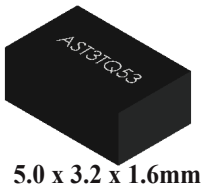
Precision SMD TCXO/VCTCXO



5.0 x 3.2 x 1.6mm

AST3TQ53

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, 50.00 MHz
- LVCMOS Output or Clippled Sine Wave output
- Frequency stabilities to include ±50ppb, ±100ppb and ±280ppb 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		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°C) at shipping			±0.5	ppm	Relative to carrier
Frequency Stability Options (Ref. to Frequency @+25°C)					
-40°C to +85°C			±50	ppb	Option "5"
-40°C to +85°C			±100	ppb	Option "1"
-40°C to +85°C			±280	ppb	Option "2"
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)			10.0	mA	No load
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	±7	<±13	ppm	
Tuning Slope	Positive				
Linearity			±10	%	
Port Impedance	100			kΩ	

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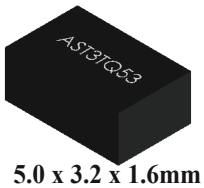

5.0 x 3.2 x 1.6mm

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:

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: LVCMOS
SW: Clipped Sine Wave

Packaging
Blank: Bulk
T5: 500pcs/reel

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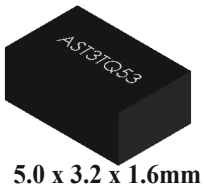
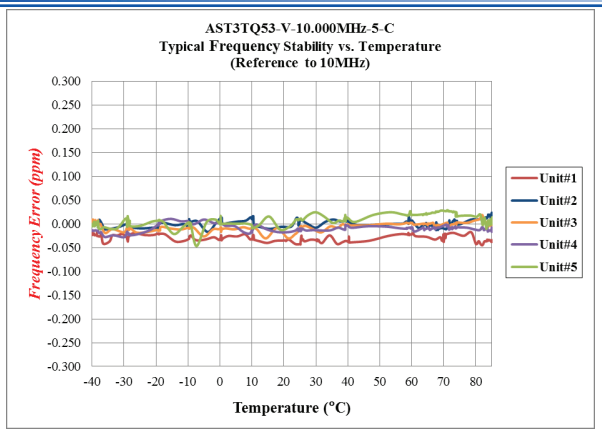
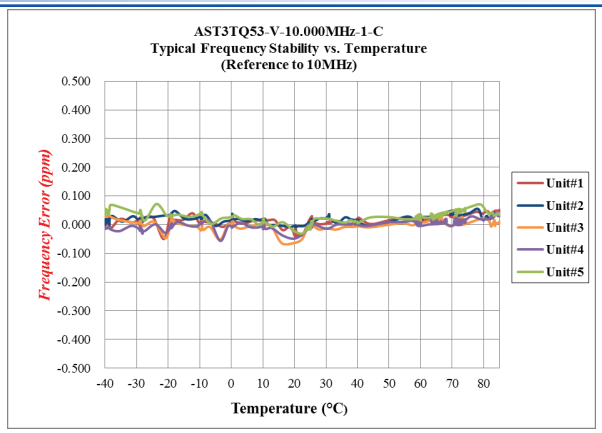
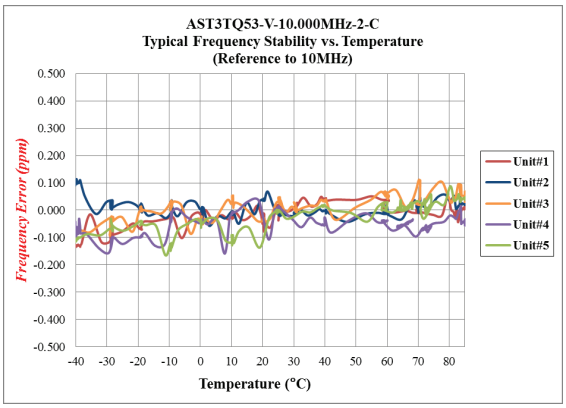


5.0 x 3.2 x 1.6mm

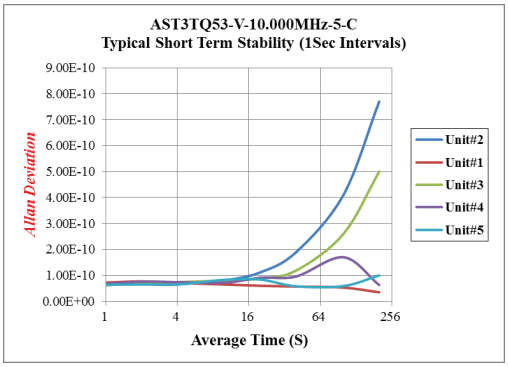
TYPICAL FREQUENCY STABILITY VS. TEMPERATURE

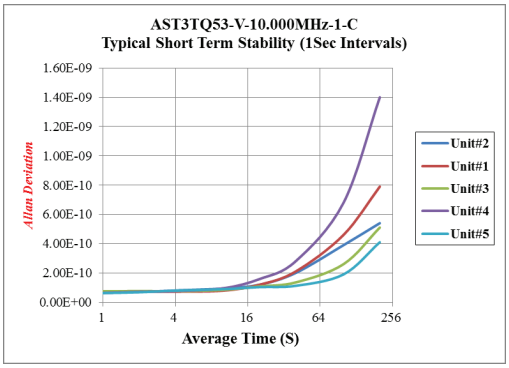


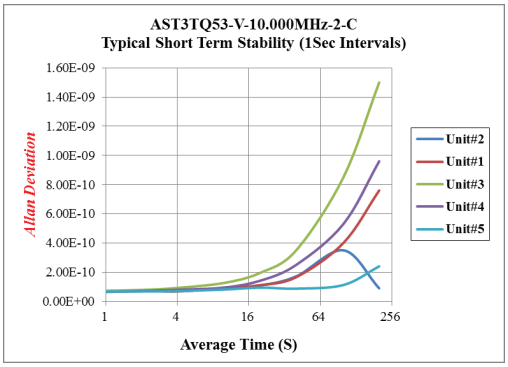




TYPICAL SHORT TERM STABILITY







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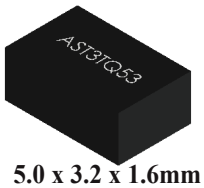
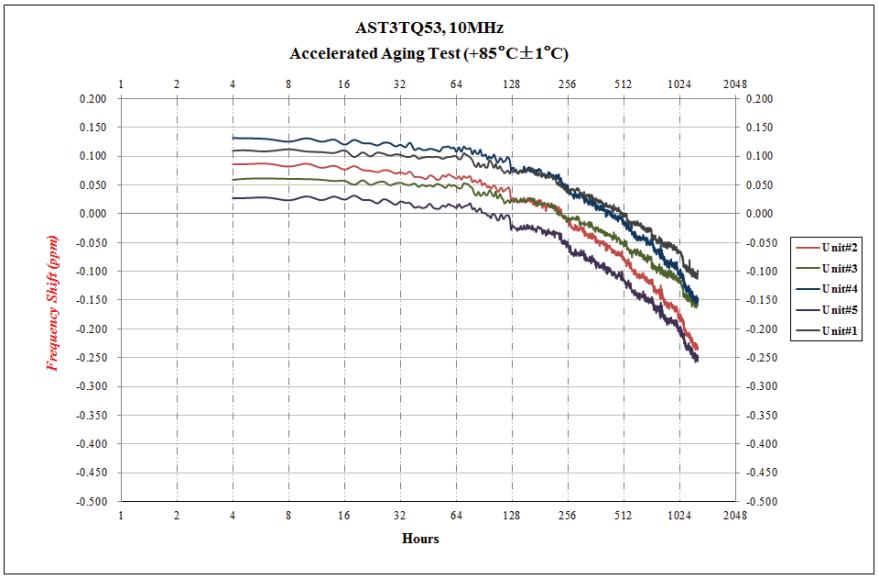


5.0 x 3.2 x 1.6mm

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

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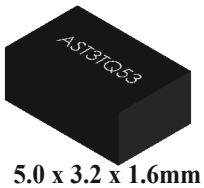
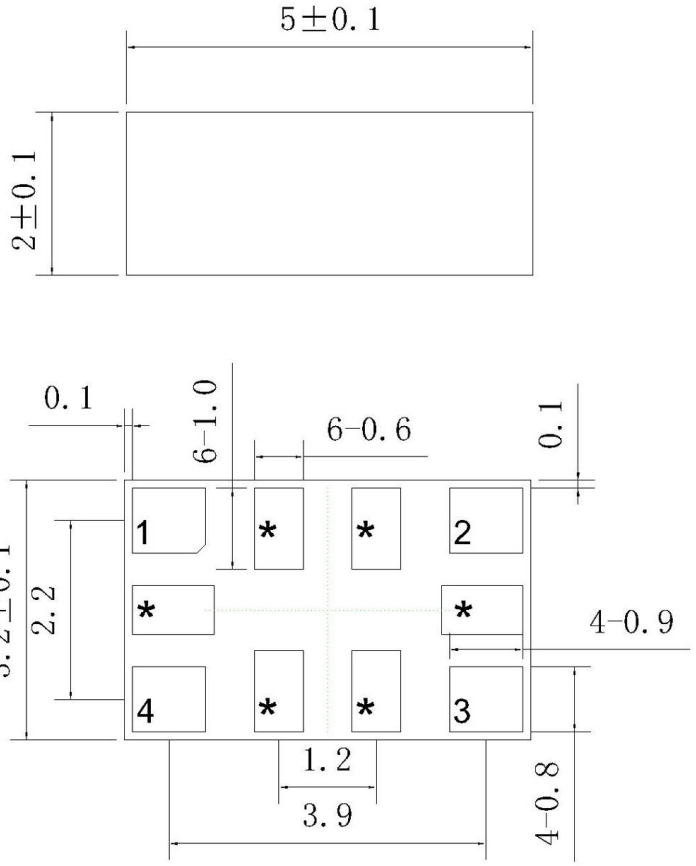


5.0 x 3.2 x 1.6mm

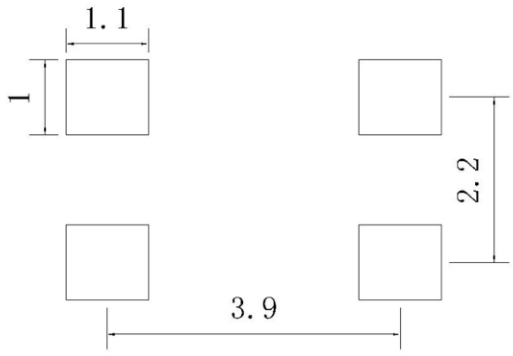
MECHANICAL DIMENSIONS:

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

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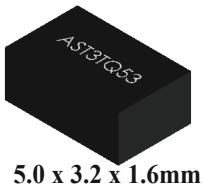
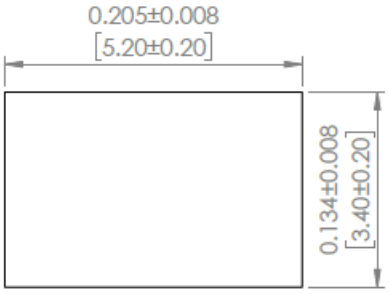


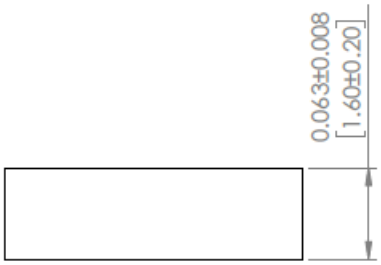
5.0 x 3.2 x 1.6mm

MECHANICAL DIMENSIONS:

Effective after 02/10/2021:

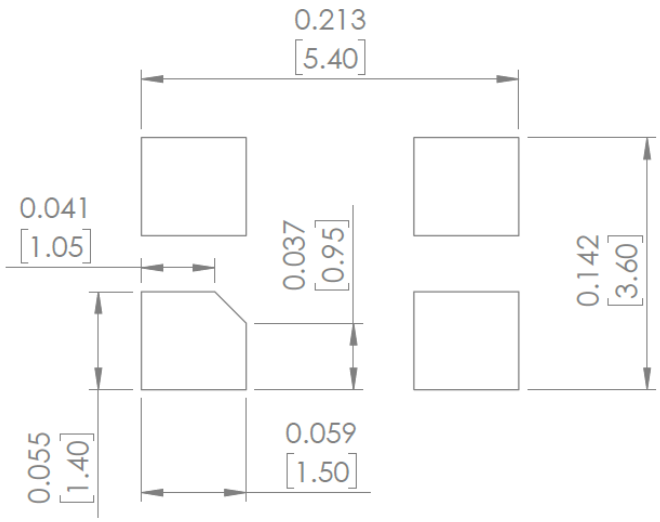


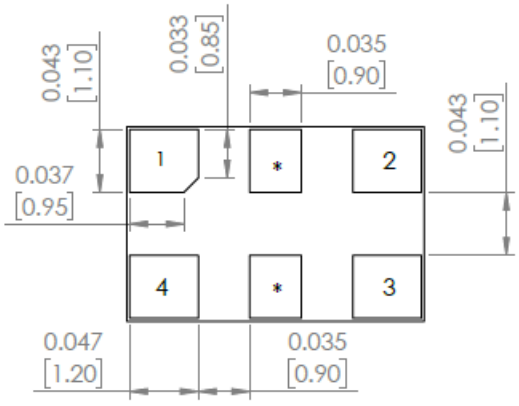
TOP VIEW



FRONT VIEW

Recommended Land Pattern





BOTTOM VIEW

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

Dimensions: inches [mm]

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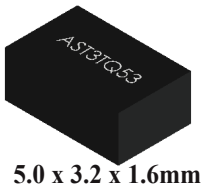

5.0 x 3.2 x 1.6mm

REFLOW PROFILE [JEDEC J-STD-020]

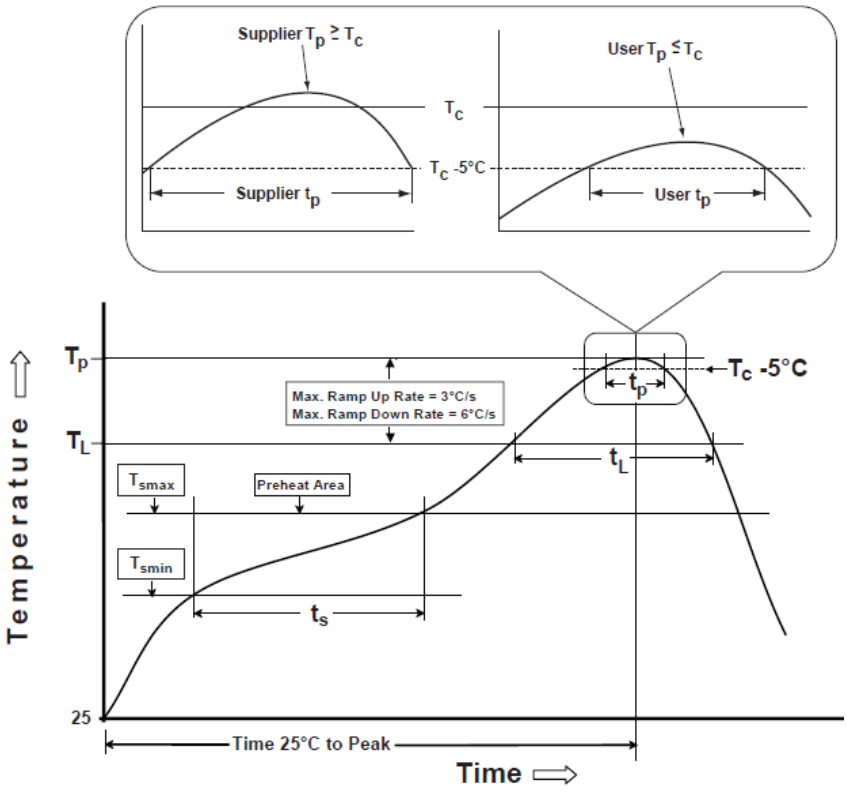

Table 1

SnPb Eutectic Process Classification Temperatures (T_c)		
Package Thickness	Volume mm³ <350	Volume mm³ >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 mm³ <350	Volume mm³ 350-2000	Volume mm³ >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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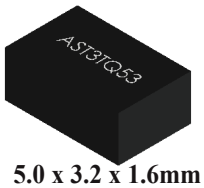
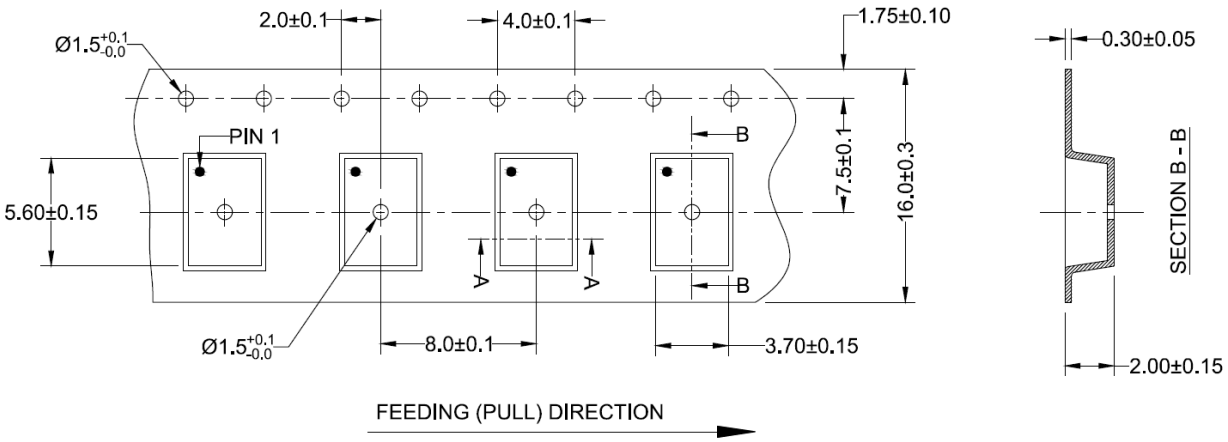
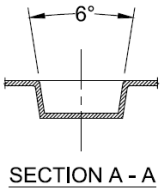


5.0 x 3.2 x 1.6mm

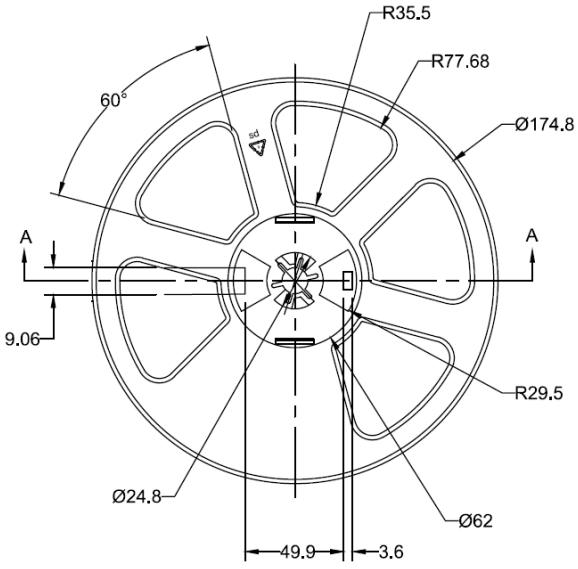
PACKAGING:

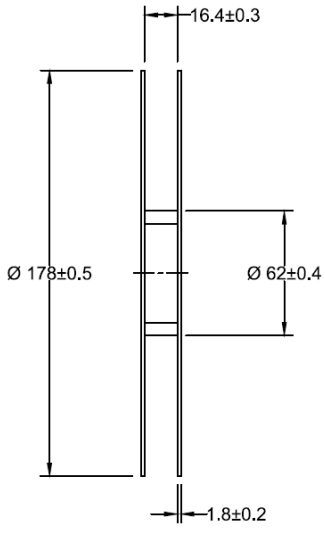
Packaging:
T5: 500pcs/reel
MSL-3 packaging applies to MOQ=25 units (cut tape) and "T5".

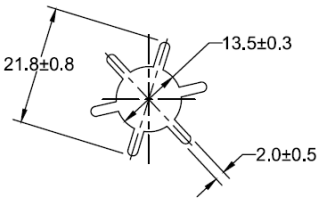




Unit: mm







Dimensions: mm

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