Features
- 3 Stage Driver Amplifier for 28/32 GHz Bands
- 21 dB Gain
- 32 dBm Output Third Order Intercept (OIP3)
- 20 dBm Output P1dB
- Variable Gain with Adjustable Bias
- Lead-Free 4 mm 24 Lead PQFN Package
- RoHS* Compliant and 260°C Reflow Compatible

Description
The MAAM-011139 is a driver amplifier assembled in a lead-free 4 mm 24-lead PQFN plastic package that operates from 27.5 - 33.4 GHz.

The amplifier provides 21 dB small signal gain. The input and output are internally matched to 50 ohms with on-chip DC blocking capacitors. The 32 dBm Output Third Order Intercept Point (OIP3) and 20 dBm output P1dB provide excellent linearity for transmit lineups.

Each device is 100% RF tested to ensure performance compliance.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAM-011139-TR0500</td>
<td>500 piece reel</td>
</tr>
<tr>
<td>MAAM-011139-TR1000</td>
<td>1000 piece reel</td>
</tr>
<tr>
<td>MAAM-011139-000SMB</td>
<td>Sample Board</td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.


For further information and support please visit:
https://www.macomtech.com/content/customersupport
Driver Amplifier
27.5 - 33.4 GHz

Electrical Specifications:

Freq = 27.5 - 33.4 GHz, \( T_A = 25°C \), \( V_D1,2 = 4.0 \) V, \( I_D1 = 100 \) mA, \( I_D2 = 100 \) mA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain</td>
<td>27.5 - 29.5 GHz</td>
<td>dB</td>
<td>19.0</td>
<td>21.0</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>29.5 - 33.4 GHz</td>
<td></td>
<td>15.5</td>
<td>17.5</td>
<td>—</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>—</td>
<td>dB</td>
<td>—</td>
<td>-10</td>
<td>—</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>—</td>
<td>dB</td>
<td>—</td>
<td>-8</td>
<td>—</td>
</tr>
<tr>
<td>Output P1dB</td>
<td>—</td>
<td>dBm</td>
<td>—</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>Output IP3</td>
<td>27.5 - 29.5 GHz</td>
<td>dBm</td>
<td>28</td>
<td>32</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>29.5 - 33.4 GHz</td>
<td></td>
<td>30</td>
<td>32</td>
<td>—</td>
</tr>
</tbody>
</table>

5. Apply gate voltages prior to drain voltages. Adjust VG1 and VG2 between \(-1.0\) and \(-0.1\) V to achieve specified current. Typical current, 200 mA = \( I_D1 \) + \( I_D2 \).

Absolute Maximum Ratings:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>+20 dBm</td>
</tr>
<tr>
<td>Drain Supply Voltage</td>
<td>+4.3 Volts</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>+150°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55°C to +150°C</td>
</tr>
</tbody>
</table>

6. Exceeding any one or combination of these limits may cause permanent damage to this device.
7. MACOM does not recommend sustained operation near these survivability limits.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 1C devices.
Typical Performance Curves

Avg IIP3, Gain, OPI3 vs Freq. Pin= -12 dBm, Id1,2 = 100 mA

Gain & Linearity vs DC Power at 28 and 32 GHz

P1dB vs. Frequency VD1,2 = 4V, Id1,2 = 100 mA

Gain vs. Pin VD1,2 = 4V, Id1,2 = 100 mA

Pout vs. Pin VD1,2 = 4V, Id1,2 = 100 mA

Gain vs. Pout VD1,2 = 4V, Id1,2 = 100 mA
**Lead-Free 4 mm 24-Lead PQFN†**

† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

**NOTES:**
1. REFERENCE JEDEC MO-220–V002–6 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. ALL DIMENSIONS SHOWN AS in/mm.
3. REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.

For further information and support please visit: https://www.macomtech.com/content/customersupport
M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.

For further information and support please visit:
https://www.macomtech.com/content/customersupport