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 hermetic sealed 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 50 Ohm 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 +85C
• RoHS Compliant

Applications
• 5G Infrastructure
• B48 CBRS
• General Purpose Wireless

Functional Block Diagram

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RF Input</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>Ground</td>
</tr>
<tr>
<td>7</td>
<td>RF Output</td>
</tr>
<tr>
<td>8</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKF-1336EVB</td>
<td>Evaluation board</td>
</tr>
<tr>
<td>AKF-1336SP</td>
<td>(5) Loose pcs</td>
</tr>
<tr>
<td>AKF-1336SR</td>
<td>(100) Short Reel</td>
</tr>
<tr>
<td>AKF-1336TR1</td>
<td>(1000) Tape &amp; Reel</td>
</tr>
<tr>
<td>AKF-1336TR2</td>
<td>(2500) Tape &amp; Reel</td>
</tr>
</tbody>
</table>
Absolute Maximum Rating

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-40 to 125 °C</td>
</tr>
<tr>
<td>Input Power (CW)</td>
<td>+32 dBm</td>
</tr>
</tbody>
</table>

Nominal Operating Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Frequency (Fc)</td>
<td>MHz</td>
<td>3625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pass bandwidth</td>
<td>MHz</td>
<td>3550 - 3700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.5¹</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Amplitude Variation</td>
<td>dB</td>
<td>1</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Attenuation</td>
<td>dB</td>
<td>TBD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 – 1000 MHz</td>
<td></td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700 - 2690 MHz</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2690 – 3450 MHz</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3450 - 3530 MHz</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3720 – 3800 MHz</td>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3800 - 6000 MHz</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6000 - 8000 MHz</td>
<td></td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td></td>
<td>16¹</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>°C</td>
<td>-40</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Load Impedence</td>
<td>Ohm</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Handling</td>
<td>dBm</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Schematic & Bill of Materials
Preliminary AKF-1336

<table>
<thead>
<tr>
<th>Reference Des.</th>
<th>Value</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB</td>
<td>N/A</td>
<td>2 layer</td>
<td>Multiple</td>
<td></td>
</tr>
<tr>
<td>U1</td>
<td>N/A</td>
<td>3.6 GHz BAW Filter</td>
<td>Akoustis</td>
<td>AKF-1336</td>
</tr>
<tr>
<td>L1</td>
<td>2.4nH</td>
<td>Chip inductor, 0402, ±0.1nH</td>
<td>Murata</td>
<td>LQW15AN2N4G8ZD</td>
</tr>
<tr>
<td>L2</td>
<td>3.0nH</td>
<td>Chip inductor, 0402, ±0.1nH</td>
<td>Murata</td>
<td>LWQ15AN3N0C10D</td>
</tr>
</tbody>
</table>

Performance Plots

![S21 Passband](image1)

![S21 Narrowband](image2)

![S21 Wideband](image3)
Package Dimensions & Pin Descriptions

NOTES:
1. PLATING THICKNESS
   ELECTRO Ni : 1.27~8.80μm(S/p)
   ELECTRO Au : 0.30~1.00μm(S/p)

Notes:
- All units are in mm unless otherwise stated
- General Tolerance:
  Linear: ±0.050mm
  X.XX: ±0.10mm
PCB Mounting Pattern

Typical Part Marking

Reel Dimension
Tape Dimension

Recommended Solder Profile

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Eutectic Sn/Pb</th>
<th>Pb Free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Ramp Up Rate</td>
<td>6 Deg C/Second</td>
<td>6 Deg C/Second</td>
</tr>
<tr>
<td>Soak Temp Time T_s (min) - T_p (max)</td>
<td>135 - 155 Deg C</td>
<td>150-300 Deg C</td>
</tr>
<tr>
<td>Max Stook Time T_s</td>
<td>2 minutes</td>
<td>3 minutes</td>
</tr>
<tr>
<td>Liquidous Temp T_l</td>
<td>163 Deg C</td>
<td>220 Deg C</td>
</tr>
<tr>
<td>Max Time Above T_s</td>
<td>150 Seconds</td>
<td>150 seconds</td>
</tr>
<tr>
<td>Max Peak Temperature T_p</td>
<td>225 Deg C</td>
<td>280 Deg C</td>
</tr>
<tr>
<td>Max Time at Peak T_p</td>
<td>30 Seconds</td>
<td>30 Seconds</td>
</tr>
<tr>
<td>Max Ramp Down Rate</td>
<td>10 Deg C/Second</td>
<td>10 Deg C/Second</td>
</tr>
</tbody>
</table>

Temperature

\[ T_p \pm 5^\circ C \]

\[ T_s, T_l, T_{s(max)}, T_{s(min)} \]
Product Compliance Information

ESD Sensitivity Ratings

<table>
<thead>
<tr>
<th>Human Body Model (HBM) Test</th>
<th>Charged Device Model (CDM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating: TBD</td>
<td>Rating: TBD</td>
</tr>
</tbody>
</table>

MSL Rating

N/A – Hermetic Package

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.

Email: sales@akoustis.com
Website: www.akoustis.com
Telephone: +1 704.997.5735
Fax: +1 704.997.5734