6.1 GHz Wi-Fi 6E & 7 Coexistence BAW Filter A10161

Description

Akoustis' A10161 is a high-performance, wide bandwidth BAW RF Filter for use in WiFi 6E & 7 applications covering portions of U-NII-5 band. A10161 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 4 & U-NII-6 thru 8. This device exhibits high-power handling capabilities necessary for demanding power requirements of the latest WiFi 6E standards. A10161 uses standard laminate packaging and is compatible with high volume, lead-free SMT soldering processes.

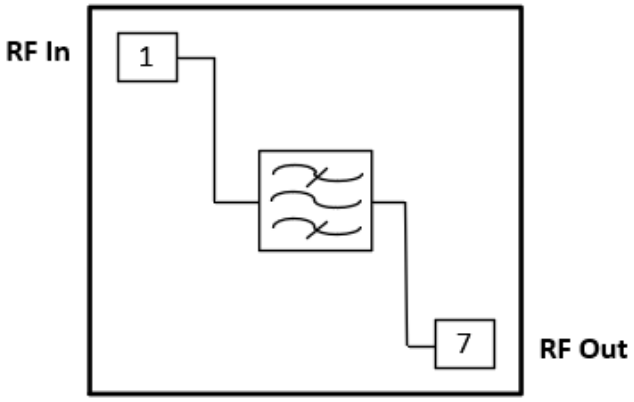
Features

- Small form factor 1.6mm x 1.8mm x 0.63mm
- Single-ended Tx/Rx ports.
- Passband covering 320 MHz
- High rejection enables coexistence with adjacent WiFi UNII bands
- High power rating
- Low insertion loss bandpass filter
- Temperature range -20C to +95C
- RoHS compliant, Pb-free package

Applications

- WiFi 6E & 7 tri and quad band routers, integrated cable modem
- WiFi 6E & 7 tri and quad band Access Points

Functional Block Diagram



Ordering Information

Part Number	Description
A10161EVB	Evaluation board
A10161SP	(5) Loose pcs
A10161SR	(100) Short Reel (7" Reel)
A10161TR1	(1000) Tape & Reel (7" Reel)
A10161TR2	(2500) Tape & Reel (7" Reel)

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Datasheet: Rev 08282024
Pat. 10,256,786

Absolute Maximum Ratings

Parameter	Conditions	Rating
Storage Temperature		-40 to 125 °C
Max Input Power	Signal: OFDM MCS0, 160MHz, PAR 10dB	31 dBm
Max Temperature		-40 to 105°C

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

Operating Parameters[7] (Temp = -20°C to 95 °C unless otherwise noted)

Parameter	Conditions	Units	Min.	Typ.	Max.
Passband		MHz	5945	6105	6265
Insertion Loss	5945 – 6265 MHz[5]	dB		2.9[1]	4.2[3]
	5965 – 6265 MHz[5]	dB		2.6[1]	5.6[2]
	5945 – 5965 MHz[5]	dB		6.1[1]	7.1[2]
Amplitude Variation	5945 – 6265 MHz[4]	dB		3.8	
Attenuation	30 – 2700 MHz	dB	44	49	
	3300 – 4200 MHz	dB	42	47	
	4200 – 4900 MHz	dB	42	47	
	5170 – 5330 MHz	dB	45	55	
	5330 – 5490 MHz	dB	45	60	
	5490 – 5730 MHz	dB	54	59	
	5735 – 5795 MHz	dB	58	63	
	5795 – 5835 MHz	dB	60	67	
	5835 – 5875 MHz	dB	60	65	
	5875 – 5895 MHz	dB	55[6]	65	
	6525 – 7125 MHz	dB	45	54	
	11890 – 12530 MHz	dB	30	48	
	17835 – 18795 MHz	dB	30	46	
Return Loss	5945 – 6265 MHz	dB	10[4]	15[1]	
Load Impedance		Ω		50	
Power Handling:	OFDM MCS0, 160MHz, PAR 10dB	dBm			29

Notes: 1) Averaged over specified frequency at 25C; 2) Averaged over 20MHz channel; 3) Averaged over 160MHz channel; 4) Average over passband; 5) For temperature > 25C; 6) @ 50C; 7) Performance based on Akoustis EVB.

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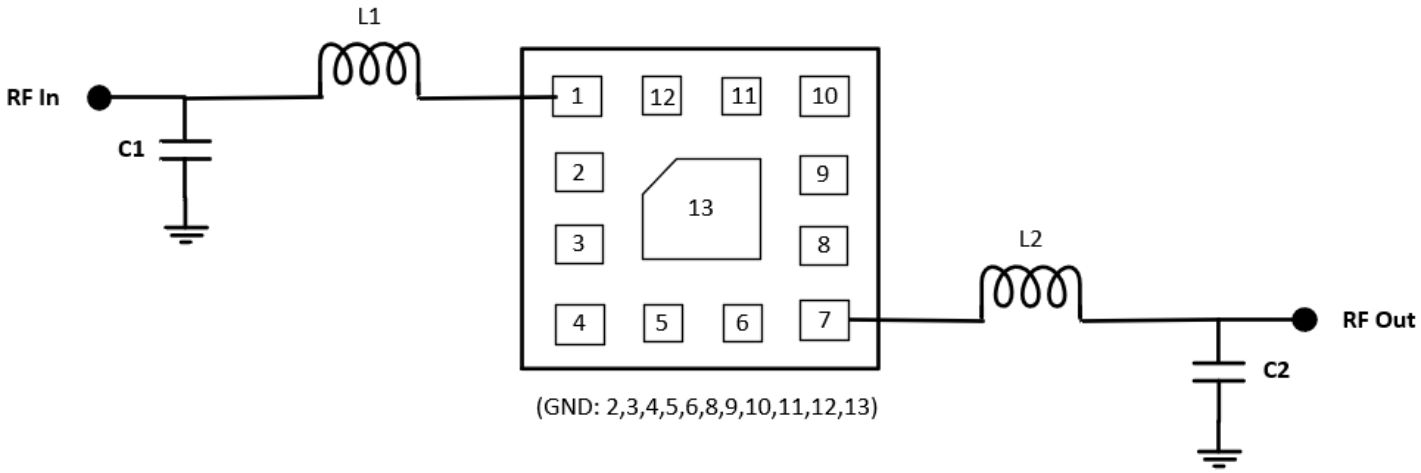
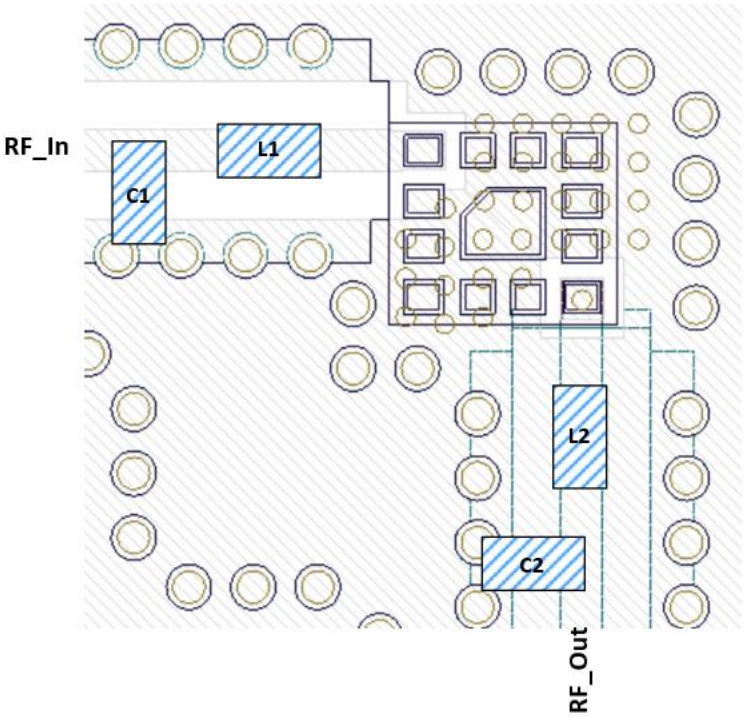
EVB Schematic & Layout





Notes:

1) Center ground pad via: 6mil; outer via: 10mil
2) “RF in” trace located on bottom layer
3) Place tuning components as close as possible to filter package
4) Emulate Akoustis EVB as close as possible, particularly the via ground patttern

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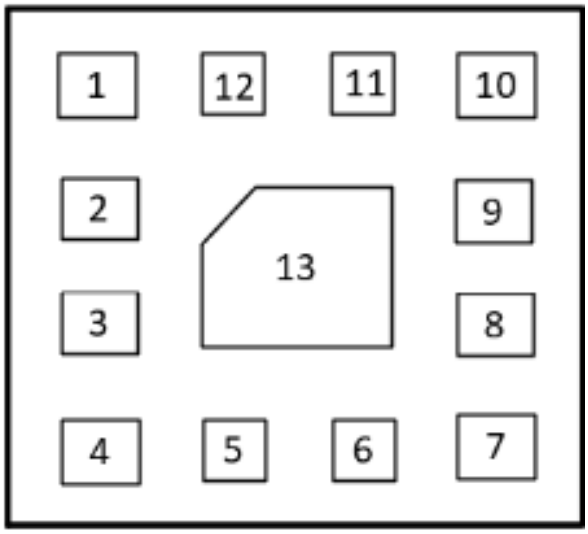
Bill of Materials

Reference Des.	Value	Description	Manufacturer	Part Number
PCB	N/A	Multi layer	Multiple	AA41816_412_A10_5_1
U1	N/A	6.1 GHz BAW Filter	Akoustis	A10161
C1	0.1pF	Chip inductor, 0201, ±0.05nH	Murata	GJM0335C1ER10BB01D
L1	1.5nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ1N5W02D
L2	1.3nH	Chip inductor, 0201, ±0.05nH	Murata	LQP03HQ1N3W02D
C2	0.24pF	Chip inductor, 0201, ±0.05nH	Murata	GJM0335C1ER24BB01D

Pin Description



Top View

Pin	Name	Description
1	RF In	TX (high power input)
7	RF Out	Antenna
2, 3, 4, 5, 6**, 8, 9, 10, 11, 12, 13**	GND	Ground

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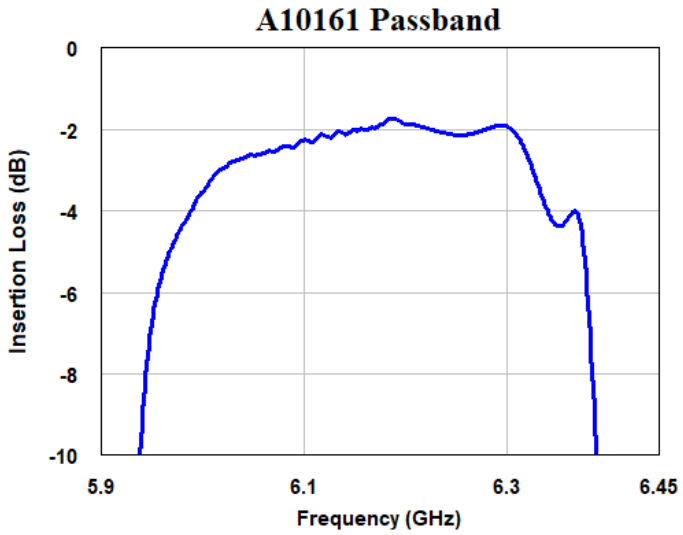
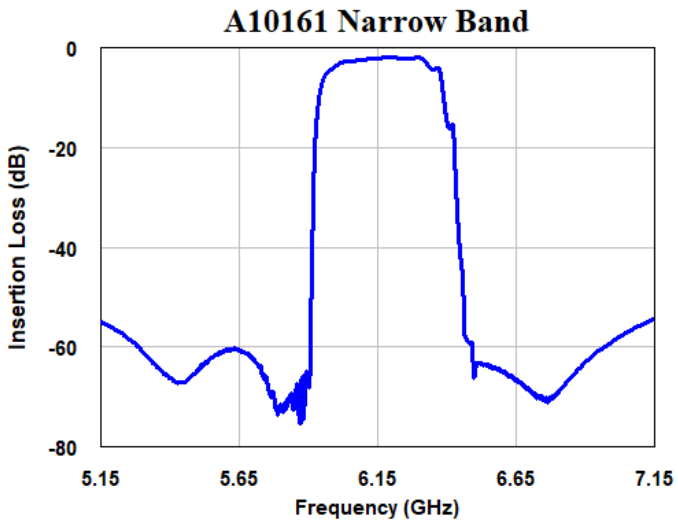
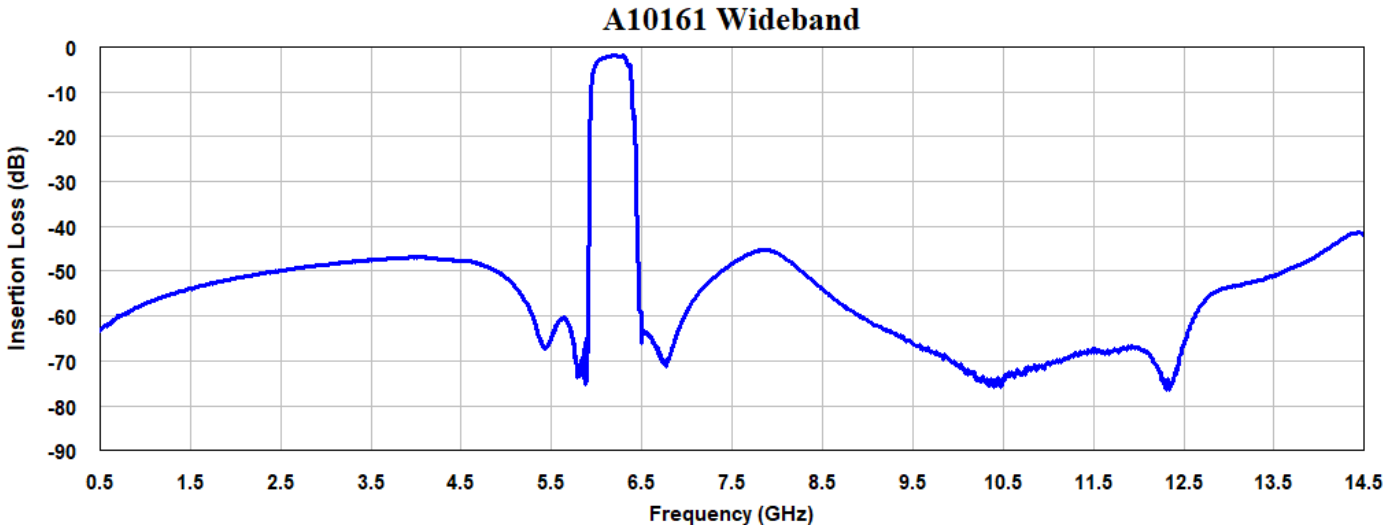
Performance Plots (Temp = 25°C unless otherwise noted)







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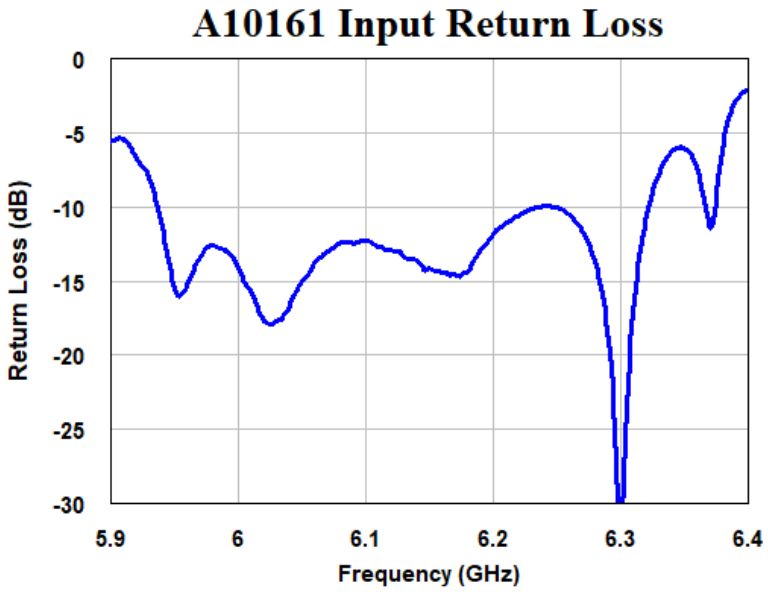
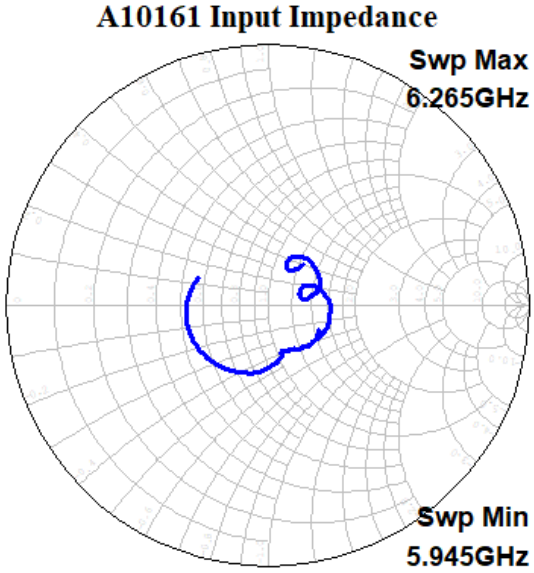
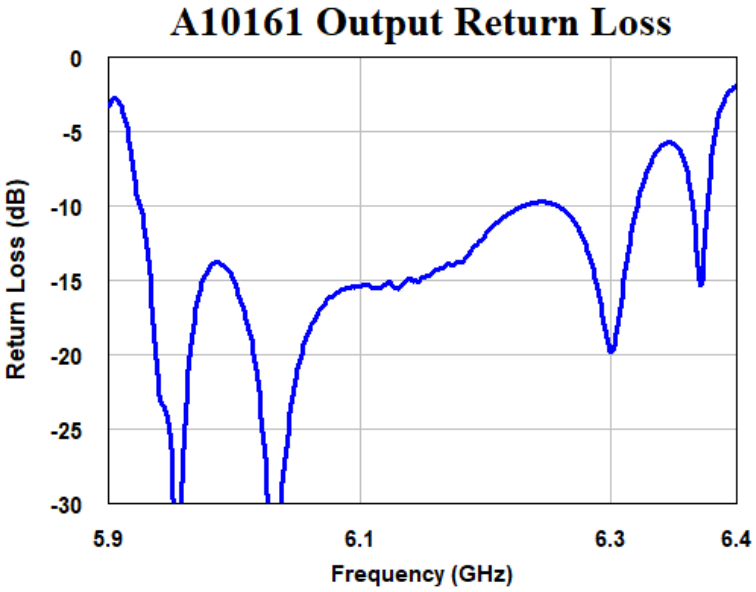
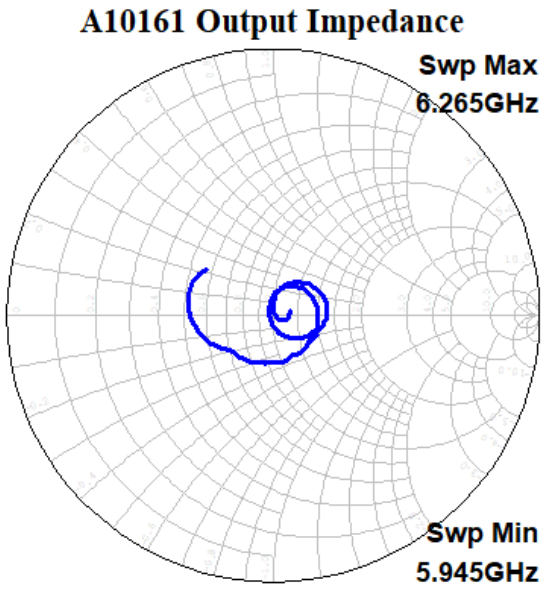
Performance Plots…continue (Temp = 25°C unless otherwise noted)









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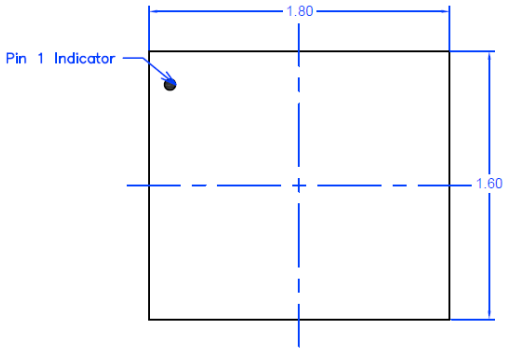
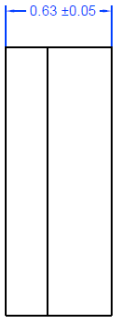
Package Outline Drawing (POD)

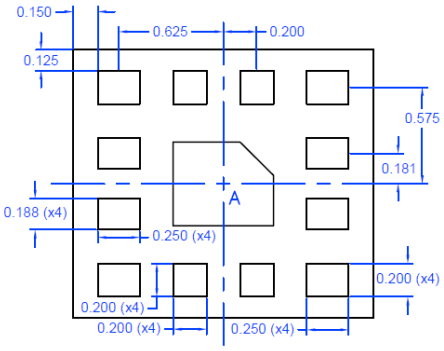
- All units in mm

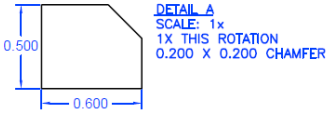


Top View



Side View



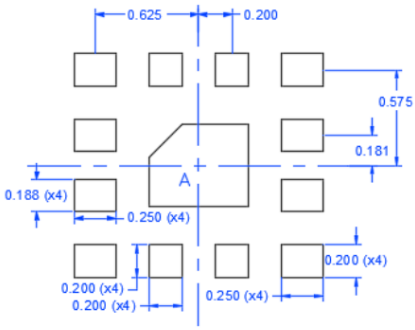


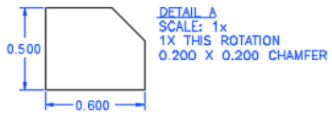
Bottom View

NOTES:

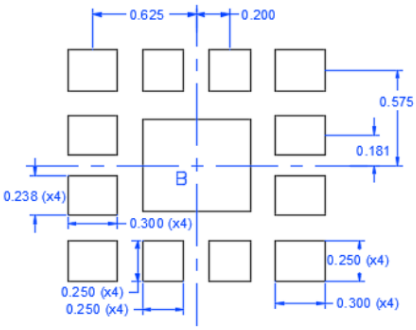
1. Terminal Finish:
   Electroless Ni/Electroless Pd/Immersion Au

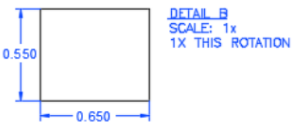
PCB Mounting Pattern



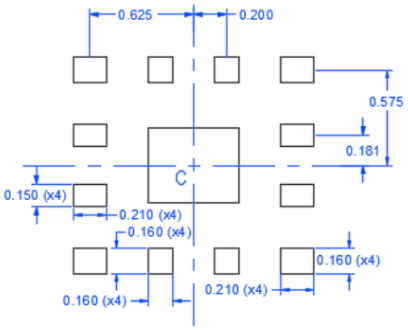


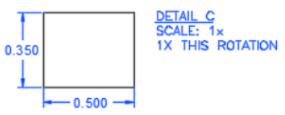
Recommended PCB Metal Top View





Recommended Solder Mask Opening Top View





Recommended Stencil Pattern Top View

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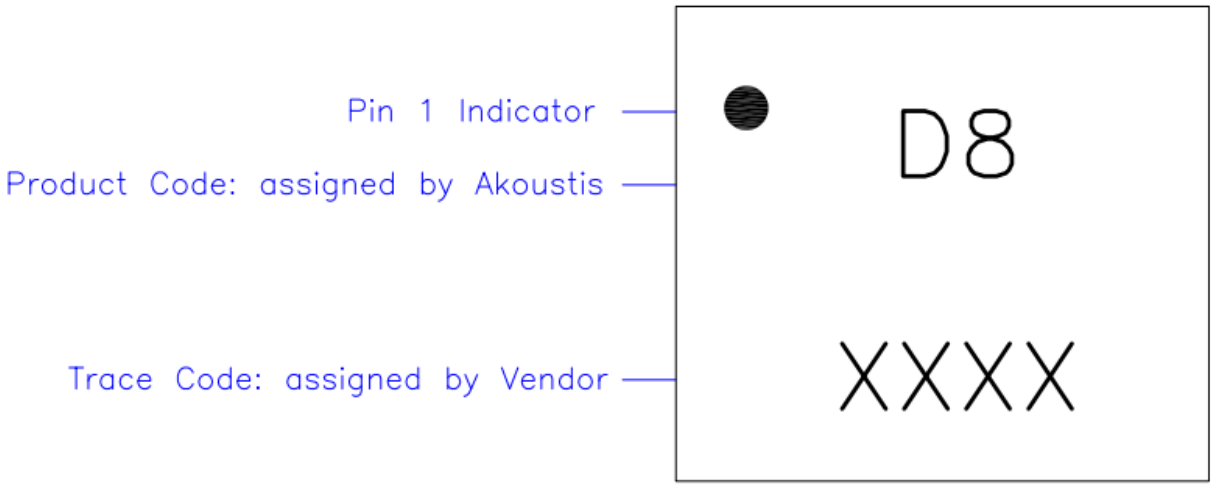
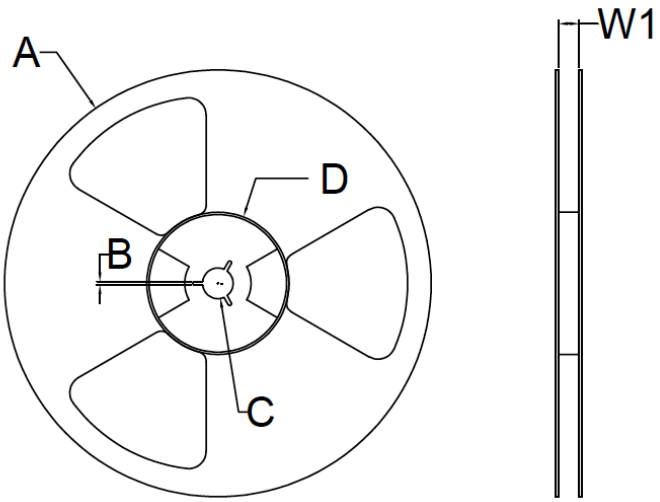
Typical Part Marking



Reel Dimensions



Reel 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

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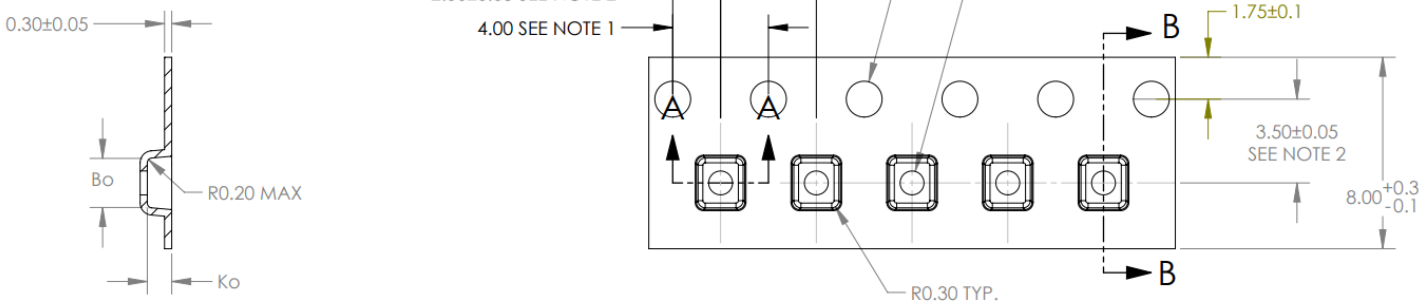
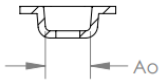
Tape Dimension

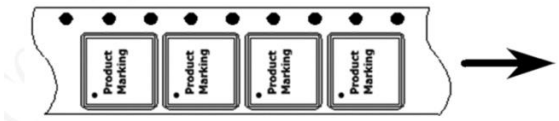


SCALE 1:1



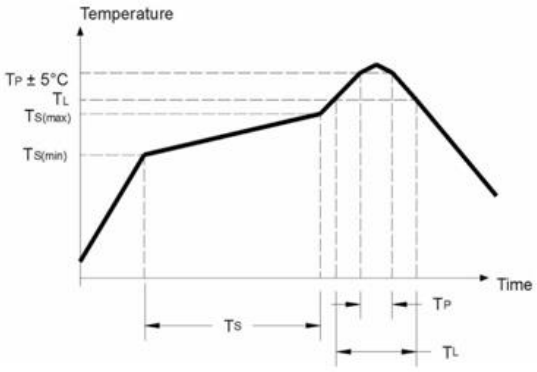
SECTION A-A

	DIM	±
Ao	1.85	0.1
Bo	2.05	0.1
Ko	1.02	0.1



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: Class 0B
Standard: ANSI/ESDA/JEDEC JS-001-2017

Charged Device Model (CDM)
Rating: Class C3
Standard: ANSI/ESDA/JEDEC JS-002-2018

MSL Rating

MSL3

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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