

Precision SMD TCXO/VCTCXO

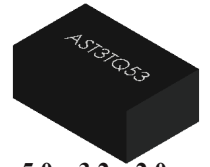
AST3TQ53



ESD Sensitive



RoHS/RoHS II Compliant



5.0 x 3.2 x 2.0mm

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
- 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		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			± 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 ($\text{Load} \pm 5\%$)			± 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})			6.0	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			± 1	%	
Port Impedance	100			k Ω	

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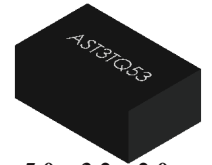
AST3TQ53



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5.0 x 3.2 x 2.0mm

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				
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: LVC MOS

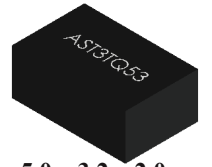
SW: Clipped Sine Wave

Packaging

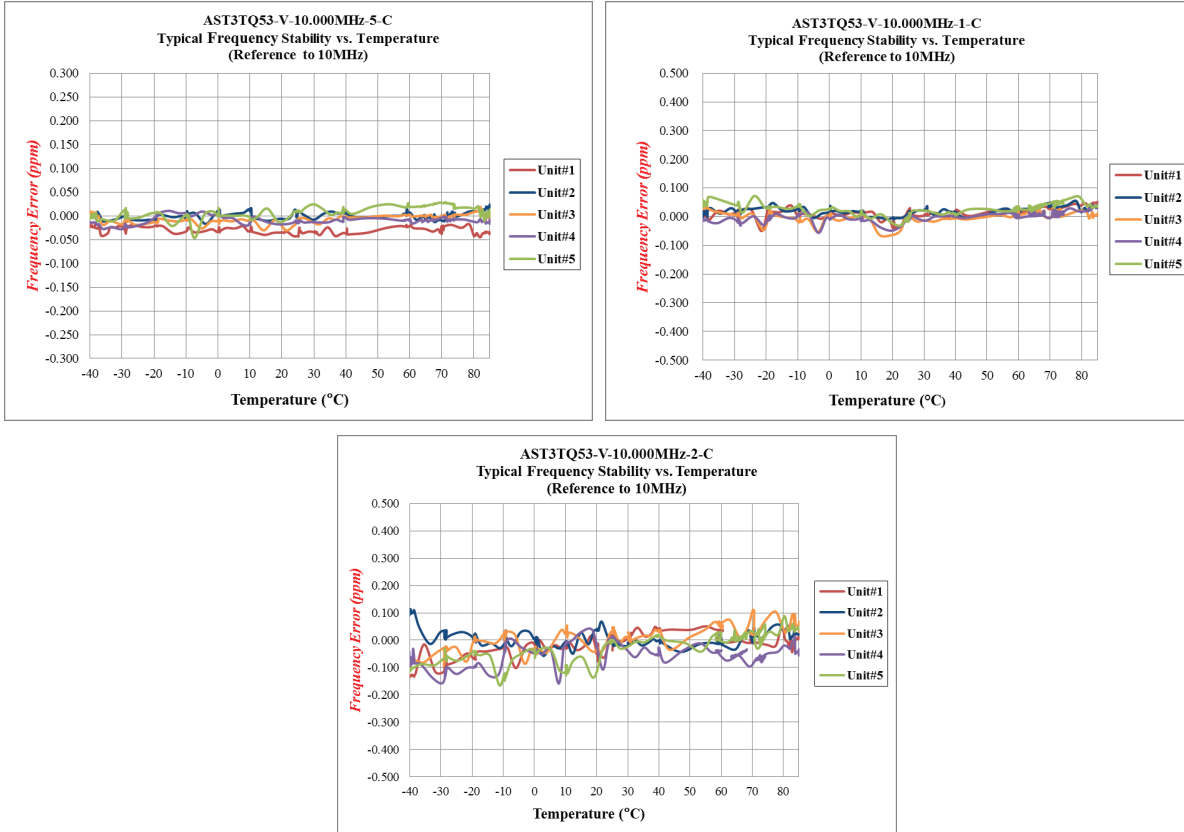
Blank: Bulk

T5: 500pcs/reel

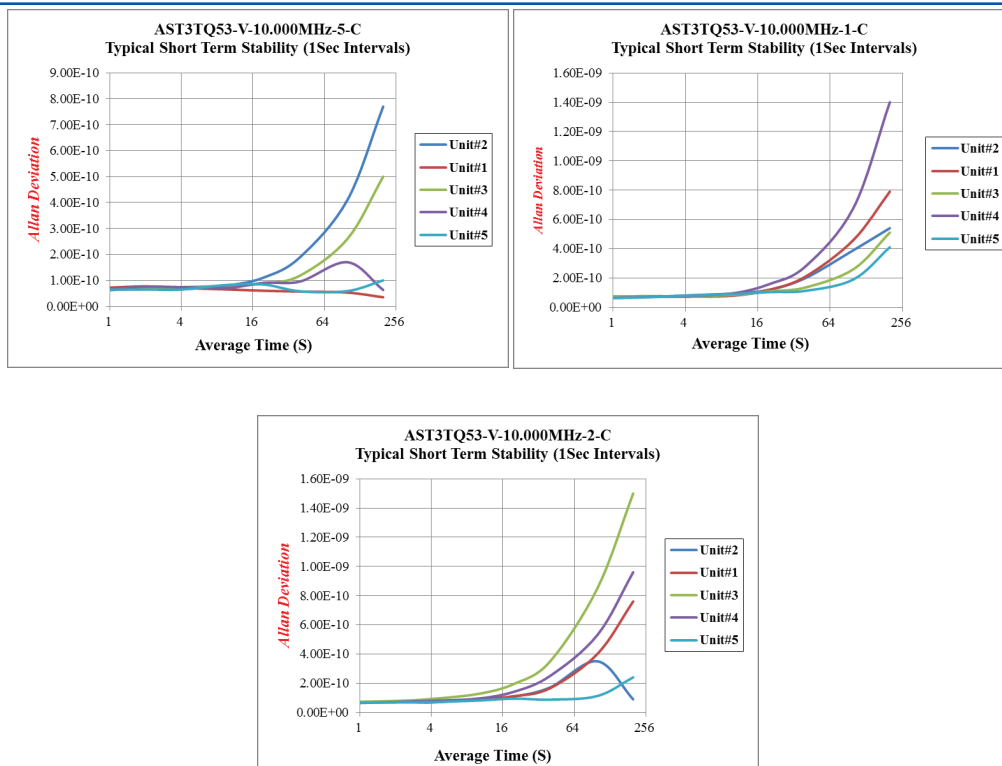
T2: 2000pcs/reel

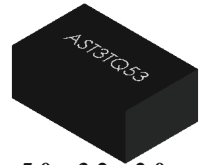


TYPICAL FREQUENCY STABILITY VS. TEMPERATURE



TYPICAL SHORT TERM STABILITY





TYPICAL FREQUENCY PULL VS. CONTROL VOLTAGE



TYPICAL PHASE NOISE

10.00 MHz Carrier



AST3TQ53



AST3TQ53

5.0 x 3.2 x 2.0mm

AST3TQ53, 10MHz
Accelerated Aging Test (+85°C ± 1°C)

The graph displays the frequency shift (ppm) of five units (Unit#1 to Unit#5) over a period of 2048 hours. The y-axis represents Frequency Shift (ppm) ranging from -0.500 to 0.200. The x-axis represents Hours on a logarithmic scale from 1 to 2048. All units show a general decrease in frequency shift over time, with Unit#1 showing the most significant drop and Unit#5 showing the least.

Hours	Unit#1 (ppm)	Unit#2 (ppm)	Unit#3 (ppm)	Unit#4 (ppm)	Unit#5 (ppm)
4	0.050	0.080	0.040	0.060	0.030
64	0.040	0.070	0.030	0.050	0.020
128	0.030	0.060	0.020	0.040	0.010
256	-0.050	-0.020	0.000	0.020	0.010
512	-0.150	-0.100	-0.050	0.000	0.010
1024	-0.250	-0.200	-0.150	-0.100	0.000
2048	-0.350	-0.300	-0.250	-0.200	-0.100

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

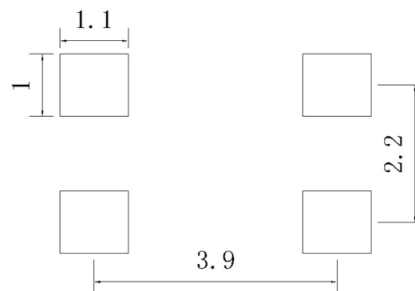
Technical drawing of a rectangular plate with dimensions and internal features. The overall dimensions are 5 ± 0.1 (width) and 2 ± 0.1 (height). The plate contains four numbered rectangular features (1, 2, 3, 4) and four asterisk-marked features (*). The features are arranged in a 2x2 grid. The dimensions of the features and their positions are as follows:

- Feature 1: Width 1.2 , Height 0.1 , Position: Top-left.
- Feature 2: Width 1.2 , Height 0.1 , Position: Top-right.
- Feature 3: Width 1.2 , Height 0.1 , Position: Bottom-right.
- Feature 4: Width 1.2 , Height 0.1 , Position: Bottom-left.
- Asterisk-marked features: Width 1.2 , Height 0.1 , Position: Top-center, Top-right, Bottom-right, Bottom-center.

The overall dimensions of the plate are 5 ± 0.1 (width) and 2 ± 0.1 (height). The dimensions of the features and their positions are as follows:

- Feature 1: Width 1.2 , Height 0.1 , Position: Top-left.
- Feature 2: Width 1.2 , Height 0.1 , Position: Top-right.
- Feature 3: Width 1.2 , Height 0.1 , Position: Bottom-right.
- Feature 4: Width 1.2 , Height 0.1 , Position: Bottom-left.
- Asterisk-marked features: Width 1.2 , Height 0.1 , Position: Top-center, Top-right, Bottom-right, Bottom-center.

Recommended Land Pattern



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

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5.0 x 3.2 x 2.0mm

REFLOW PROFILE:



TAPE & REEL:

T5: 500pcs/reel; T2: 2000pcs/reel

MSL-3 packaging applies to MOQ=25 units (cut tape), T5 & T2.



W	A0	B0	K0	P	F
16.0±0.3	3.7±0.15	5.6±0.15	2.0±0.15	8.0±0.1	7.5±0.1
E	D	D1	P0	P2	t
1.75±0.1	1.5+0.1/-0.0	1.5+0.1/-0.0	4.0±0.1	2.0±0.1	0.3±0.05



B-B



W	A	N	T	E	F	D
16.4±0.3	178±0.5	62±0.4	1.8±0.2	2.0±0.5	21.8±0.8	13.5±0.3

Dimensions: mm

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