

## 4.9 GHz 5G Coexistence BAW Filter

A10149

### Description

Akoustis' A10149 is a high-performance, ultra-small bandpass BAW RF Filter for use in 4.9 GHz 5G applications covering 100 MHz of 5G n79 band. A10149 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 5G n77 and WiFi U-NII 1-3 bands. This device exhibits high-power handling capabilities necessary for demanding power requirements of the latest small cell requirements. A10149 uses standard ceramic packaging and is compatible with high volume, lead-free SMT soldering processes.

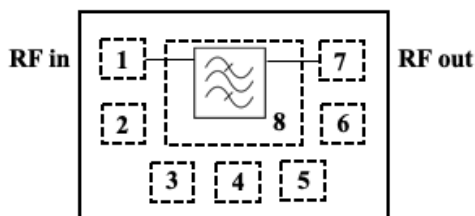
### Features

- Ultra small form factor 2.5mm x 2.0mm x 0.8mm
- Single-ended Tx/Rx ports.
- High rejection enables coexistence with adjacent 5G n77 and WiFi UNII bands
- High power rating, maximum +30dBm
- Low insertion loss passband filter
- Performance over -40 C to +85 C
- 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
A10149EVB	Evaluation board
A10149SP	(5) Loose pcs
A10149SR	(100) Short Reel (7" Reel)
A10149TR1	(1000) Tape & Reel (7" Reel)
A10149TR2	(2500) Tape & Reel (7" Reel)

## Absolute Maximum Ratings

Parameter	Conditions	Rating
Storage Temperature		-40 to 125 °C
Input Power	Signal: 5G NR, 100 MHz, PAR 7.8dB Temp: 85°C	+31 dBm

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

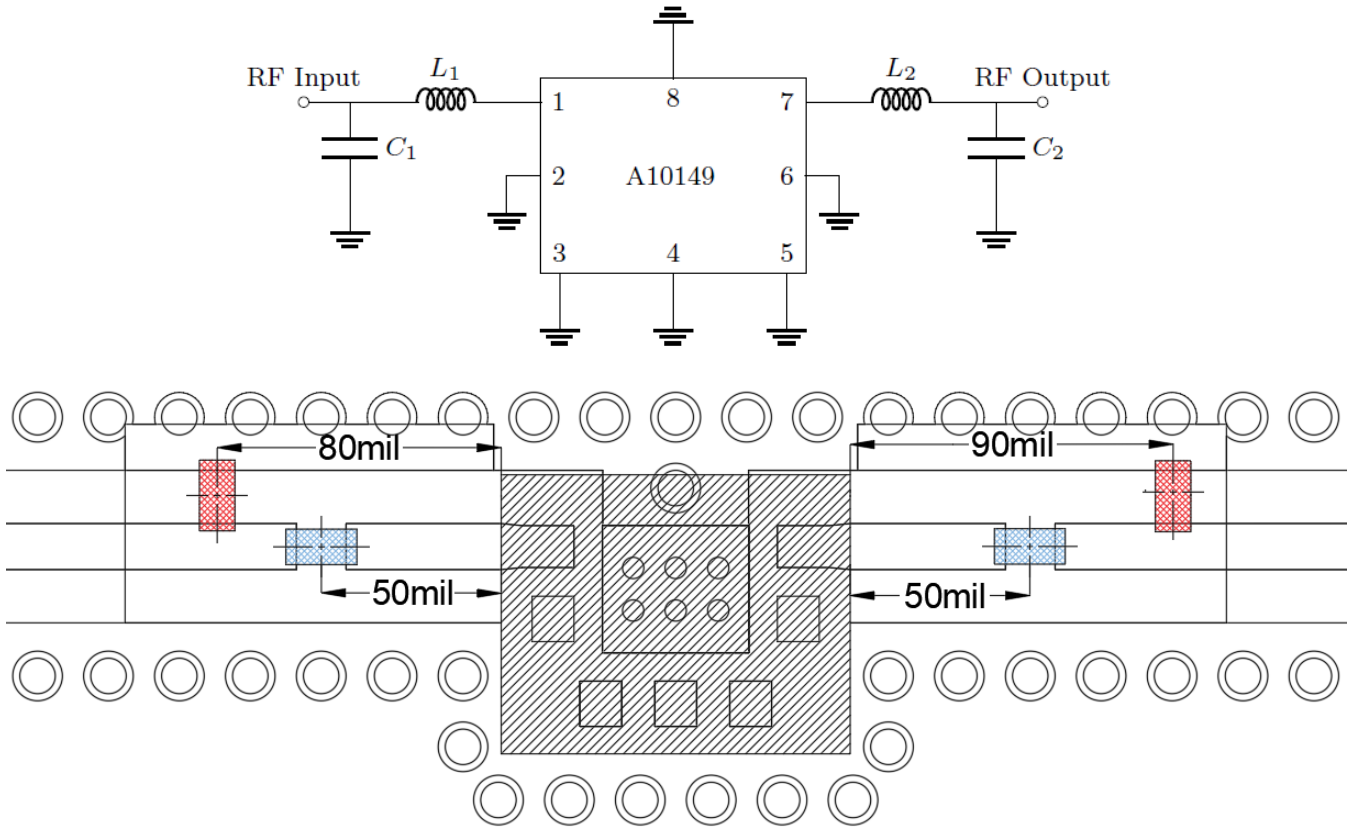
## Operating Parameters (Temp = -40°C to +85°C unless otherwise noted)

Parameter	Conditions	Units	Min.	Typ.	Max.
Passband		MHz	4800	4850	4900
Insertion Loss	4800 – 4900 MHz	dB		1.8 <sup>(1)</sup>	2.2
Amplitude Variation	4800 – 4900 MHz	dB		0.6	0.8
Attenuation	10 – 2370 MHz	dB	40	43	
	2400 – 3800 MHz	dB	37	40	
	3900 – 4650 MHz	dB	38	40	
	5150 – 5350 MHz	dB	40	43	
	5725 – 5850 MHz	dB	52	55	
	6000 – 10000 MHz	dB	44	46	
Return Loss	4800 – 4900 MHz		14	20 <sup>(1)</sup>	
Load Impedance		Ω		50	
Power Handling	5G NR, 100 MHz, PAR 7.8dB	dBm			30

Note:

1. Averaged over specified frequency at room temperature

## EVB Schematic & Layout



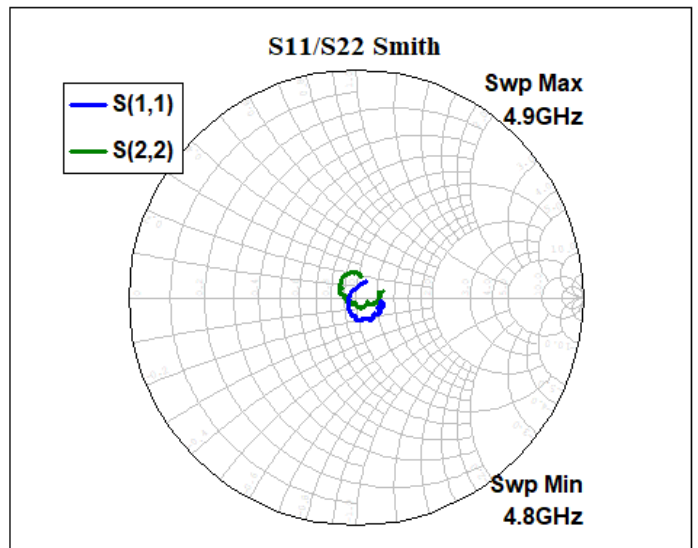
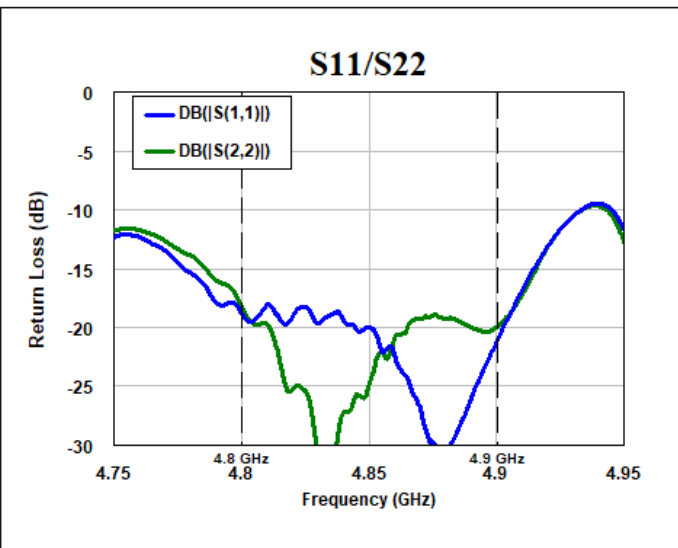
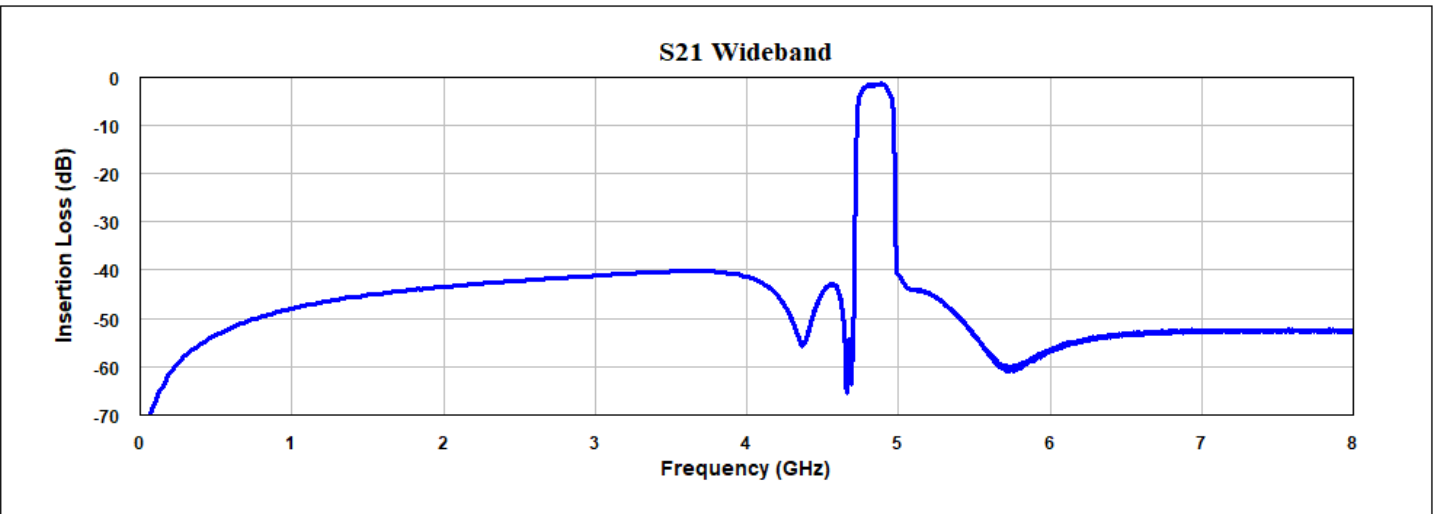
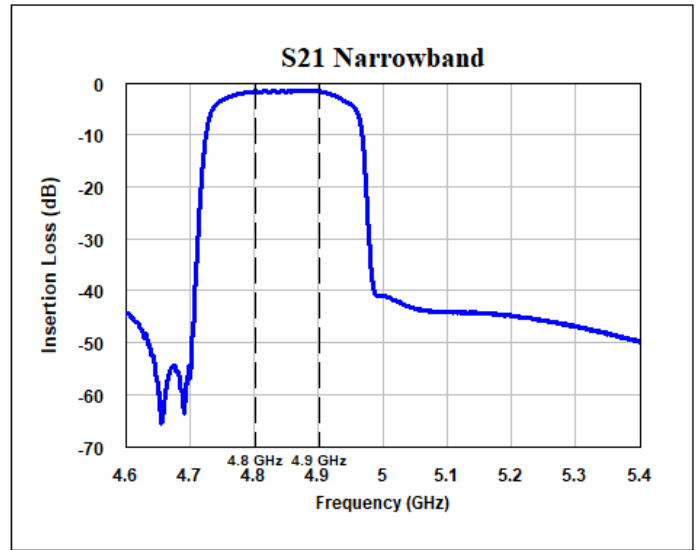
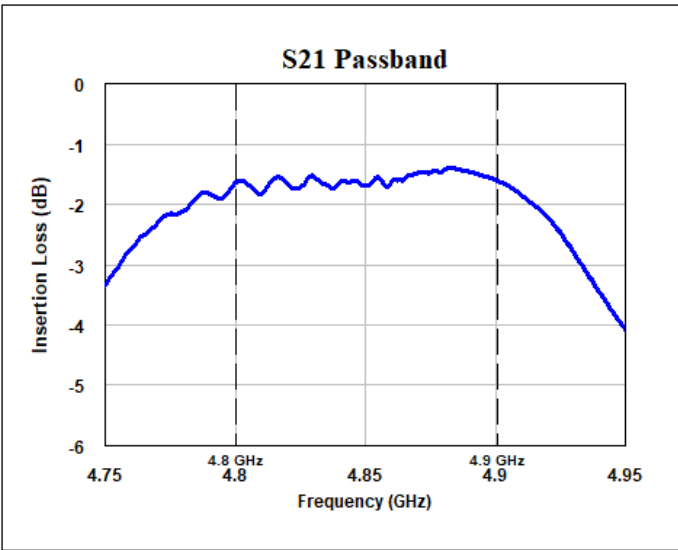
**Note:**

- 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	4.85 GHz BAW Filter	Akoustis	A10149
L1	2.0nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ2N0B02
L2	2.0nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ2N0B02
C1	0.4pF	Chip capacitor, 0201, ±0.05pF	Murata	GJM0335C1HR40WB01D
C2	0.4pF	Chip capacitor, 0201, ±0.05pF	Murata	GJM0335C1HR40WB01D

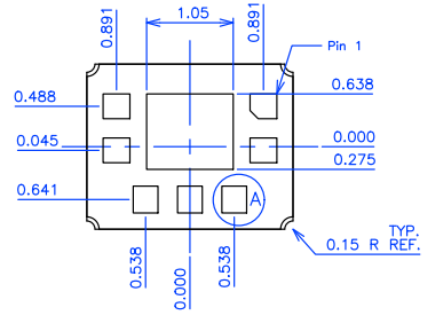
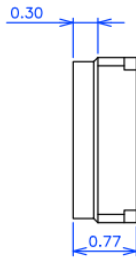
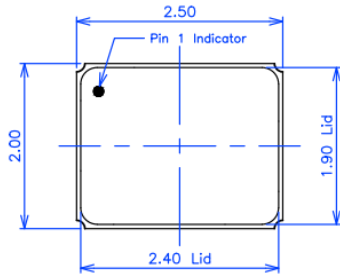
### Performance Plots (Temp = 25°C unless otherwise noted)



## Package Drawing

Notes:

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

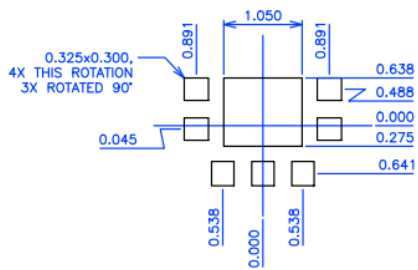


DETAIL A  
 PAD  
 SCALE: 2x  
 3X THIS ROTATION  
 4X ROTATED 90°  
 PIN 1 CHAMFER 0.150 X 45°

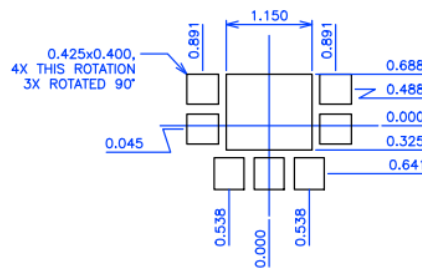
NOTES:

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

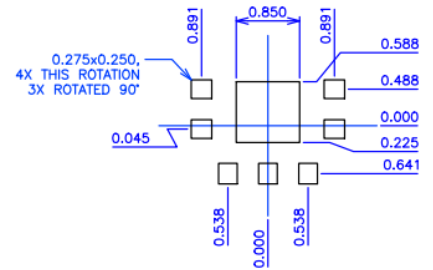
## PCB Mounting Pattern



Recommended PCB  
 Metal Top View

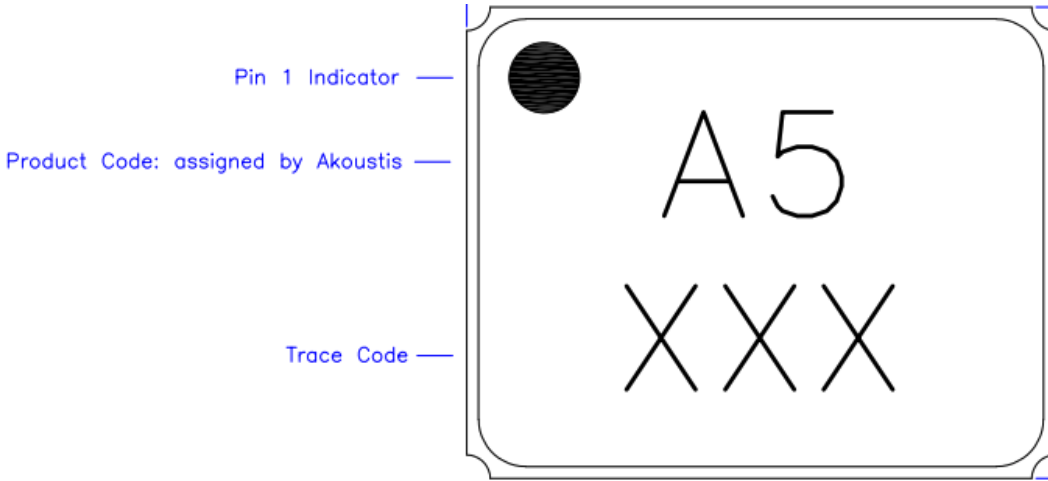


Recommended  
 Solder Mask Opening  
 Top View

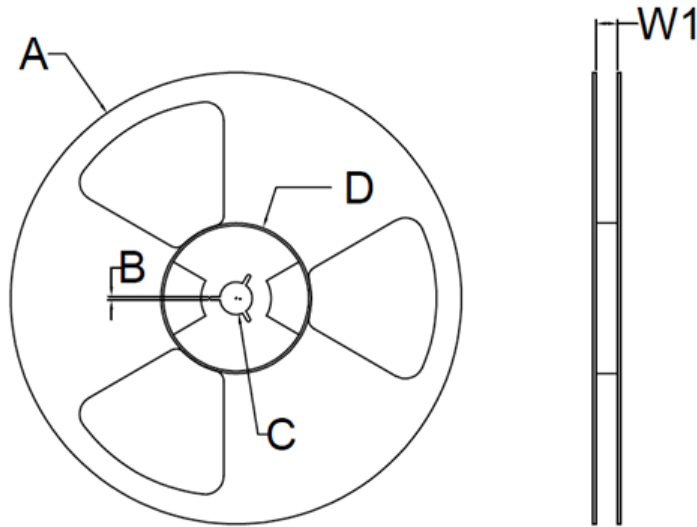


Recommended Stencil  
 Pattern Top View

## Typical Part Marking



## Reel Dimensions



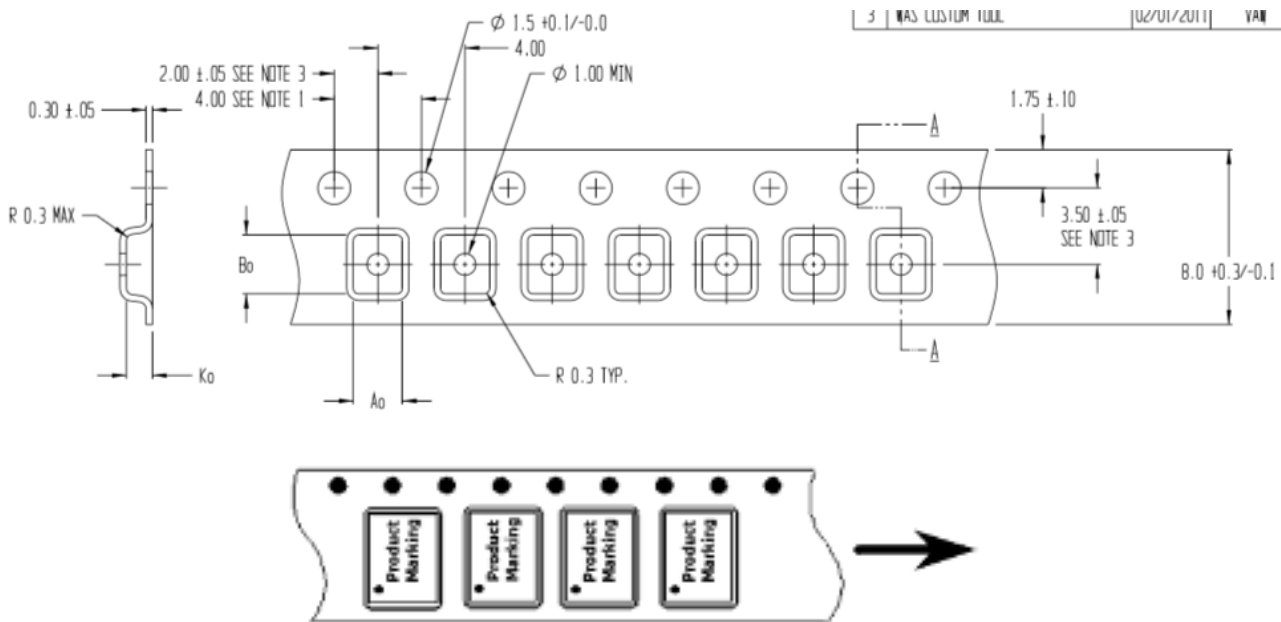
Reel Dimensions						
Reel Size	Tape Width	A	B	C	D	W1 *measured at hub
7 Inch	8 mm	180 +0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0 +/- 2.0 mm	8.40 + 1.5 / -0 mm
	12 mm	180 +0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm	60.0 +/- 2.0 mm	12.40 + 2.0 / -0 mm
	16 mm	180 +0/-2.0 mm	2.0mm +/-0.5	13.0+0.5 / -0 mm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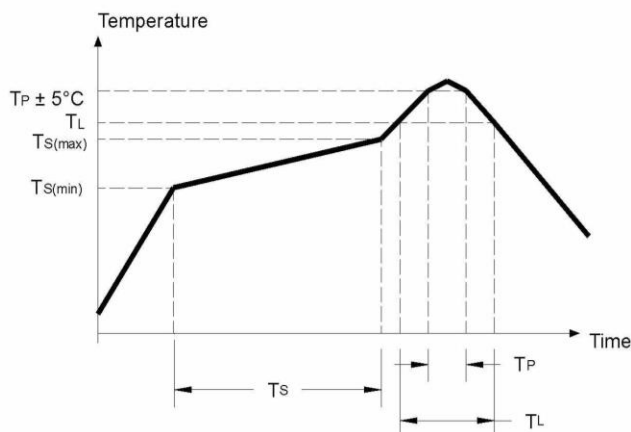
### Tape Dimension

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



### Recommended Solder Profile

Parameter	Eutectic Sn/Pb	Pb Free
Max Ramp Up Rate	6 Deg C/Second	6 Deg C/Second
Soak Temp Time $T_s(\text{min}) - T_s(\text{max})$	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



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## Product Compliance Information

### ESD Sensitivity Ratings

Human Body Model (HBM) Test

Rating: 500 V

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

Charged Device Model (CDM)

Rating: 1000 V

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.

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