

Precision SMD VCTCXO/TCXO

AST3TDA

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Check Inventory



ESD Sensitive



7.0 x 5.0 x 2.2 mm

RoHS/RoHS II Compliant

MSL Level = 3

Features

- Wide operating temperature range with high stability options: -40°C to +105°C @ ± 50 ppb, ± 100 ppb and ± 280 ppb
- Standard available frequencies: 10, 12.8, 16.384, 18.432, 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, 15, 16.384, 18.432, 19.2, 19.44, 20, 30.72, 38.88, 40, 50			MHz	
Operating Temperature Range	-40		+105	°C	See options
Initial Frequency Tolerance at shipping	-1		+1	ppm	@ $T_A = 25^\circ\text{C}$, $V_{cc} = 3.3\text{V}$, $V_c = 1.65\text{V}$ within 30 days after ex-works
Frequency Stability over Operating Temperature Range [Note 1]	-100		+100	ppb	See options
Frequency Stability vs. Supply Voltage Change ($V_{dd} \pm 5\%$)	-50		+50	ppb	@ $T_A = 25^\circ\text{C}$, V_{cc} varied from 3.13V to 3.47V, $V_c = 1.65\text{V}$
Frequency Stability vs. Load Change ($\text{Load} \pm 5\%$)	-50		+50	ppb	5% load change @ $T_A = 25^\circ\text{C}$, $V_{cc} = 3.3\text{V}$, $V_c = 1.65\text{V}$, $O_{Load} = 15\text{pF}$
Short Term Stability			200	ppb	after power for 1 hour ref. to 25°C
Aging (first year)	-1		+1	ppm	$T_A = 25^\circ\text{C}$, $V_{cc} = 3.3\text{V}$, after 1h of operation
Aging (20 years @ $+25^\circ\text{C}$)	-3		+3	ppm	
Supply Voltage (V_{dd})	3.13	3.3	3.47	V	See options
Supply Current (I_{cc})			10	mA	25°C , $V_{cc} = 3.3\text{V}$, $O_{Load} = 15\text{pF}$
Start-up Time			5	ms	
Control Port (<i>Applicable for VCTCXO only</i>)					
Control Voltage Range (V_c)	0		3.3	V	
Center Control Voltage (V_c)		1.65		V	
Frequency Tuning Range (Carrier Frequency $\leq 20\text{MHz}$)			-8	ppm	$V_c = 0\text{V}$, referenced to $V_c = 1.65\text{V}$
	-1		+1	ppm	$V_c = 1.65\text{V}$, referenced to carrier frequency
	+8			ppm	$V_c = 3.3\text{V}$, referenced to $V_c = 1.65\text{V}$
Frequency Tuning Range (Carrier Frequency $> 20\text{MHz}$)			-5	ppm	$V_c = 0\text{V}$, referenced to $V_c = 1.65\text{V}$
	-1		+1	ppm	$V_c = 1.65\text{V}$, referenced to carrier frequency
	+5			ppm	$V_c = 3.3\text{V}$, referenced to $V_c = 1.65\text{V}$

Note 1: T_A varied from -40°C to 105°C, measurement referenced to frequency observed with $f_{ref} = (f_{max} + f_{min})/2$, $V_{cc} = 3.3\text{V}$, $V_c = 1.65\text{V}$, temperature variable speed less than 2°C/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 (@25°C):		-85	-80	dBc/Hz	Offset @10Hz
		-115	-110		Offset @100Hz
		-140	-135		Offset @1kHz
		-150	-145		Offset @10kHz
		-152	-148		Offset @100kHz
		-155	-150		Offset @1MHz
Clipped Sine Wave Output					
Output Level	0.8			V _{p-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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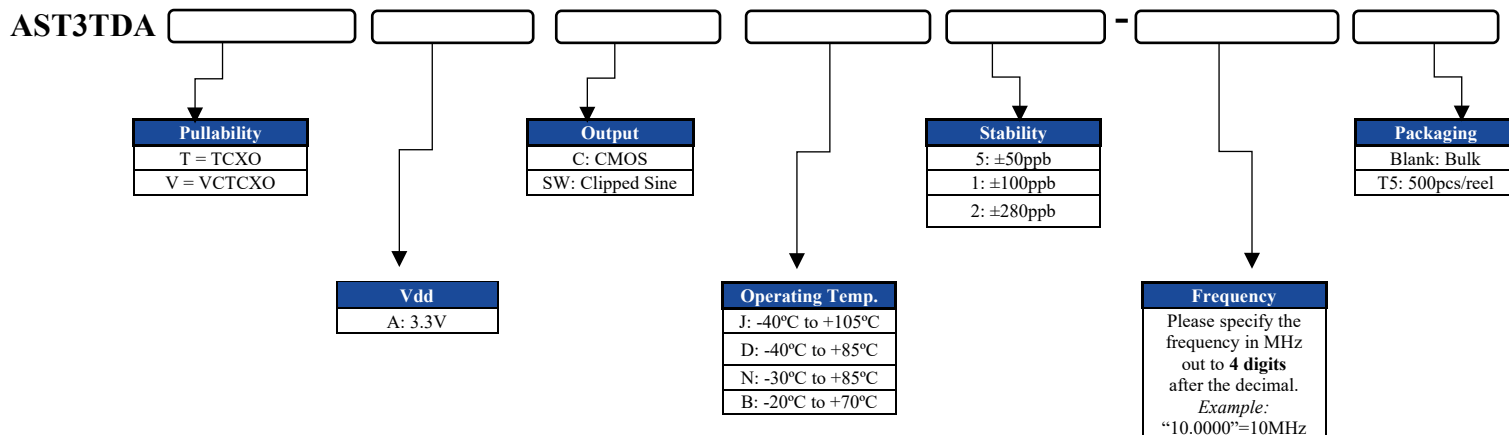


7.0 x 5.0 x 2.2 mm

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MSL Level = 3

Part Identification



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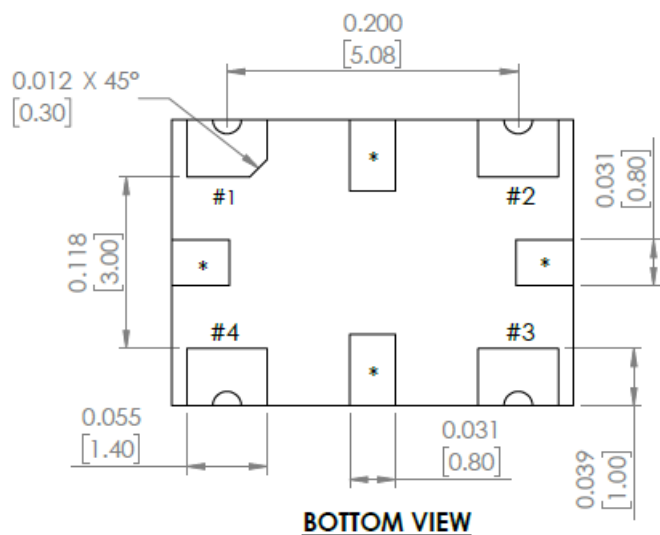
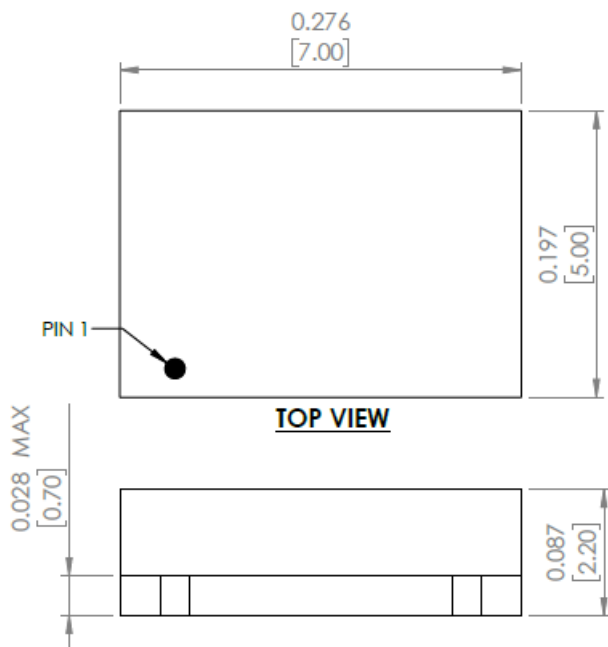


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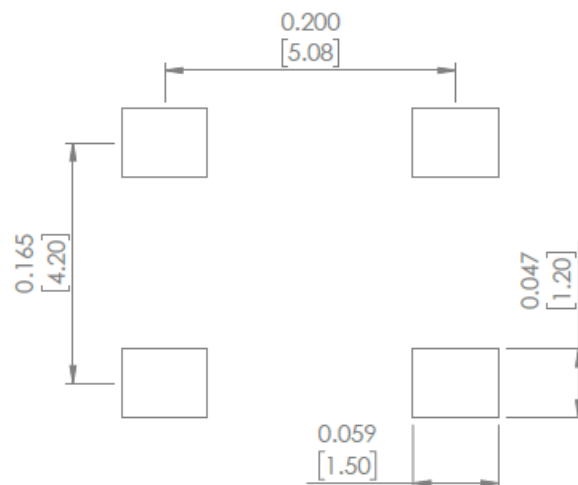
7.0 x 5.0 x 2.2 mm
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Mechanical Dimensions



Dimensions: inches [mm]
Tolerance $\pm 0.2\text{mm}$

Recommended Land Pattern



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

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Reflow Profile [JEDEC J-STD-020]

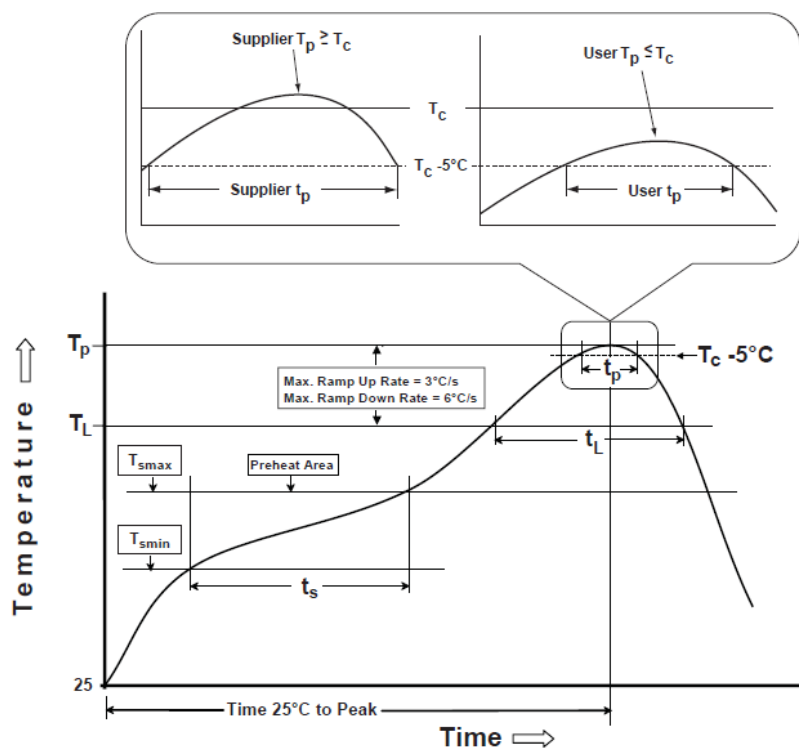


Table 1

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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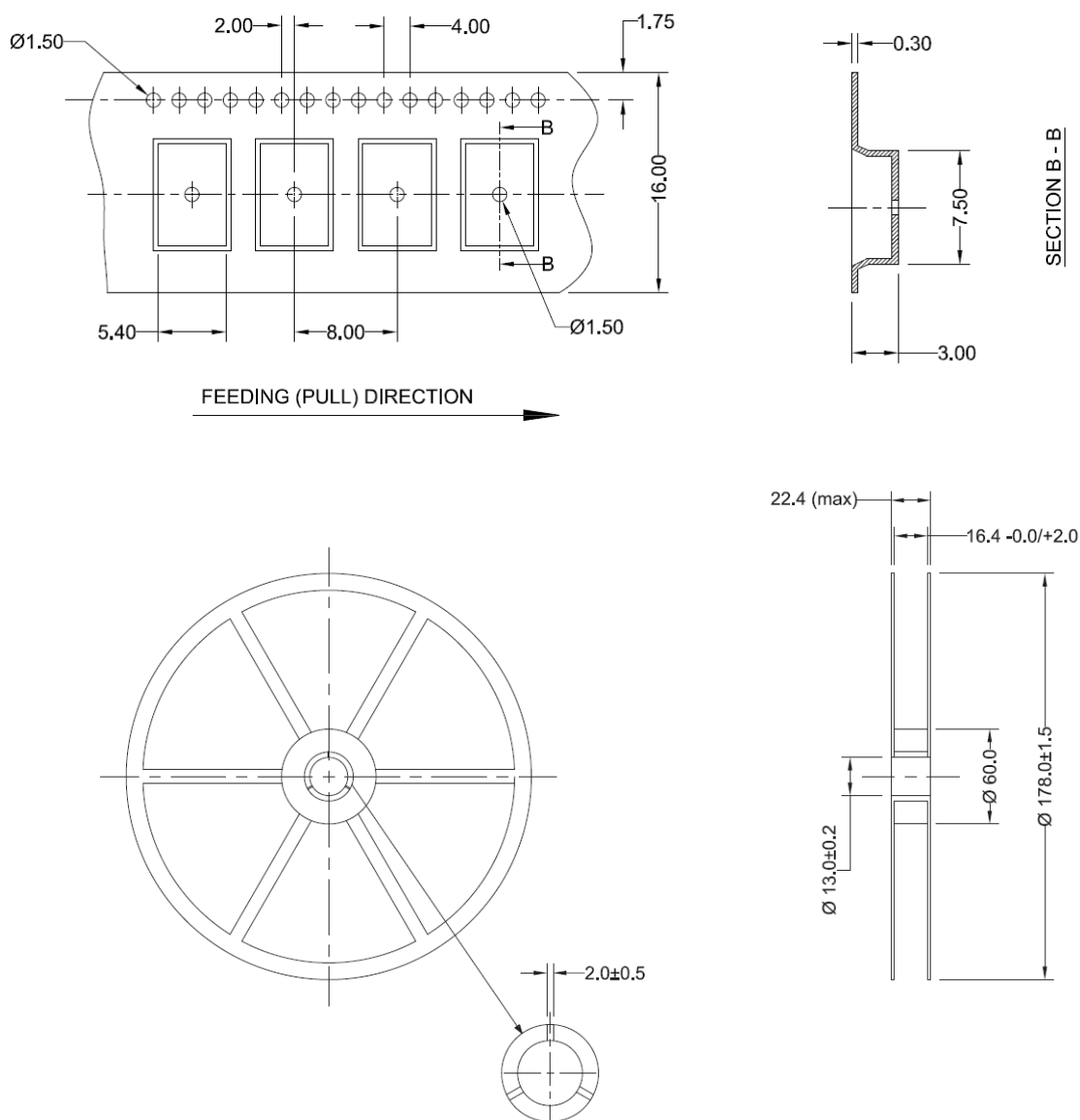
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Packaging

T5: 500pcs/reel



Dimensions: mm

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