5.9GHz C-V2X Coexistence BAW Filter A10159

Description

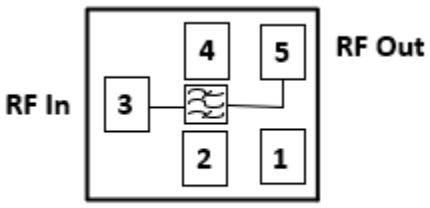
Akoustis' A10159 is a high-performance RF BAW filter for use in 5.9GHz covering B47. The A10159 utilizes Akoustis' patented, XBAW® technology to deliver differentiated filter performance. This BAW filter provides low insertion loss with ultra steep skirts to meet the stringent rejection requirements of C-V2X and DSRC standards enabling coexistence with Wi-Fi and LTE radios. The A10159 exhibits high-power handling capabilities to establish long range connectivity necessary for modern wireless communication applications. The A10159 uses standard ceramic hermetic packaging and is compatible with high volume, lead-free SMT soldering processes.

- AEC-Q200 Grade 2
- Ultra small form factor 1.1 x 0.9 x 0.43mm
- Single-ended Tx/Rx ports.
- Ultra-steep skirts for best OOB rejection to enable coexistence with Wi-Fi and LTE bands
- Low insertion loss passband filter
- Temperature range -40℃ to +105℃
- RoHS compliant, Pb-free ceramic package

Applications

- Automotive
- C-V2X Systems
- DSRC/11p High Power Systems
- Telematics / Infotainment

Functional Block Diagram



Top View

Pin #	Description
3	RF Input
5	RF Output
1,2, 4	Ground

Ordering Information

Part Number	Description
A10159EVB	Evaluation board
A10159SP	(5) Loose pcs
A10159SR	(100) Short Reel (7" Reel)
A10159TR1	(1000) Tape & Reel (7" Reel)
A10159TR2	(2500) Tape & Reel (7" Reel)

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9805-A Northcross Center Court, Huntersville, NC 28078
Datasheet: Rev 05132024
Pat. 10,256,786

Absolute Maximum Ratings

Parameter		Rating
Storage Temperature		-40 to 125 °C
Max Input Power	Signal: E-UTRA, 10MHz, 50RB, 6dB PAR	+32 dBm
Max Temperature		-40 to 105°C

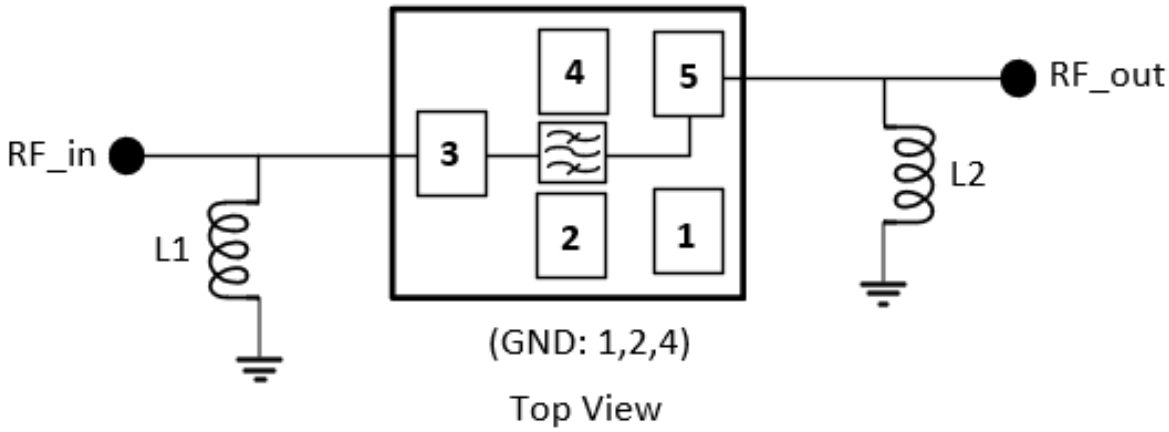
Exceeding any one limit or a combination of AMR conditions may result in damage to the device.

Operating Parameters[5] (Temp= -40°C to +105°C unless otherwise noted)

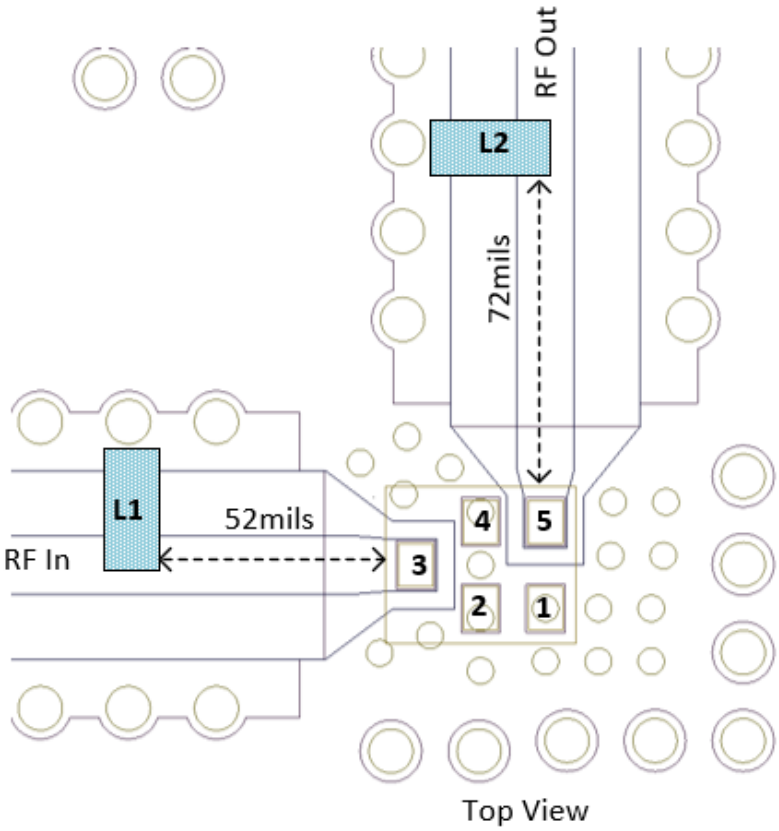
Parameter	Conditions	Units	Min.	Typ.	Max.
Passband		MHz	5855	5890	5925
Insertion Loss	5855 – 5925 MHz[4]	dB		1.5 [1]	2.2[3]
					2.5[2]
	5855 – 5925 MHz	dB			2.8[3]
					3.3[2]
Amplitude Variation	5855 – 5925 MHz	dB		0.9	
Attenuation	30 – 1000 MHz	dB	55	65	
	1000 – 2400 MHz	dB	45	50	
	2400 – 2500 MHz	dB	41	46	
	3300 – 4200 MHz	dB	30	37	
	4400 – 5000 MHz	dB	35	42	
	5170 – 5735 MHz	dB	42	50	
	5735 - 5775 MHz	dB	34	40	
	5775 - 5795 MHz	dB	27[2]	38	
	5795 – 5815 MHz	dB	10[2]	20[2]	
	6105 - 6250 MHz	dB	27	30	
	6250 - 7125 MHz	dB	30	35	
	11710 - 11850 MHz	dB	40	45	
	17565 - 17775 MHz	dB	8	12	
Return Loss	5855 – 5925 MHz	dB	10	15	
Load Impedance		Ω		50	
Power Handling	E-UTRA, 10MHz, 50RB, 6dB PAR	dBm			29

Notes: 1) Averaged over specified frequency at 25C; 2) Averaged over 10MHz; 3) Averaged over 20MHz; 4) For temperature >25C; 5) Performance based on Akoustis EVB

EVB Schematic



EVB Layout



Notes:

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

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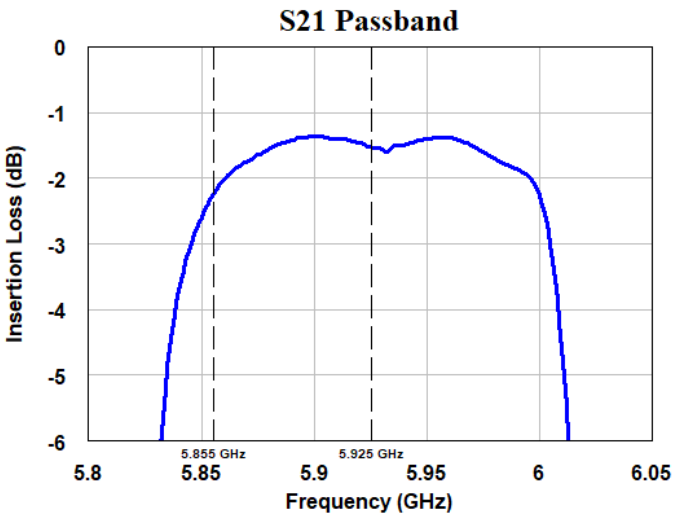
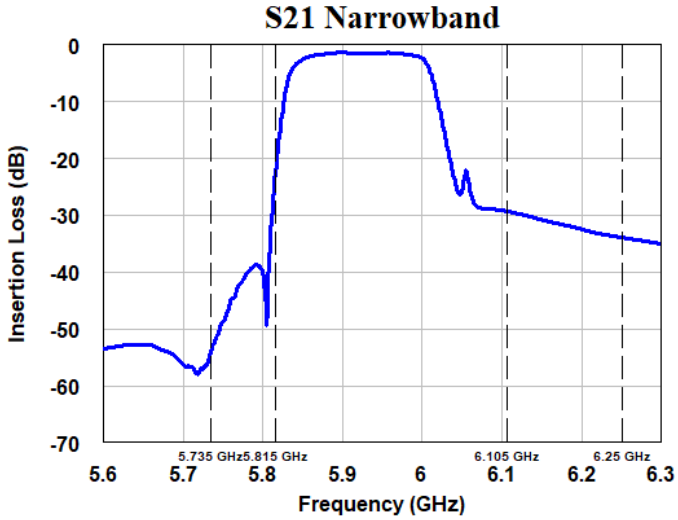
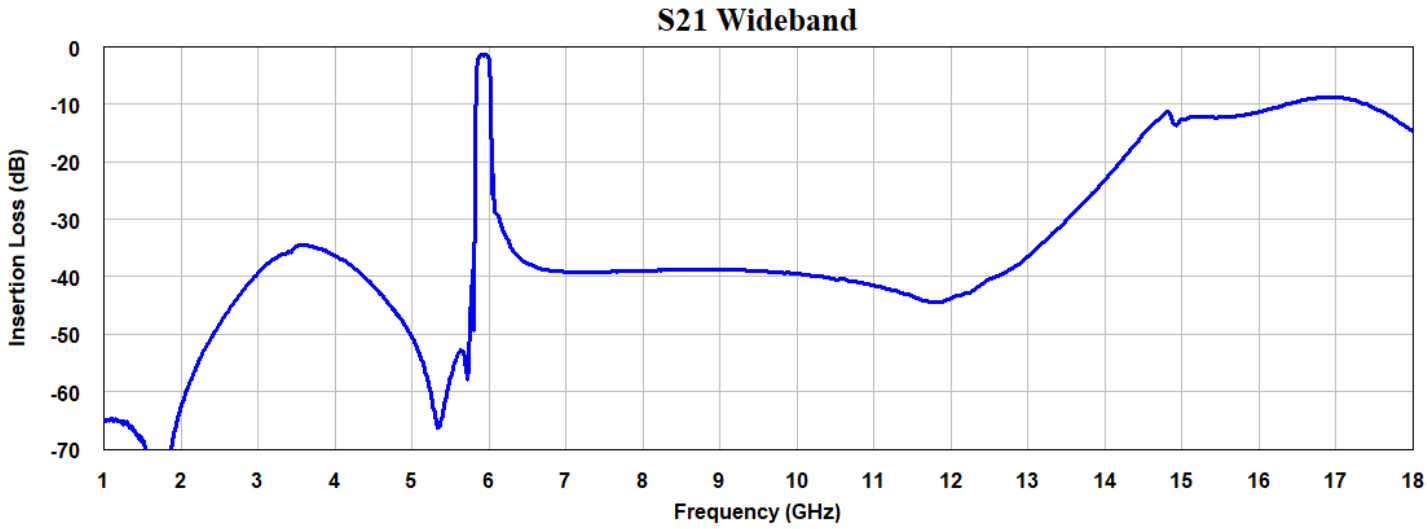
Bill of Materials

Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	4 layer	Multiple	AA71109-412-A10-1-1
U1	N/A	5.89GHz Wi-Fi Filter	Akoustis	A10159
L1	1.8nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ1N8B02D
L2	1.9nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ1N9B02D

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







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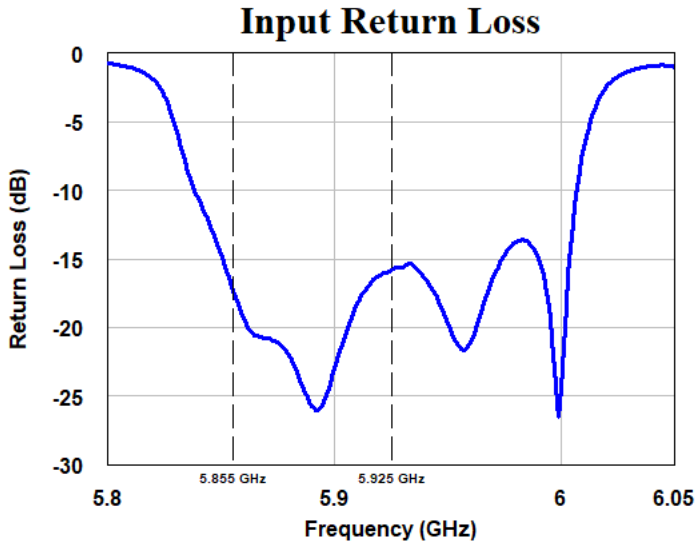
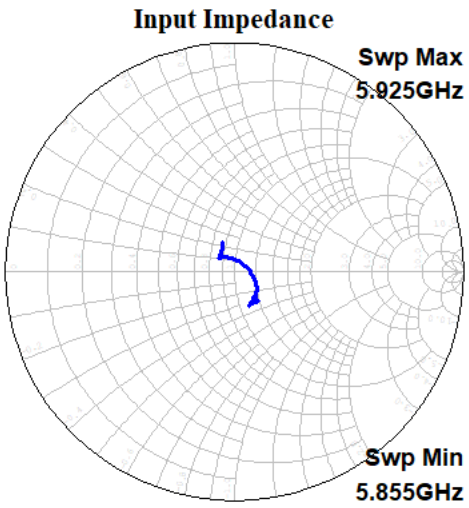
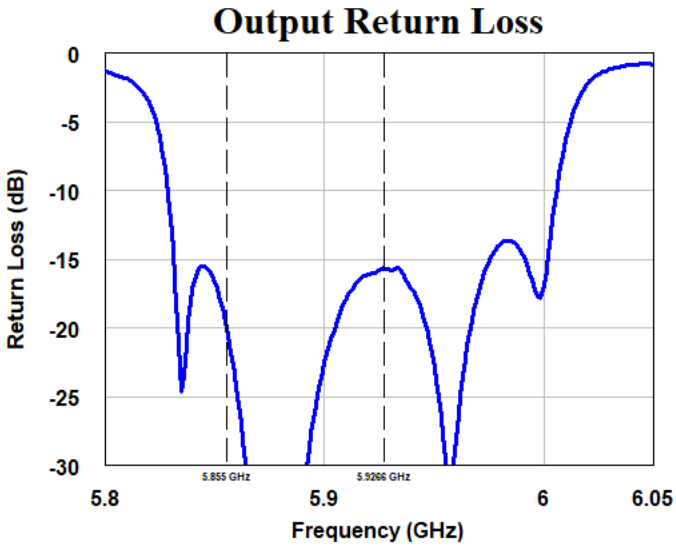
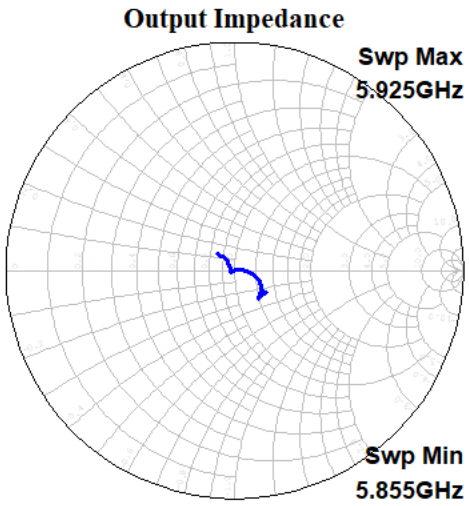
Performance Plots…continue (Temp = 25°C unless otherwise noted)









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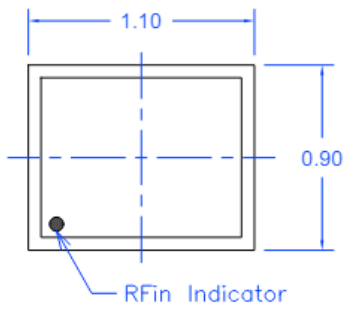
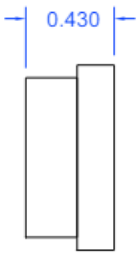
Package Drawing & Pin Indicator

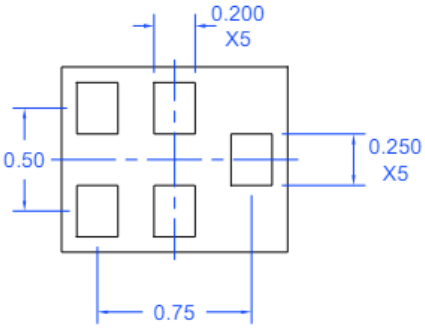
Notes:
- All Units are in mm unless otherwise stated
- General Tolerance:
  Linear X.XXX = ±0.050mm
  X.XX = ±0.10mm



Top View



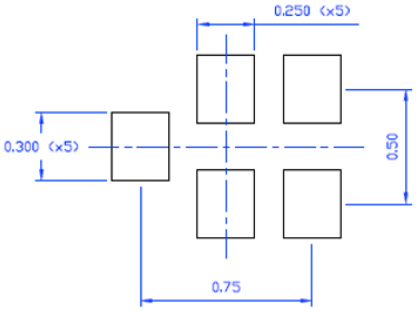
Side View



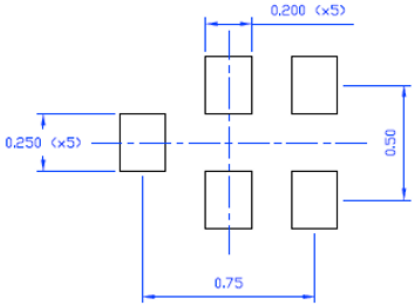
Bottom View

Recommended PCB Patterns

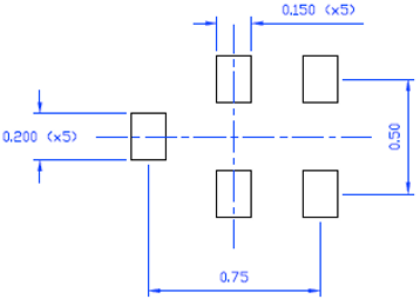
Recommended PCB Metal Top View



Recommended Solder Mask Opening Top View



Recommended Stencil Pattern Top View



Notes:
- All Units are in mm Unless Otherwise Stated
- General Tolerance:
  Linear X.XX = ±0.050mm
  X.XXX = ±0.10mm

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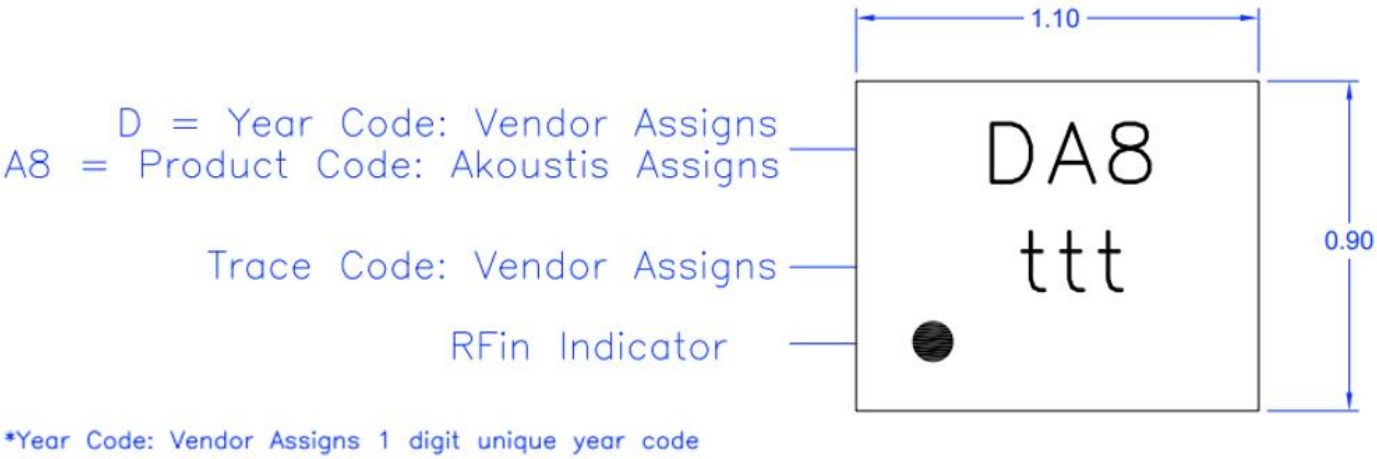
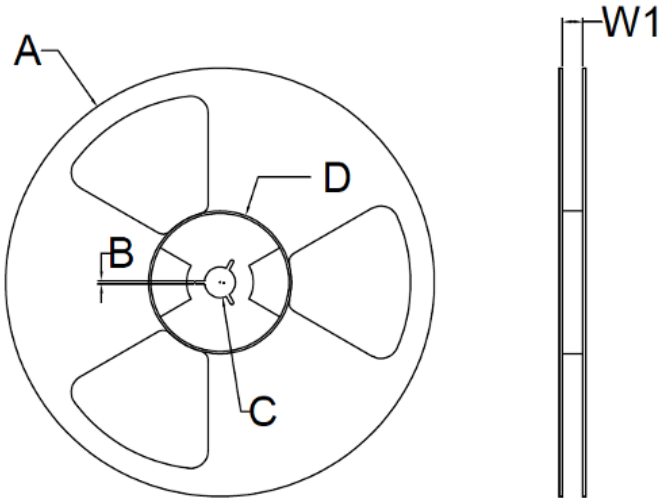
Typical Part Marking



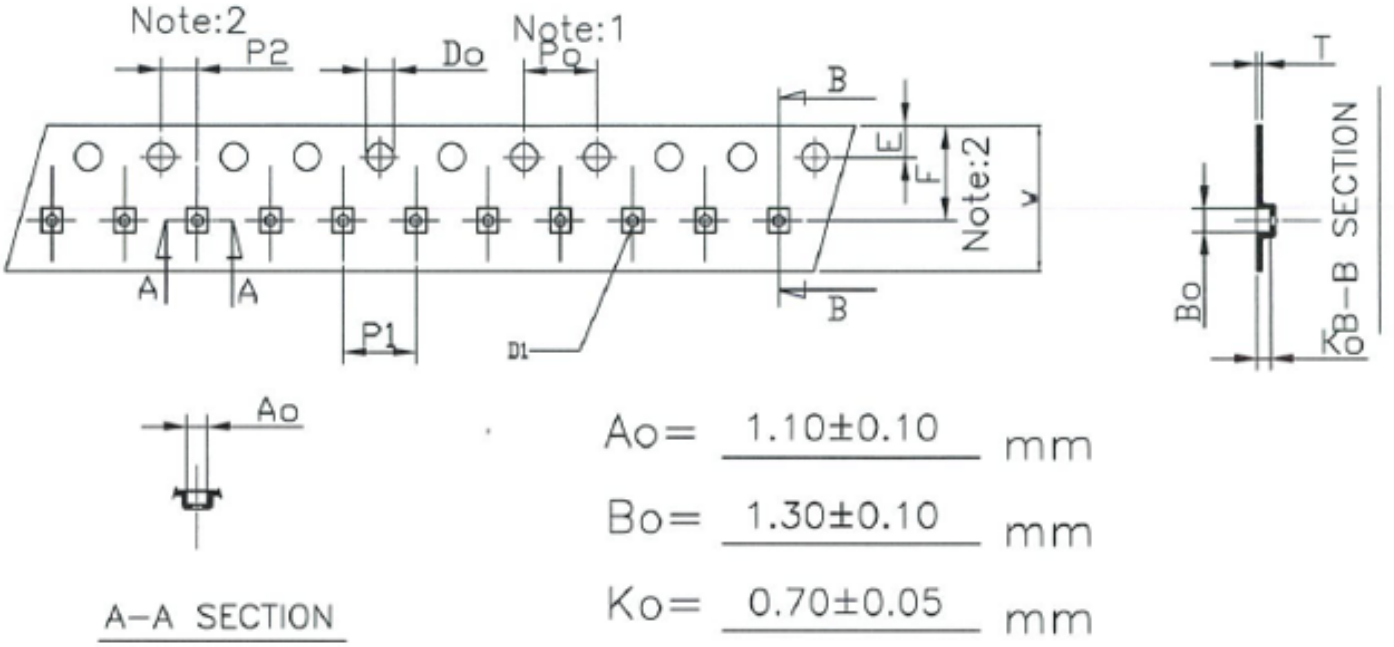
Reel Dimensions



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



Ao= 1.10±0.10 mm

Bo= 1.30±0.10 mm

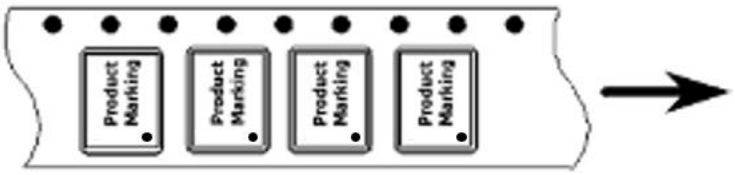
Ko= 0.70±0.05 mm

Unit: mm

Symbol	Spec.
Po	4.0±0.10
P1	4.0±0.10
P2	2.0±0.05
Do	$1.50^{+0.1}_{-0}$
D1	0.60±0.05
E	1.75±0.10
F	3.50±0.05
10Po	40.0±0.10
W	8.0±0.20
T	0.25±0.02

Notes:

1. 10 Sprocket hole pitch cumulative tolerance is ± 0.1mm
2. Pocket position relative to sprocket hole measured as true position of pocket not pocket hole
3. Ao and Bo measured on a place 0.3mm above the bottom of the pocket
4. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier
5. Carrier camber shall be not than 1mm per 100mm through a length of 250mm



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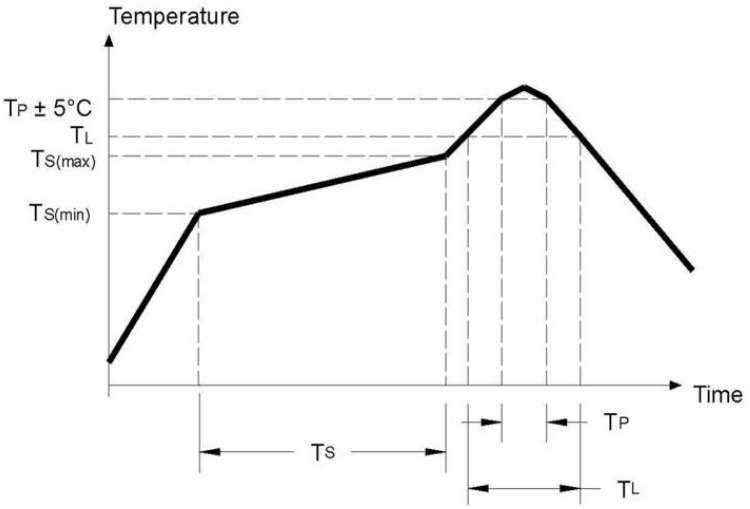
Recommended Solder Profile

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



Product Compliance Information

ESD Sensitivity Ratings

Human Body Model (HBM) Test
Rating: Class 1B
Standard: ANSI/ESDA/JEDEC JS-001-2017

Charged Device Model (CDM)
Rating: Class C3
Standard: ANSI/ESDA/JEDEC JS-002

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

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