=15pF |
| $V_{OL}$ | | | 0.4 | V | Output Load=15pF |
| Output Load | | | 15 | pF | |
| Duty Cycle | 45 | | 55 | % | @( $V_{OH}$ - $V_{OL}$)/2 |
| Rise/Fall Time | | | 6 | ns | Output Load=15pF |

## PART IDENTIFICATION:

AST3TQ-□- [ ] MHz - 50 -□-□

| Pull-Ability |
|---|
| T = TCXO |
| V = VCTCXO |

| Frequency in MHz |
|---|
| Please specify the frequency in MHz e.g. 19.200MHz |

| Output Type |
|---|
| C: LVCMOS |
| SW: Clipped Sine Wave |

| Packaging |
|---|
| Blank: Bulk |
| T5: 500pcs/reel |
| T2: 2000pcs/reel |




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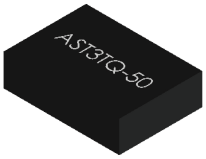


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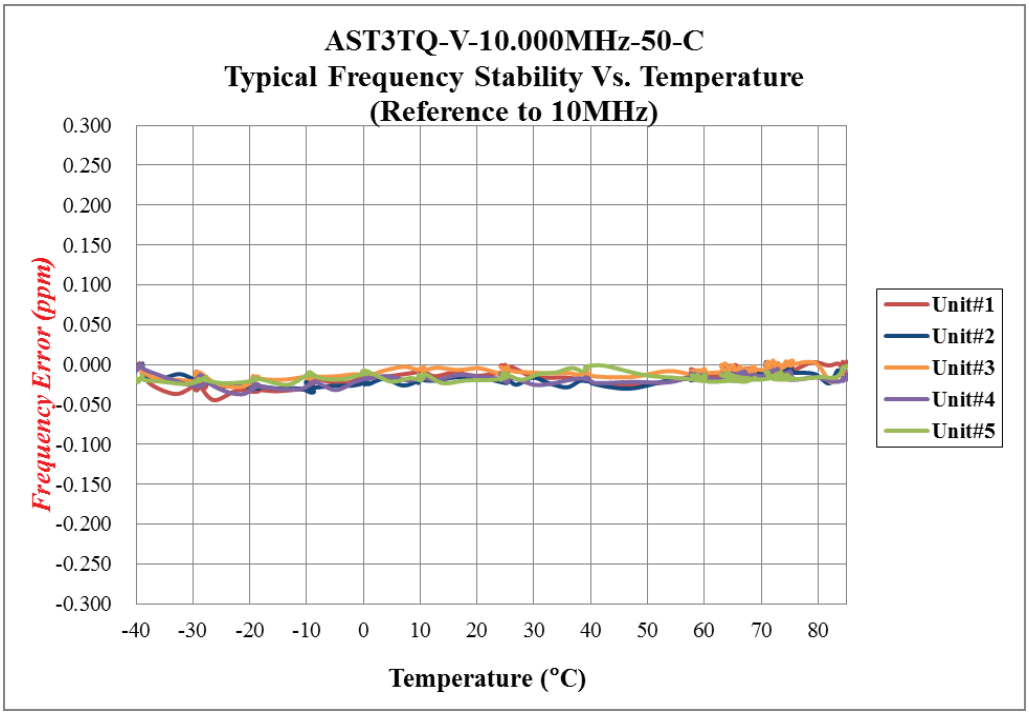
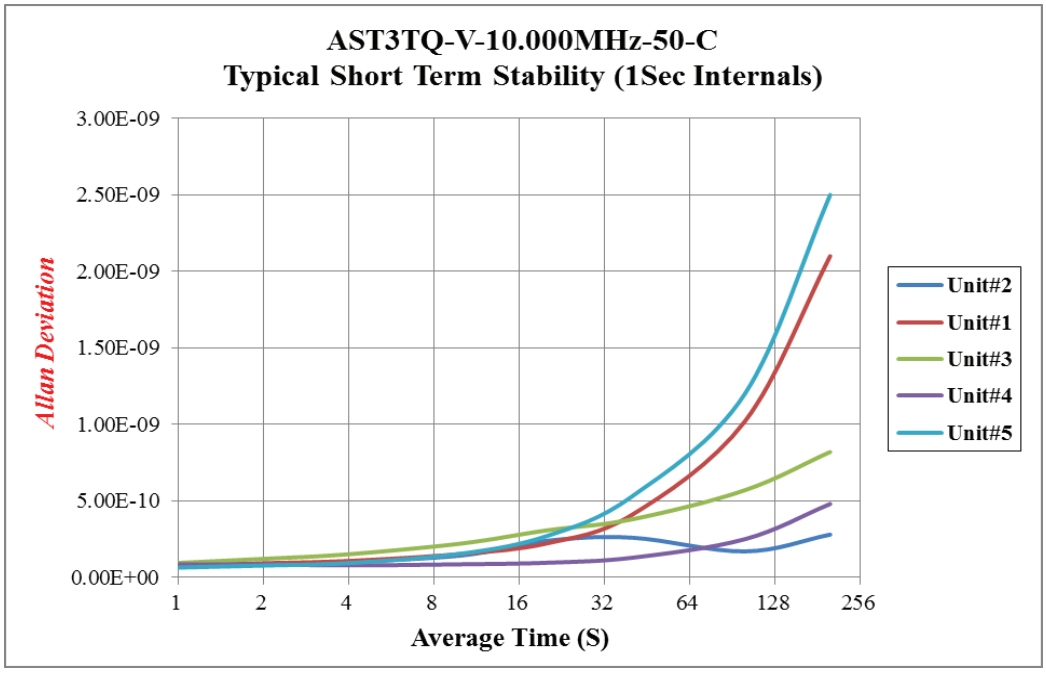
## TYPICAL FREQUENCY STABILITY VS. TEMPERATURE




## TYPICAL SHORT TERM STABILITY



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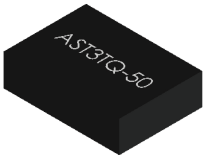


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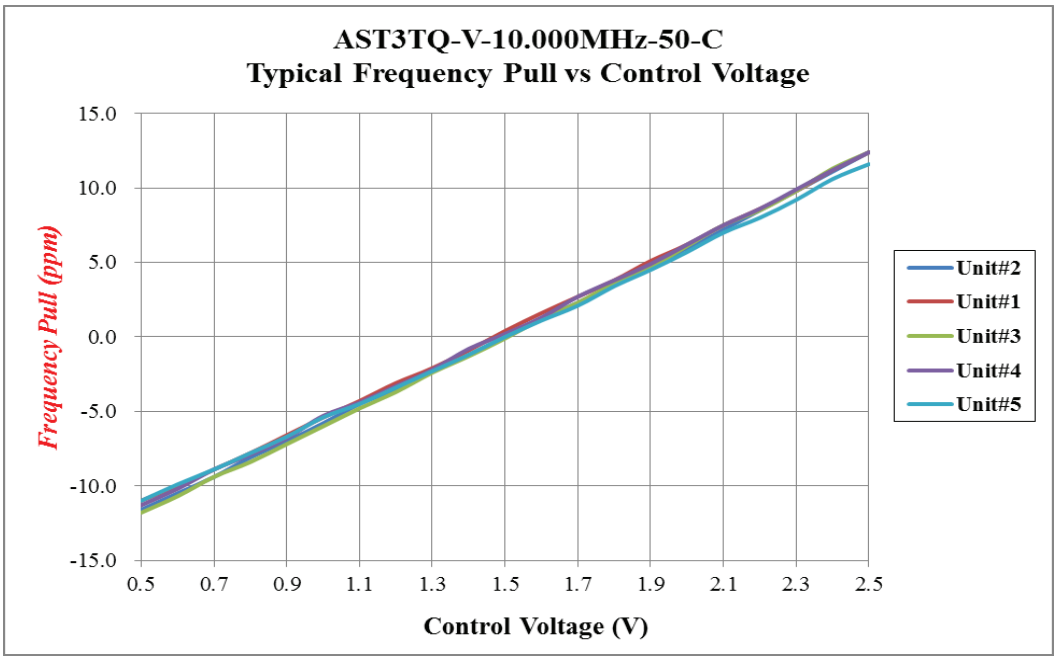
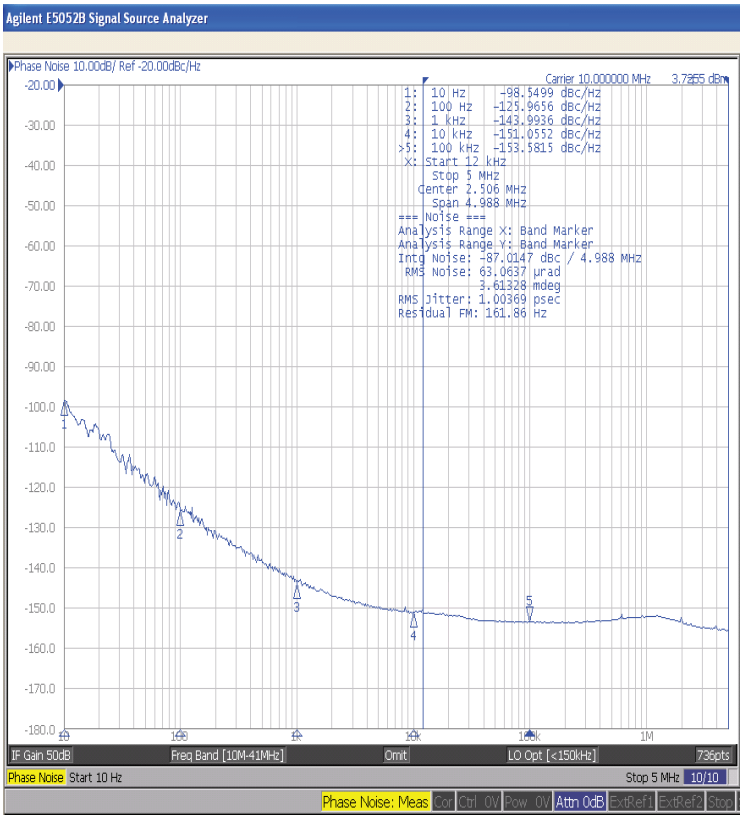
## TYPICAL FREQUENCY PULL VS. CONTROL VOLTAGE




## TYPICAL PHASE NOISE

**10.00 MHz Carrier**



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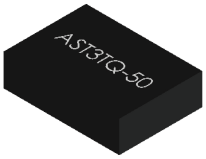
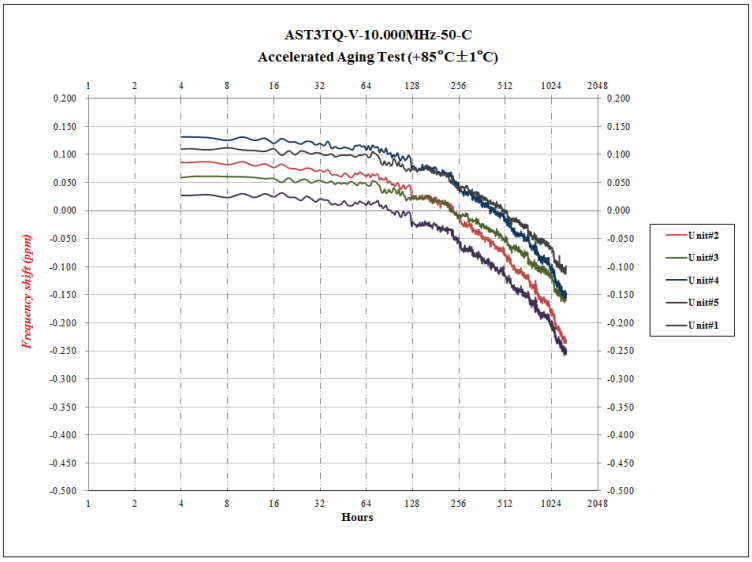



**7.0 x 5.0 x 1.9mm**

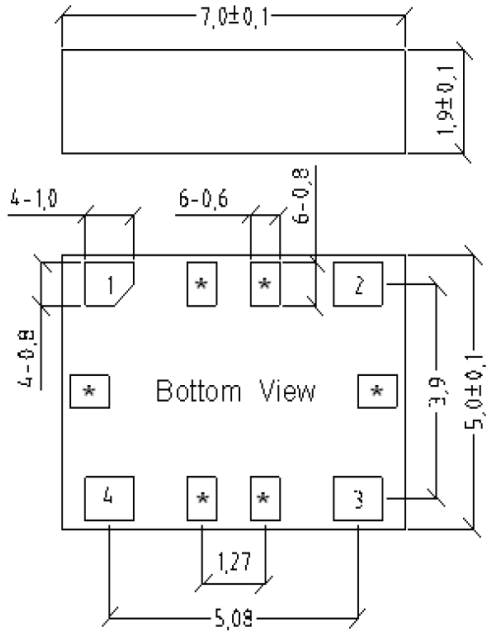
## TYPICAL AGING:



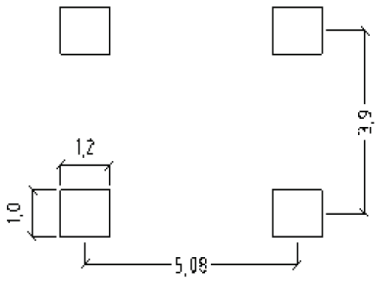

| Aging Test Conditions | |
|---|---|
| Series | AST3TQ-50 |
| Frequency | 10MHz |
| Acquisition Mode | Cycle |
| Acquisition Time | 1129 hours |
| Test Temperature | +85°C ± 1°C |
| Number of Samples | 5pcs |

| Aging Data | | | |
|---|---|---|---|
| No. | Aging Time (hrs) | Aging/Day (ppm) | Projected Aging/year (ppm) |
| #1 | 1129 | -0.0039 | -0.3896 |
| #2 | 1129 | -0.0059 | -0.5925 |
| #3 | 1129 | -0.0042 | -0.4202 |
| #4 | 1129 | -0.0056 | -0.5555 |
| #5 | 1129 | -0.0055 | -0.5492 |

## OUTLINE DIMENSION:




Recommended Land Pattern




| Pin | Function |
|---|---|
| 1 | NC *(for TCXO)*<br>Vc (*for VCTCXO*) |
| 2 | GND |
| 3 | Output |
| 4 | Vdd |
| * | For factory test only |

**Dimensions: mm**

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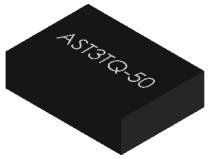


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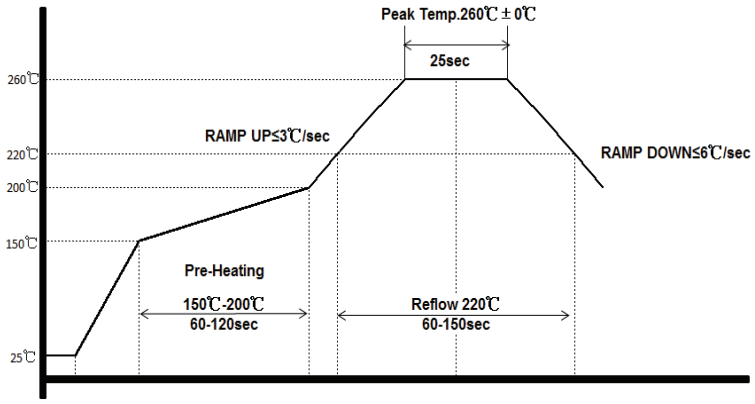
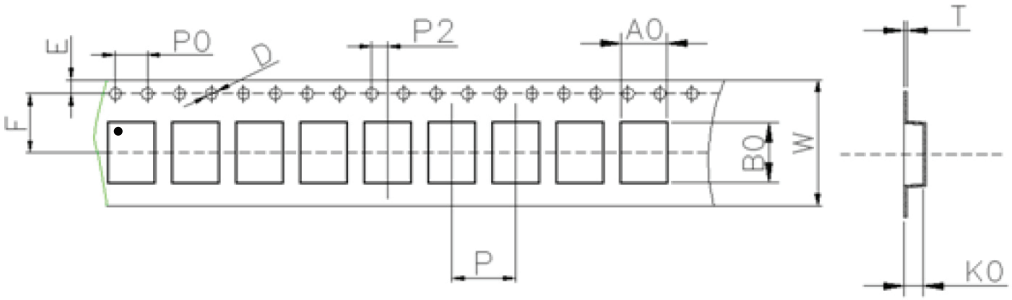
## REFLOW PROFILE:

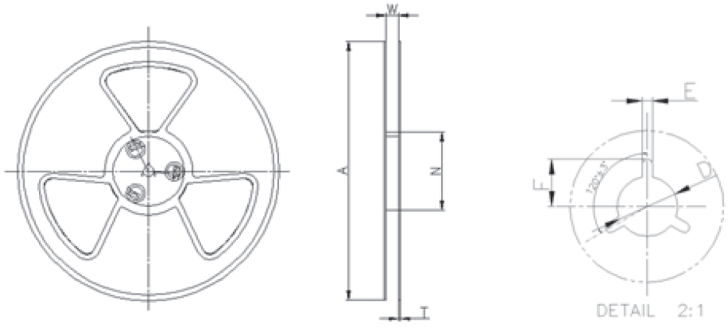



## TAPE & REEL:

**Packaging:**
**T5: 500pcs/reel**
**T2: 2,000pcs/reel**
**MSL-3 packaging applies to MOQ=25 units (cut tape) & T5 and T2.**




| W | A0 | B0 | K0 | P | F |
|---|---|---|---|---|---|
| 16.0±0.3 | 5.7±0.15 | 7.6±0.15 | 2.4±0.15 | 8.0±0.1 | 7.5±0.1 |
| **E** | **D** | **P0** | **P2** | **T** | |
| 1.75±0.1 | 1.5+0.1/-0.0 | 4.0±0.1 | 2.0±0.1 | 0.3±0.05 | |




**Dimensions: mm**

| W | A | N | T | E | F | D |
|---|---|---|---|---|---|---|
| 16.5±0.4 | 330±0.5 | 100±0.3 | 1.8±0.2 | 2.1±0.3 | 10.75±0.3 | 13.5+0.5/-0.2 |

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Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

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