HMC-C048

LOW NOISE AMPLIFIER
MODULE, 5 - 9 GHz

Features

Low Noise Figure: 1.75 dB @ 6 GHz
High Gain: 22 dB
Output IP3: +25 dBm
P1dB Output Power: +14.8 dBm
50 Ohm Matched & DC Blocked RF I/Os
Hermetically Sealed Module
Field Replaceable SMA Connectors
-55 °C to +85 °C Operating Temperature

General Description

The HMC-C048 is a GaAs MMIC pHEMT Low Noise Amplifier in a miniature, hermetic module which operates between 5 and 9 GHz. This high dynamic range low noise amplifier module provides 22 dB of gain and up to +25 dBm of output IP3 while operating from a single positive supply between +8V and +16V. The amplifier I/Os are internally matched to 50 Ohms and DC blocked for robust performance. The module features removable coaxial connectors which can be detached to allow direct connection of the I/O pins to a microstrip or coplanar circuit.

Typical Applications

The HMC-C048 LNA is ideal for:
• Telecom Infrastructure
• Microwave Radio & VSAT
• Military & Space
• Test Instrumentation

Functional Diagram

Electrical Specifications, $T_A = +25^\circ C$, $Vdc = +12V$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>5 - 9</td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Gain</td>
<td>18.5</td>
<td>22.5</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Gain Variation Over Temperature</td>
<td>0.015</td>
<td></td>
<td></td>
<td>dB/°C</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>1.75</td>
<td>2.3</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>14</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>15</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Output Power for 1 dB Compression (P1dB)</td>
<td>12</td>
<td>14.8</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Saturated Output Power (Psat)</td>
<td>16.7</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Output Third Order Intercept (IP3)</td>
<td>25</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Supply Current</td>
<td>105</td>
<td>140</td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>
LOW NOISE AMPLIFIER
MODULE, 5 - 9 GHz

Broadband Gain & Return Loss

Gain vs. Temperature

Input Return Loss vs. Temperature

Output Return Loss vs. Temperature

Reverse Isolation vs. Temperature

Noise Figure vs. Temperature

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LOW NOISE AMPLIFIER
MODULE, 5 - 9 GHz

Output P1dB vs. Temperature

Psat vs. Temperature

Output IP3 vs. Temperature

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bias Supply Voltage (Vdc)</td>
<td>+16 Vdc</td>
</tr>
<tr>
<td>RF Input Power (RFIN)</td>
<td>+0 dBm</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65 to +150 °C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-55 to +85 °C</td>
</tr>
</tbody>
</table>

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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## Pin Descriptions

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Function</th>
<th>Description</th>
<th>Interface Schematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RFIN &amp; RF Ground</td>
<td>RF input connector, coaxial female, field replaceable. This pin is AC coupled and matched to 50 Ohms.</td>
<td><img src="image1.png" alt="Interface Diagram" /></td>
</tr>
<tr>
<td>2, 5, 6</td>
<td>GND</td>
<td>One of these pins must be connected to power supply ground.</td>
<td><img src="image2.png" alt="Interface Diagram" /></td>
</tr>
<tr>
<td>3</td>
<td>Vdc</td>
<td>Power supply voltage for the amplifier.</td>
<td><img src="image3.png" alt="Interface Diagram" /></td>
</tr>
<tr>
<td>4</td>
<td>RFOUT &amp; RF Ground</td>
<td>RF output connector, coaxial female, field replaceable. This pin is AC coupled and matched to 50 Ohms.</td>
<td><img src="image4.png" alt="Interface Diagram" /></td>
</tr>
</tbody>
</table>
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Outline Drawing

Package Information

<table>
<thead>
<tr>
<th>Package Type</th>
<th>C-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacer Weight</td>
<td>3.3 gms [2]</td>
</tr>
</tbody>
</table>

[1] Includes the connectors
[2] ±1 gms Tolerance

NOTES:
1. PACKAGE, LEADS, COVER MATERIAL: Kovar™
2. FINISH: GOLD PLATE OVER NICKEL PLATE
3. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]
4. TOLERANCES:
   4.1 XX = ±0.02
   4.2 XXX = ±0.010
5. FIELD REPLACEABLE SMA CONNECTORS

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