

# 3.5 GHz 5G Coexistence BAW Filter

# A10335

## Description

Akoustis' A10335 is a high-performance, ultra-small bandpass BAW RF Filter for use in 5G infrastructure applications covering 300 MHz of 5G n78/77 band. A10335 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 4G LTE and 5G bands. This device exhibits high-power handling capabilities necessary for demanding power requirements of the latest 5G infrastructure requirements. A10335 uses standard ceramic packaging and is compatible with high-volume, lead-free SMT soldering processes.

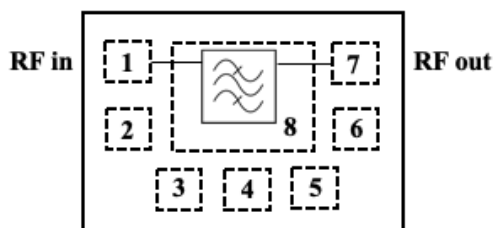
## Features

- Small form factor 2.5mm x 2.0mm x 0.8mm
- Single-ended Tx/Rx ports.
- High rejection enables coexistence with adjacent 4G LTE & 5G bands
- High power rating, maximum +30 dBm
- Low insertion loss passband filter
- Performance over -40 C to +85C
- RoHS compliant

## Applications

- 5G Infrastructure
- General Purpose Wireless

## Functional Block Diagram



Pin #	Description
1	RF Input
2	Ground
3	Ground
4	Ground
5	Ground
6	Ground
7	RF Output
8	Ground

## Ordering Information

Part Number	Description
A10335EVB	Evaluation board
A10335SP	(5) Loose pcs
A10335SR	(100) Short Reel (7" Reel)
A10335TR1	(1000) Tape & Reel (7" Reel)
A10335TR2	(2500) Tape & Reel (7" Reel)

## Absolute Maximum Ratings

Parameter		Rating
Storage Temperature		-40 to 125°C
Input Power	Signal: 5G NR, 100 MHz, PAR 7.8dB	+33 dBm
Max Temperature		-40 to 105°C

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

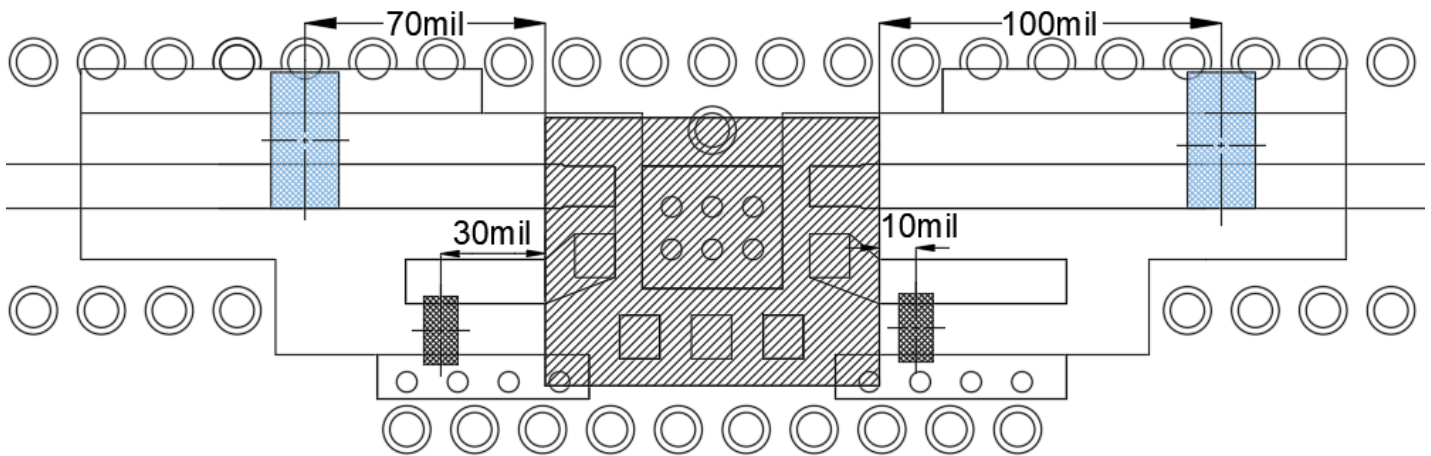
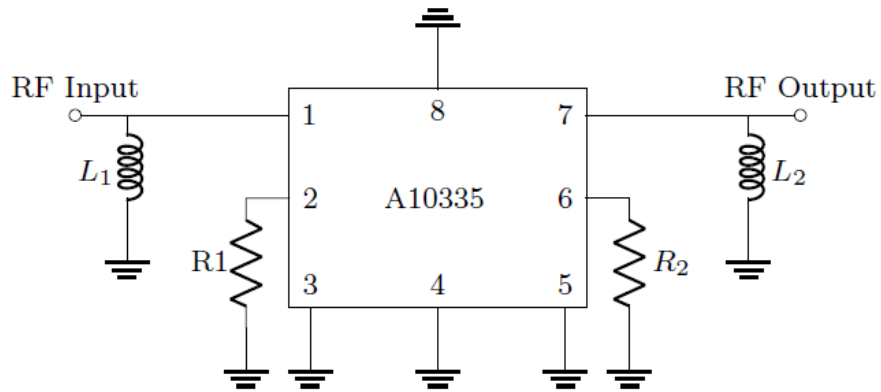
## Operating Parameters (Temp = -40°C to +85°C unless otherwise noted)

Parameter	Conditions	Units	Min.	Typ.	Max.
Passband		MHz	3300	3450	3600
Insertion Loss	3300 – 3600 MHz	dB		1.2 <sup>(1)</sup>	2.8
Amplitude Variation	3300 – 3600 MHz	dB		1.9	2.1
Attenuation	10 – 960 MHz	dB	50	51	
	960 – 1880 MHz	dB	28	30	
	1880 – 2483 MHz	dB	22	23	
	2500 – 3150 MHz	dB	21	22	
	3200 – 3265 MHz	dB	14 <sup>(2)</sup>	17	
	3635 – 3800 MHz	dB	12	13	
	3800 – 5925 MHz	dB	28	30	
	6000 – 10000 MHz	dB	5	6	
Return Loss	3300 – 3600 MHz		11	17 <sup>(1)</sup>	
Load Impedance		Ω		50	
Power Handling	5G NR, 100 MHz, PAR 7.8dB	dBm			32
2 <sup>nd</sup> Harmonic	Po=28dBm (25°C)	dBm/MHz		-38	
3 <sup>rd</sup> Harmonic	Po=28dBm (25°C)	dBm/MHz		-93	
4 <sup>th</sup> Harmonic	Po=28dBm (25°C)	dBm/MHz		-105	

Note:

1. Averaged over specified frequency at room temperature
2. Averaged over any 10MHz bandwidth

## EVB Schematic & Layout



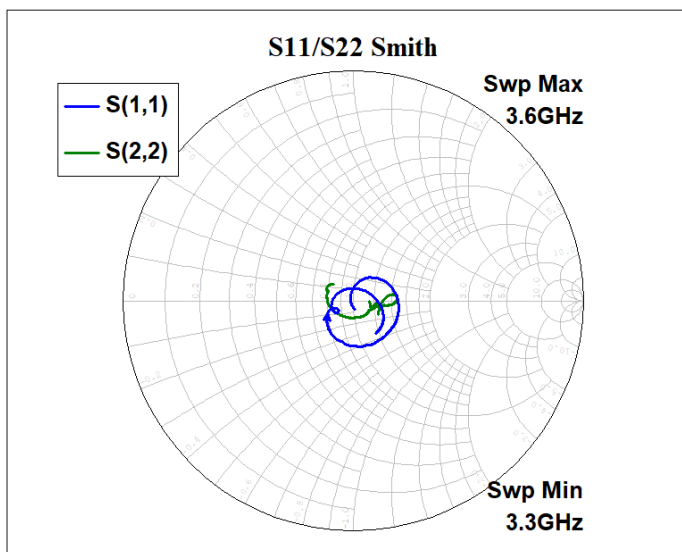
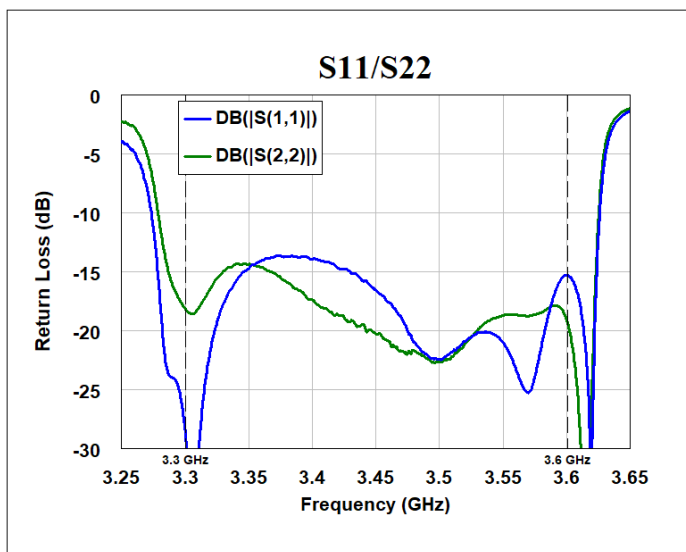
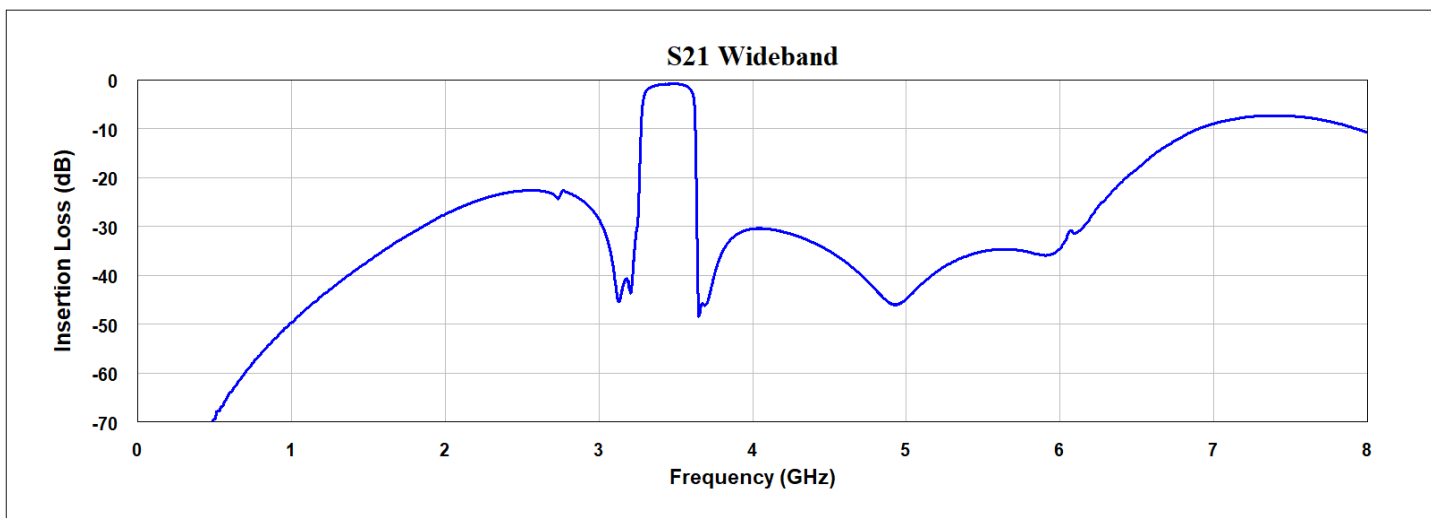
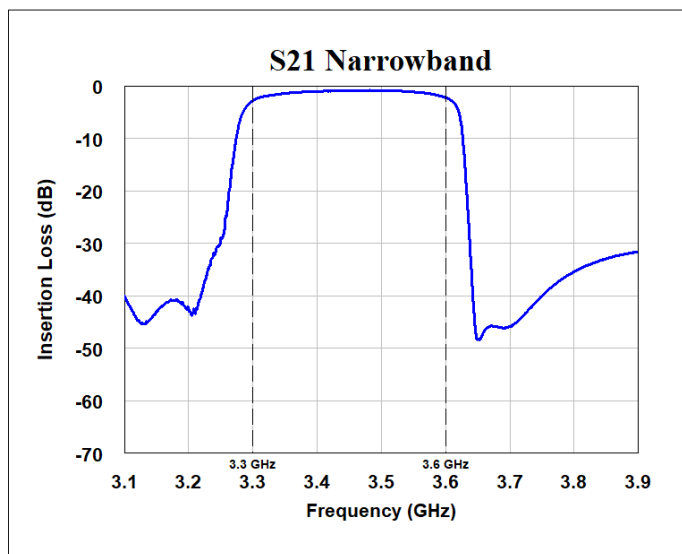
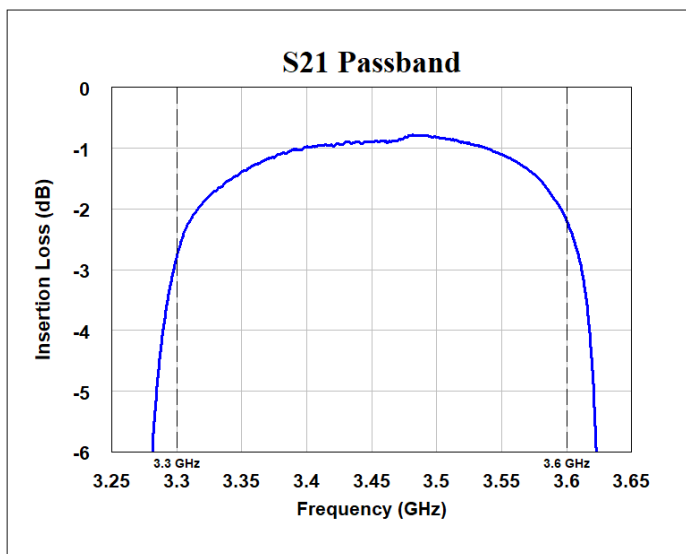
Note:

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

## Bill of Materials

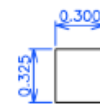
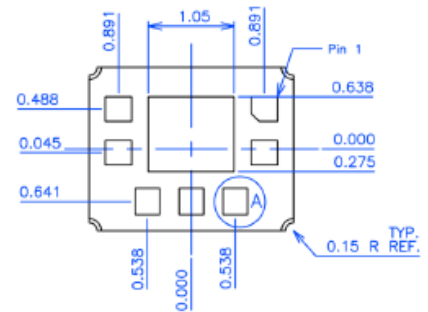
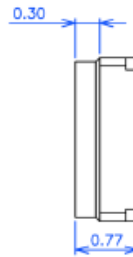
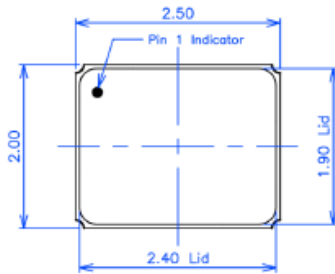
Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	4 layer	Multiple	A10335-412-RBN-1
U1	N/A	3.5 GHz BAW Filter	Akoustis	A10335
L1	2.8nH	Chip inductor, 0402 ±0.1nH	Murata	LQW15AN2N8G8ZD
L2	3.6nH	Chip capacitor, 0401 ±0.1nH	Murata	LQW15AN3N6B8ZD
R1, R2	0Ω	Chip resistor, 0201	Vishay	RCS02010000Z0ED

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



## Package Drawing and Pin Description

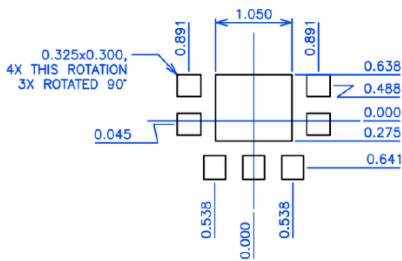
- Notes:
- All Units are in mm unless otherwise stated
  - General Tolerance:
  - Linear X.XXX =  $\pm 0.050\text{mm}$
  - X.XX =  $\pm 0.10\text{mm}$



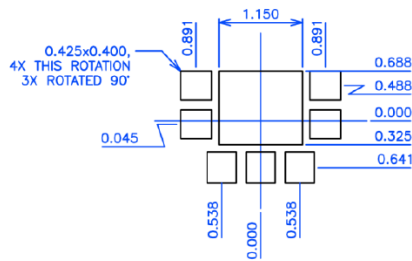
DETAIL A  
 PAD  
 SCALE: 2x  
 3X THIS ROTATION  
 4X ROTATED 90°  
 PIN 1 CHAMFER 0.150 X 45°

- NOTES:
- PLATING THICKNESS  
 ELECTRO Ni : 1.27~8.89 $\mu\text{m}$ (S/P)  
 ELECTRO Au : 0.30~1.00 $\mu\text{m}$ (S/P)

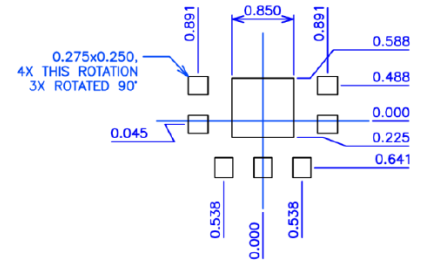
## PCB Mounting Pattern



Recommended PCB  
 Metal Top View



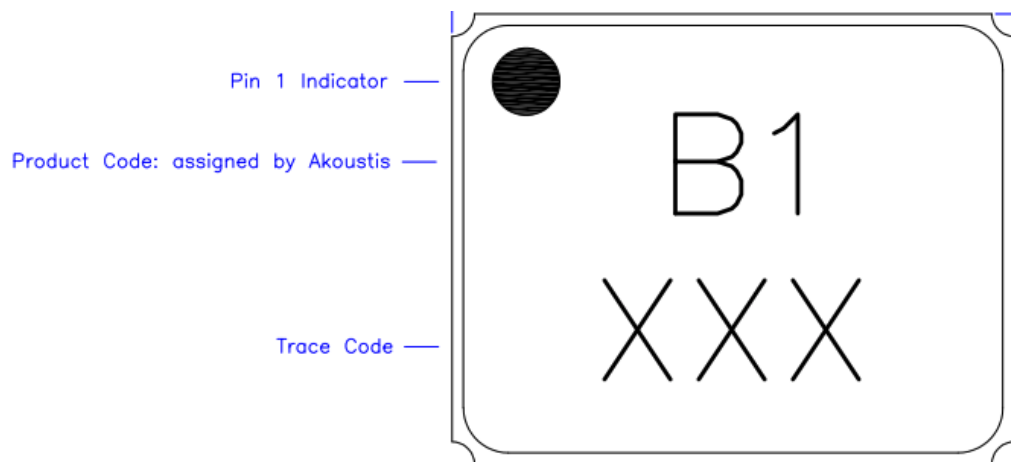
Recommended  
 Solder Mask Opening  
 Top View



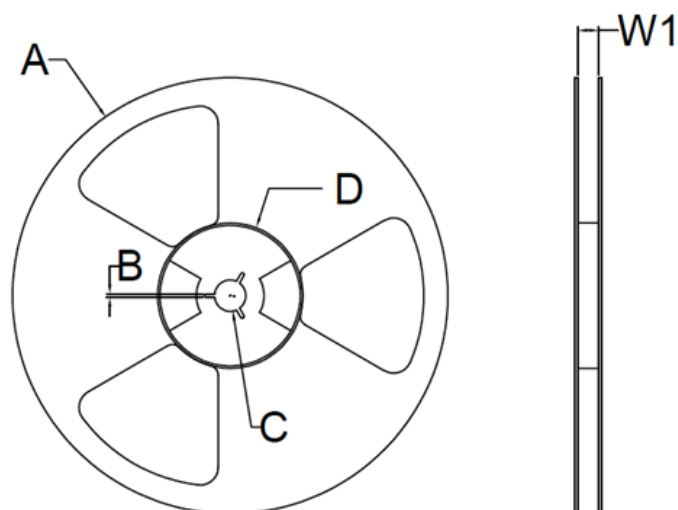
Recommended Stencil  
 Pattern Top View

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## Typical Part Marking



## Reel Dimensions



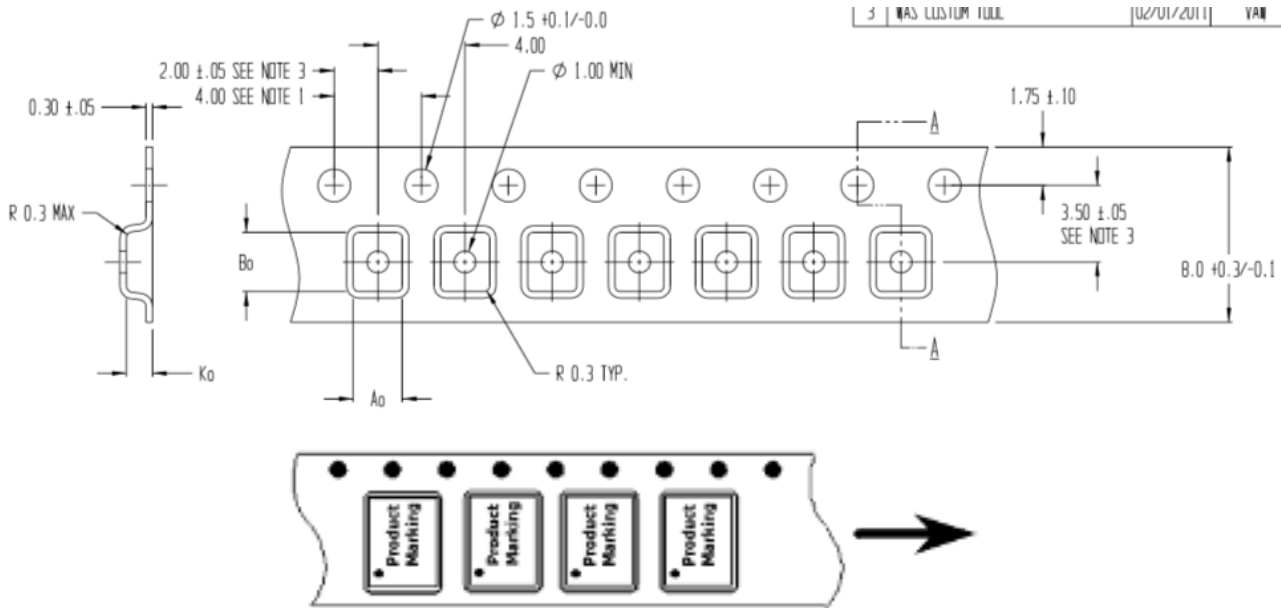
Reel Dimensions						
Reel Size	Tape Width	A	B	C	D	W1 *measured at hub
7 Inch	8 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0 +/- 2.0 mm	8.40+1.5 / -0 mm
	12 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0 +/- 2.0 mm	12.40+2.0 / -0 mm
	16 mm	180+0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0 +/- 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

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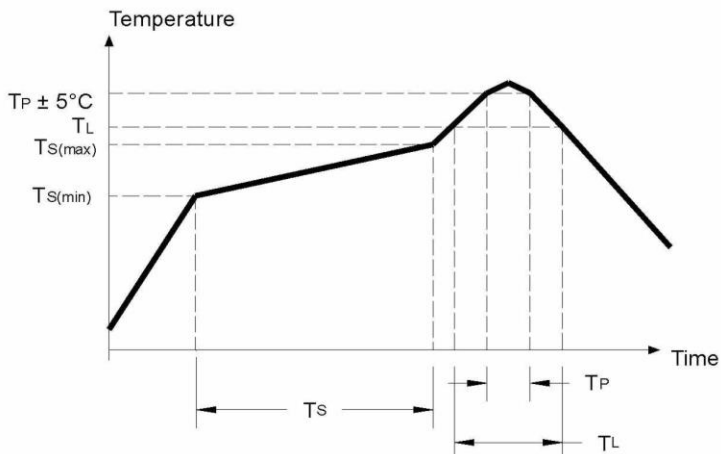
## Tape Dimension

$A_0 = 2.25$   
 $B_0 = 2.70$   
 $K_0 = 1.20$



## Recommended Solder Profile

Parameter	Eutectic Sn/Pb	Pb Free
Max Ramp Up Rate	6 Deg C/Second	6 Deg C/Second
Soak Temp Time $T_S$ (min) - $T_S$ (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



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## Product Compliance Information

### ESD Sensitivity Ratings

Human Body Model (HBM) Test

Rating: 1000V Class 1C

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

Charged Device Model (CDM)

Rating: 1000V Class C3

Standard: ANSI/ESDA/JEDEC JS-002-2014

### 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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