

6.5 GHz WiFi 6E Coexistence BAW Filter

A10165

Description

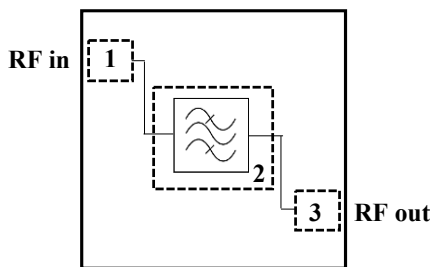
Akoustis’ A10165 is a high-performance, ultra-wide bandwidth BAW RF Filter for use in WiFi 6E applications covering U-NII-5 thru U-NII-8 bands. A10165 utilizes Akoustis’ patented, XBAW® technology which provides leading RF filter performance. This BAW RF filter provides low insertion loss and meets the 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	Signal: OFDM MCS0, 20 MHz, PAR 10dB	+30 dBm
Max Temperature		-40 to 105 °C

Exceeding any one limit or a combination of AMR conditions may result in damage to the device

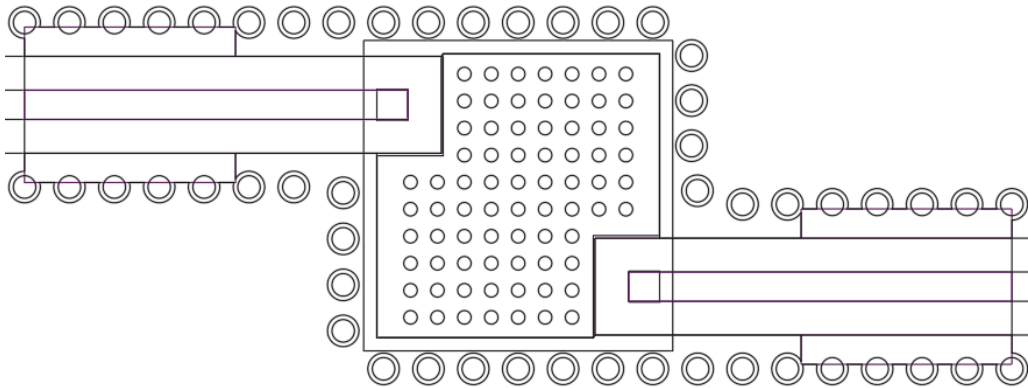
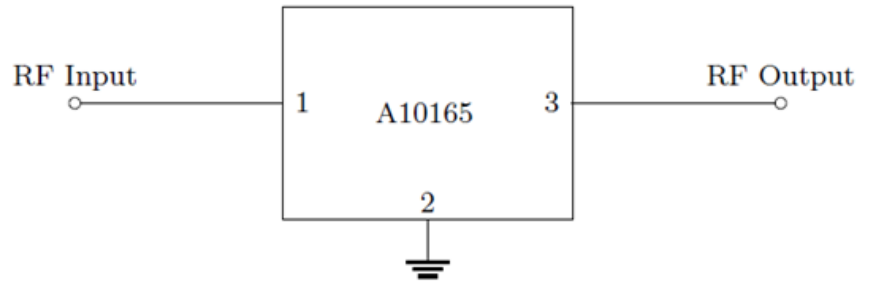
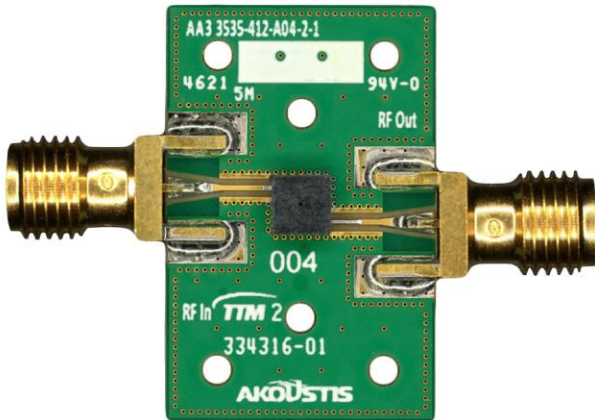
Operating Parameters (Temp = -40°C to +85°C unless otherwise noted)

Parameter	Conditions	Units	Min.	Typ.	Max.
Pass bandwidth		MHz	5945	6535	7125
Insertion Loss	5945 – 7125 MHz	dB		1.7 ⁽¹⁾	3.8 ⁽²⁾
					3.0 ⁽³⁾
Amplitude Variation	5945 – 7125 MHz	dB		1.9 ⁽²⁾	2.2 ⁽²⁾
Attenuation	30 – 1000 MHz	dB	41	45	
	1000 – 3300 MHz	dB	20	22	
	3300 – 4000 MHz	dB	12	14	
	5170 – 5330 MHz	dB	43 ⁽²⁾	48 ⁽¹⁾	
			46 ⁽³⁾		
	5330 – 5490 MHz	dB	42 ⁽²⁾	49 ⁽¹⁾	
			44 ⁽³⁾		
	5490 – 5730 MHz	dB	44 ⁽²⁾	51 ⁽¹⁾	
			45 ⁽³⁾		
5735 – 5815 MHz	dB	43 ⁽²⁾	50 ⁽¹⁾		
5815 – 5835 MHz	dB	41 ⁽²⁾	46 ⁽¹⁾		
8500 – 12000 MHz	dB	13	14		
Return Loss	5945 – 6905 MHz		10	15 ⁽¹⁾	
	6905 – 7065 MHz		9	10 ⁽¹⁾	
	7065 – 7125 MHz		8	10 ⁽¹⁾	
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 thru vias 6mil diameter
- 2) RF ground thru vias 10mil diameter

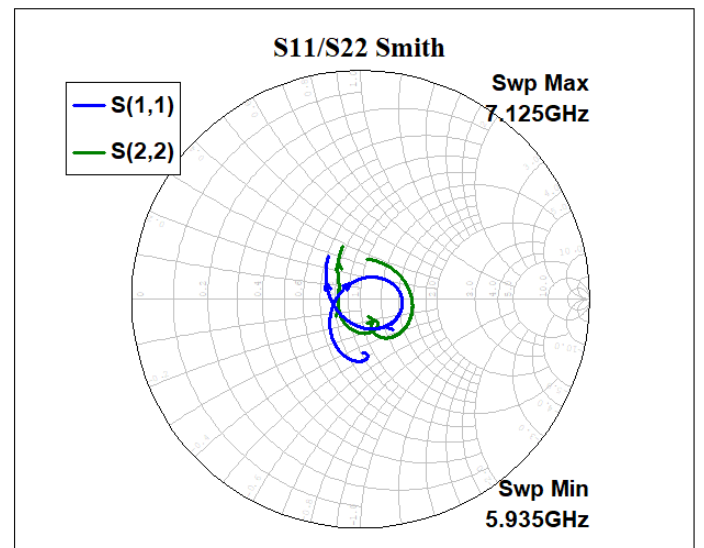
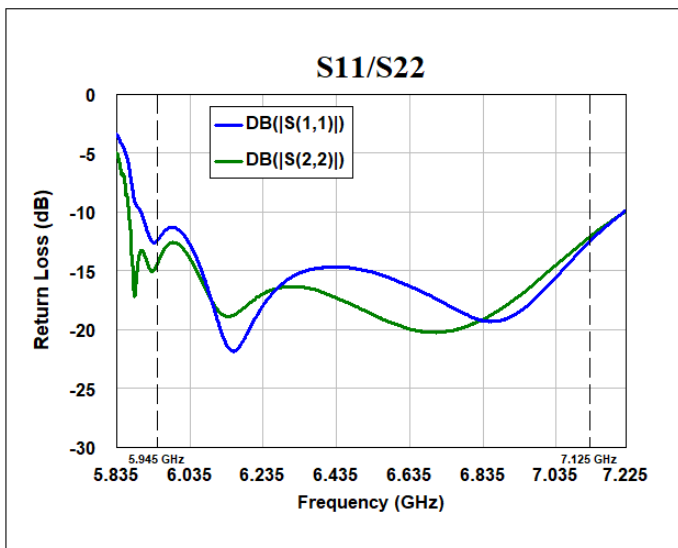
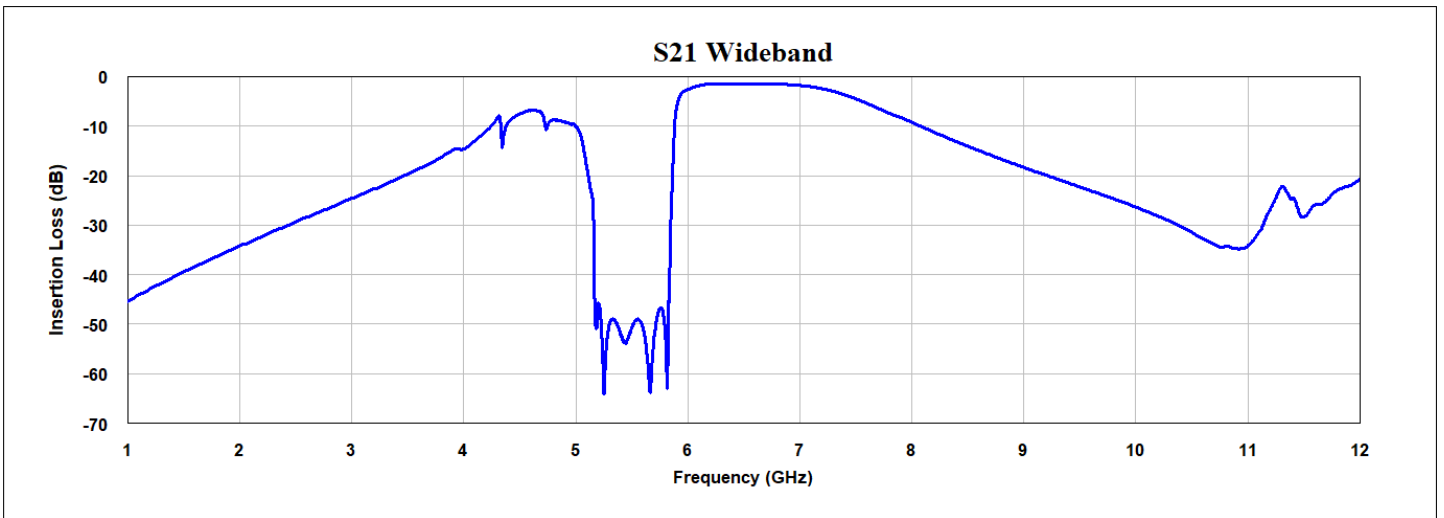
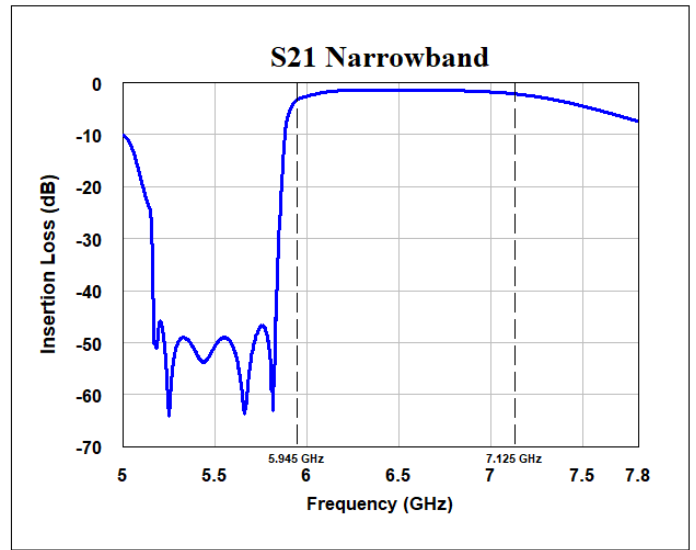
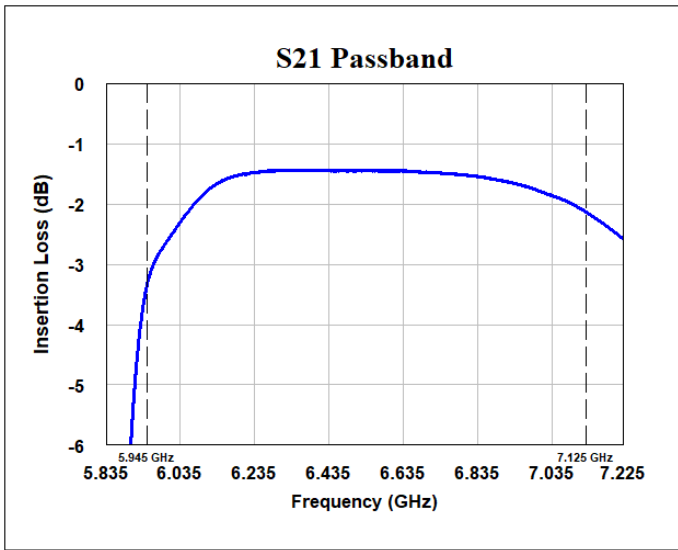
Pin Description

Pin	Name	Description
1	RF Input	Internally DC short to ground. If DC voltage is present in RF line, an external DC block is required.
2	GND	Emulate above via pattern as close as possible.
3	RF Output	Internally DC short to ground. If DC voltage is present in RF line, an external DC block is required.

Bill of Materials

Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	4 layer	Multiple	AA33535-412-A04-2-1
U1	N/A	6.53 GHz BAW Filter	Akoustis	A10165

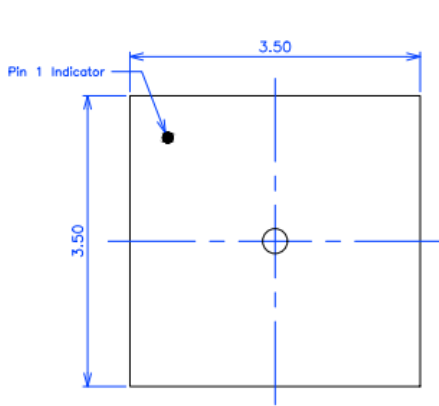
Performance Plots (Temp = 25°C unless otherwise noted)



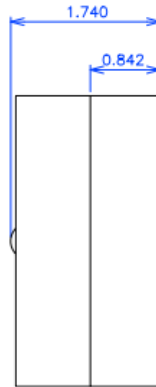
Package Drawing & Pin Description

Notes:

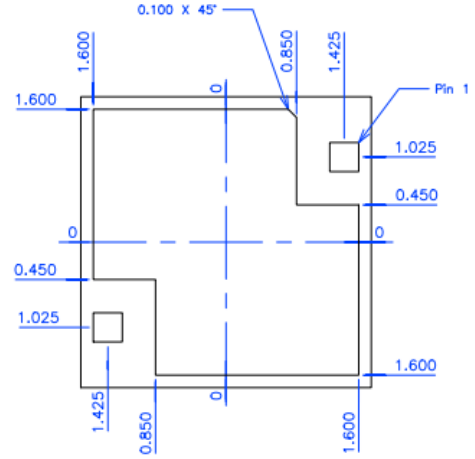
- All Units are in mm unless otherwise stated
- General Tolerance:
- Linear X.XXX = ±0.050mm
- X.XX = ±0.10mm



Top View



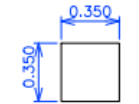
Side View



Bottom View

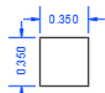
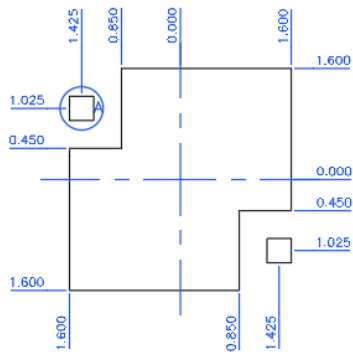
NOTES:

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



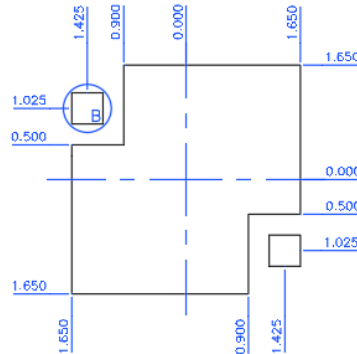
PAD: 2x
SCALE: 2x

PCB Mounting Pattern



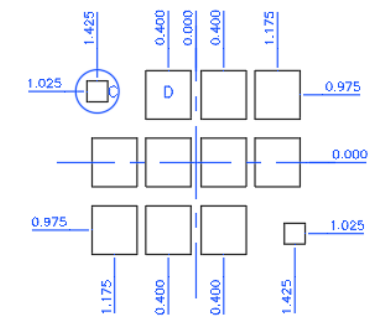
DETAIL_A
PAD
SCALE: 2x
2X THIS ROTATION

Recommended PCB
Metal Top View



DETAIL_B
PAD
SCALE: 2x
2X THIS ROTATION

Recommended Solder
Mask Opening Top View



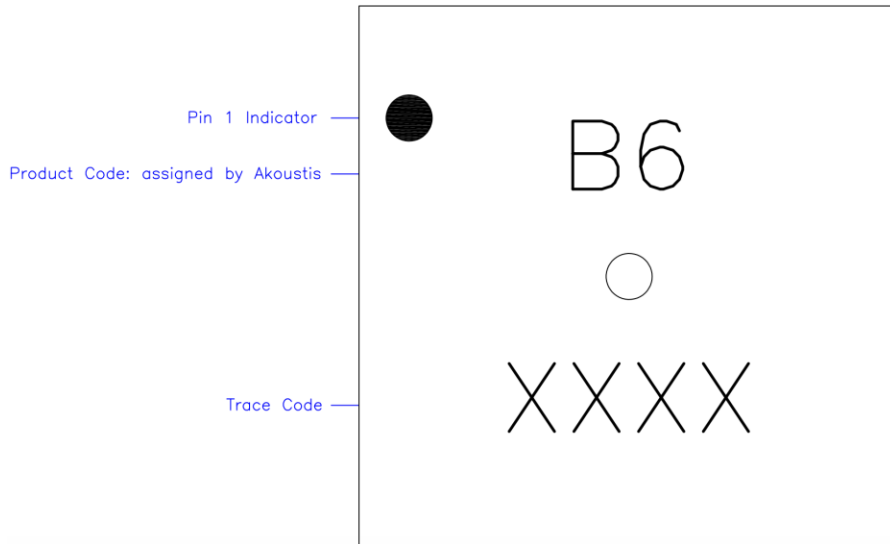
DETAIL_C
PAD
2X THIS ROTATION



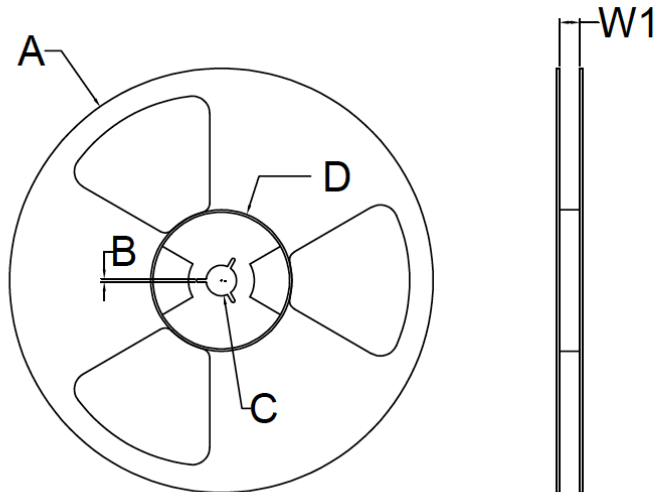
DETAIL_D
PAD
10X THIS ROTATION

Recommended Stencil
Pattern Top View

Typical Part Marking



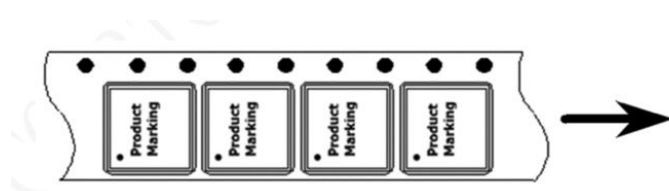
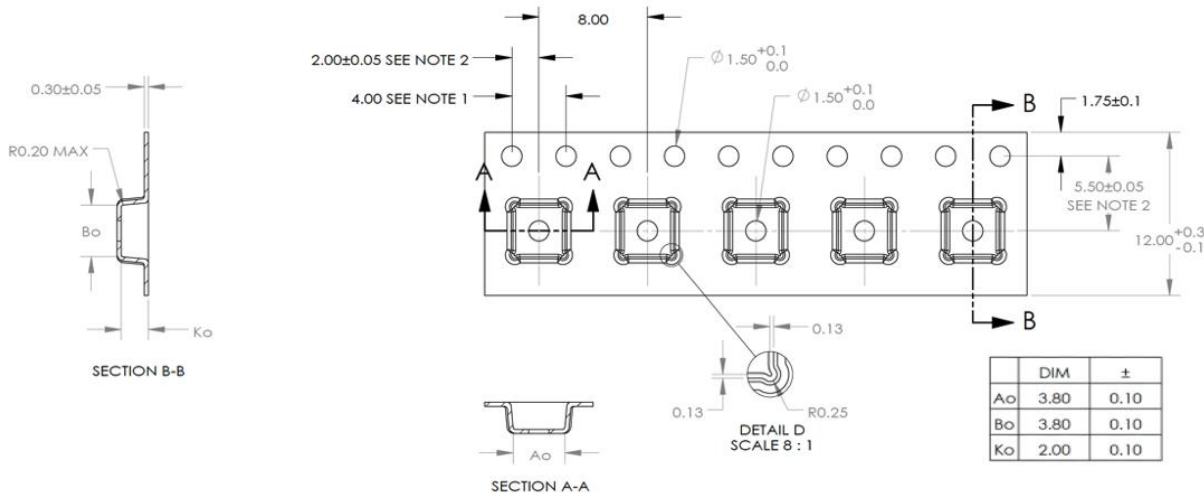
Reel Dimensions



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

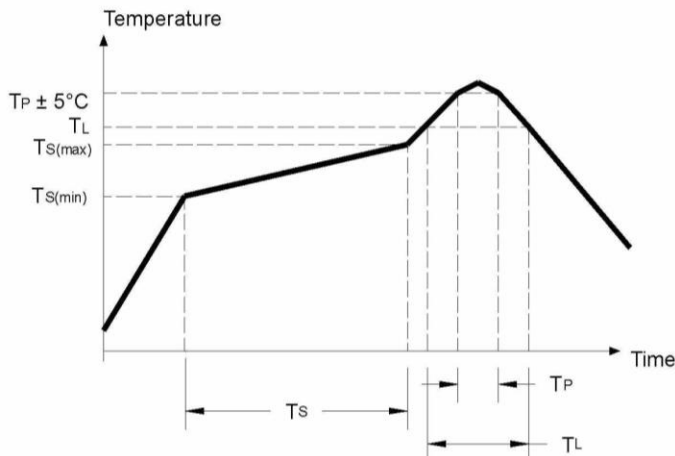
Note: 7 Inch Reel Only Has One Opening

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 without notice. Please contact Akoustis for the latest on our products and company information.

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