

## 6.5 GHz WiFi 6E Coexistence BAW Filter

## A10165

### Description

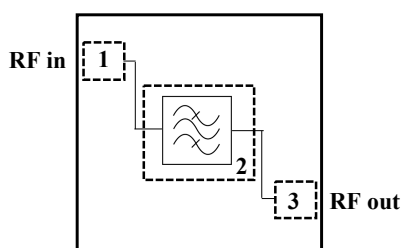
Akoustis' A10165 is a high performance, ultra-wide bandwidth BAW RF Filter for use in WiFi 6E applications covering U-NII-5 thru U-NII-8 bands. A10165 utilizes Akoustis' patented, XBAW technology which provides leading RF filter performance. This BAW RF filter provides low insertion loss and meets the 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, 50 ohm 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 1.73mm
- Single ended Tx/Rx ports.
- Ultra-wide passband covering 1180MHz
- High rejection enables coexistence with adjacent WiFi UNII bands
- High power rating, maximum +27dBm
- Low insertion loss band pass 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   |
| A10165TR1   | (1000) Tape & Reel |
| A10165TR2   | (2500) Tape & Reel |

## Absolute Maximum Ratings

| Parameter           | Rating        |
|---------------------|---------------|
| Storage Temperature | -40 to 125 °C |
| Input Power         | +29 dBm       |

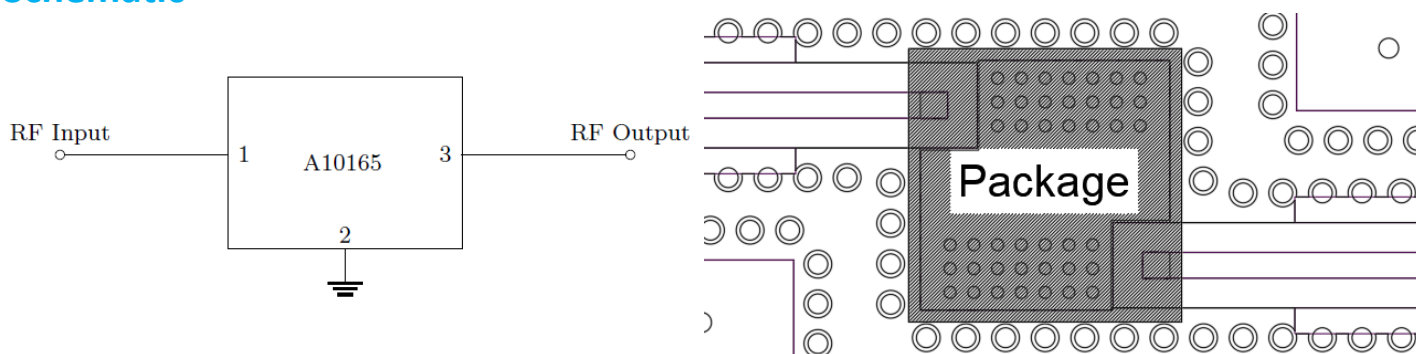
## Nominal Operating Parameters (Simulations)

| Parameter                                           | Units | Min. | Typ.               | Max. |
|-----------------------------------------------------|-------|------|--------------------|------|
| Center Frequency (Fc)                               | MHz   |      | 6535               |      |
| Pass bandwidth                                      | MHz   |      | 5945 - 7125        |      |
| Insertion Loss                                      |       |      |                    |      |
| 5945 – 7125 MHz                                     | dB    |      | 1.8 <sup>(1)</sup> | 3.8  |
| Amplitude Variation                                 |       |      |                    |      |
| 5945 – 7125 MHz                                     | dB    |      | 1.5                | 1.8  |
| Attenuation                                         |       |      |                    |      |
| 30 – 1000 MHz                                       | dB    | 44   | 45                 |      |
| 1000 - 3300 MHz                                     | dB    | 21   | 22                 |      |
| 3300 – 4000 MHz                                     | dB    | 13   | 14                 |      |
| 5170 – 5815 MHz                                     | dB    | 45   | 46                 |      |
| 5815 – 5835 MHz                                     | dB    | 33   | 40                 |      |
| 8500 - 12000 MHz                                    | dB    | 13   | 14                 |      |
| Return Loss                                         |       |      |                    |      |
| 5945 – 7125 MHz                                     |       | 10   | 15 <sup>(1)</sup>  |      |
| Operating Temperature                               | C     | -40  |                    | 85   |
| Load Impedance                                      | Ohm   |      | 50                 |      |
| Power Handling: 802.11ax MCS10, 80 MHz BW, PAR 11dB | dBm   |      |                    | 27   |

Note:

1. S-parameter averaged over specified pass band frequency at room temperature

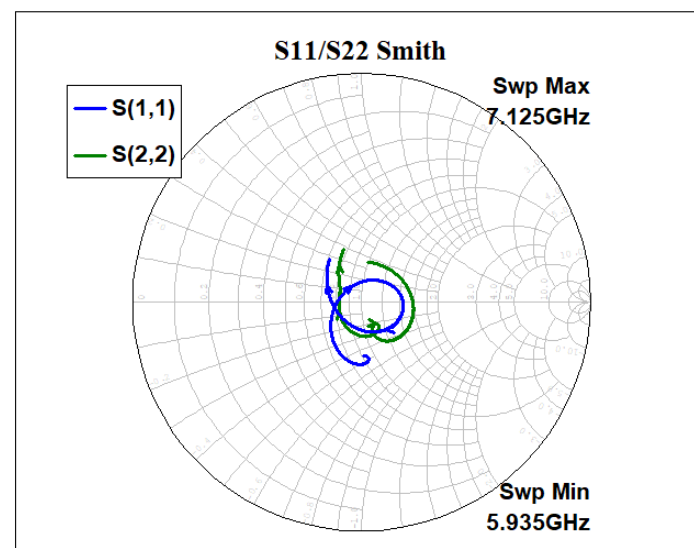
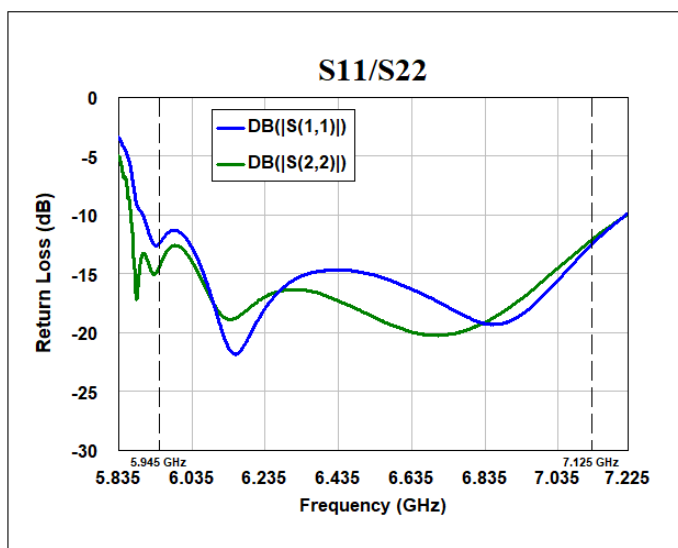
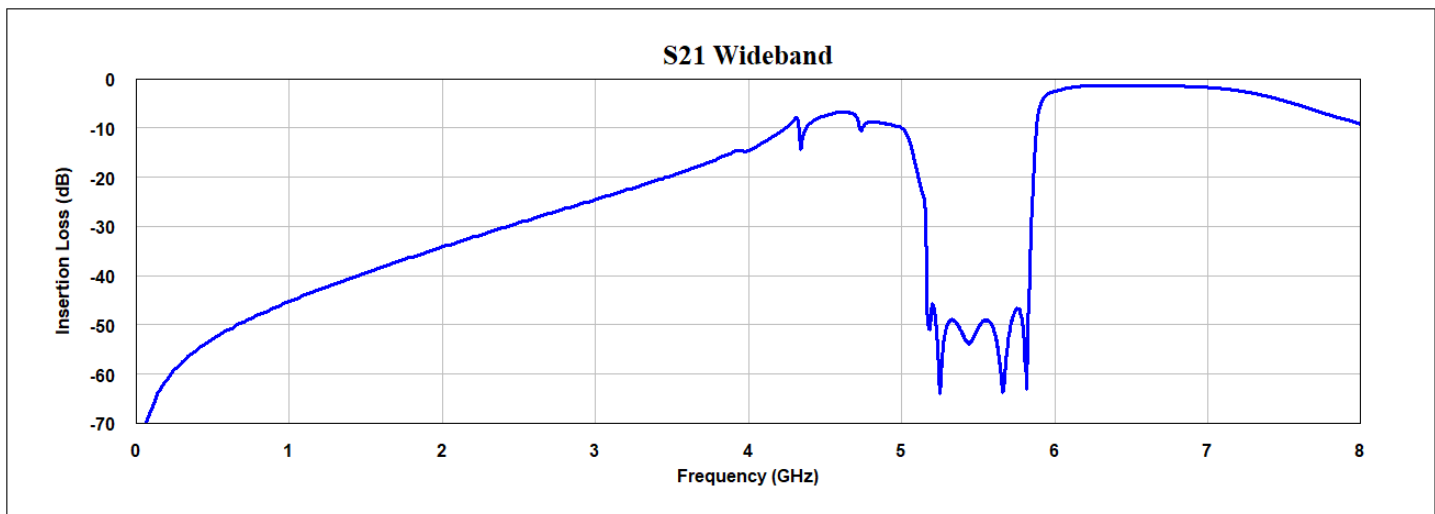
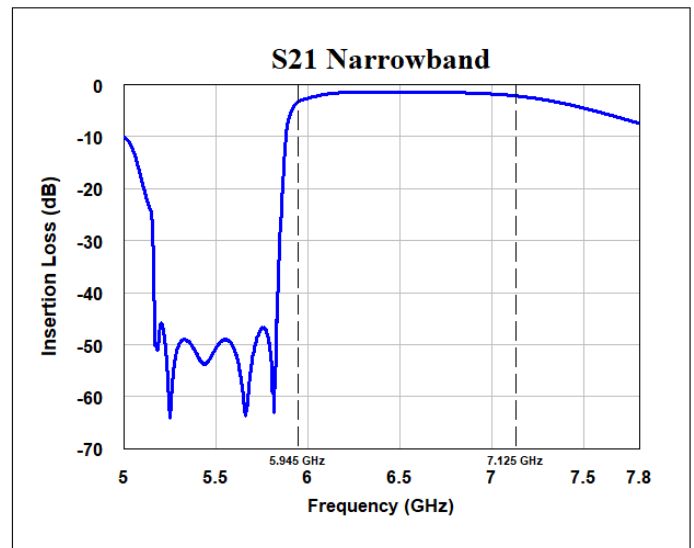
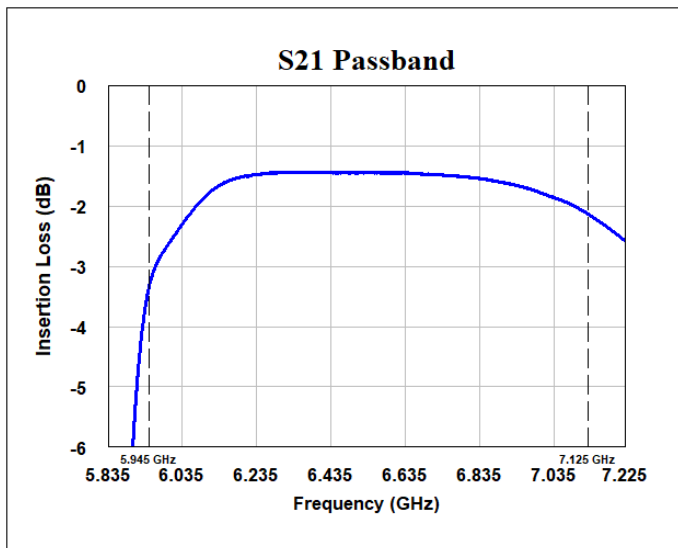
## Schematic



## Bill of Materials

| Reference Des. | Value | Description         | Manufacturer | Part Number |
|----------------|-------|---------------------|--------------|-------------|
| PCB            | N/A   | 4 layer             | Multiple     |             |
| U1             | N/A   | 6.53 GHz BAW Filter | Akoustis     | A10165      |

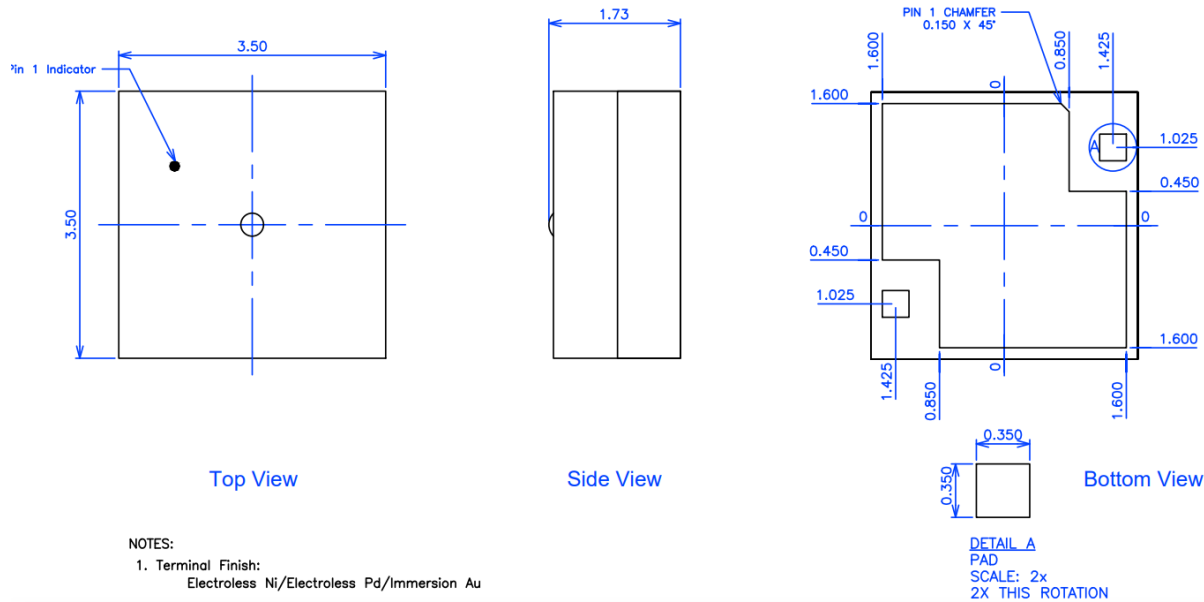
## Performance Plots



## Package Drawing & Pin Description

### Notes:

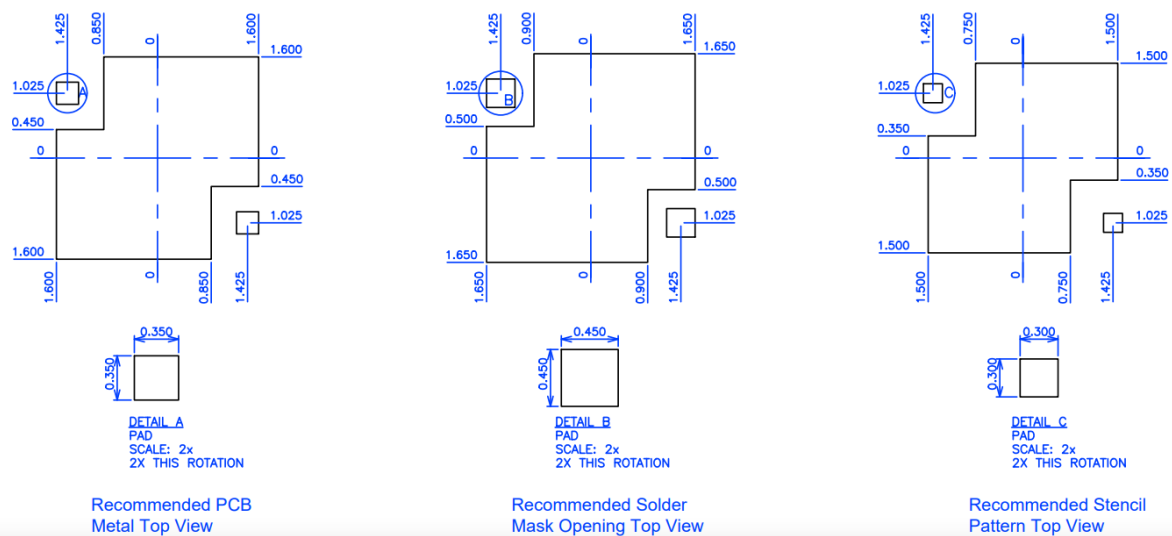
- All Units are in mm unless otherwise stated
- General Tolerance:  
Linear X.XXX =  $\pm 0.050\text{mm}$   
X.XX =  $\pm 0.10\text{mm}$



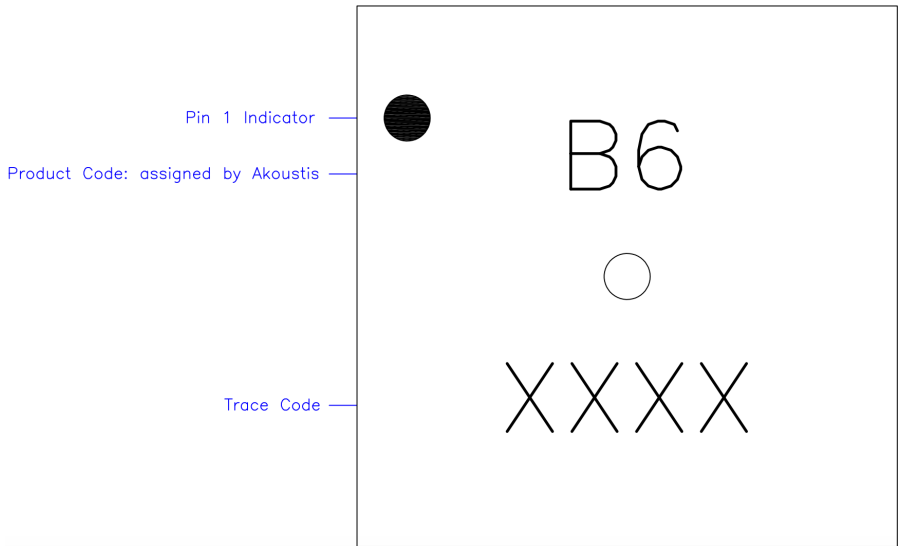
## PCB Mounting Pattern

### Notes:

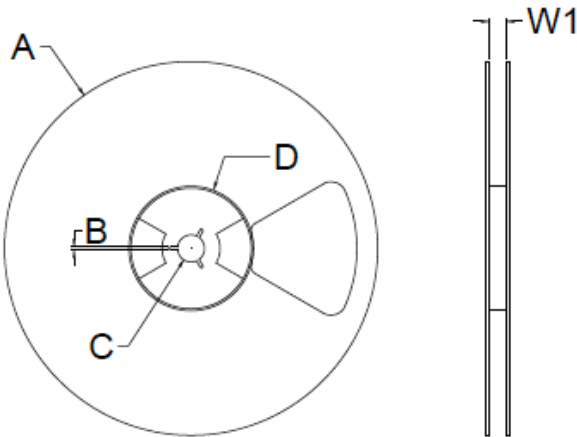
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Typical Part Marking

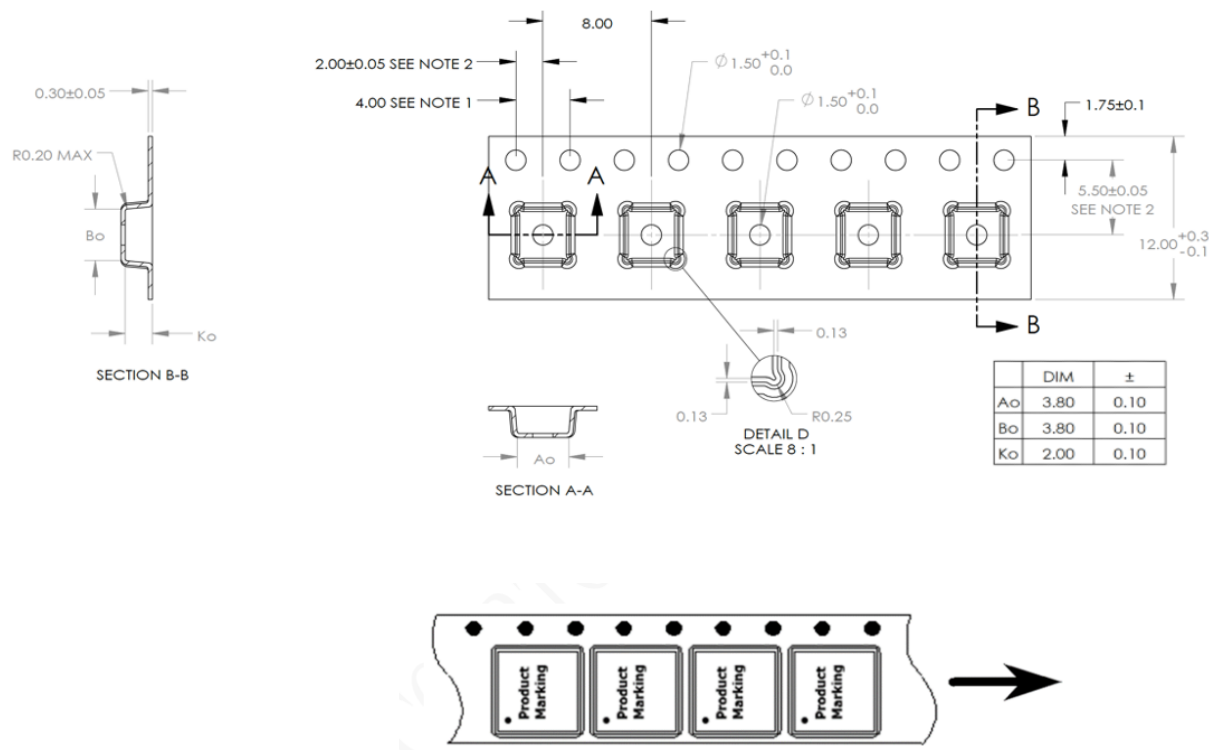


Reel Dimension For 12mm Tape Width



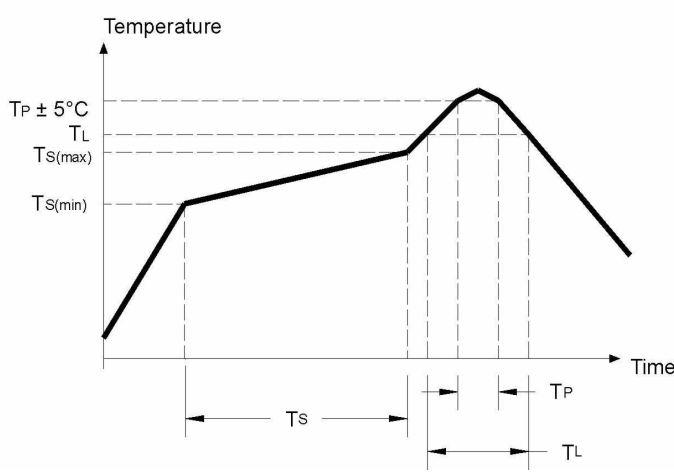
| Reel Dimensions |                |           |                    |         |                     |
|-----------------|----------------|-----------|--------------------|---------|---------------------|
| Tape Width      | A              | B         | C                  | D       | W1 *measured at hub |
| 8 mm            | 180 +0/-2.0 mm | 1.5mm Min | 13.0 + 0.5 / -0 mm | 60.0 mm | 8.40 + 1.5 / -0 mm  |
| 12 mm           | 180 +0/-2.0 mm | 1.5mm Min | 13.0 + 0.5 / -0 mm | 60.0 mm | 12.40 + 2.0 / -0 mm |
| 16 mm           | 180 +0/-2.0 mm | 1.5mm Min | 13.0 + 0.5 / -0 mm | 60.0 mm | 16.40 + 2.0 / -0 mm |

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 Ts(min) - Ts (max) | 135 - 155 Deg C | 150-200 Deg C   |
| Max Soak Time Ts                  | 2 minutes       | 3 minutes       |
| Liquidous Temp TL                 | 183 Deg C       | 220 Deg C       |
| Max Time Above TL                 | 150 Seconds     | 150 Seconds     |
| Max Peak Temperature TP           | 225 Deg C       | 260 Deg C       |
| Max Time at Peak TP               | 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: TBD

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

Charged Device Model (CDM)

Rating: TBD

Standard: ANSI/ESDA/JEDEC JS-002-2018

### MSL Rating

TBD

### RoHS

This part is compliant with 2011/65EU RoHS directive on the restrictions of the use of certain hazardous substances in electrical and electronics 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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