MAAM-008821

Broadband CATV Single Ended 5-Way Active Splitter
50 - 1100 MHz

Features
- 5-Way Splitter
- Single Ended Input and Outputs
- 3.5 dB Gain
- +15 dBmV /Channel Input
- 3.8 dB Noise Figure
- Single +5 Volt Supply
- Lead-Free 3 mm 12-Lead PQFN Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description
The MAAM-008821 CATV 5-way active splitter is a GaAs MMIC which exhibits low noise figure and distortion in a lead-free 3mm 12-lead PQFN plastic package. The design features 75 Ω inputs and outputs.

The MAAM-008821 is ideally suited for multi-tuner set top boxes, home gateways, and other broadband internet based appliances.

The MAAM-008821 is fabricated using M/A-COM Technology’s pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAM-008821-TR1000</td>
<td>1000 piece reel</td>
</tr>
<tr>
<td>MAAM-008821-TR3000</td>
<td>3000 piece reel</td>
</tr>
<tr>
<td>MAAM-008821-001SMB</td>
<td>Sample Test Board</td>
</tr>
</tbody>
</table>

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

3. The exposed pad centered on the package bottom must be connected to RF and DC ground.


For further information and support please visit:
https://www.macom.com/support
Broadband CATV Single Ended 5-Way Active Splitter
50 - 1100 MHz

Electrical Specifications: Freq. 50 - 1000 MHz, $T_A = 25^\circ C$, $V_{DD} = +5$ Volts, $Z_0 = 75 \Omega$

<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>IN to All Outputs</td>
<td>dB</td>
<td>2</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Gain Flatness</td>
<td>IN to All Outputs</td>
<td>dB</td>
<td>-</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>IN to All Outputs</td>
<td>dB</td>
<td>-</td>
<td>3.8</td>
<td>-</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>IN</td>
<td>dB</td>
<td>-</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>All Outputs</td>
<td>dB</td>
<td>-</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Composite Triple Beat, CTB</td>
<td>132 channels, +15 dBmV/channel at the input</td>
<td>dBc</td>
<td>-</td>
<td>-70</td>
<td>-</td>
</tr>
<tr>
<td>Composite Second Order, CSO</td>
<td>132 channels, +15 dBmV/channel at the input</td>
<td>dBc</td>
<td>-</td>
<td>-60</td>
<td>-</td>
</tr>
<tr>
<td>Reverse Isolation</td>
<td>All Outputs to IN</td>
<td>dB</td>
<td>-</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>Output to Output Isolation</td>
<td>Isolation between all RF outputs</td>
<td>dB</td>
<td>-</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>Output Power at 1dB Compression, P1dB</td>
<td>IN to All Outputs</td>
<td>dB</td>
<td>-</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>Output 3rd Order Intercept Point, OIP3</td>
<td>500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout</td>
<td>dBm</td>
<td>-</td>
<td>24</td>
<td>-</td>
</tr>
<tr>
<td>Output 2nd Order Intercept Point, OIP2</td>
<td>500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout</td>
<td>dBm</td>
<td>-</td>
<td>48</td>
<td>-</td>
</tr>
<tr>
<td>$I_{DO}$</td>
<td>$V_{DD} = +5$ Volts</td>
<td>mA</td>
<td>-</td>
<td>120</td>
<td>150</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings 4,5,6

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Input Power</td>
<td>+12 dBm</td>
</tr>
<tr>
<td>Vbias</td>
<td>+10.0 V</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20°C to +85°C</td>
</tr>
<tr>
<td>Junction Temperature7</td>
<td>150°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +150°C</td>
</tr>
</tbody>
</table>

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 devices. An external protection circuit using an inexpensive anti-parallel diode pair can be used to protect the IC.

Please reference application note AN3028 on http://www.macomtech.com for further detail.

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM Technology does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > $1 \times 10^6$ hours.
7. Junction Temperature ($T_J$) = $T_C + \Theta_{JC}$($V$*I)
   Typical thermal resistance ($\Theta_{JC}$) = 77$^\circ$ C/W.
   a) For $T_C = 25^\circ$C,
      $T_J = 71^\circ$C @ 5 V, 120 mA
   b) For $T_C = 85^\circ$C,
      $T_J = 127^\circ$C @ 5 V, 110 mA
Schematic Including Off-Chip Components

8. The exposed pad centered on the package bottom must be connected to ground for RF, DC and thermal considerations.

Off-Chip Component Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>1 µH</td>
<td>1210</td>
</tr>
<tr>
<td>L2 - L6</td>
<td>10 nH</td>
<td>0402</td>
</tr>
<tr>
<td>R1, R2</td>
<td>220 Ω</td>
<td>0402</td>
</tr>
<tr>
<td>R3 - R7</td>
<td>910 Ω</td>
<td>0402</td>
</tr>
<tr>
<td>C1 - C8</td>
<td>0.01 µF</td>
<td>0402</td>
</tr>
</tbody>
</table>

9. L1 supplied from EPCOS, part number B82422A1102K100
Typical Performance Curves

**Gain to 1100 MHz**
**Typical All Outputs**

![Gain to 1100 MHz graph](image)

**Gain to 3000 MHz**
**Typical All Outputs**

![Gain to 3000 MHz graph](image)

**Input Return Loss**

![Input Return Loss graph](image)

**Output Return Loss**
**Typical All Outputs**

![Output Return Loss graph](image)
Typical Performance Curves

**Broadband CATV Single Ended 5-Way Active Splitter**

**50 - 1100 MHz**

**Rev. V1**

**Noise Figure**

**Typical All Outputs**

**Reverse Isolation to 3000 MHz**

**Typical From All Outputs to Input**

**OUT-OUT Isolation to 1100 MHz**

**Typical Between All Outputs**

**OUT-OUT Isolation to 3000 MHz**

**Typical Between All Outputs**

For further information and support please visit:

https://www.macom.com/support
Lead-Free 3 mm 12-Lead PQFN†

†Reference Application Note M538 for lead-free solder reflow recommendations.

Meets JEDEC moisture sensitivity level 1 requirements.

Plating is 100% matte tin over copper.
Broadband CATV Single Ended 5-Way Active Splitter
50 - 1100 MHz

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.macom.com/support