Keysight HMMC-5632 Packaged GaAs Integrated Directional Detector
HMMC-5632-BLK (bulk) and HMMC-5632-TR1 (tape & reel)

Description

HMMC-5632 is a low-loss, directional detector with an integrated diode, capacitor, and resistors on chip. It is fabricated using the M6A process at HFTC. The device has bond pads (not beam leaded) and is designed for low cost applications. No external resistors are required.

Chip and package geometries

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package type</td>
<td>Quad Flat - No Leads (SMT QFN)</td>
</tr>
<tr>
<td>Package dimensions</td>
<td>2.0 x 2.0 mm (0.079 x 0.079 in)</td>
</tr>
<tr>
<td>Package thickness</td>
<td>0.85 ± 0.10 mm (0.035 ± 0.0039 in)</td>
</tr>
<tr>
<td>Lead pitch</td>
<td>0.40 mm (0.016 in)</td>
</tr>
<tr>
<td>Lead width</td>
<td>0.20 mm (0.008 in)</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameters / Conditions</th>
<th>Min.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_{\text{max}}$</td>
<td>Max instantaneous input power (burn-out damage limit)</td>
<td>25</td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td>$T_{\text{stg}}$</td>
<td>Storage temperature</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>$T_{\text{bs}}$</td>
<td>Package backside temperature</td>
<td>-40</td>
<td>+85</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{\text{stg}}$</td>
<td>Storage temperature</td>
<td>-65</td>
<td>165</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{\text{assy}}$</td>
<td>Maximum solder reflow temp. (max. 3 cycles @ 30 sec./cycle)</td>
<td>+260</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Parameters specified for continuous operation at $T_{\text{bs}} \leq 85°C$.
2. Operation in excess of any one of these conditions may result in permanent damage to this component.
3. Refer to JEDEC J-STD-020D for detailed reflow profile, 3 reflows max.

Features

- Frequency range: 0.2 to 20 GHz
- Coupling flatness: ±1 dB
- Directivity: > 15 dB
- Return loss: > 15 dB
- Insertion loss: < 1.5 dB
- Sensitivity: 18 mV/mW
- Max input power: 25 dBm @ 70°C
- 2:1 Source VSWR
- Output open circuit
- RoHS Compliant SMT
- 2mm x2mm QFN Surface Mount Package
Application

- Leveling (ALC Loop)

Moisture compatibility

Injection mold components like the HMMC-5632 in QFN are moisture-sensitive. The product is tested to the moisture and reflow sensitivity level 3 as per IPC/Jedec J-STD-020 and must be mounted within 168 hours of opening the shipping container. Store and handle parts for reflow and for rework per IPC/Jedec J-STD-033B. An example of the moisture sensitivity label is shown in Figure 2.

![Moisture sensitivity label](image)

Figure 1. Moisture sensitivity label

Tape and reel

The HMMC-5632 is available in tape and reel format to facilitate automatic pick and place manufacturing. See Figure 8.

RoHS compliance

The HMMC-5632 is RoHS Compliant. This means the component meets the requirements of the European Parliament and the Council of the European Union “Restriction of Hazardous Substances” Directive 2002/95/EC, commonly known as “RoHS”. The six regulated substances are lead, mercury, cadmium, chromium VI (hexavalent), polybrominated biphenyls (PBB) and polybrominated biphenyl ethers (PBDE). RoHS compliance implies that any residual concentration of these substances is below the RoHS Directive’s maximum concentration values (MVC); being less than 1000 ppm by weight for all substances except for cadmium which is less than 100 ppm by weight.
ESD and handling precautions

GaAs MMICs in either chip or SMT packages are ESD sensitive. ESD preventive measures must be employed in all aspects of storage, handling, and assembly. MMIC ESD precautions, handling considerations, die attach and bonding methods are critical factors in successful GaAs MMIC performance and reliability.

Keysight application note, “GaAs MMIC ESD, Die Attach and Bonding Guidelines” provides basic information on these subjects.

Figure 2. HMMC-5632 schematic

Figure 3. HMMC-5632 PinOut

Figure 4. HMMC-5632 footprint diagram
Figure 5. HMMC-5632 safe operating region $T_{\text{case}}$: +70 °C

Figure 6. HMMC-5632 typical transfer characteristic temp = +25°C
Figure 7. HMMC-5632 dimension drawing (dimensions in mm)

Figure 8. Tape and reel information
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