

# Precision SMD TCXO/VCTCXO

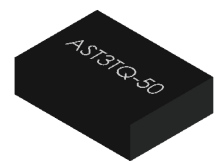
AST3TQ-50



ESD Sensitive



RoHS/RoHS II Compliant



7.0 x 5.0 x 1.9mm

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 Clipped Sine Wave output
- Frequency stability:  $\pm 50$ ppb over  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  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

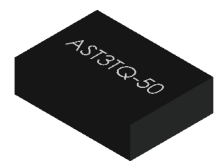
## STANDARD SPECIFICATIONS:

### Maximum Rating

| Parameters                | Rating                              |
|---------------------------|-------------------------------------|
| Storage Temperature Range | $-55$ to $+125^{\circ}\text{C}$     |
| Supply Voltage            | $-0.5$ to $6\text{V}$               |
| Control Voltage           | $0$ to $3\text{V}$                  |
| ESD, HBM/CDM/MM           | $4\text{kV}/2\text{kV}/200\text{V}$ |

### 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 ( <i>Applicable for VCTCXO only</i> )     |                                                                               |         |         |       |                                                   |
| 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    |                                                   |



## STANDARD SPECIFICATIONS:

(Continued)

| Parameters                                      | Minimum    | Typical | Maximum | Unites | Notes                                    |
|-------------------------------------------------|------------|---------|---------|--------|------------------------------------------|
| Phase Noise<br>(10MHz carrier frequency @25°C): |            |         | -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 |         |         |        |                                          |
| LVC MOS Output (Square Wave)                    |            |         |         |        |                                          |
| V <sub>OH</sub>                                 | 2.4        |         |         | V      | Output Load=15pF                         |
| V <sub>OL</sub>                                 |            |         | 0.4     | V      | Output Load=15pF                         |
| Output Load                                     |            |         | 15      | pF     |                                          |
| Duty Cycle                                      | 45         |         | 55      | %      | @( V <sub>OH</sub> - V <sub>OL</sub> )/2 |
| Rise/Fall Time                                  |            |         | 6       | ns     | Output Load=15pF                         |

## PART IDENTIFICATION:

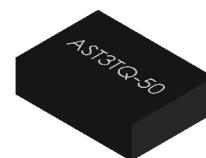
AST3TQ-- MHz - 50 -  -

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

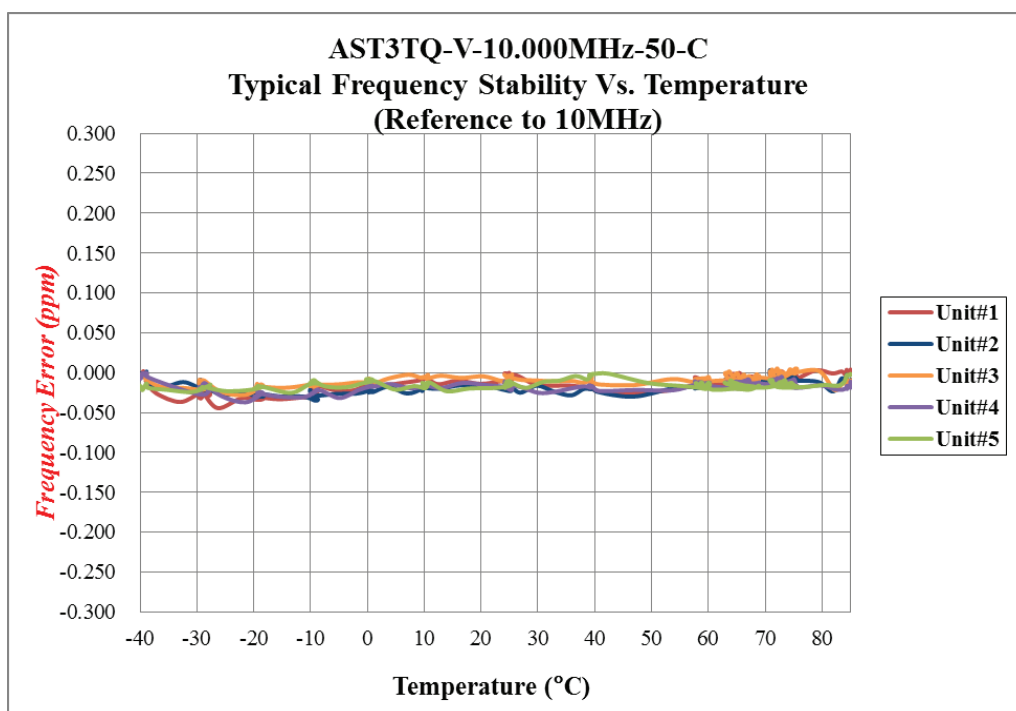
| Frequency in MHz                                      |
|-------------------------------------------------------|
| Please specify the frequency in MHz<br>e.g. 19.200MHz |

| Output Type           |
|-----------------------|
| C: LVC MOS            |
| SW: Clipped Sine Wave |

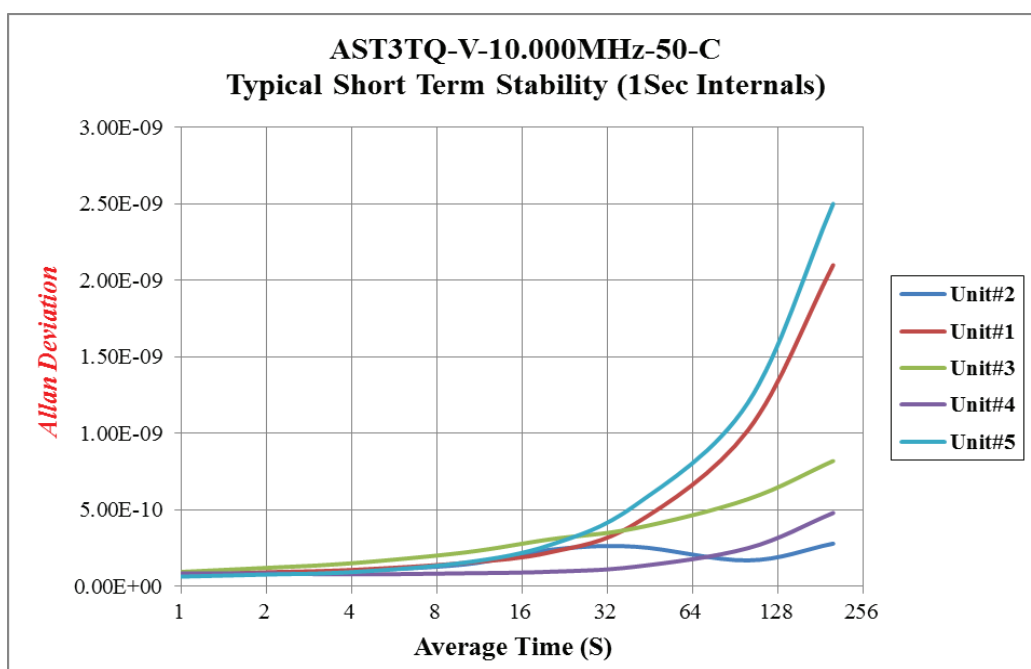
| Packaging        |
|------------------|
| Blank: Bulk      |
| T5: 500pcs/reel  |
| T2: 2000pcs/reel |



### TYPICAL FREQUENCY STABILITY VS. TEMPERATURE



### TYPICAL SHORT TERM STABILITY



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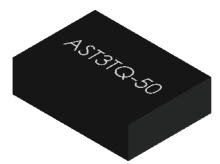
AST3TQ-50



ESD Sensitive

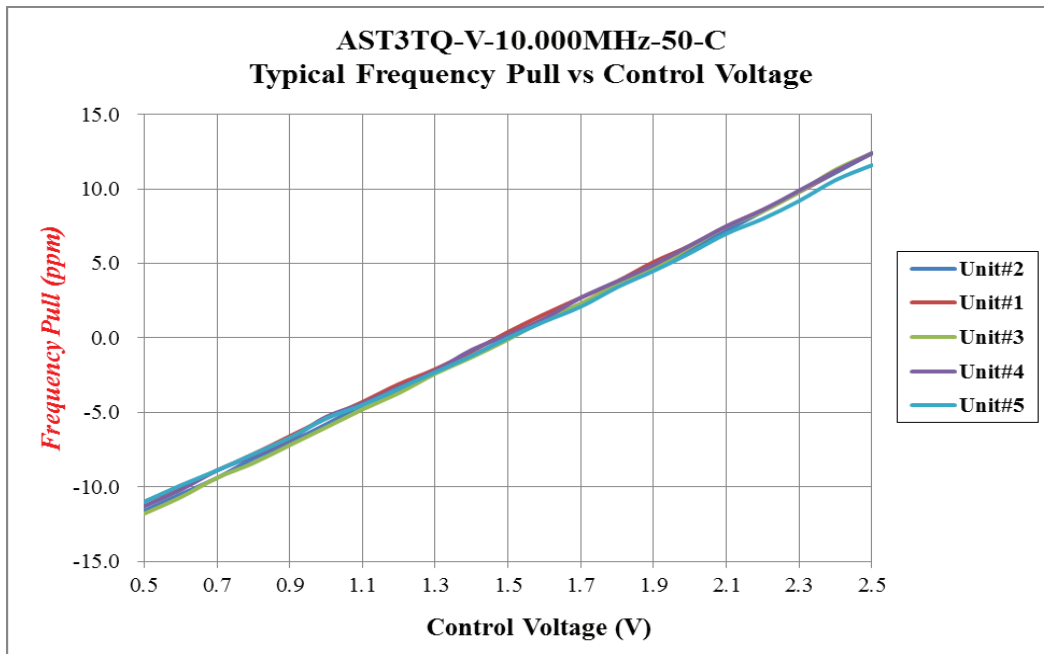


RoHS/RoHS II Compliant



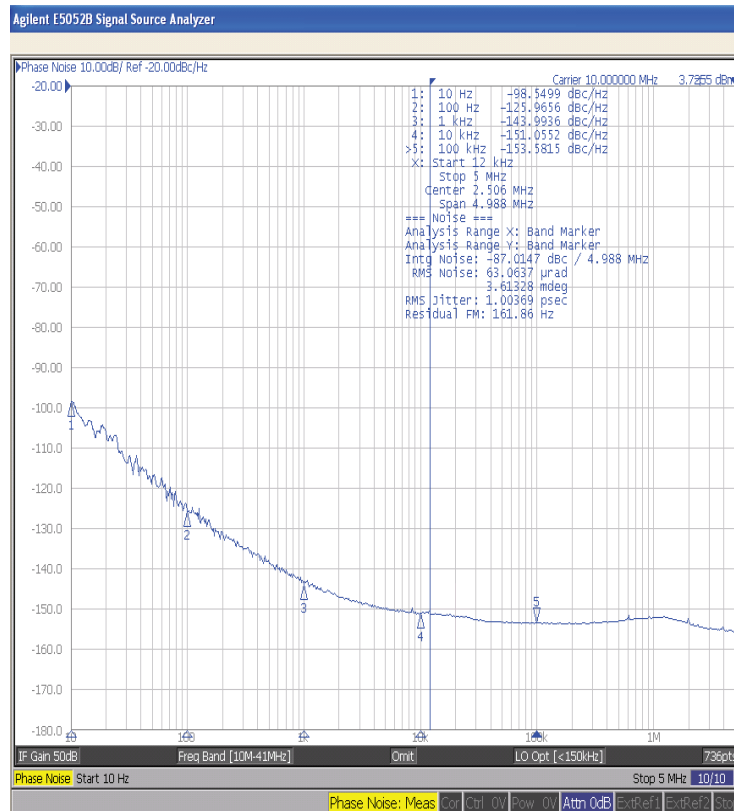
7.0 x 5.0 x 1.9mm

## TYPICAL FREQUENCY PULL VS. CONTROL VOLTAGE



## TYPICAL PHASE NOISE

### 10.00 MHz Carrier



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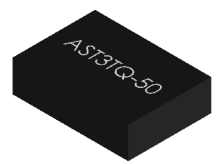
AST3TQ-50



ESD Sensitive

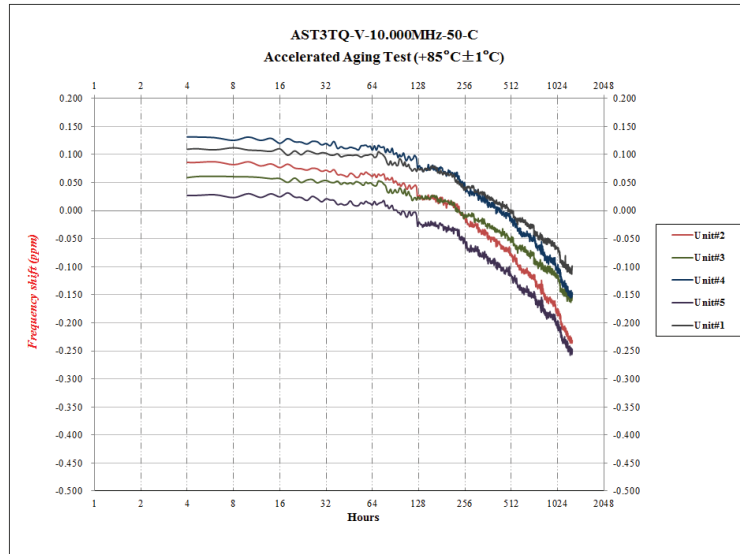


RoHS/RoHS II Compliant



7.0 x 5.0 x 1.9mm

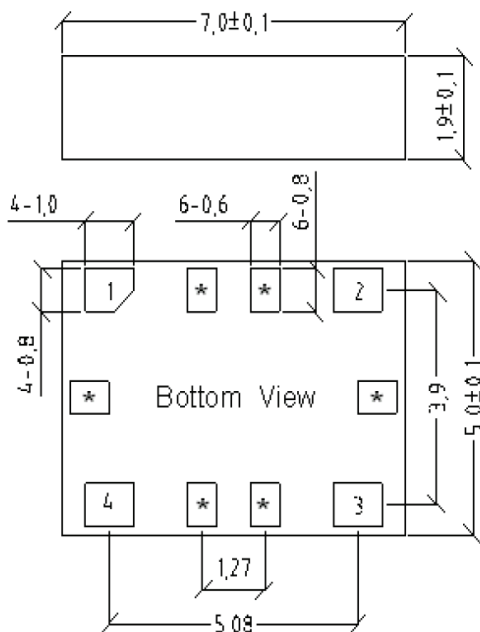
## TYPICAL AGING:



| 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        |

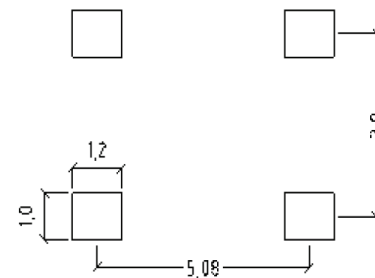
| Aging Data |                  |                 |                            |
|------------|------------------|-----------------|----------------------------|
| No.        | Aging Time (hrs) | Aging/Day (ppm) | Projected Aging/year (ppm) |
| #1         | 1129             | -0.0039         | -0.3896                    |
| #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:



Dimensions: mm

## Recommended Land Pattern



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

# Precision SMD TCXO/VCTCXO

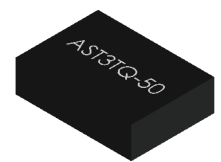
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## REFLOW PROFILE:



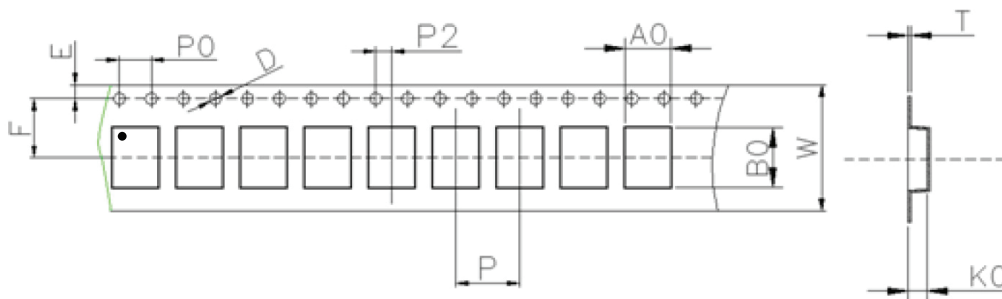
## TAPE & REEL:

Packaging:

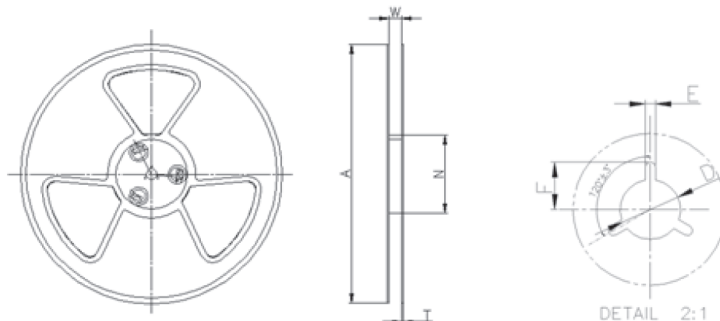
T5: 500pcs/reel

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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