

# 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 (@ $+25^{\circ}\text{C}$ ) at shipping       |                                                                               |            | $\pm 500$    | ppb              | Relative to carrier                                                                |
| <b>Frequency Stability Options</b>                                       |                                                                               |            |              |                  |                                                                                    |
| $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$                           |                                                                               |            | $\pm 50$     | ppb              |                                                                                    |
| Frequency Stability vs. Supply Voltage Change ( $V_{\text{dd}}\pm 5\%$ ) |                                                                               |            | $\pm 100$    | ppb              |                                                                                    |
| Frequency Stability vs. Load Change ( $\text{Load}\pm 5\%$ )             |                                                                               |            | $\pm 200$    | ppb              |                                                                                    |
| Aging (first year @ $+25^{\circ}\text{C}$ )                              |                                                                               |            | $\pm 1.0$    | ppm              |                                                                                    |
| Aging (20 years @ $+25^{\circ}\text{C}$ )                                |                                                                               | $\pm 3.0$  | $\pm 4.6$    | ppm              |                                                                                    |
| Supply Voltage ( $V_{\text{dd}}$ )                                       | $+3.135$                                                                      | $+3.3$     | $+3.465$     | V                |                                                                                    |
| Supply Current ( $I_{\text{cc}}$ )                                       |                                                                               | $3.0$      | $4.0$        | mA               | @10MHz carrier                                                                     |
|                                                                          |                                                                               | $5.5$      | $7.0$        |                  | @40MHz carrier                                                                     |
| <b>Control Port (Applicable for VCTCXO only)</b>                         |                                                                               |            |              |                  |                                                                                    |
| Control Voltage Range ( $V_{\text{c}}$ )                                 | $+0.5$                                                                        | $+1.5$     | $+2.5$       | V                |                                                                                    |
| Center Control Voltage ( $V_{\text{c}}$ )                                |                                                                               | $+1.5$     |              | V                | To be with-in $\pm 500$ ppb of $F_{\text{c}}$ @ $25^{\circ}\text{C}$ (at shipping) |
| Frequency Tuning Range                                                   | $\pm 5.00$                                                                    | $\pm 7.00$ | $<\pm 13.00$ | ppm              | ( $V_{\text{c}} = 1.5\text{V}\pm 1.0\text{V}$ )                                    |
| Tuning Slope                                                             | Positive                                                                      |            |              |                  |                                                                                    |
| Linearity                                                                |                                                                               |            | $\pm 1$      | %                |                                                                                    |
| Port Impedance                                                           | 100                                                                           |            |              | $\text{k}\Omega$ |                                                                                    |

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(Continued)

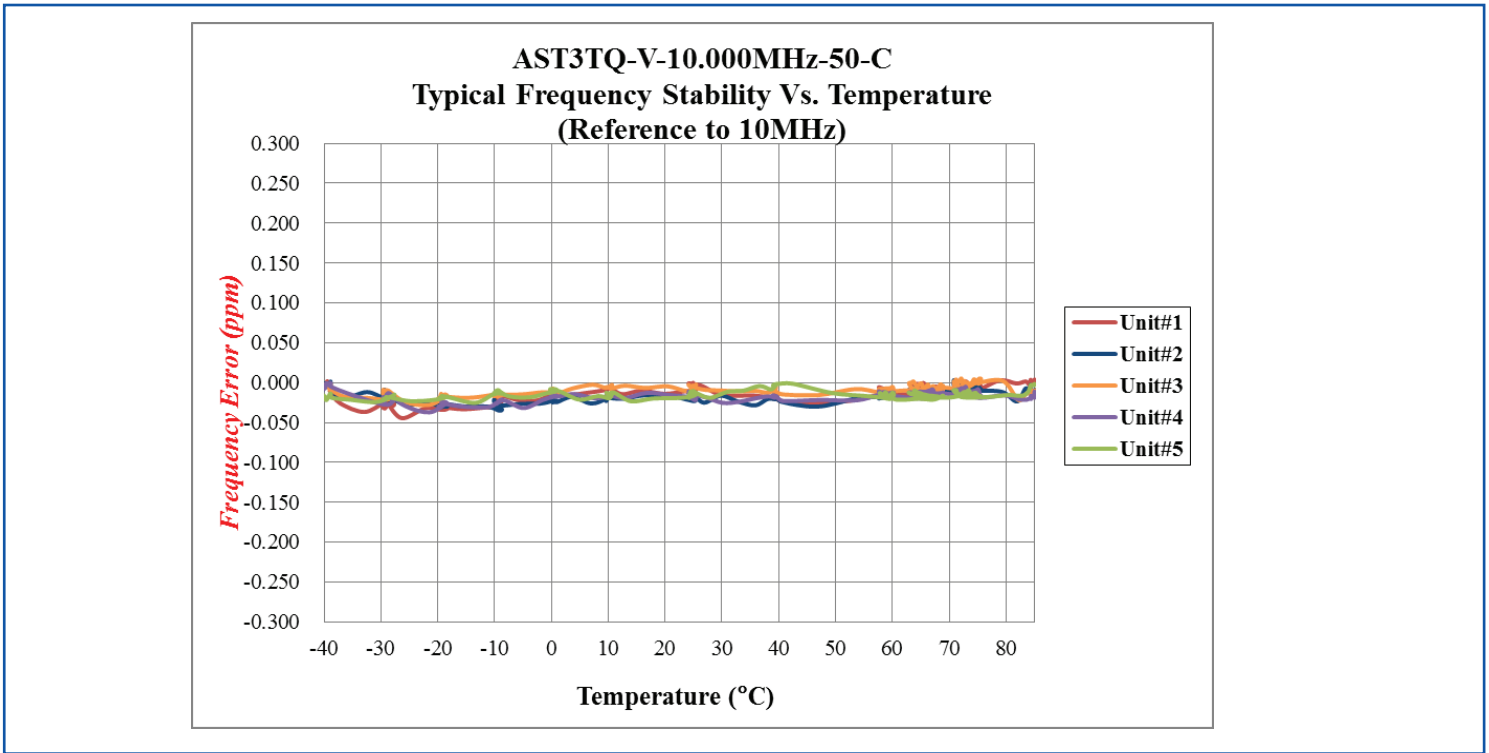
| Parameters                                      | Minimum    | Typical | Maximum | Unites | Notes                                   |
|-------------------------------------------------|------------|---------|---------|--------|-----------------------------------------|
| Phase Noise<br>(10MHz carrier 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                       |
| <b>Clipped Sine Wave</b>                        |            |         |         |        |                                         |
| Output Level                                    | 0.8        |         |         | Vp-p   |                                         |
| Output Load                                     | 10kΩ//10pF |         |         |        |                                         |
| <b>LVC MOS Output (Square Wave)</b>             |            |         |         |        |                                         |
| 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:

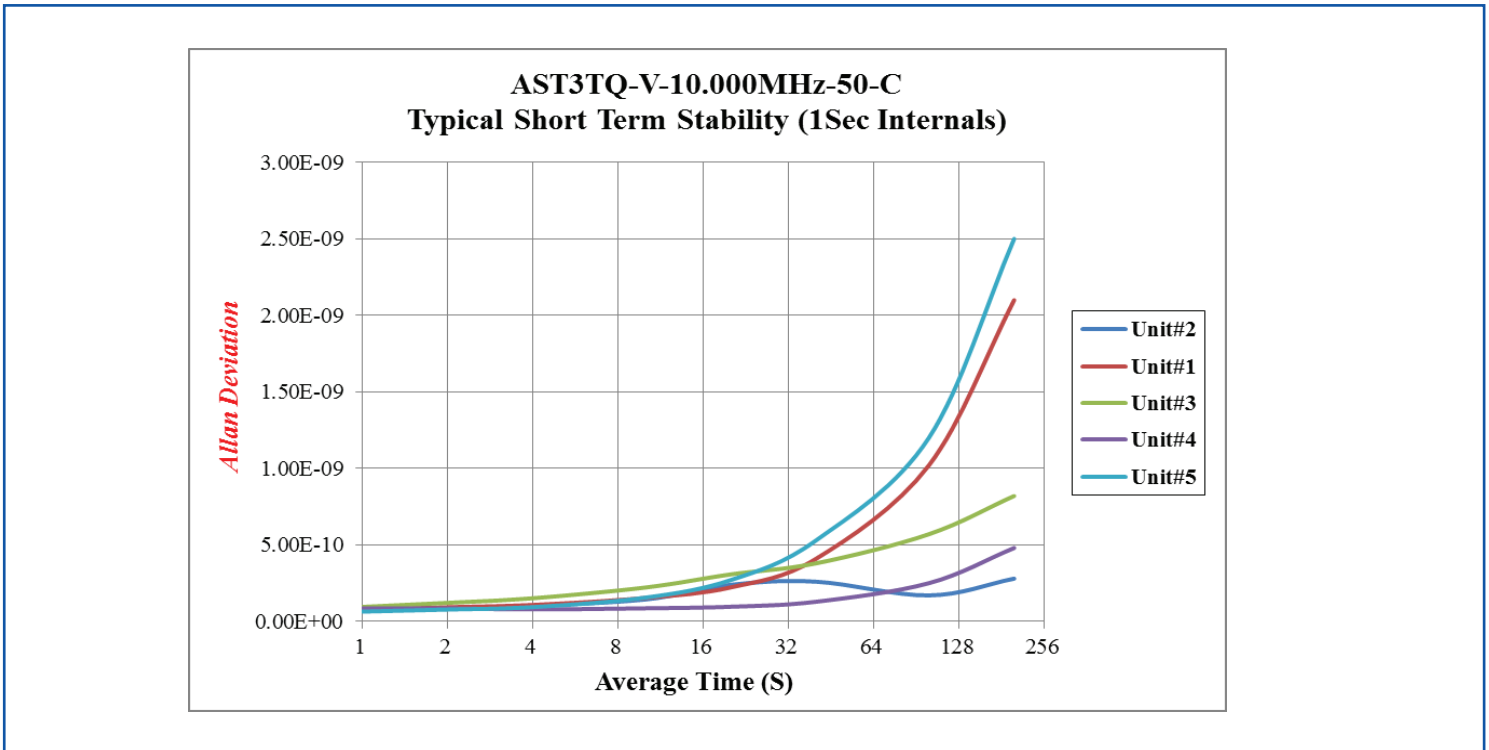




### TYPICAL FREQUENCY STABILITY VS. TEMPERATURE



### TYPICAL SHORT TERM STABILITY





### TYPICAL FREQUENCY PULL VS. CONTROL VOLTAGE



### TYPICAL PHASE NOISE



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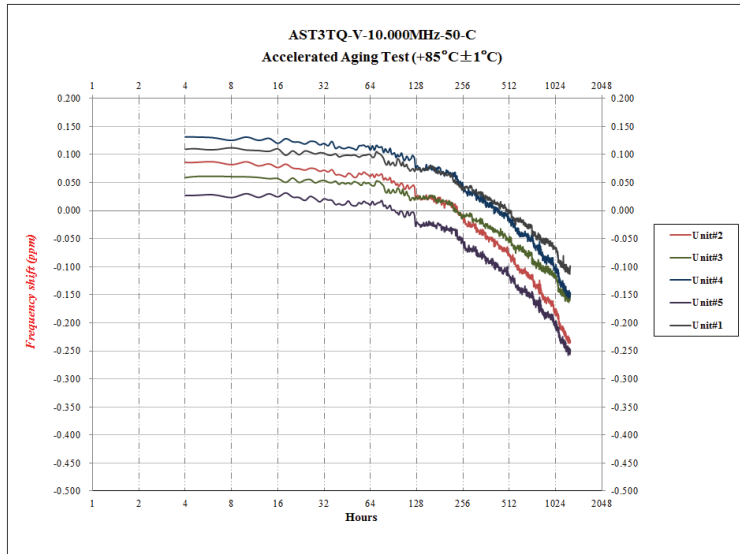


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7.0 x 5.0 x 1.9mm

## 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:



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            |

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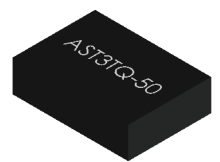
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## REFLOW PROFILE:



## 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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- Подбор аналогов;
- Консультации по применению компонента;
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- Техническая поддержка проекта;
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#### Как с нами связаться

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