Precision SMD VCTCXO/TCXO

AST3TDA53

Request Samples | Check Inventory | ESD Sensitive | Pb

5.0 x 3.2 x 0.7 mm
RoHS/RoHS II Compliant
MSL Level = 3

Features

- Wide operating temperature range with high stability: -40ºC to +105ºC @ ±280ppb
- Standard available frequencies: 10, 12.8, 16.384, 19.2, 19.44, 20, 30.72, 38.88, 40, 50MHz
- CMOS or Clipped Sine Wave output
- Voltage-control option available

Applications

- Stratum 3
- Network routers and switches
- COTS Military Radios & other Communication Hardware
- Wireless Communication
- GPS Tracking with Hold-Over Accuracy
- Test & Measurement Equipment
- Autonomous Technologies

Maximum Ratings

Parameters	Notes
Storage Temperature Range	-55 to +105°C
Supply Voltage	-0.5 to 6V
Control Voltage	0 to 3.3V
ESD, HBM/CDM/MM	4kV/2kV/200V/400V

Electrical Specifications

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Range	10		50	MHz	
Standard Frequencies	10, 12.8, 16.384, 19.2, 19.44, 20, 30.72, 38.88, 40, 50			MHz	
Operating Temperature Range	-40		+105	ºC	*See options*
Initial Frequency Tolerance at shipping	-1		+1	ppm	@ T_A = 25ºC, V_{cc}= 3.3V, V_c=1.65V within 30 days after ex-works
Frequency Stability over Operating Temperature Range [Note 1]	-280		+280	ppb	
Frequency Stability vs. Supply Voltage Change (Vdd±5%)	-100		+100	ppb	@ T_A=25ºC, V_{cc} varied from 3.13V to 3.47V, V_c=1.65V
Frequency Stability vs. Load Change (Load±5%)	-100		+100	ppb	5% load change @ T_A= 25ºC, V_{cc}=3.3V, V_c=1.65V, O_{Load}= 15pF
Short Term Stability			200	ppb	after power for 1hour ref. to 25ºC
Aging (first year)	-1		+1	ppm	T_A=25ºC, V_{cc}=3.3V, after 1h of operation
Aging (20 years @+25°C)	-3		+3	ppm	
Supply Voltage (Vdd)	3.13	3.3	3.47	V	*See options*
Supply Current (Icc)			10	mA	25ºC, V_{cc}=3.3V, O_{Load}= 15pF
Start-up Time			5	ms	
Control Port (*Applicable for VCTCXO only*)					
Control Voltage Range (Vc)	0		3.3	V	
Center Control Voltage (Vc)		1.65		V	
Frequency Tuning Range (Carrier Frequency <=20MHz)			-8	ppm	V_c=0V, referenced to V_c=1.65V
	-1		+1	ppm	V_c=1.65V, referenced to carrier frequency
	+8			ppm	V_c=3.3V, referenced to V_c=1.65V
Frequency Tuning Range (Carrier Frequency >20MHz)			-5	ppm	V_c=0V, referenced to V_c=1.65V
	-1		+1	ppm	V_c=1.65V, referenced to carrier frequency
	+5			ppm	V_c=3.3V, referenced to V_c=1.65V

Note 1: **T_A varied from -40ºC to 105ºC, measurement referenced to frequency observed with $f_{ref}=(f_{max}+f_{min})/2$, V_{cc}= 3.3V, V_c=1.65V, temperature variable speed less than 2ºC/min.**

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Electrical Specifications *continued*

Parameters	Min.	Typ.	Max.	Units	Notes
Tuning Slope		Positive			
Linearity			10	%	
Port Impedance	100			kΩ	
Phase Noise @ 19.2MHz (@25°C):		-95	-90	dBc/Hz	Offset @10Hz
		-120	-115		Offset @100Hz
		-145	-140		Offset @1kHz
		-157	-152		Offset @10kHz
		-159	-154		Offset @100kHz
		-159	-154		Offset @1MHz
Phase Noise @ 20MHz (@25°C):		-93	-88	dBc/Hz	Offset @10Hz
		-120	-115		Offset @100Hz
		-145	-140		Offset @1kHz
		-157	-152		Offset @10kHz
		-159	-154		Offset @100kHz
		-159	-154		Offset @1MHz
Phase Noise @ 38.88MHz (@25°C):		-90	-85	dBc/Hz	Offset @10Hz
		-115	-110		Offset @100Hz
		-135	-130		Offset @1kHz
		-148	-143		Offset @10kHz
		-150	-145		Offset @100kHz
		-151	-146		Offset @1MHz
Clipped Sine Wave Output					
Output Level	0.8			Vp-p	
Output Load		10kΩ//10pF			
CMOS (Square Wave) Output					
V_{OH}	2.4			V	V_{cc}=3.3V, O_{load}=15 pF
V_{OL}			0.4	V	V_{cc}=3.3V, O_{load}=15 pF
Output Load		15		pF	
Duty Cycle	45	50	55	%	@50%
Rise / Fall Time (10%~90%)			8	ns	@25°C

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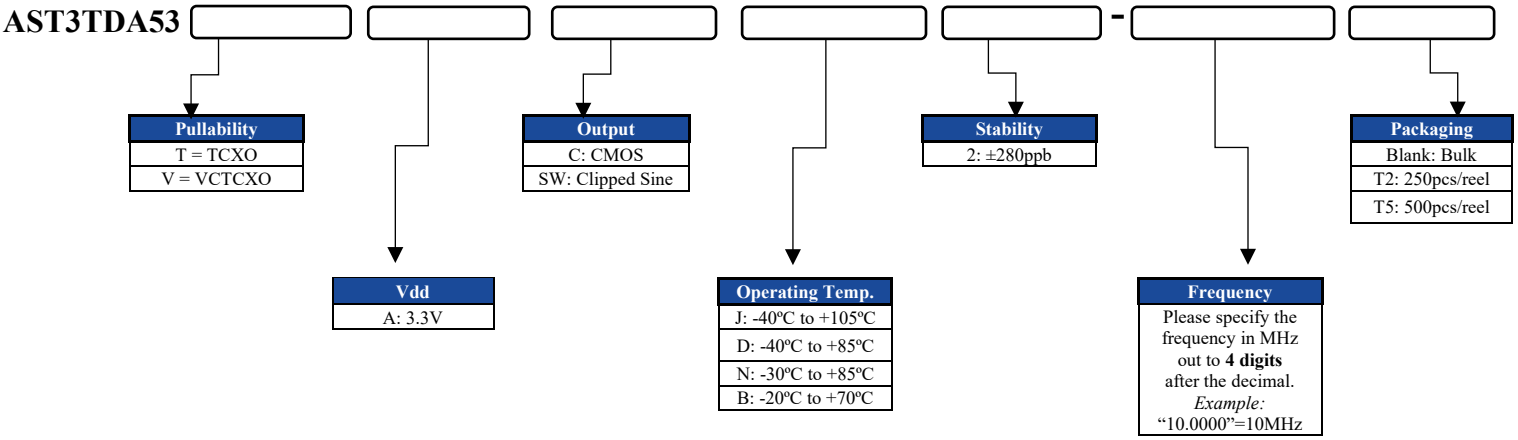
MSL Level = 3

Part Identification



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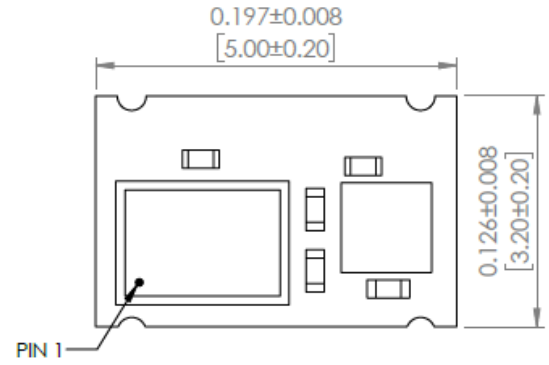
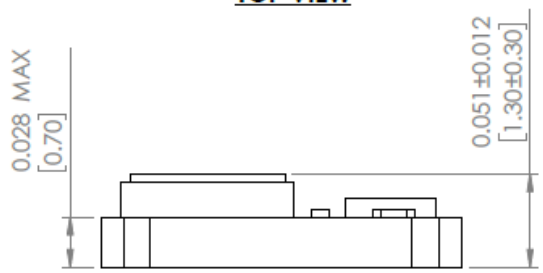
MSL Level = 3

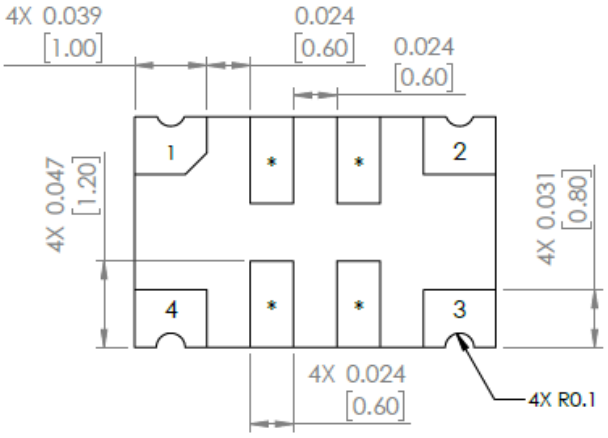
Mechanical Dimensions



TOP VIEW

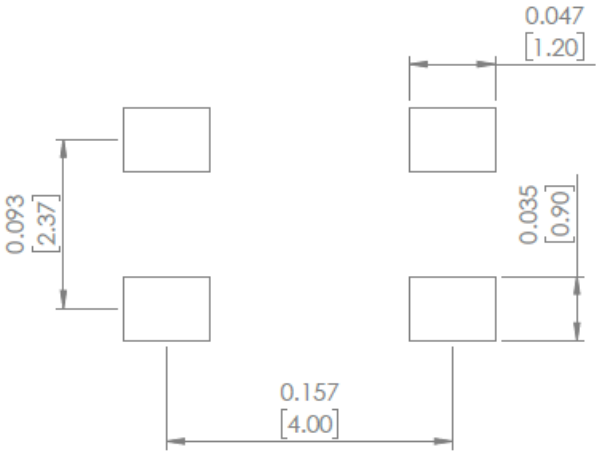


SIDE VIEW



BOTTOM VIEW

Recommended Land Pattern



Pin #	Function
1	Do not connect (for TCXO) Voltage control (for VCTCXO)
2	GND
3	Output
4	Vdd
*	Do not connect

Dimensions: inches [mm]
Tolerance ±0.2mm

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Reflow Profile [JEDEC J-STD-020]

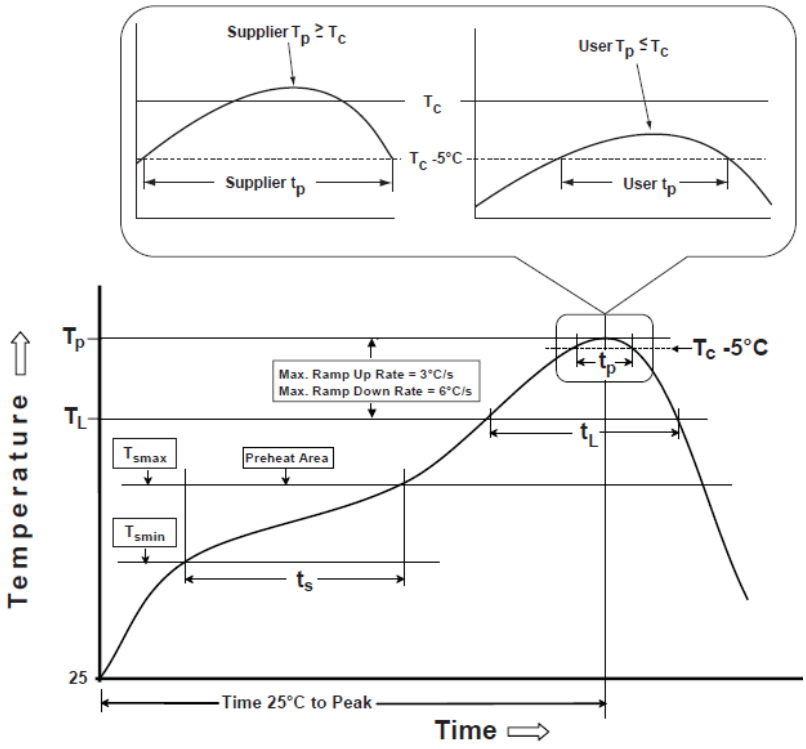

Table 1

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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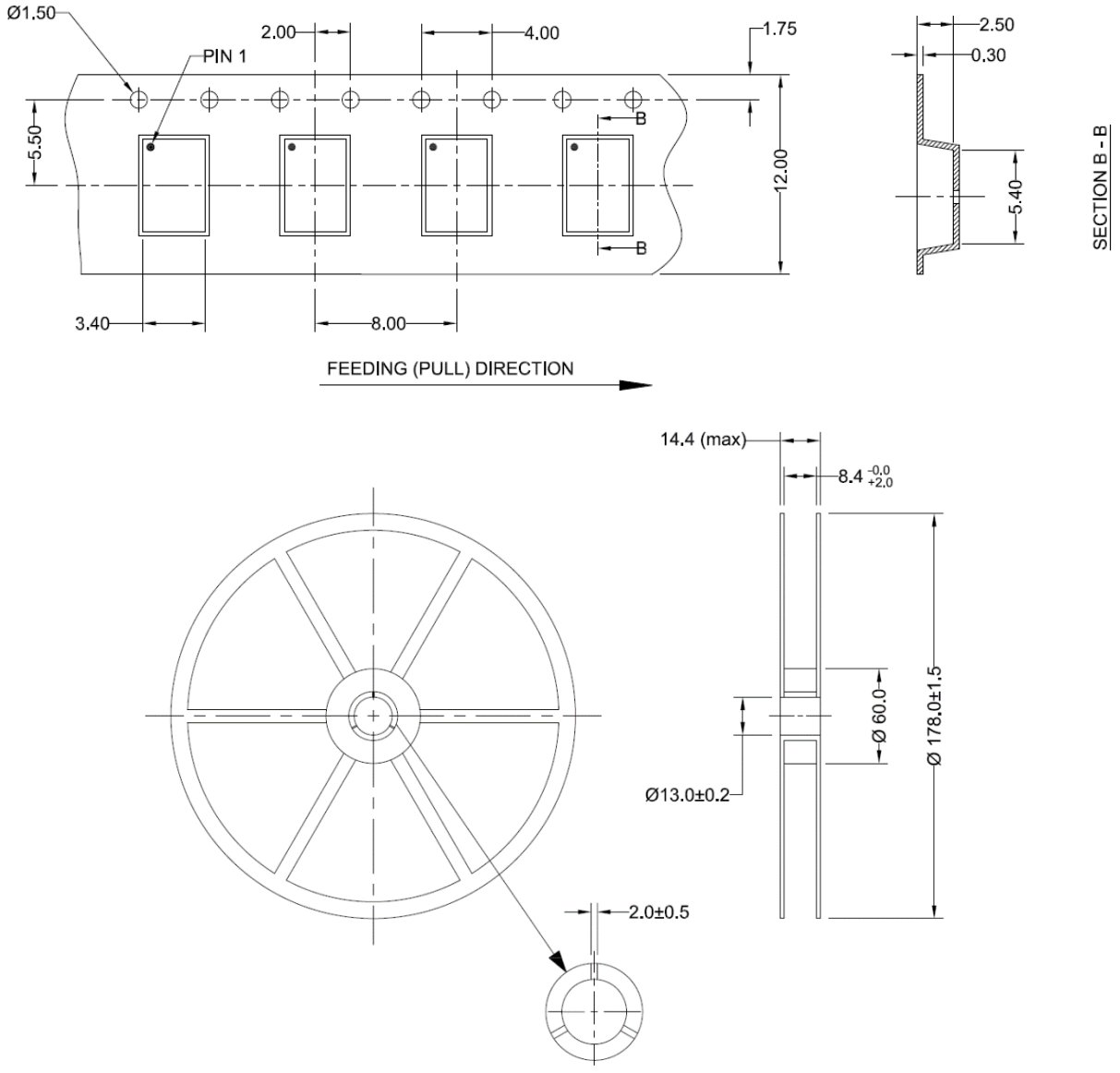
Packaging

T2: 250pcs/reel
T5: 500pcs/reel



Dimensions: mm

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