

# Precision SMD TCXO/VCTCXO

AST3TQ-28



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, 15.36, 16.32, 16.384, 19.20, 19.44, 20.00, 25.00, 26.00, 30.72 & 40.00 MHz
- Standard LVC MOS Output
- Frequency stability of  $\pm 280$  ppb ( $\pm 0.28$  ppm) over  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Excellent Phase Noise, Harmonics & 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:

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

| Parameters                                              | Minimum                                                                                | Typical | Maximum | Units  | Notes                                    |
|---------------------------------------------------------|----------------------------------------------------------------------------------------|---------|---------|--------|------------------------------------------|
| Frequency Range                                         | 10                                                                                     |         | 40      | MHz    |                                          |
| Standard Frequencies:                                   | 10.00, 12.80, 15.36, 16.32, 16.384, 19.20, 19.44, 20.00, 25.00, 26.00, 30.72 and 40.00 |         |         | MHz    |                                          |
| Initial Frequency Tolerance (@+25°C) at shipping        |                                                                                        |         | ±0.3    | ppm    | Relative to carrier                      |
| Frequency Stability Options                             |                                                                                        |         |         |        |                                          |
| -40°C to +85°C                                          |                                                                                        |         | ±280    | ppb    |                                          |
| Frequency Stability vs. Supply Voltage Change (Vdd±5%): |                                                                                        |         | ±100    | ppb    |                                          |
| Frequency Stability vs. Load Change (Load±5%):          |                                                                                        |         | ±200    | ppb    |                                          |
| Supply Voltage (Vdd):                                   | +3.135                                                                                 | +3.3    | +3.465  | V      |                                          |
| Aging (first year @+25°C):                              |                                                                                        |         | ±1.0    | ppm    |                                          |
| Aging (20 years @+25°C):                                |                                                                                        | ±3.0    | ±4.6    | ppm    |                                          |
| Supply Current (Ice) (into 15pF load):                  |                                                                                        | 3.0     | 4.0     | mA     | @10MHz carrier                           |
|                                                         |                                                                                        | 5.5     | 7.0     |        | @40MHz carrier                           |
| LVCMOS Output (Square wave)                             |                                                                                        |         |         |        |                                          |
| V <sub>OH</sub> :                                       | 2.4                                                                                    |         |         | V      | Load=15pF                                |
| V <sub>OL</sub> :                                       |                                                                                        |         | 0.4     | V      | Load=15pF                                |
| Load:                                                   |                                                                                        |         | 15      | pF     |                                          |
| Duty Cycle:                                             | 45                                                                                     |         | 55      | %      | @( V <sub>OH</sub> - V <sub>OL</sub> )/2 |
| Rise/Fall Time:                                         |                                                                                        |         | 6       | ns     | Load=15pF                                |
| RMS Jitter (12kHz to 20MHz BW)                          | 0.4                                                                                    |         | 1.3     | ps     | Carrier dependent                        |
| Control Port                                            |                                                                                        |         |         |        | Applicable for VCTCXO only               |
| Voltage Range (Vc)                                      | 0.50                                                                                   |         | +2.50   | V      |                                          |
| Frequency Pull                                          | ±7.00                                                                                  | ±10.00  | ±12.00  | ppm    | (Vc = 1.5V±1.0V)                         |
| Center Control Voltage (Vc)                             |                                                                                        | +1.50   |         |        | To be with-in ±500 ppb of Fc @ 25°C      |
| Port Impedance                                          | 100                                                                                    |         |         | kΩ     |                                          |
| Phase Noise (10MHz carrier frequency @25°C):            |                                                                                        |         | -95     | dBc/Hz | Offset @10Hz                             |
|                                                         |                                                                                        |         | -120    |        | Offset @100Hz                            |
|                                                         |                                                                                        |         | -140    |        | Offset @1kHz                             |
|                                                         |                                                                                        |         | -145    |        | Offset @10kHz                            |
|                                                         |                                                                                        |         | -150    |        | Offset @100kHz                           |



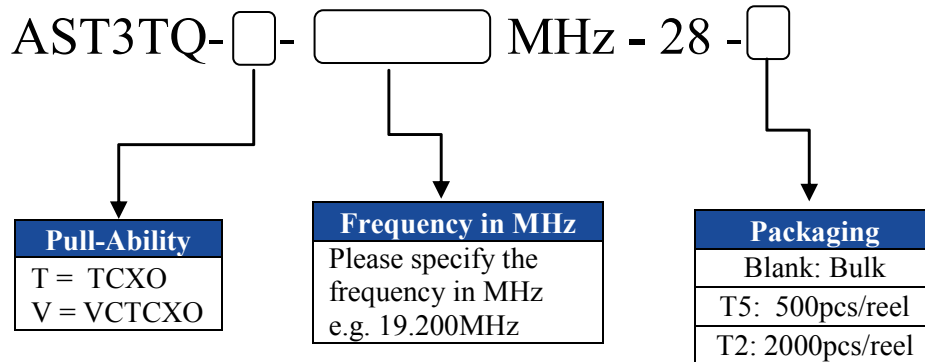
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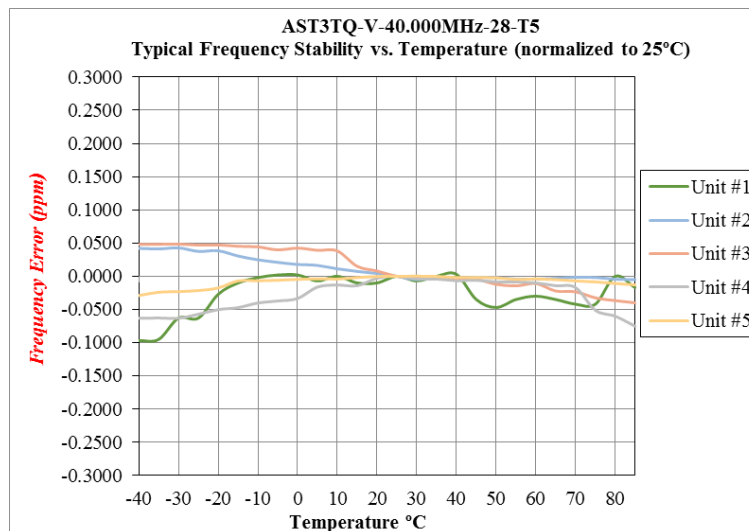
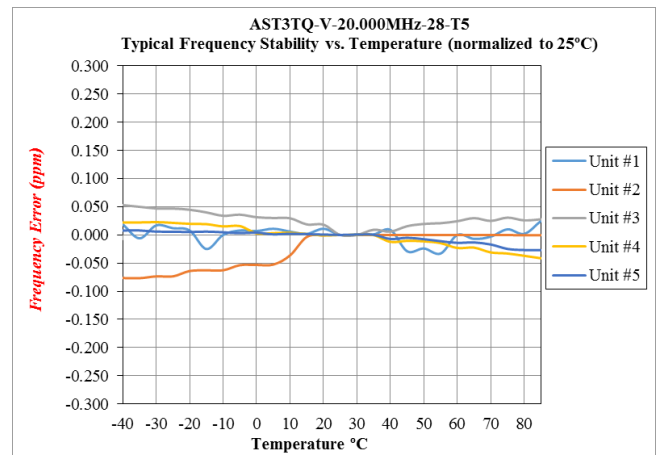
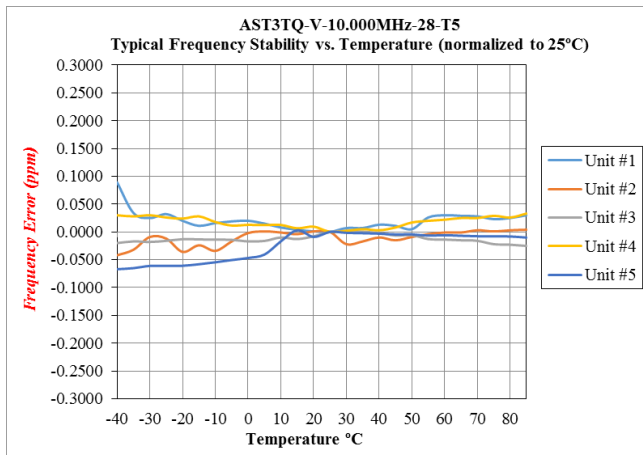
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### OPTIONS & PART IDENTIFICATION: (left blank if standard)



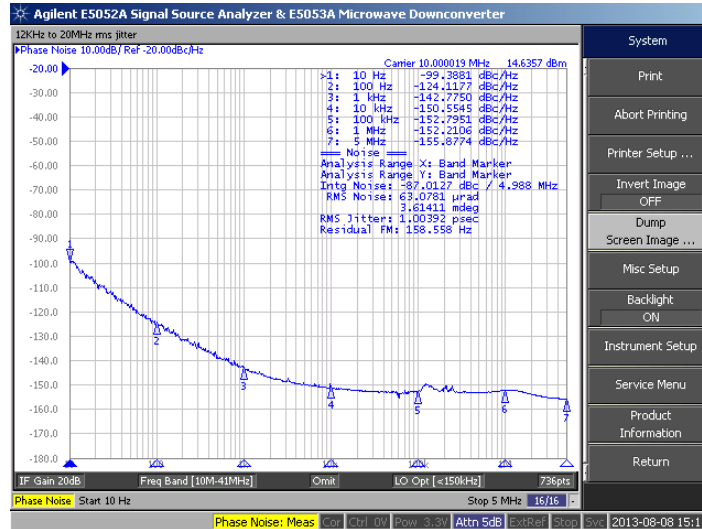
### FREQUENCY STABILITY VS. TEMPERATURE



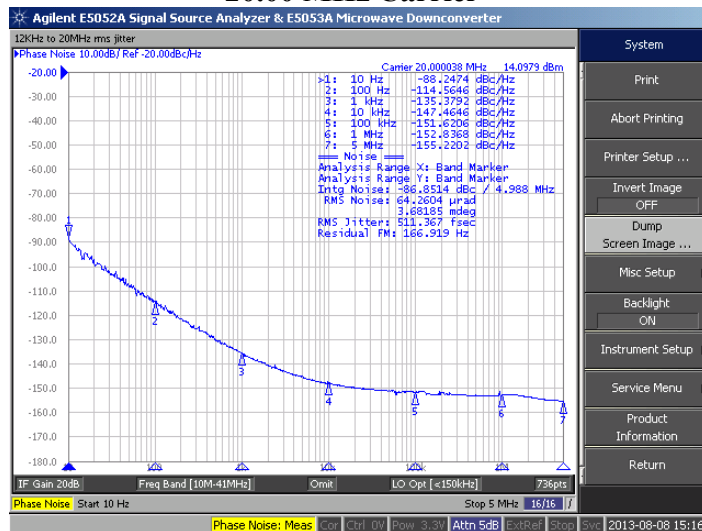


### TYPICAL PHASE NOISE

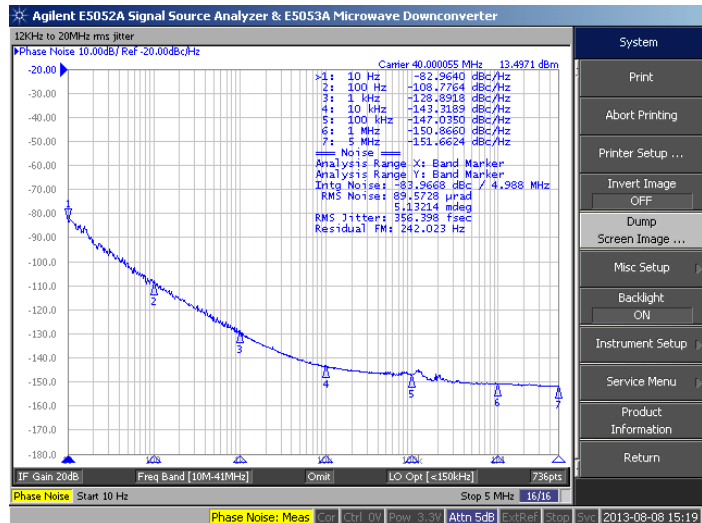
#### 10.00 MHz Carrier



#### 20.00 MHz Carrier



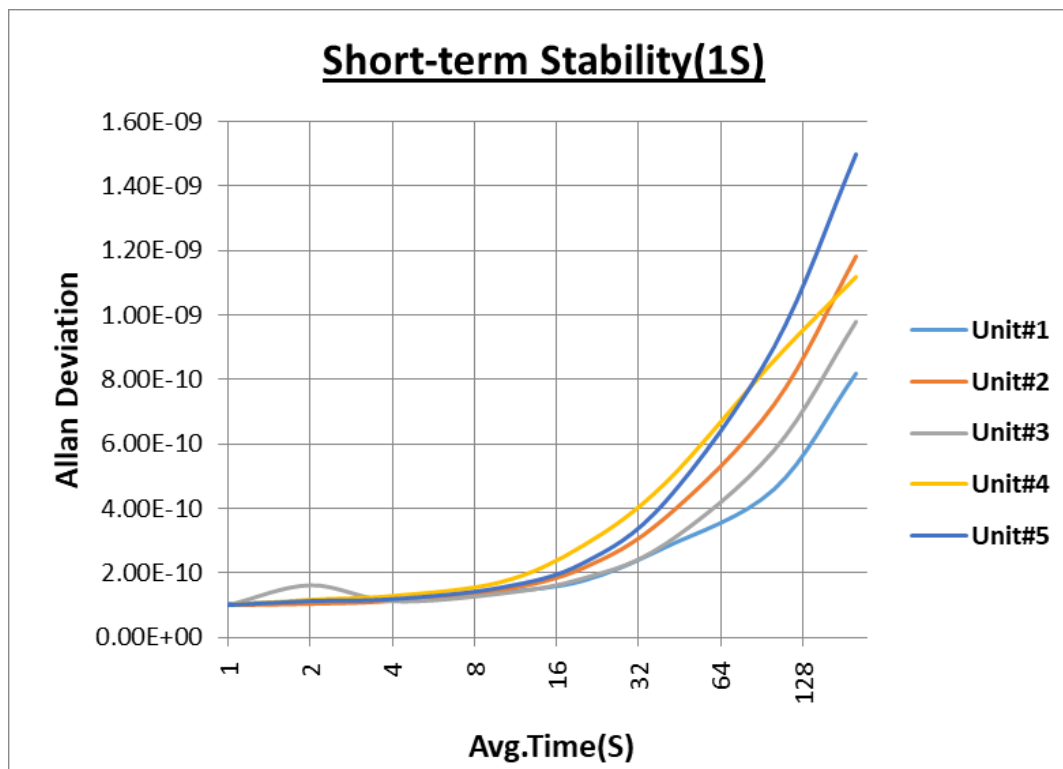
#### 40.00 MHz Carrier

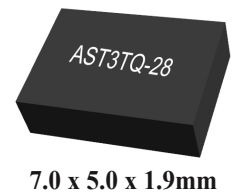




7.0 x 5.0 x 1.9mm

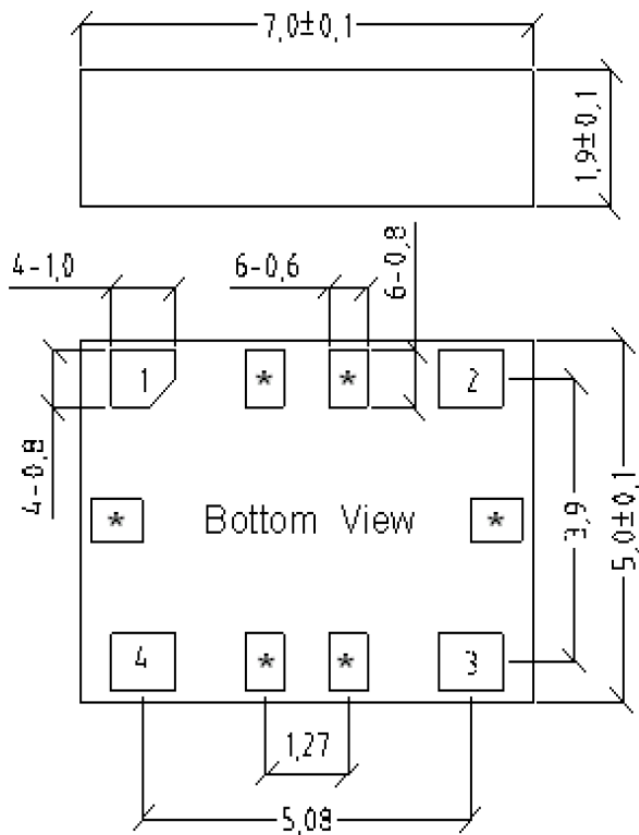
## Typical Allan Deviation Performance @10.00MHz carrier



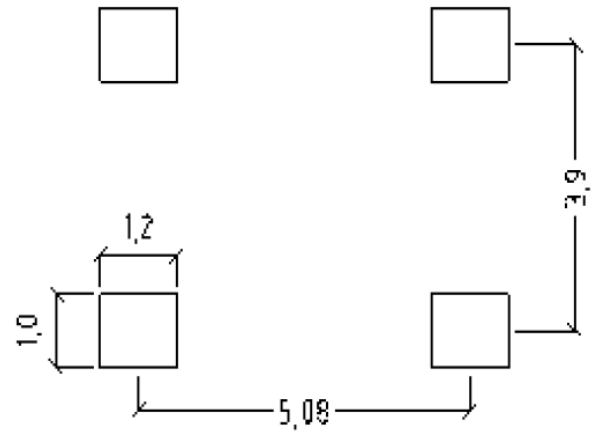


7.0 x 5.0 x 1.9mm

### OUTLINE DIMENSION:



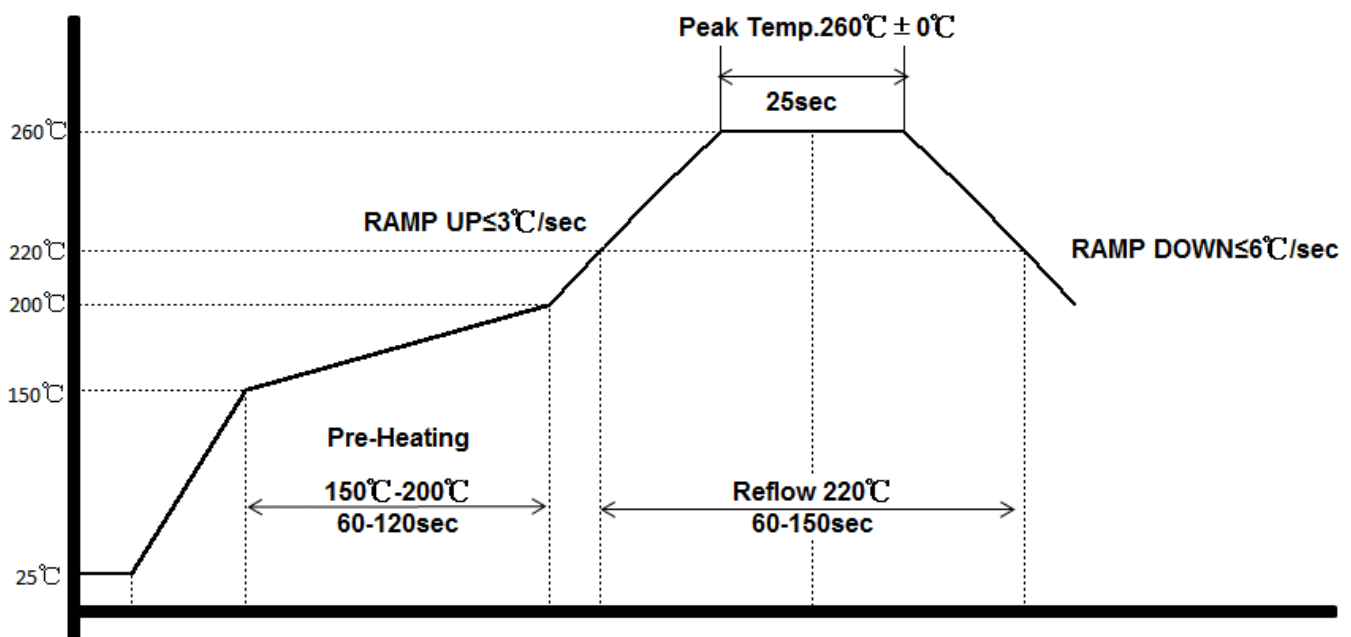
### Recommended Land Pattern



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

Dimensions: mm

### REFLOW PROFILE:





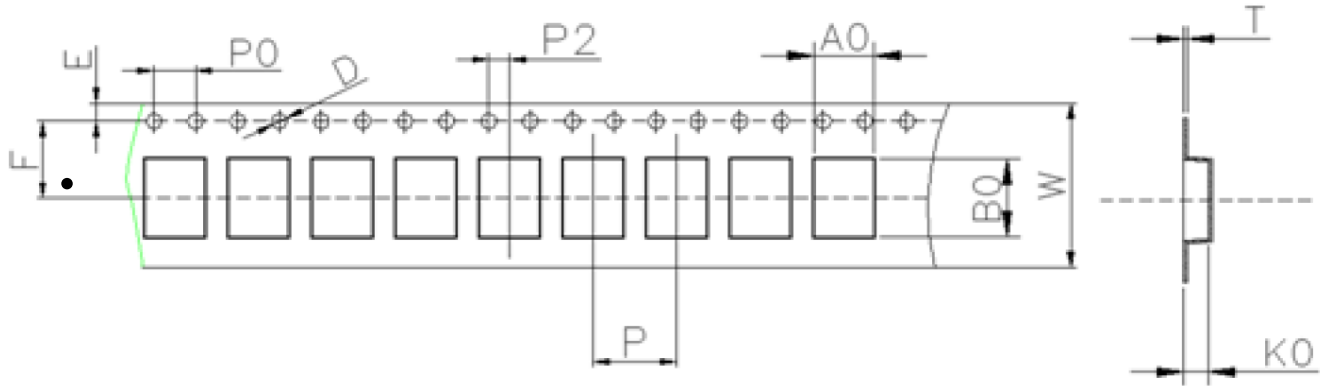
### TAPE & REEL:

#### Packaging:

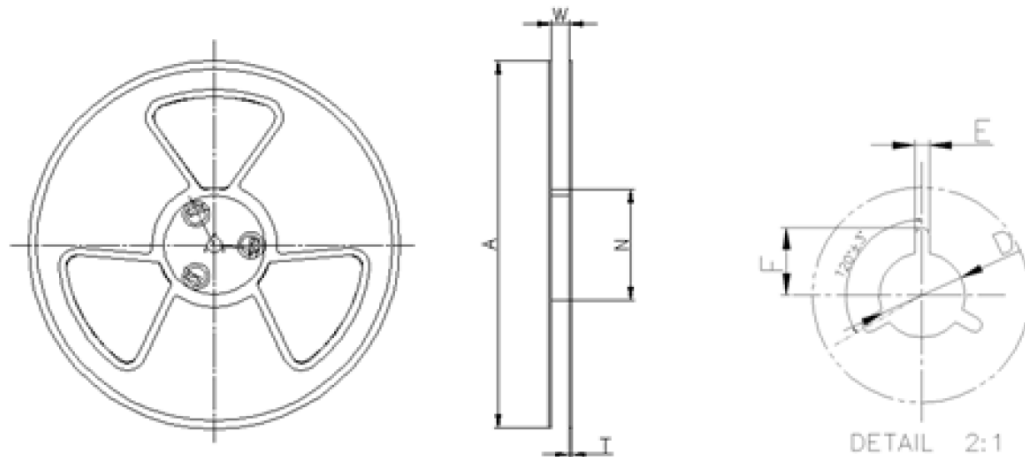
T5: 500pcs/reel

T2: 2,000pcs/reel

**MSL-3 packaging applies to MOQ=50 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 |         |



| 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 |

Dimensions: mm

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