Ultra-Low Noise XO / VCXO

ABLNO

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9.2 x 14.8 x 5.5 mm
RoHS/RoHS II Compliant
MSL Level = 1

Features

- High "Q", 3rd Overtone Crystal Technology
- Ultra Low Phase Noise -162 dBc/Hz Typ. @ 10kHz offset, 100MHz carrier
- Standard LVCMOS RF Output
- Wide Operating Temperature (-40ºC to +85ºC) standard
- ±28 ppm Max. All inclusive Stability (including Aging) over 10-years
- Available Frequency range from 24.576MHz to 200.00MHz

Applications

- Satellite Modem Communication Systems
- COTS - Military communications
- Avionics
- Low Phase Noise Signal Sources
- High Definition TV
- Test & Measurement
- Ultra Low Jitter RF Communication Circuitry

Key Electrical Specifications

Parameters		Min.	Typ.	Max.	Units	Notes
RF Output Frequency Range		24.576		200.00	MHz	
Standard Available Frequencies		24.576 MHz, 50.00MHz, 80.00MHz, 81.92MHz, 92.16MHz, 96.00MHz, 98.304MHz, 100MHz, 104.00MHz, 106.25MHz, 120.00MHz, 122.88MHz, 125.00MHz, 150.00MHz, 155.52MHz, 156.250MHz, 200MHz				Custom frequencies available upon request
Supply Voltage (Vdd)		3.135	3.300	3.465	Volts	
Current Drain	24.576MHz ~ 99.999MHz			25.00	mA	
	100MHz ~ 149.999MHz			35.00		
	≥ 150.00MHz			40.00		
Waveform		LVCMOS				
Output Load				15	pF	
V_{OH}		0.9*Vdd			Volts	
V_{OL}				0.1*Vdd	Volts	
Symmetry		45	50	55	%	
Rise & Fall Times				3.0	ns	
Operating Temperature Range		-40		+85	ºC	
Frequency Stability						
Over (-40º C to +85ºC)			±12.00	±18.00	ppm	Relative to measured frequency @ 25ºC
ALL effects, including Aging				±28.00	ppm	
Storage Temperature Range		-40		+90	ºC	

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Parameters		Min.	Typ.	Max.	Units	Notes
Aging	First Year			±2.00	ppm	
	5-Years			±5.00	ppm	
	10-Years			±7.00	ppm	
Phase Noise (24.576MHz Carrier)						Vdd=3.3V
@ 10 Hz offset			-90	-82	dBc/Hz	**Note #1 & #2**
@ 100 Hz offset			-120	-115	dBc/Hz	
@ 1,000 Hz offset			-145	-140	dBc/Hz	
@ 10,000 Hz offset			-165	-160	dBc/Hz	
@ 100,000 Hz offset			-166	-165	dBc/Hz	
@ 1,000,000 Hz offset			-166	-165	dBc/Hz	
Phase Noise (50MHz Carrier)						Vdd=3.3V
@ 10 Hz offset			-90	-82	dBc/Hz	***Note #1 & #2***
@ 100 Hz offset			-120	-115	dBc/Hz	
@ 1,000 Hz offset			-145	-140	dBc/Hz	
@ 10,000 Hz offset			-165	-160	dBc/Hz	
@ 100,000 Hz offset			-166	-165	dBc/Hz	
@ 1,000,000 Hz offset			-166	-165	dBc/Hz	
RMS Jitter (12kHz ~ 20MHz BW)			< 100	125	**Femto Seconds**	
Phase Noise (100MHz Carrier)						Vdd=3.3V
@ 10 Hz offset			-88	-82	dBc/Hz	***Note #1 & #2***
@ 100 Hz offset			-118	-115	dBc/Hz	
@ 1,000 Hz offset			-141	-138	dBc/Hz	
@ 10,000 Hz offset			-160	-155	dBc/Hz	
@ 100,000 Hz offset			-161	-160	dBc/Hz	
@ 1,000,000 Hz offset			-165	-160	dBc/Hz	
RMS Jitter (12kHz ~ 20MHz BW)			< 50	100	**Femto Seconds**	

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Parameters	Min.	Typ.	Max.	Units	Notes
Phase Noise (156.25MHz Carrier)					Vdd=3.3V
@ 10 Hz offset		-75	-70	dBc/Hz	**Note #1 & #2**
@ 100 Hz offset		-110	-105	dBc/Hz	
@ 1,000 Hz offset		-140	-135	dBc/Hz	
@ 10,000 Hz offset		-155	-150	dBc/Hz	
@ 100,000 Hz offset		-161	-160	dBc/Hz	
@ 1,000,000 Hz offset		-165	-160	dBc/Hz	
RMS Jitter (12kHz ~ 20MHz BW)		< 50	100	**Femto Seconds**	
Phase Noise (200MHz Carrier)					Vdd=3.3V
@ 10 Hz offset		-75	-70	dBc/Hz	**Note #1 & #2**
@ 100 Hz offset		-105	-100	dBc/Hz	
@ 1,000 Hz offset		-135	-130	dBc/Hz	
@ 10,000 Hz offset		-150	-145	dBc/Hz	
@ 100,000 Hz offset		-155	-150	dBc/Hz	
RMS Jitter (12kHz ~ 20MHz BW)		< 20	30	**Femto Seconds**	
Electrical Frequency Adjustment					
Control Voltage Range (Vc)	0.0	1.65	3.30	Volts	
Frequency Pull Range	±28.00		±55.00	ppm	Referenced to the carrier
Frequency Pull Slope		Positive			
Control Voltage Port Impedance	10			kΩ	
Control Port Linearity			±10	%	

Note #1: Maximum Phase Noise is verified on 100% of the parts at 25ºC ± 3ºC.

Note #2: The above specified Phase Noise & Jitter is with the oscillator device configured as a VCXO. In XO configuration, the Phase Noise will be slightly better at each offset between 10Hz and 10 kHz, by approximately -3dB to -5dB.

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Options and Part Identification:

ABLNO - [ ] Frequency (MHz) - [ ] [ ]

Fixed Clock Vs. VCXO Option	
Blank	Fixed Clock Oscillator
V	VCXO (±28 ppm min. Pull)

Tape & Reel Options	
Blank	< 250 units on cut tape
T2	250 units per reel
T	1,000 units per reel

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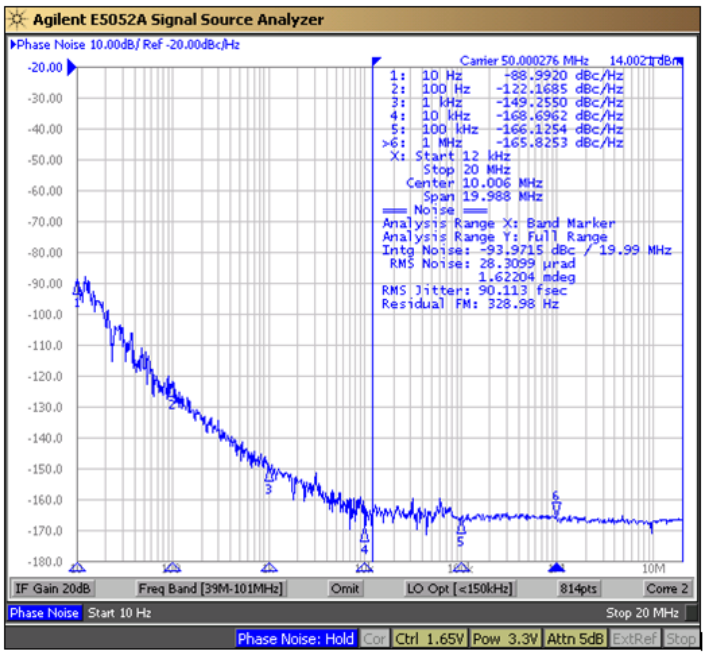
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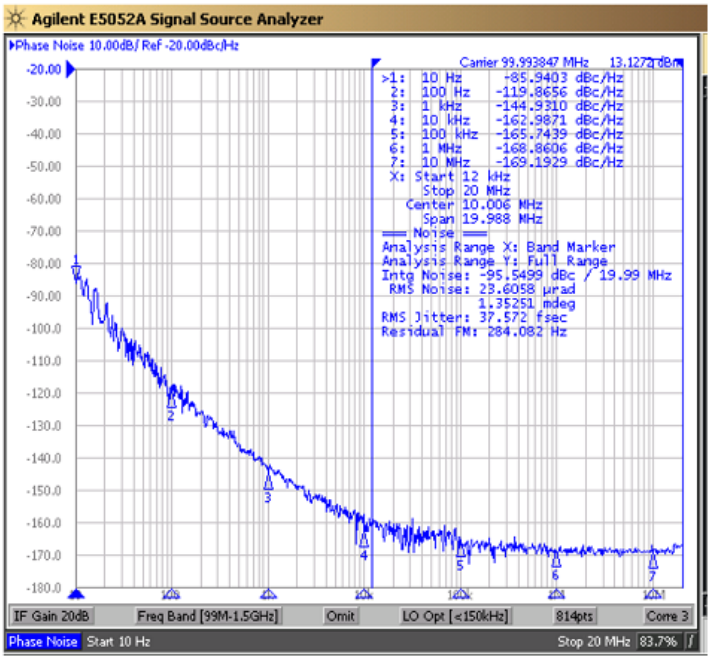
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Typical Phase Noise Performance @ 50.00 MHz Carrier



Typical Phase Noise Performance @ 100.00 MHz Carrier



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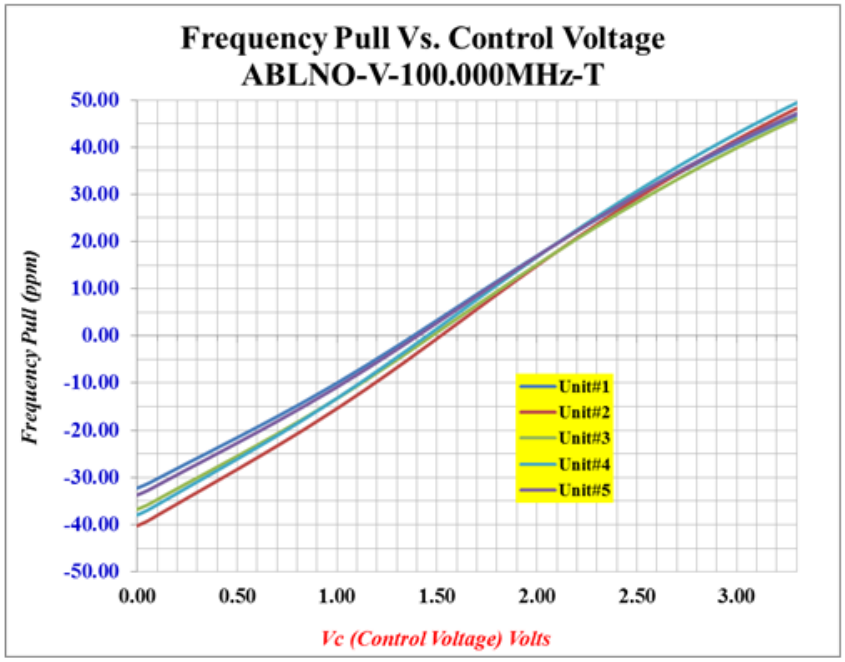
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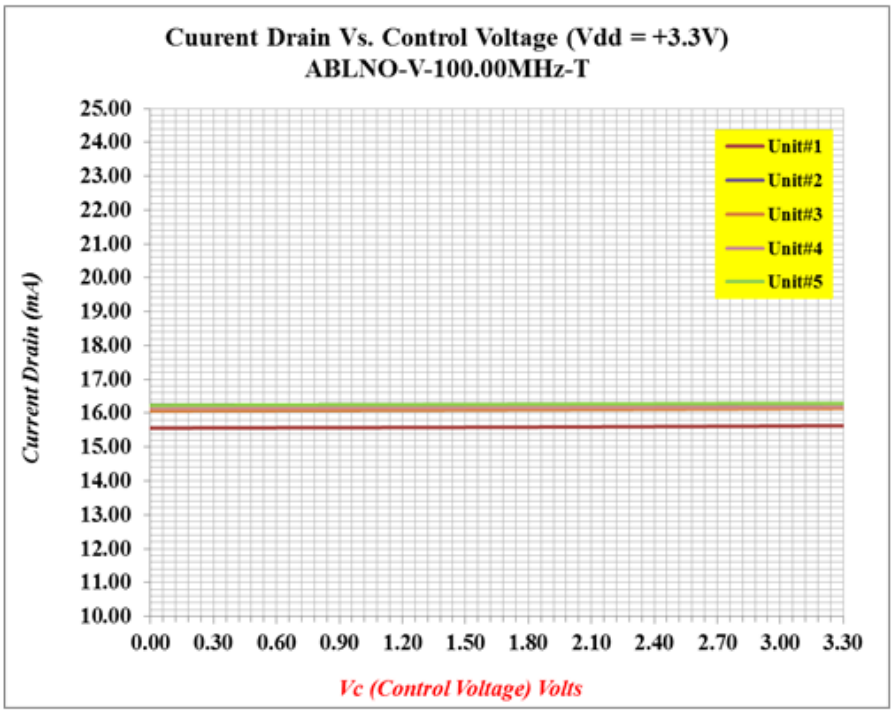
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9.2 x 14.8 x 5.5 mm
RoHS/RoHS II Compliant
MSL Level = 1

Frequency Pull versus Control Voltage (referenced to 100.000MHz)



Current Drain versus Control Voltage @ Vdd = +3.3V



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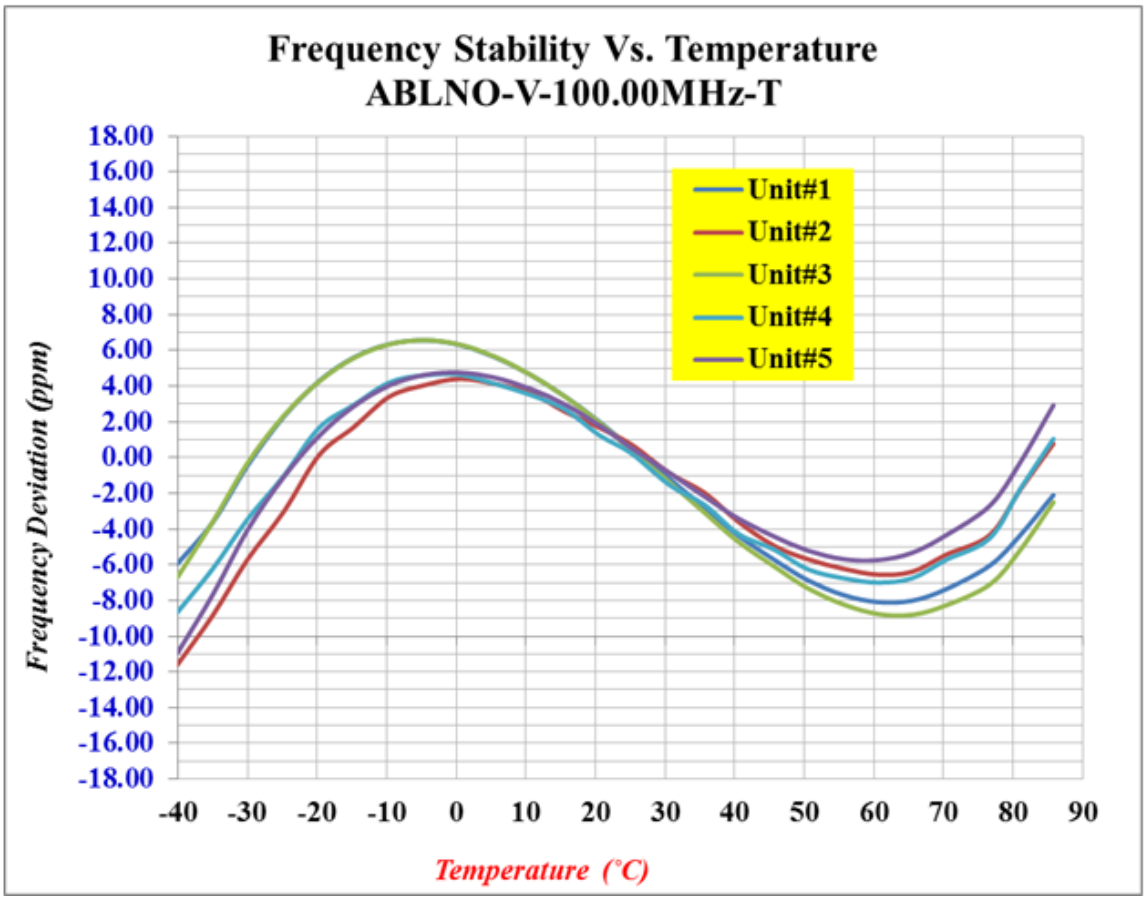
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RoHS/RoHS II Compliant
MSL Level = 1

Frequency Stability Vs. Temperature @ Vdd = +3.3V ***(referenced to measured frequency @ 25ºC)***



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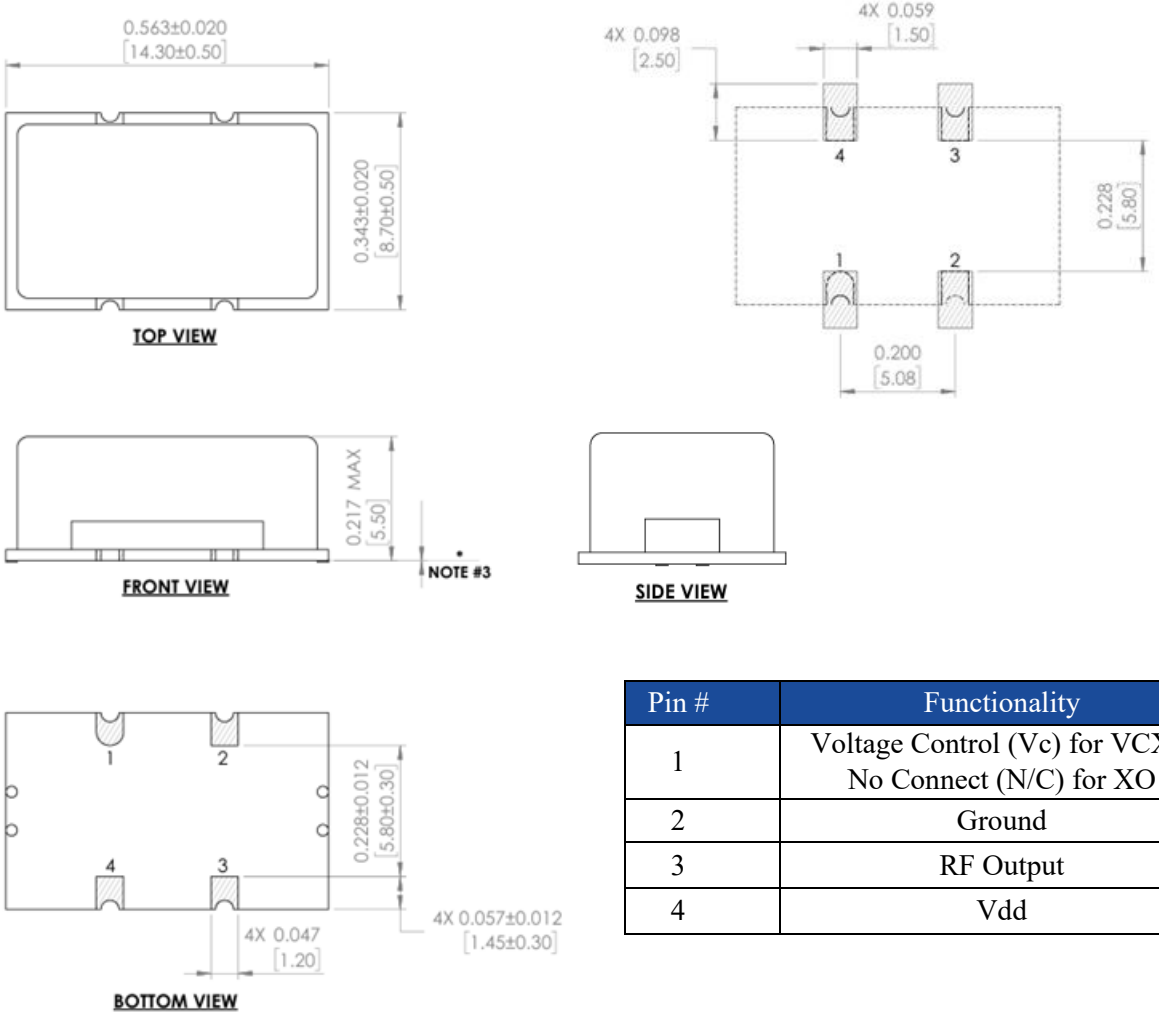
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9.2 x 14.8 x 5.5 mm
RoHS/RoHS II Compliant
MSL Level = 1

Mechanical Dimensions



Pin #	Functionality
1	Voltage Control (Vc) for VCXO No Connect (N/C) for XO
2	Ground
3	RF Output
4	Vdd

Note #3: SMD Termination Coplanarity: 0.15mm maximum

Dimensions: Inches [mm]

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Reflow Profile [JEDEC J-STD-020]

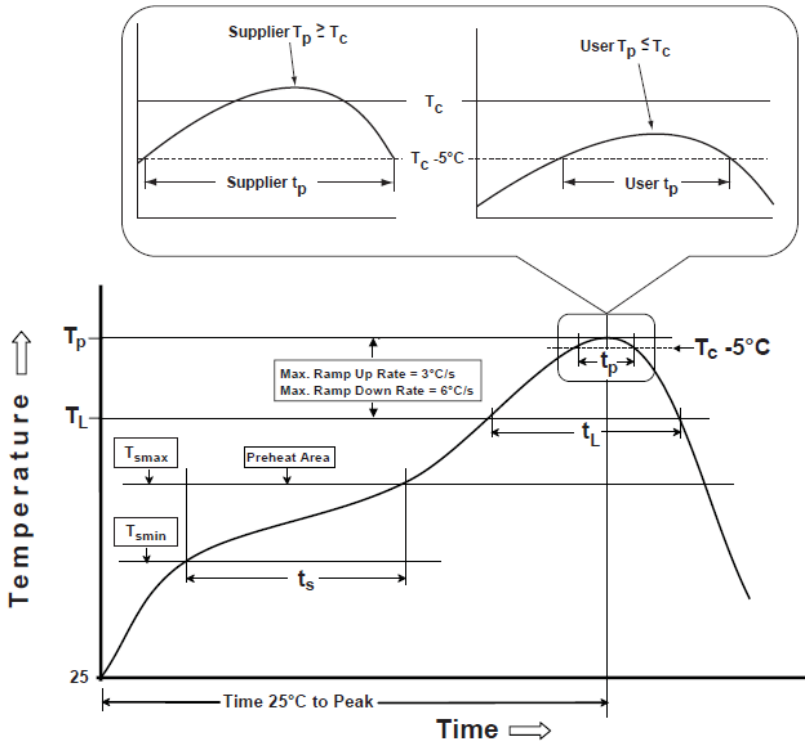


Table 1

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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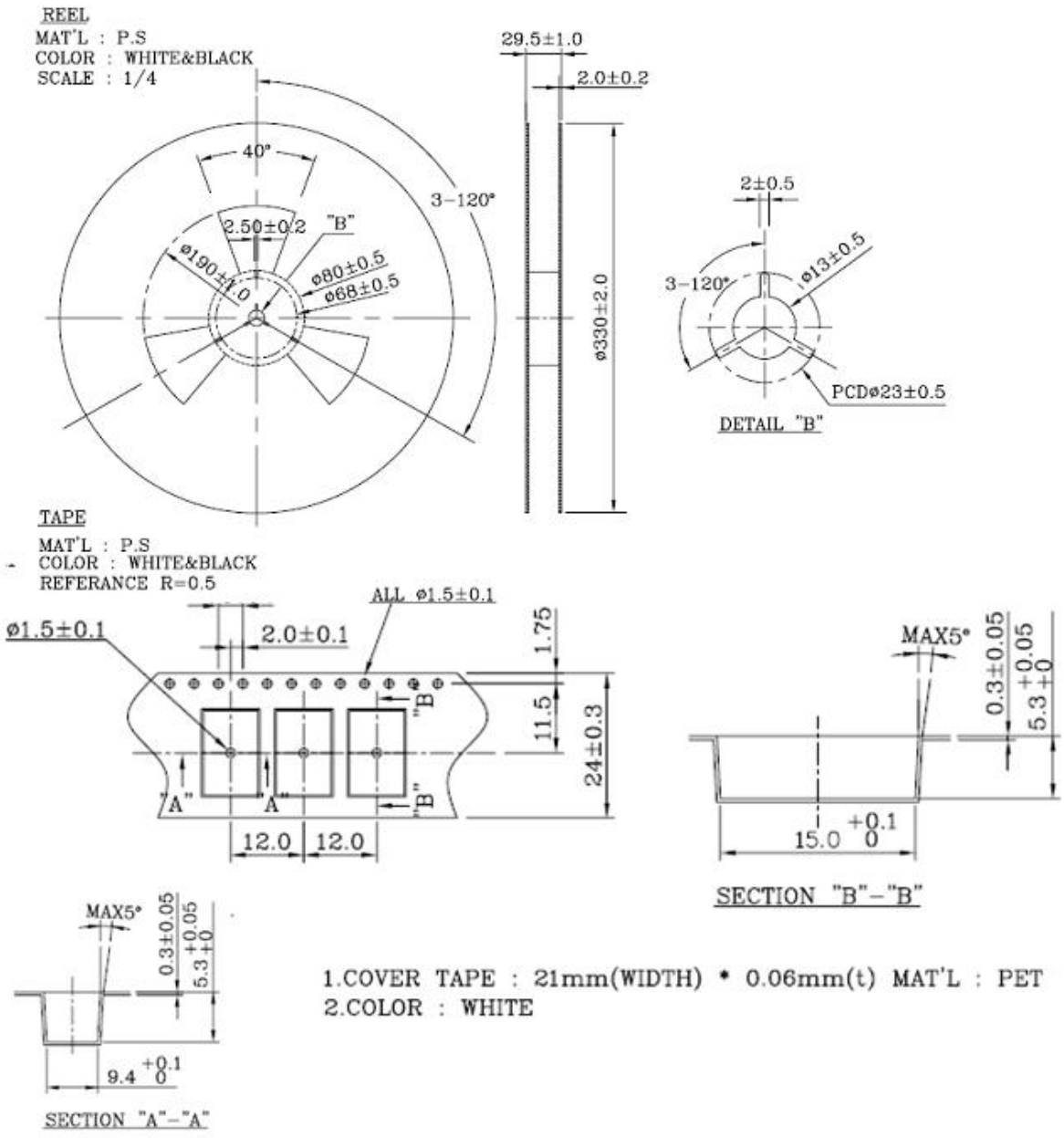
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MSL Level = 1

Packaging

(1,000) units per reel (option T), (250) units per reel available (option # T2)



1.COVER TAPE : 21mm(WIDTH) * 0.06mm(t) MAT'L : PET
2.COLOR : WHITE

Dimensions= mm

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