

# 6.5 GHz WiFi 6E Coexistence BAW Filter

# A10165

## Description

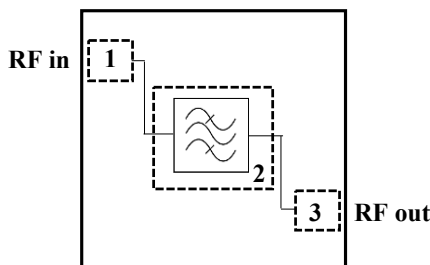
Akoustis’ A10165 is a high-performance, ultra-wide bandwidth BAW RF Filter for use in WiFi 6E applications covering U-NII-5 thru U-NII-8 bands. A10165 utilizes Akoustis’ patented, XBAW™ technology which provides leading RF filter performance. This BAW RF filter provides low insertion loss and meets the stringent rejection requirements enabling coexistence with U-NII-1 thru 3. This device exhibits high-power handling capabilities necessary for demanding power requirements of the latest WiFi 6E standards. A10165 is a fully integrated, 50Ω module using standard laminate packaging and is compatible with high volume, lead-free SMT soldering processes.

- Small form factor 3.5mm x 3.5mm x 1.74mm
- Single-ended Tx/Rx ports.
- Ultra-wide passband covering 1180MHz
- High rejection enables coexistence with adjacent WiFi UNII bands
- High power rating, maximum +28dBm
- Low insertion loss bandpass filter
- Performance over -40 C to +85C
- RoHS compliant, Pb-free package

## Applications

- WiFi 6E tri band routers, integrated cable modem
- WiFi 6E tri band access points
- LTE/LAA small cells

## Functional Block Diagram



Pin #	Description
1	RF Input
2	Ground
3	RF Output

## Ordering Information

Part Number	Description
A10165EVB	Evaluation board
A10165SP	(5) Loose pcs
A10165SR	(100) Short Reel (7" Reel)
A10165TR1	(1000) Tape & Reel (7" Reel)
A10165TR2	(2500) Tape & Reel (13" Reel)

## Absolute Maximum Ratings

Parameter	Conditions	Rating
Storage Temperature		-40 to 125 °C
Input Power	Singal: OFDM MCS0, 20 MHz, PAR 10dB Temp: 85°C	+30 dBm

A combination of AMR conditions may result in damage to the device

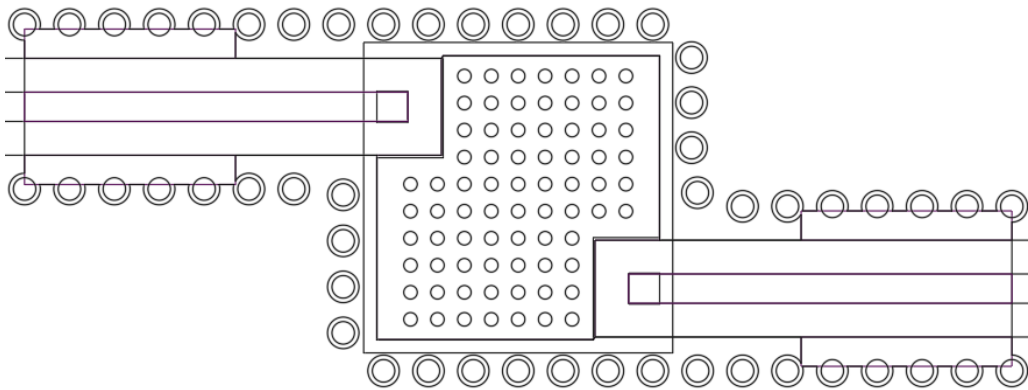
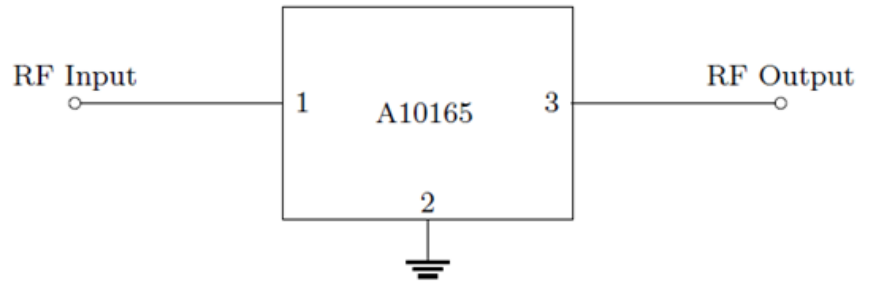
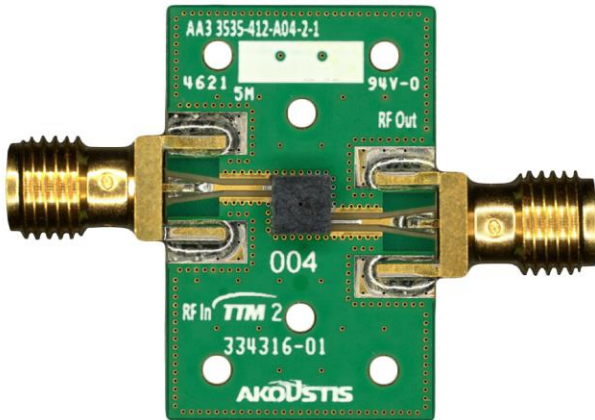
## Operating Parameters (Temp = -40°C to +85°C unless otherwise noted)

Parameter	Conditions	Units	Min.	Typ.	Max.
Pass bandwidth		MHz	5945	6535	7125
Insertion Loss	5945 – 7125 MHz	dB		1.7 <sup>(1)</sup>	3.8 <sup>(2)</sup>
					3.0 <sup>(3)</sup>
Amplitude Variation	5945 – 7125 MHz	dB		1.9 <sup>(2)</sup>	2.2 <sup>(2)</sup>
Attenuation	30 – 1000 MHz	dB	41	45	
	1000 – 3300 MHz	dB	20	22	
	3300 – 4000 MHz	dB	12	14	
	5170 – 5330 MHz	dB	43 <sup>(2)</sup>	48 <sup>(1)</sup>	
			46 <sup>(3)</sup>		
	5330 – 5490 MHz	dB	42 <sup>(2)</sup>	49 <sup>(1)</sup>	
			44 <sup>(3)</sup>		
	5490 – 5730 MHz	dB	44 <sup>(2)</sup>	51 <sup>(1)</sup>	
			45 <sup>(3)</sup>		
5735 – 5815 MHz	dB	43 <sup>(2)</sup>	50 <sup>(1)</sup>		
5815 – 5835 MHz	dB	41 <sup>(2)</sup>	46 <sup>(1)</sup>		
8500 – 12000 MHz	dB	13	14		
Return Loss	5945 – 7125 MHz		10	15 <sup>(1)</sup>	
Load Impedance		Ω		50	
Power Handling	OFDM, MCS0, 20 MHz, PAR 10dB	dBm			28

Note:

1. Averaged over specified frequency at room temperature
2. Averaged over 20MHz channel
3. Averaged over 160MHz channel

## EVB Schematic & Layout



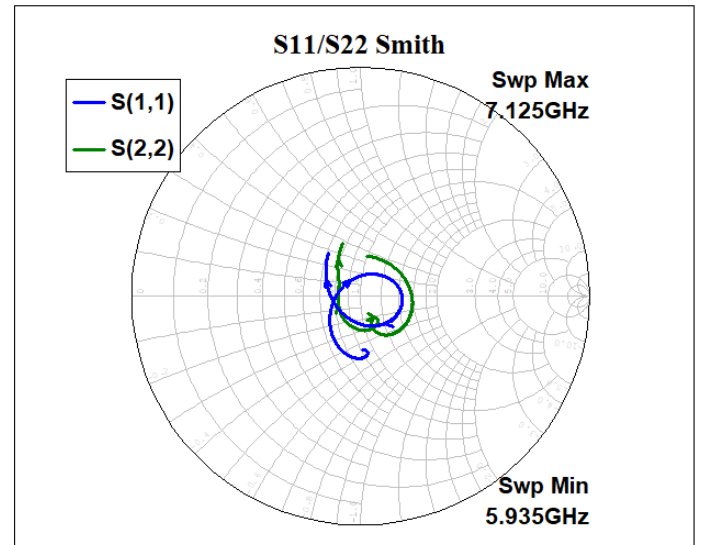
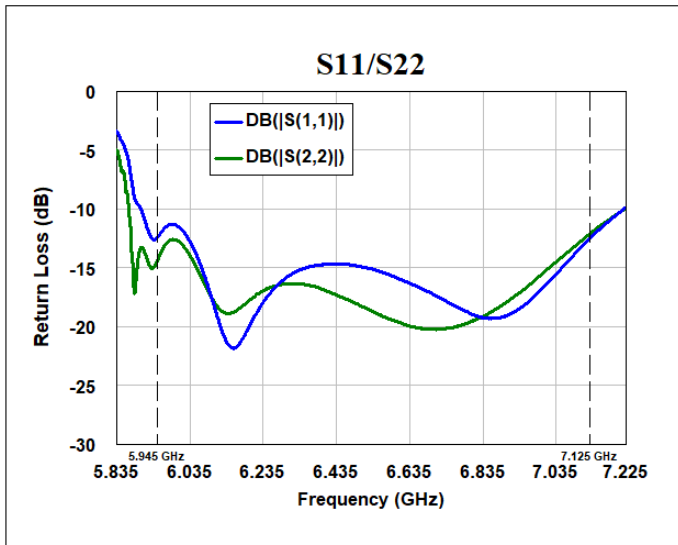
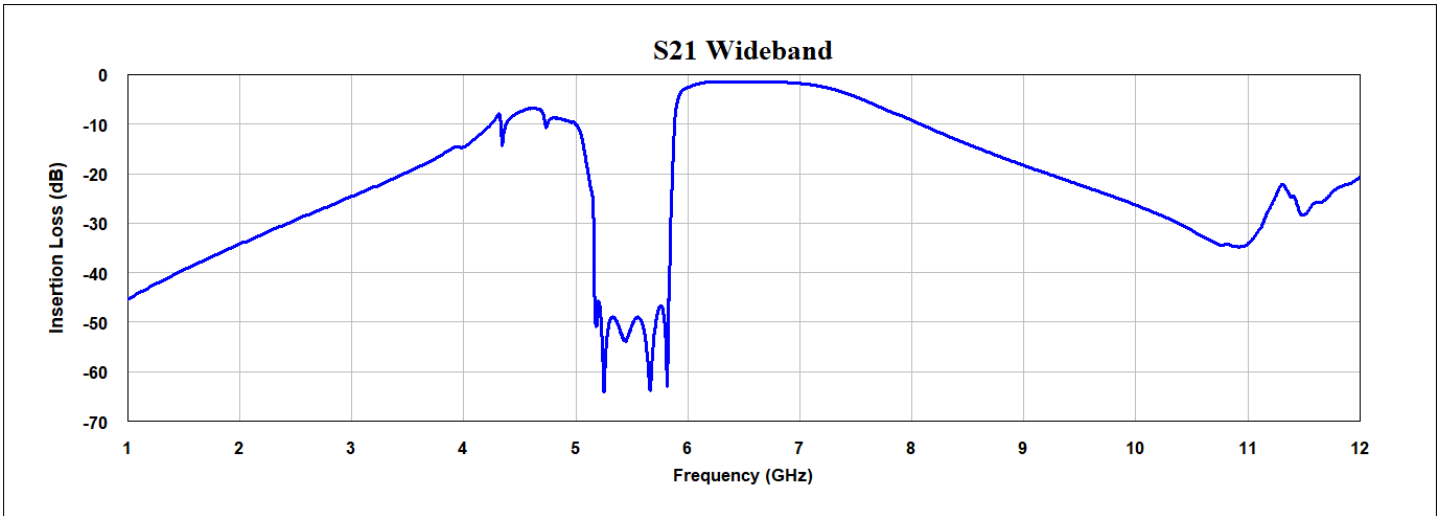
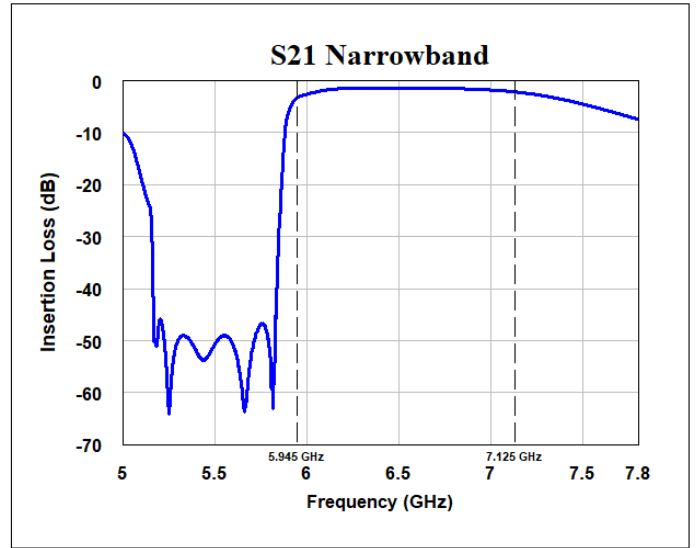
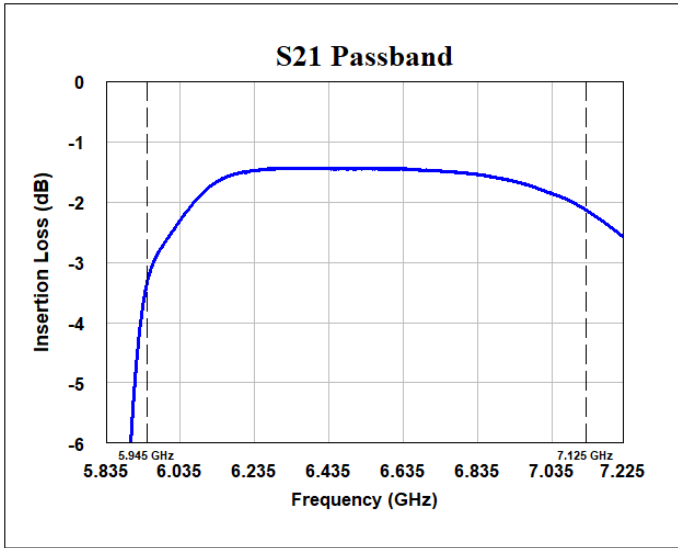
Note:

- 1) Center ground pad vias 6mil diameter
- 2) RF ground vias 10mil diameter

## Bill of Materials

Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	4 layer	Multiple	
U1	N/A	6.53 GHz BAW Filter	Akoustis	A10165

Performance Plots (Temp = 25°C unless otherwise noted)

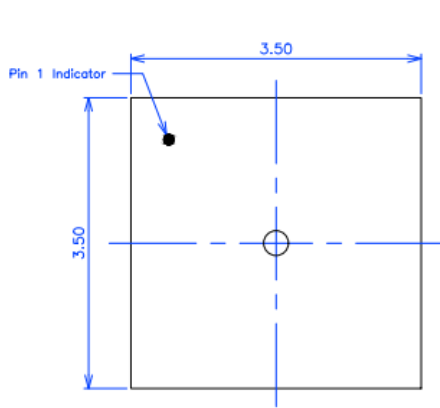


A10165

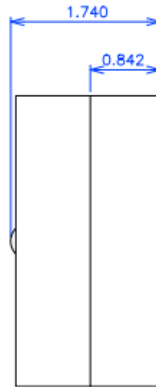
## Package Drawing & Pin Description

**Notes:**

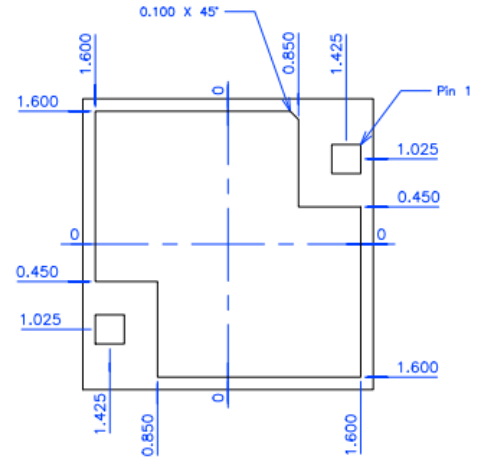
- All Units are in mm unless otherwise stated
- General Tolerance:
- Linear X.XXX = ±0.050mm
- X.XX = ±0.10mm



Top View



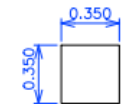
Side View



Bottom View

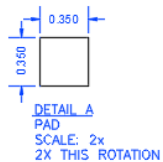
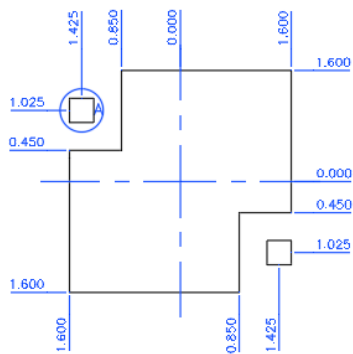
**NOTES:**

1. Terminal Finish:  
Electroless Ni/Electroless Pd/Immersion Au

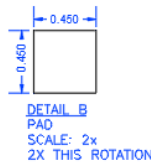
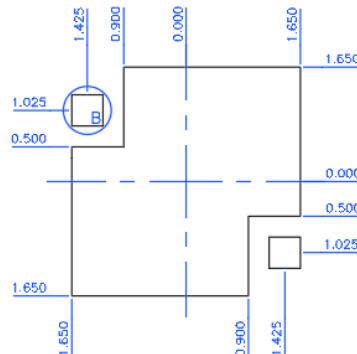


PAD: 2x  
SCALE: 2x

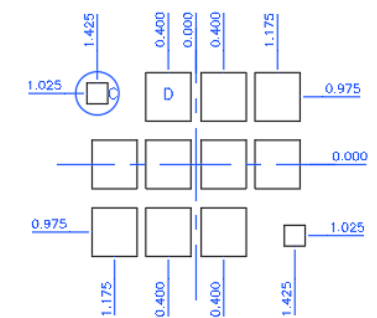
## PCB Mounting Pattern



Recommended PCB  
Metal Top View

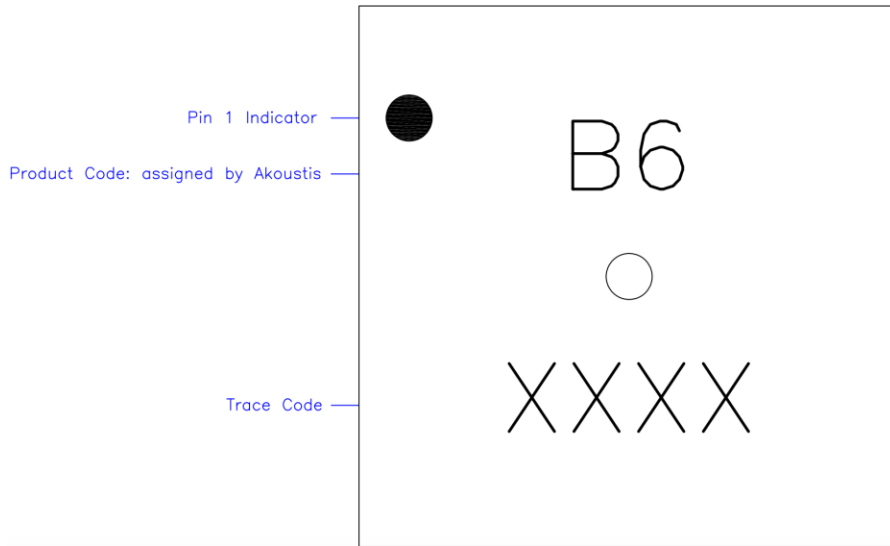


Recommended Solder  
Mask Opening Top View

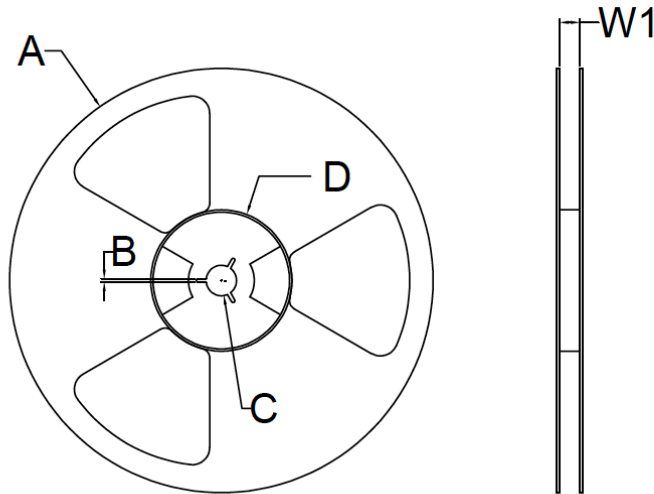


Recommended Stencil  
Pattern Top View

## Typical Part Marking



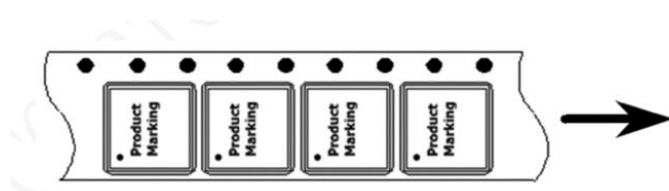
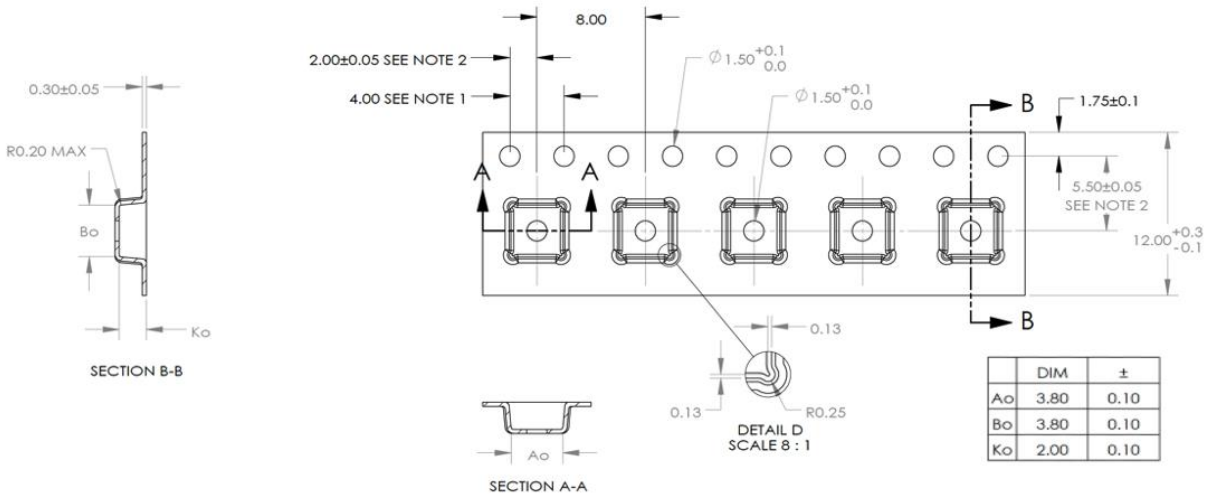
## Reel Dimensions



Reel Dimensiones						
Reel Size	Tape Width	A	B	C	D	W1 *measured at hub
7 Inch	8 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0+/- 2.0 mm	8.40 + 1.5 / -0 mm
	12 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0+/- 2.0 mm	12.40 + 2.0 / -0 mm
	16 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0+/- 2.0 mm	16.40 + 2.0 / -0 mm
13 Inch	8 mm	330 +/- 2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0.2 mm	102 +/- 2.0 mm	8.8 + 2.0 / -0 mm
	12 mm	330 +/- 2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0.2 mm	102 +/- 2.0 mm	12.8 + 2.0 / -0 mm
	16 mm	330 +/- 2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0.2 mm	102 +/- 2.0 mm	16.8 + 2.0 / -0 mm

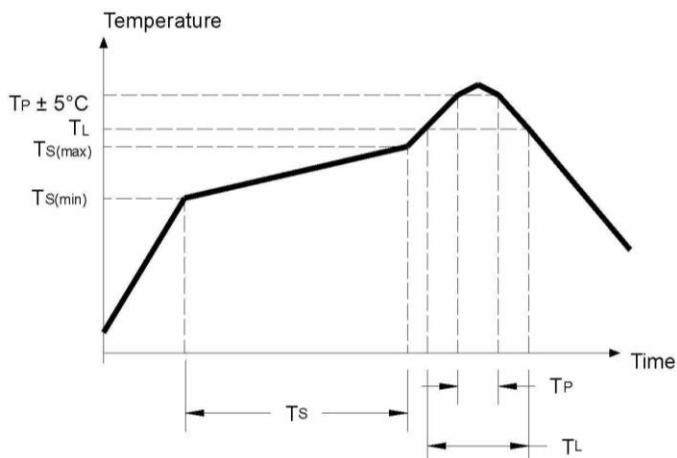
Note: 7 Inch Reel Only Has One Opening

## Tape Dimension



## Recommended Solder Profile

Parameter	Eutectic Sn/Pb	Pb Free
Max Ramp Up Rate	6 Deg C/Second	6 Deg C/Second
Soak Temp Time $T_S(\text{min}) - T_S(\text{max})$	135 - 155 Deg C	150-200 Deg C
Max Soak Time $T_S$	2 minutes	3 minutes
Liquidous Temp $T_L$	183 Deg C	220 Deg C
Max Time Above $T_L$	150 Seconds	150 Seconds
Max Peak Temperature $T_P$	225 Deg C	260 Deg C
Max Time at Peak $T_P$	30 Seconds	30 Seconds
Max Ramp Down Rate	10 Deg C/Second	10 Deg C/Second



A10165

## Product Compliance Information

### ESD Sensitivity Ratings

Human Body Model (HBM) Test

Rating: Class 1B 500V

Standard: ANSI/ESDA/JEDEC JS-001-2017

Charged Device Model (CDM)

Rating: Class C3 1000V

Standard: ANSI/ESDA/JEDEC JS-002-2018

### MSL Rating

MSL1

### RoHS

This part is compliant with the 2011/65EU RoHS directive on the restrictions of the use of certain hazardous substances in electrical and electronic equipment as amended by Directive (EU) 2015/863

## Contact Information

All contents specified in the datasheet are subject to change. Please contact Akoustis for the latest on our products and company information.

Email: [sales@akoustis.com](mailto:sales@akoustis.com)

Website: [www.akoustis.com](http://www.akoustis.com)

Telephone: +1 704.997.5735

Fax: +1 704.997.5734