

B48 CBRS 3.6GHz Bandpass BAW Filter

AKF-1336

Description

Akoustis' AKF-1336 is a high-performance, ultra-small bandpass BAW Filter targeting 5G B48 Citizen Broadcast Radio Solutions (CBRS) infrastructure applications. AKF-1336 utilizes Akoustis' XBAW® technology which provides leading RF filter performance. This BAW filter provides 150 MHz bandwidth, low insertion loss at 3.6 GHz, and high out-of-band attenuation. AKF-1336 uses standard ceramic packaging and is compatible with high-volume, lead-free SMT soldering processes.

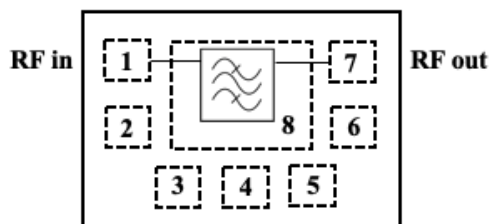
Features

- Ultra small form factor 2.5mm x 2.0mm x 0.8mm
- Single-ended 50Ω Ant, Tx/Rx ports
- High out-of-band attenuation
- High power handling, maximum +30dBm
- Low insertion loss 150 MHz passband filter
- Performance -40 C to +85°C
- RoHS Compliant

Applications

- 5G Infrastructure
- B48 CBRS
- General Purpose Wireless

Functional Block



| 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 |
|-------------|------------------------------|
| AKF-1336EVB | Evaluation board |
| AKF-1336SP | (5) Loose pcs |
| AKF-1336SR | (100) Short Reel (7" Reel) |
| AKF-1336TR1 | (1000) Tape & Reel (7" Reel) |
| AKF-1336TR2 | (2500) Tape & Reel (7" Reel) |

Absolute Maximum Rating

| Parameter | | Rating |
|---------------------|----------------------------------|---------------|
| Storage Temperature | | -40 to 125 °C |
| Max Input Power | Signal: 5G/LTE E-UTRA 10MHz 50RB | +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

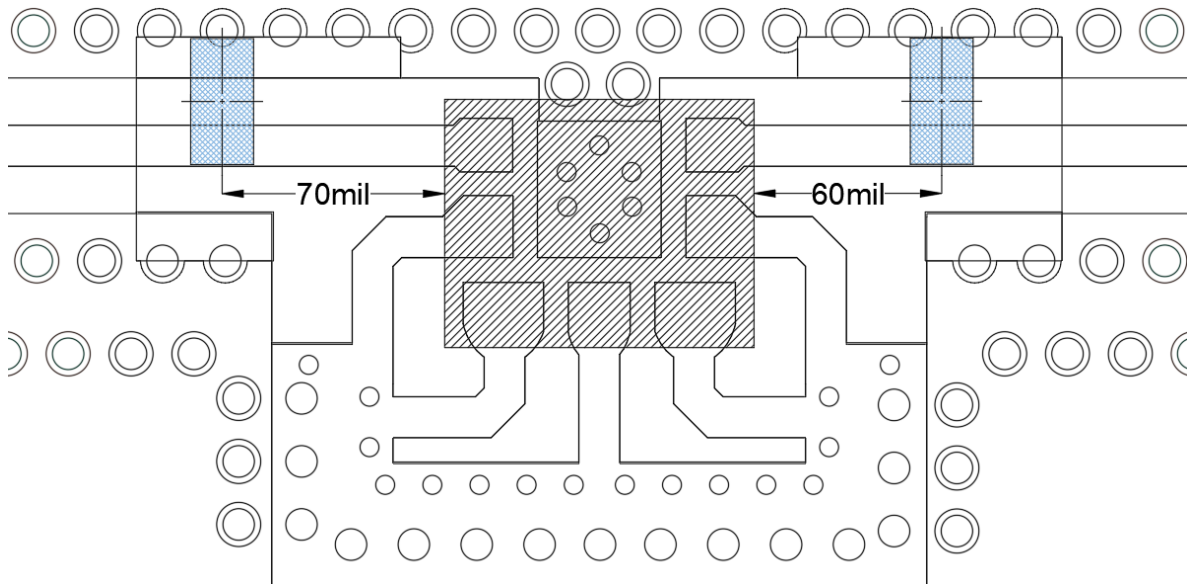
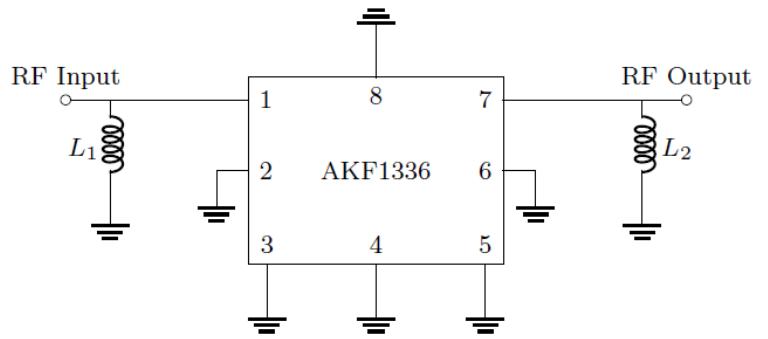
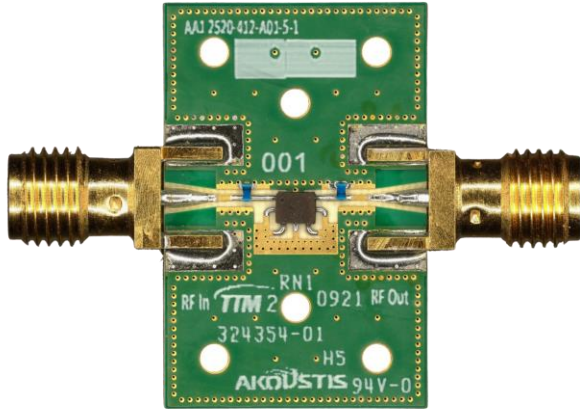
Operating Parameters (Temp=-40°C to +85°C unless otherwise noted)

| Parameter | Conditions | Units | Min. | Typ. | Max. |
|--------------------------|--------------------------------|---------|------|--------------------|--------------------|
| Passband | | MHz | 3550 | 3625 | 3700 |
| Insertion Loss | 3550 – 3700 MHz | dB | | 1.5 ⁽¹⁾ | 2.7 ⁽³⁾ |
| Amplitude Variation | 3550 – 3700 MHz | dB | | 1 | 1.5 |
| Attenuation | 10 – 1000 MHz | dB | 50 | 55 | |
| | 1700 - 2690 MHz | dB | 22 | 25 | |
| | 2690 - 3450 MHz | dB | 22 | 25 | |
| | 3450 - 3530 MHz ⁽²⁾ | dB | 10 | 15 | |
| | 3720 – 3800 MHz ⁽²⁾ | dB | 9 | 15 | |
| | 3800 - 6000 MHz | dB | 14 | 25 | |
| | 6000 - 8000 MHz | dB | 15 | 18 | |
| Return Loss | 3550 - 3700MHz | dB | 10 | 16 ⁽¹⁾ | |
| Load Impedance | | Ω | | 50 | |
| Power Handling | 5G/LTE E-UTRA 10MHz 50RB | dBm | | | 30 |
| 2 nd Harmonic | Po=27dBm (25°C) | dBm/MHz | | -28 | |
| 3 rd Harmonic | Po=27dBm (25°C) | dBm/MHz | | -73 | |

Note:

1. Averaged over specified frequency at room temperature
2. S-parameter averaged over 5MHz
3. Averaged over 10MHz frequency

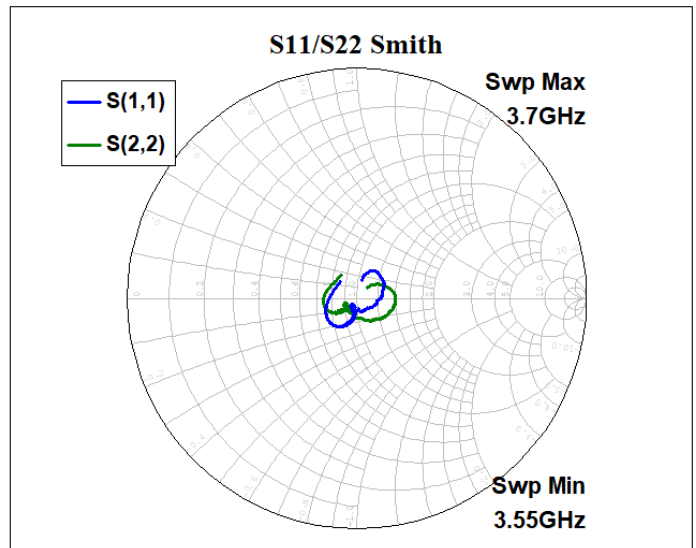
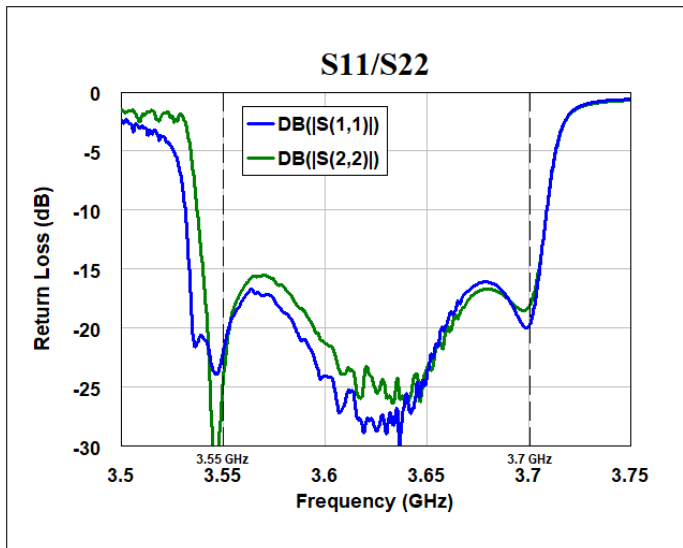
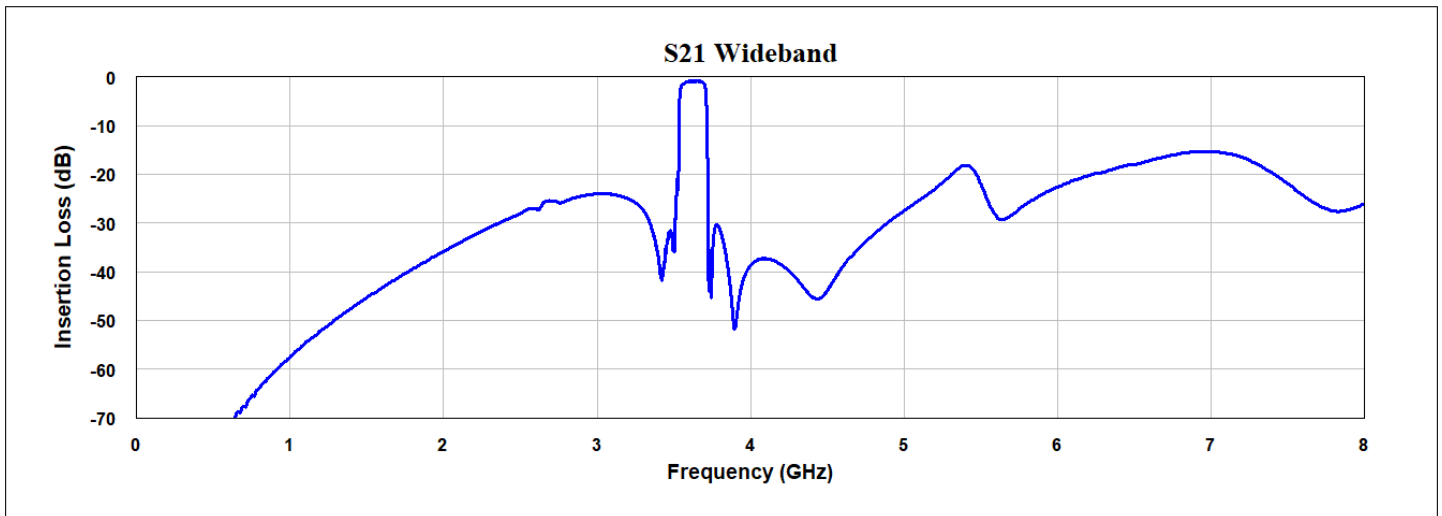
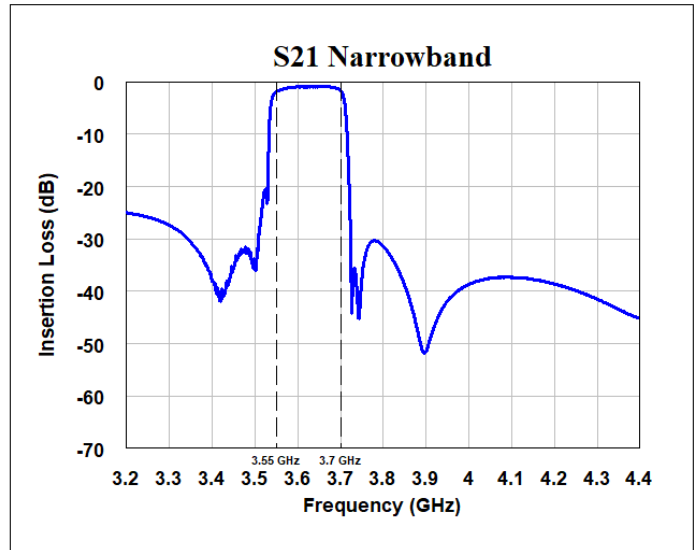
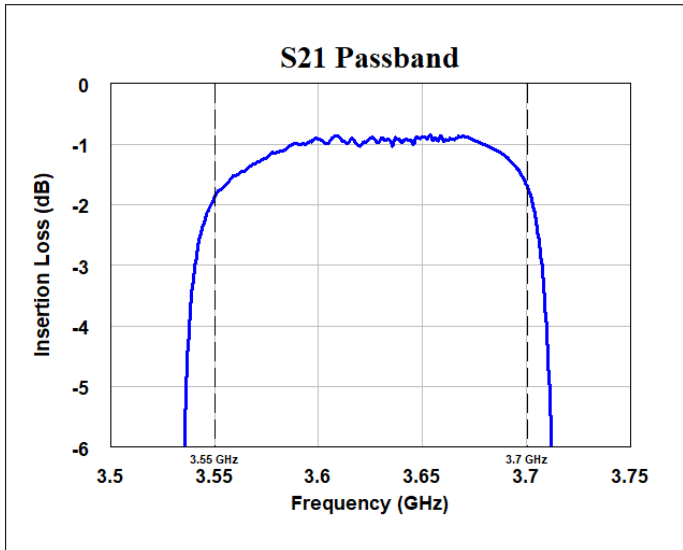
EVB Schematic & Layout



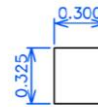
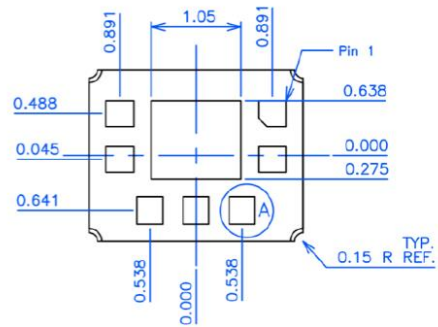
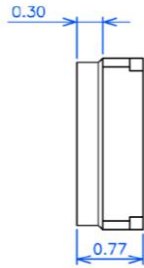
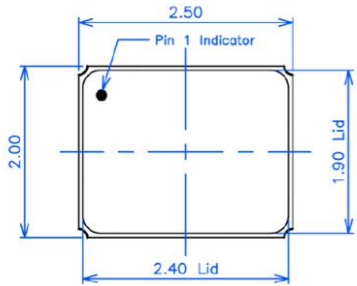
Bill of Materials

| Reference Des. | Value | Description | Manufacturer | Part Number |
|----------------|-------|-----------------------------|--------------|----------------------|
| PCB | N/A | 4 layer | Multiple | AA1 2520-412-A01-5-1 |
| U1 | N/A | 3.6 GHz BAW Filter | Akoustis | AKF-1336 |
| L1 | 2.6nH | Chip inductor, 0402, ±0.1nH | Murata | LQW15AN2N6G8ZD |
| L2 | 3.0nH | Chip inductor, 0402, ±0.1nH | Murata | LQW15AN3N0C10D |

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



Package Dimensions & Pin Descriptions



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

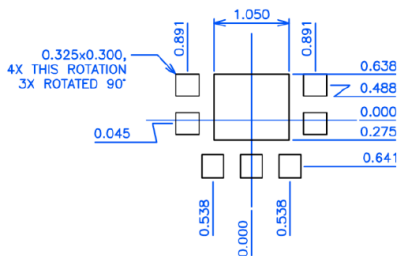
NOTES:

1. PLATING THICKNESS
 ELECTRO Ni : 1.27~8.89µm(S/P)
 ELECTRO Au : 0.30~1.00µm(S/P)

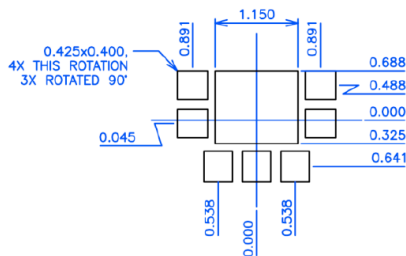
Notes:

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

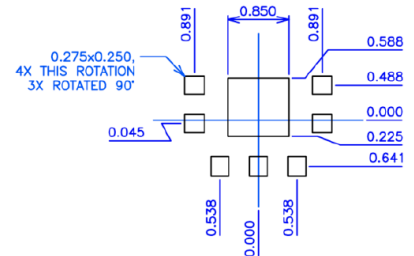
PCB Mounting Pattern



Recommended PCB
 Metal Top View

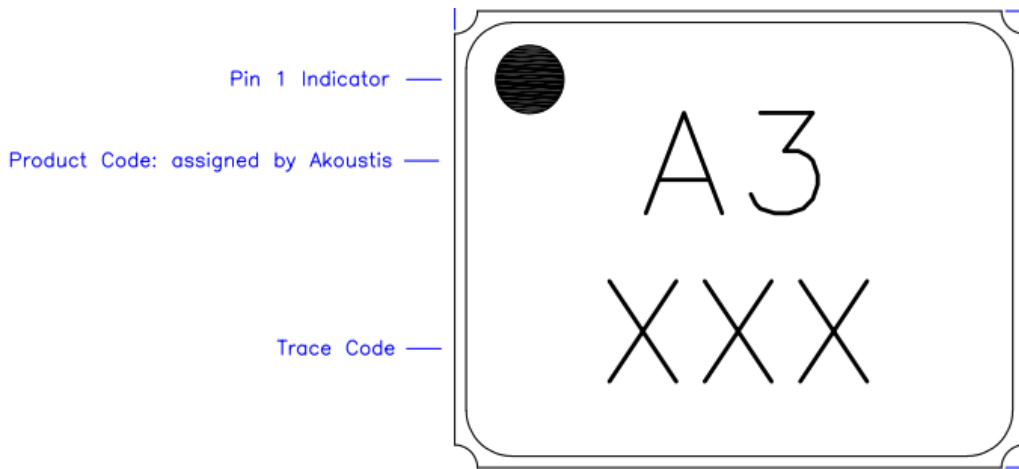


Recommended
 Solder Mask Opening
 Top View

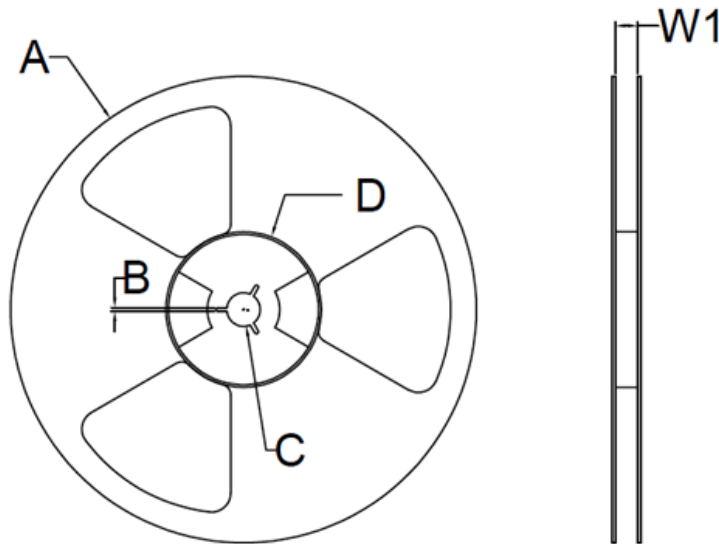


Recommended Stencil
 Pattern Top View

Typical Part Marking



Reel Dimensions

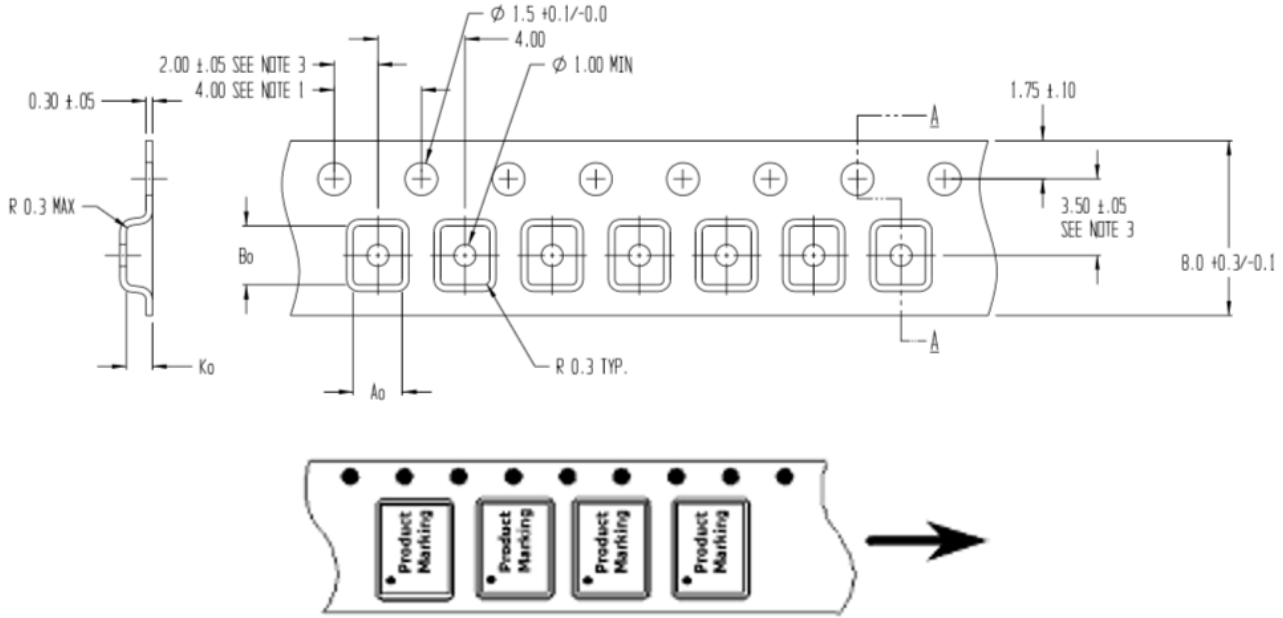


| Reel Dimensions | | | | | | |
|-----------------|------------|----------------|--------------|--------------------|-----------------|---------------------|
| Reel Size | Tape Width | A | B | C | D | W1 *measured at hub |
| 7 Inch | 8 mm | 180 +0/-2.0 mm | 2.0mm +/-0.5 | 13.0+0.5 / -0 mm | 60.0 +/-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

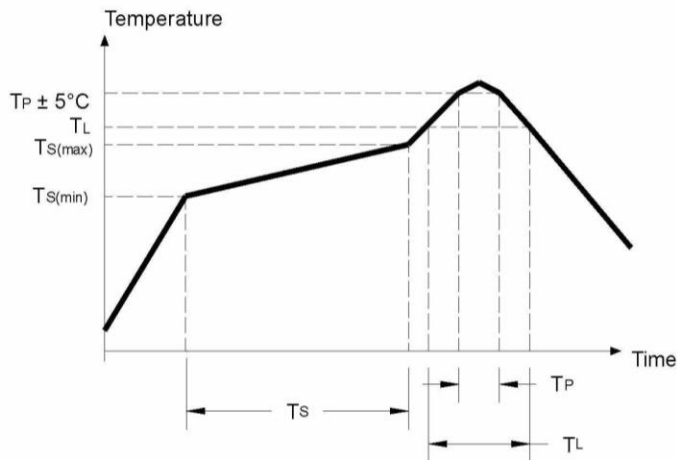
Tape Dimension

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



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 |



Product Compliance Information

ESD Sensitivity Ratings

Human Body Model (HBM) Test

Rating: Class 1C 1000V

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

Charged Device Model (CDM)

Rating: Class C3 1000V

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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