

Precision SMD TCXO/VCTCXO

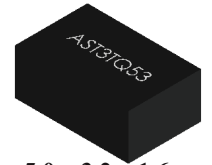
AST3TQ53



ESD Sensitive



RoHS/RoHS II Compliant



5.0 x 3.2 x 1.6mm

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, 50.00 MHz
- LVC MOS Output or Clipped Sine Wave output
- Frequency stabilities to include ± 50 ppb, ± 100 ppb and ± 280 ppb over -40°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 6V
Control Voltage	0 to 3V
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		51.2	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, 50.00			MHz	
Initial Frequency Tolerance (@ $+25^{\circ}\text{C}$) at shipping			± 0.5	ppm	Relative to carrier
Frequency Stability Options (Ref. to Frequency @$+25^{\circ}\text{C}$)					
-40°C to $+85^{\circ}\text{C}$			± 50	ppb	Option "5"
-40°C to $+85^{\circ}\text{C}$			± 100	ppb	Option "1"
-40°C to $+85^{\circ}\text{C}$			± 280	ppb	Option "2"
Frequency Stability vs. Supply Voltage Change ($V_{\text{dd}} \pm 5\%$)			± 100	ppb	
Frequency Stability vs. Load Change ($I_{\text{load}} \pm 5\%$)			± 200	ppb	
Aging (first year @ $+25^{\circ}\text{C}$)			± 1.0	ppm	
Aging (20 years @ $+25^{\circ}\text{C}$)		± 3.0	± 4.6	ppm	
Supply Voltage (V_{dd})	$+3.135$	$+3.3$	$+3.465$	V	
Supply Current (I_{cc})			10.0	mA	No load
Control Port (Applicable for VCTCXO only)					
Control Voltage Range (V_{c})	$+0.5$	$+1.5$	$+2.5$	V	
Center Control Voltage (V_{c})		$+1.5$		V	To be with-in ± 500 ppb of F_{c} @ 25°C (at shipping)
Frequency Tuning Range	± 5	± 7	$< \pm 13$	ppm	
Tuning Slope	Positive				
Linearity			± 10	%	
Port Impedance	100			k Ω	

REVISED: 2.16.2021



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CERTIFIED

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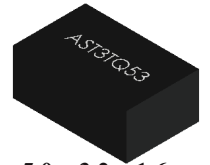
AST3TQ53



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RoHS/RoHS II Compliant



5.0 x 3.2 x 1.6mm

STANDARD SPECIFICATIONS:

(Continued)

Parameters	Minimum	Typical	Maximum	Unites	Notes
Phase Noise (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 _{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:

AST3TQ53 - - MHz - - -

Pullability

T = TCXO

V = VCTCXO

Frequency in MHz

Please specify the frequency in MHz.
e.g. 19.200MHz

Freq. Stability over Operating Temp.

5: ±50ppb

1: ±100ppb

2: ±280ppb

Output Type

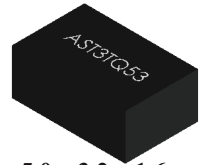
C: LVC MOS

SW: Clipped
Sine Wave

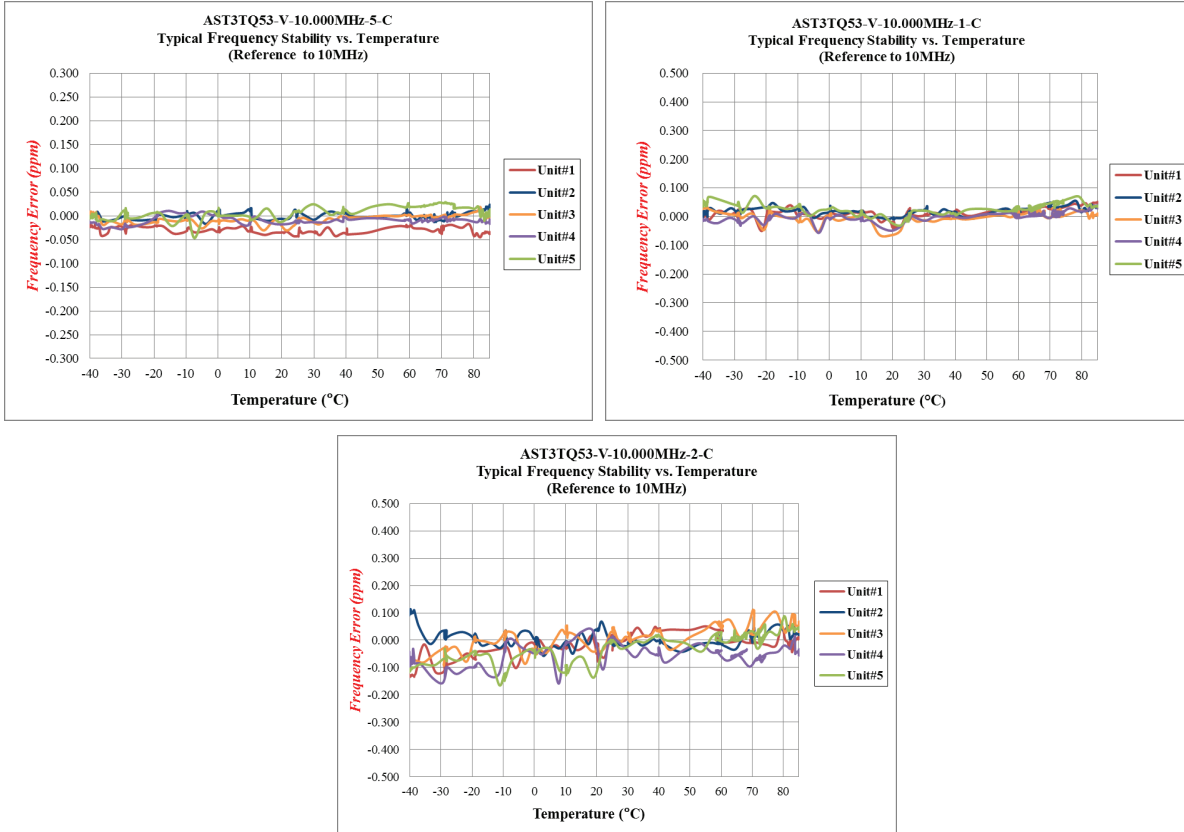
Packaging

Blank: Bulk

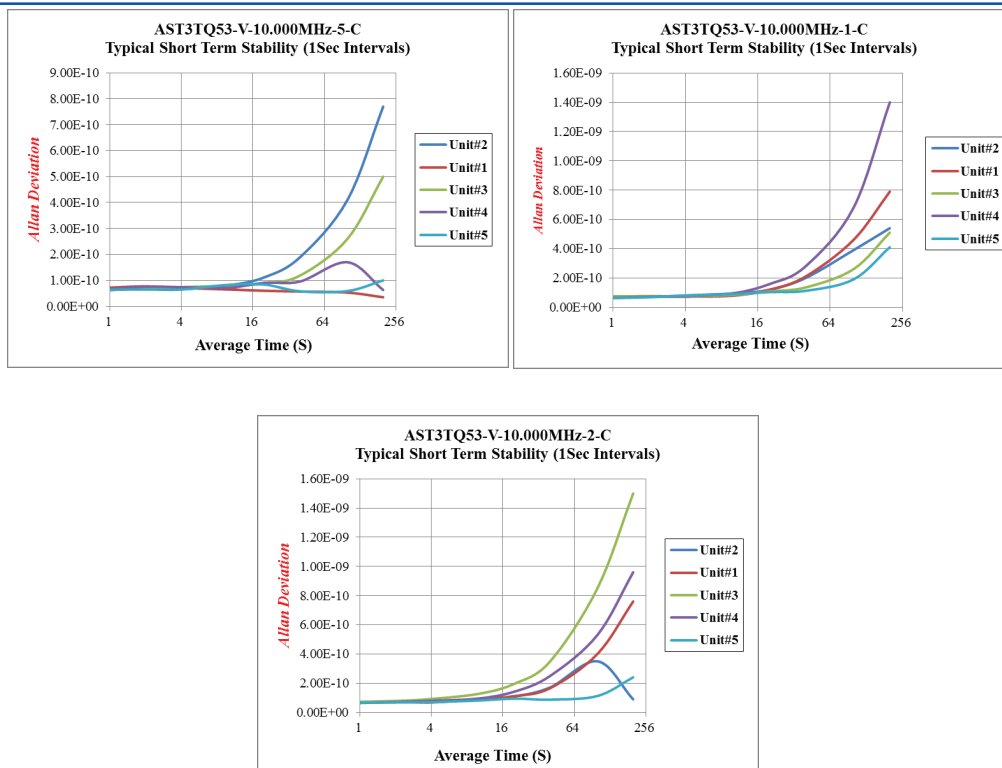
T5: 500pcs/reel

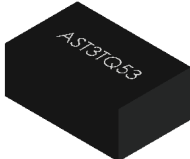


TYPICAL FREQUENCY STABILITY VS. TEMPERATURE

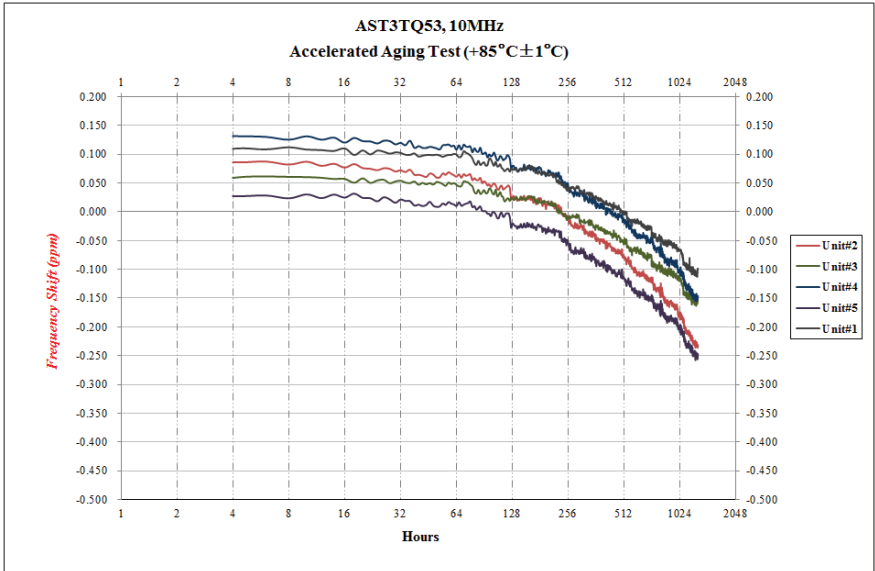


TYPICAL SHORT TERM STABILITY



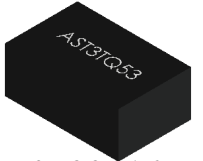


TYPICAL AGING:



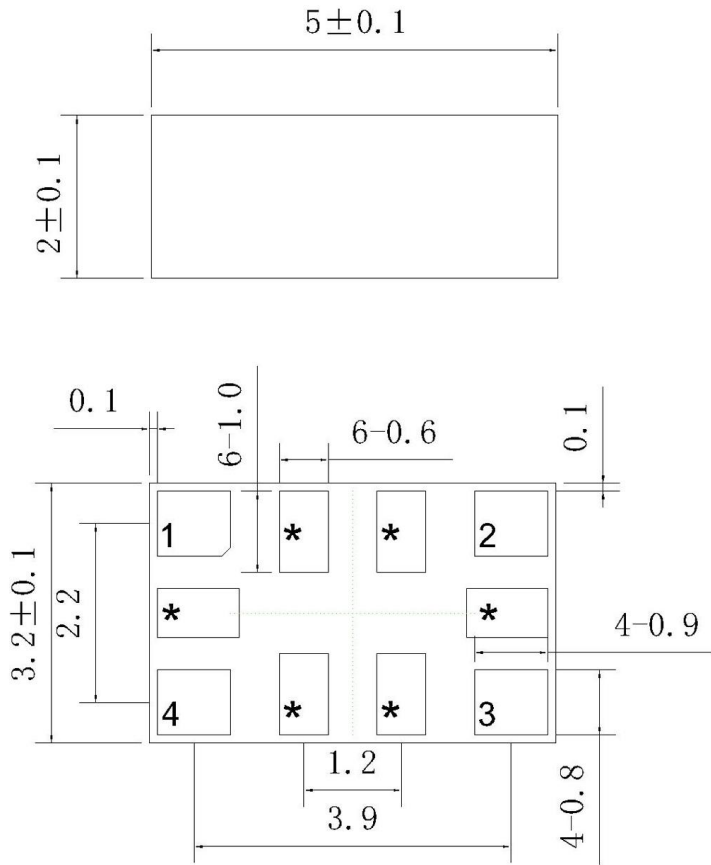
Aging Test Conditions	
Series	AST3TQ53
Frequency	10MHz
Acquisition Mode	Cycle
Acquisition Time	1129 hours
Test Temperature	+85°C ± 1°C
Number of Samples	5pcs

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



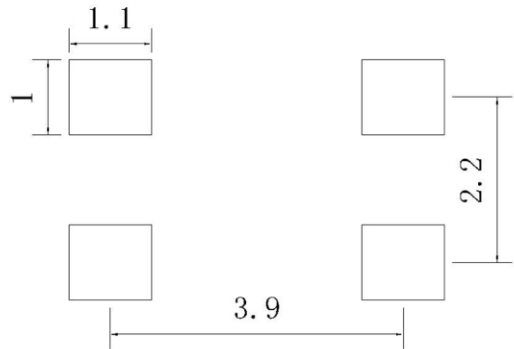
MECHANICAL DIMENSIONS:

Effective before 02/10/2021:

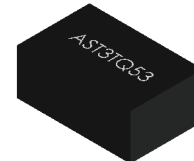


Pin	Function
1	NC (for TCXO) Vc (for VCTCXO)
2	GND
3	Output
4	Vdd
*	For factory test only

Recommended Land Pattern

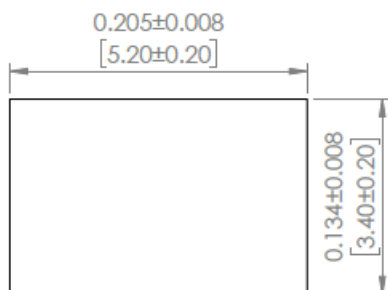


Dimensions: mm



MECHANICAL DIMENSIONS:

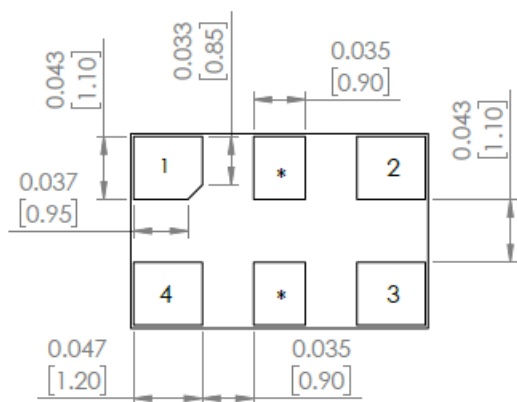
Effective after 02/10/2021:



TOP VIEW

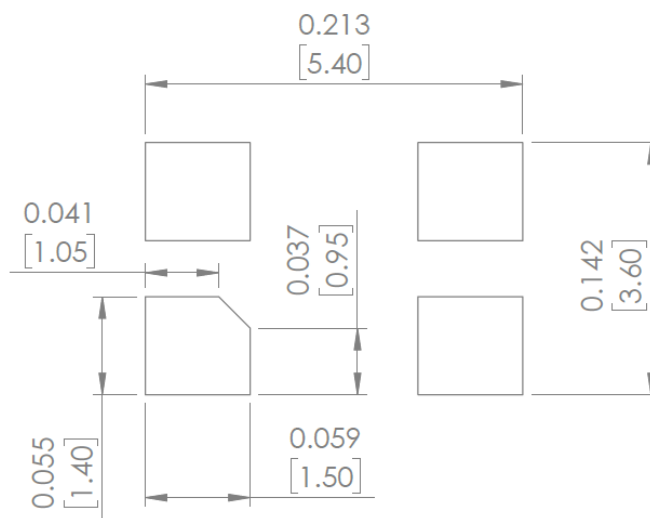


FRONT VIEW



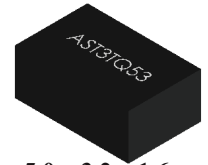
BOTTOM VIEW

Recommended Land Pattern



Pin	Function
1	NC (<i>for TCXO</i>) V _c (<i>for VCTCXO</i>)
2	GND
3	Output
4	V _{dd}
*	For factory test only

Dimensions: inches [mm]



REFLOW PROFILE [JEDEC J-STD-020]

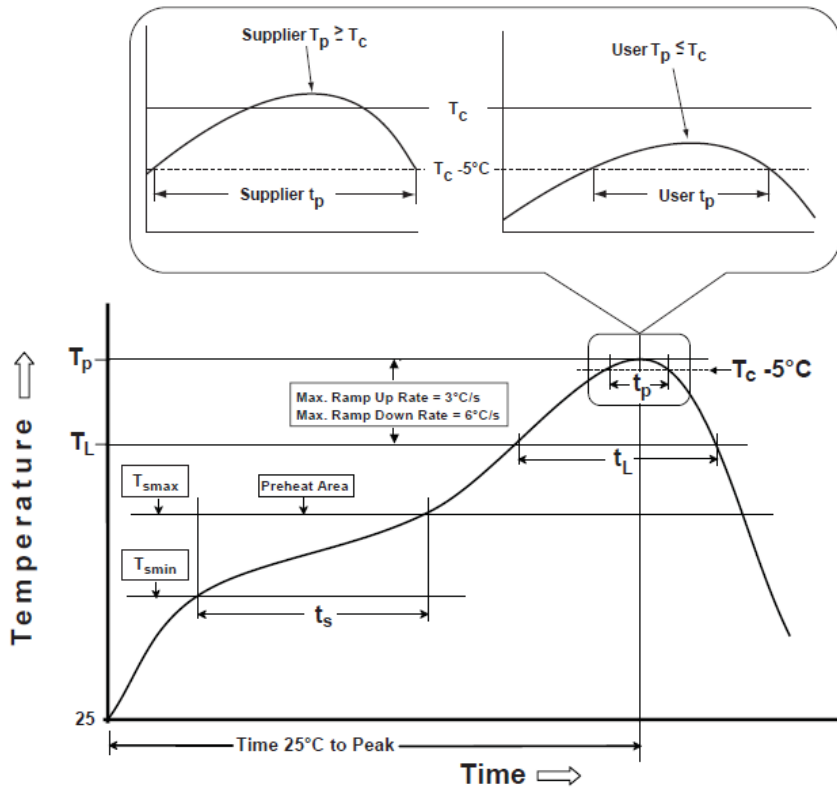


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm ³ <350	Volume mm ³ >350
<2.5 mm	235 °C	220 °C
>2.5 mm	220 °C	220 °C

Table 2

Pb-Free Process Classification Temperatures (T_c)			
Package – Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T_{smin})	100°C	150°C
Temperature maximum (T_{smax})	150°C	200°C
Time (T_{smin} to T_{smax}) (t_s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T_{smax} to T_p)	3°C/sec. max	3°C/sec. max
Liquidous temperature (T_L)	183°C	217°C
Time at liquidous (t_L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T_p)*	see Table 1	see Table 2
Time (t_p)** within 5°C of the specified classification temperature (T_c)	20 sec.	30 sec.
Ramp-down rate (T_p to T_{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t_p) is defined as supplier minimum and a user maximum.

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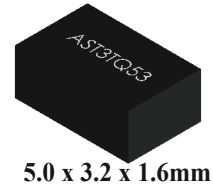
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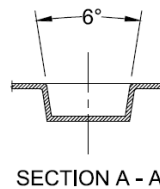
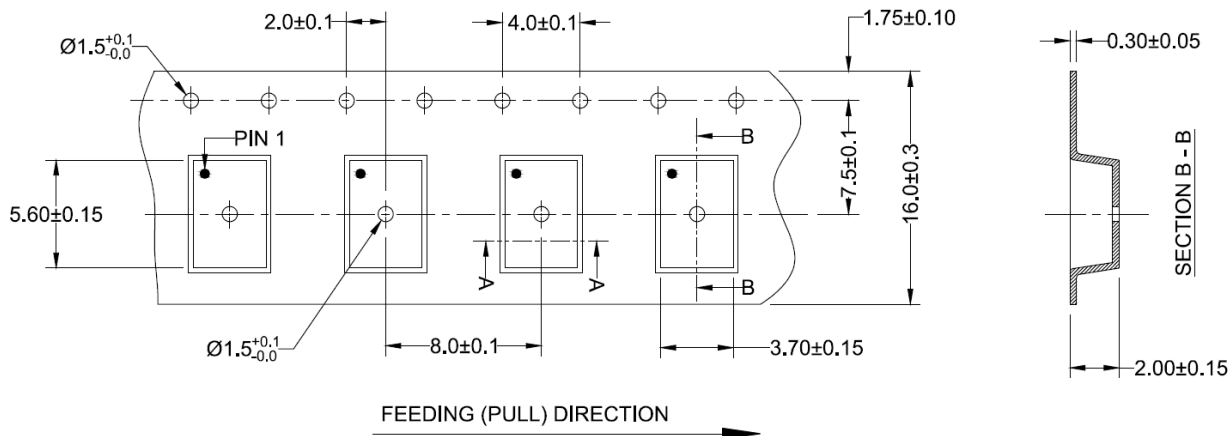
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PACKAGING:

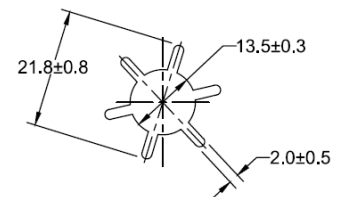
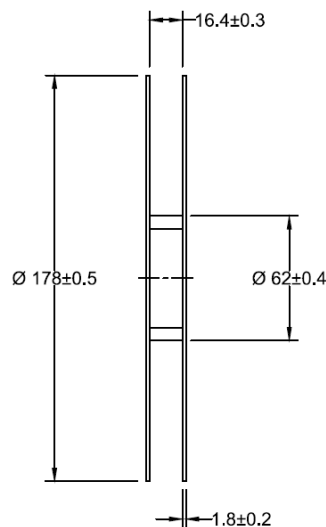
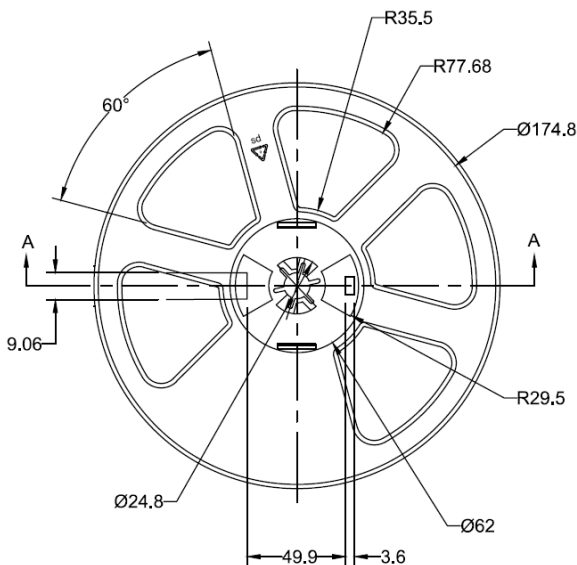
Packaging:

T5: 500pcs/reel

MSL-3 packaging applies to MOQ=25 units (cut tape) and "T5".



Unit: mm



SECTION A - A

Dimensions: mm

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REVISED: 2.16.2021

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