

## Satellite Communications Single Ended 2-Way Active Splitter 950 - 2150 MHz

Rev. V1

### Features

- 2-Way Splitter
- Single Ended Input and Outputs
- 75  $\Omega$  Impedance
- 4.8 dB Gain
- 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

M/A-COM Tech’s MAAM-008970 2-way active splitter is a GaAs MMIC which exhibits low noise figure and distortion in a lead-free PQFN plastic package. The MAAM-008970 employs a low noise, high linearity amplifier and power splitter functionality. The design features 75  $\Omega$  inputs and outputs.

The MAAM-008970 is ideally suited for satellite communications multi-tuner set top boxes, and other broadband based appliances.

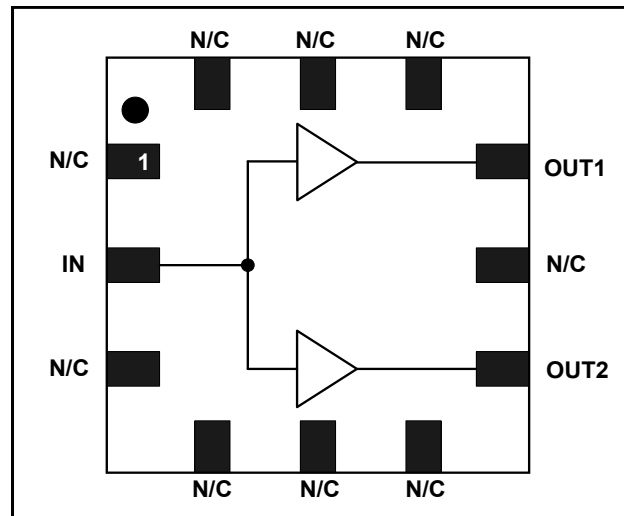
The MAAM-008970 is fabricated using M/A-COM Tech’s PHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

### Ordering Information<sup>1,2</sup>

Part Number	Package
MAAM-008970-TR1000	1000 piece reel
MAAM-008970-TR3000	3000 piece reel
MAAM-008970-001SMB	Sample Test Board

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

### Functional Schematic



### Pin Configuration<sup>3</sup>

Pin No.	Pin Name	Description
1	N/C	No Connection
2	IN	RF Input
3	N/C	No Connection
4	N/C	No Connection
5	N/C	No Connection
6	N/C	No Connection
7	OUT2	RF Output 2
8	N/C	No Connection
9	OUT1	RF Output 1
10	N/C	No Connection
11	N/C	No Connection
12	N/C	No Connection
13	Paddle <sup>3</sup>	

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

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

## Satellite Communications Single Ended 2-Way Active Splitter 950 - 2150 MHz

Rev. V1

**Electrical Specifications: Freq: 2150 MHz, T<sub>A</sub> = 25°C, V<sub>DD</sub> = +5 Volts, Z<sub>0</sub> = 75 Ω**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	In to Out1, In to Out2	dB	4.0	4.8	5.8
Gain Flatness	In to Out1, In to Out2	dB	—	0.3	—
Noise Figure	In to Out1, In to Out2	dB	—	5.0	—
Input Return Loss	Input	dB	—	12	—
Output Return Loss	Output	dB	—	12	—
Reverse Isolation	Out1 to In, Out2 to In	dB	—	18	—
Output to Output Isolation	Out1 to Out2	dB	—	23	—
Output Power at 1 dB Compression, P1dB	1450 MHz	dBm	—	7	—
Output 3rd Order Intercept Point, OIP3	1450 MHz, P <sub>IN</sub> = 0 dBm, 6 MHz Spacing	dBm	—	17	—
Output 2nd Order Intercept Point, OIP2	1450 MHz, P <sub>IN</sub> = 0 dBm, 6 MHz Spacing	dBm	—	30	—
I <sub>DD</sub>	V <sub>DD</sub> = + 5 Volts	mA	—	60	75

### Absolute Maximum Ratings <sup>4,5,6</sup>

Parameter	Absolute Maximum
Input Power	+12 dBm
V <sub>bias</sub>	+10.0 V
Operating Temperature	0°C to +85°C
Junction Temperature <sup>7</sup>	+150°C
Storage Temperature	-65°C to +125°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > 1 x 10<sup>6</sup> hours.
7. Junction Temperature (T<sub>J</sub>) = T<sub>A</sub> + Θ<sub>jc</sub> \* (V \* I)  
Typical thermal resistance (Θ<sub>jc</sub>) = 148 °C/W.
  - a) For T<sub>A</sub> = 25°C,  
T<sub>J</sub> = 69 °C @ 5.0 V, 60 mA
  - b) For T<sub>A</sub> = 85°C,  
T<sub>J</sub> = 126 °C @ 5.0 V, 55 mA

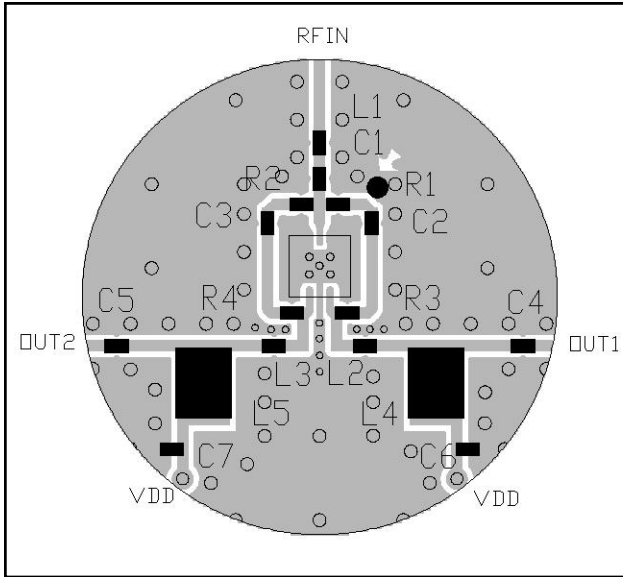
### Handling Procedures

Please observe the following precautions to avoid damage:

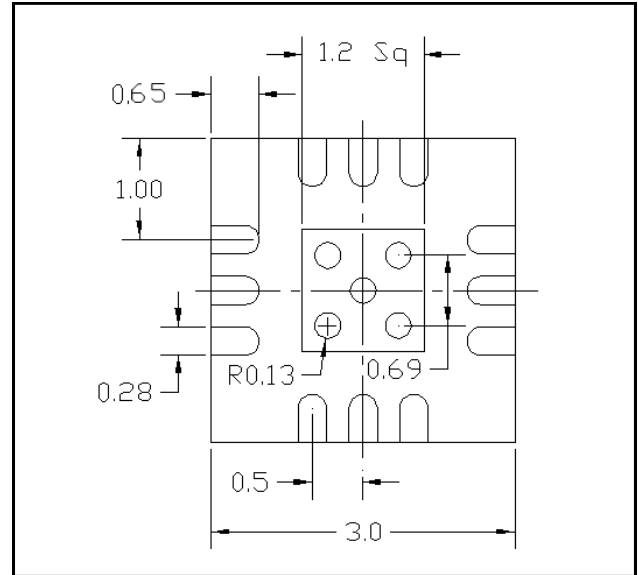
### Static Sensitivity

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.

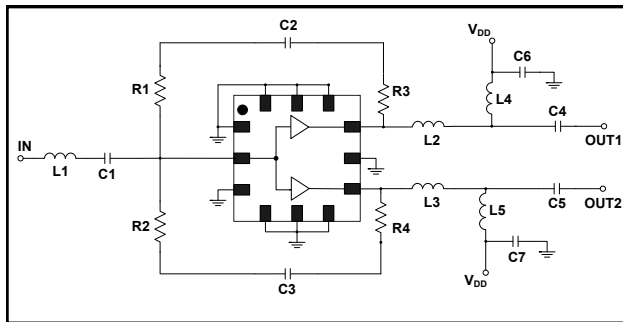
## Recommended PCB



## PCB Land Pattern



## Schematic Including Off-Chip Components

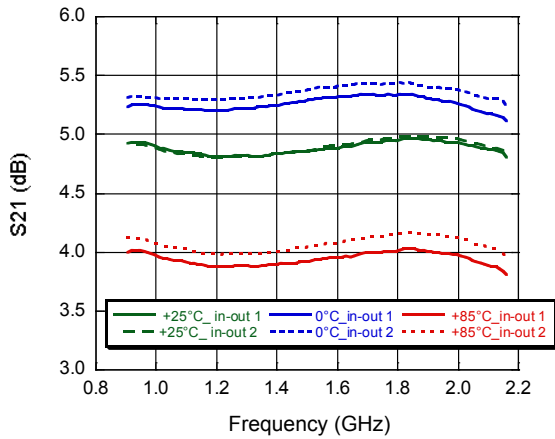


## Off-Chip Component Values

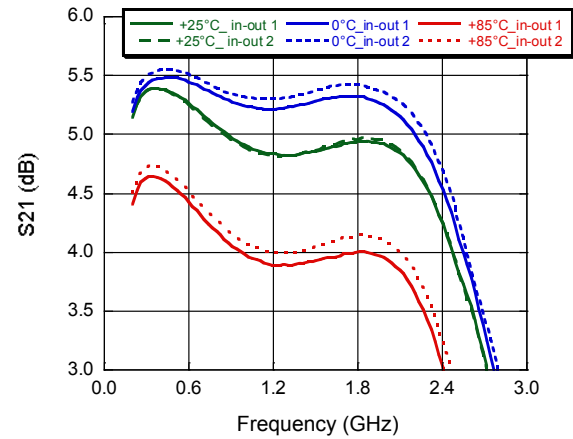
Component	Value	Package
C1 - C5	1000 pF	0402
C6 - C7	0.01 $\mu$ F	0402
L1	4.7 nH	0402
L2, L3	2 nH	0402
L4, L5	100 nH	1008
R1, R2	480 $\Omega$	0402
R3, R4	75 $\Omega$	0402

## Typical Performance Curves

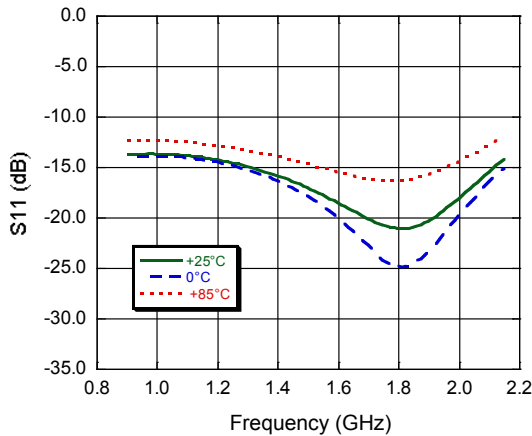
Gain\_OUT1 & OUT2



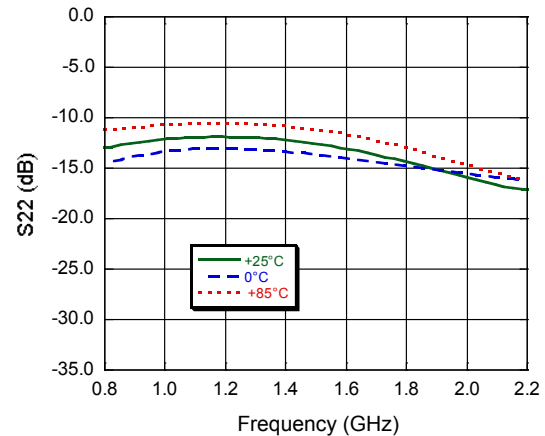
Gain\_OUT1 & OUT2 to 3 GHz



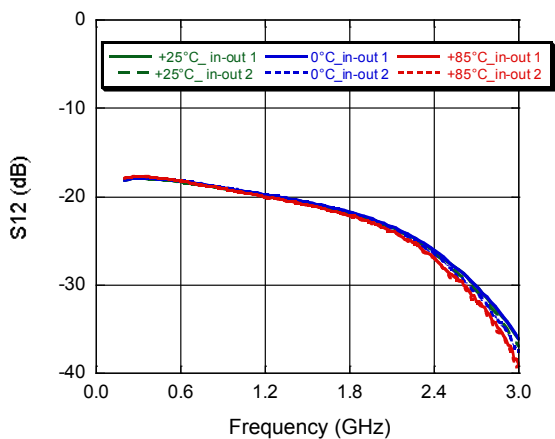
Input Return Loss



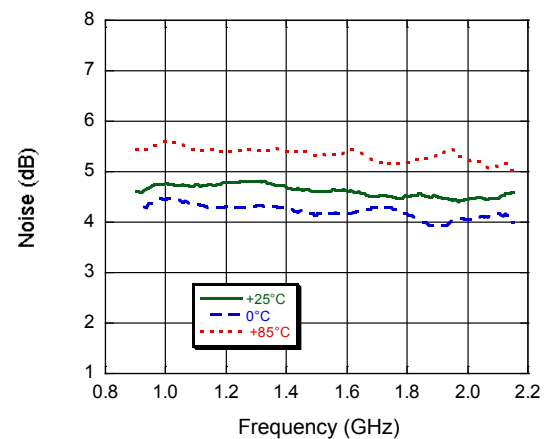
Output Return Loss (Typical both Outputs)



Reverse Isolation to 3 GHz



Noise Figure (Typical both Outputs)

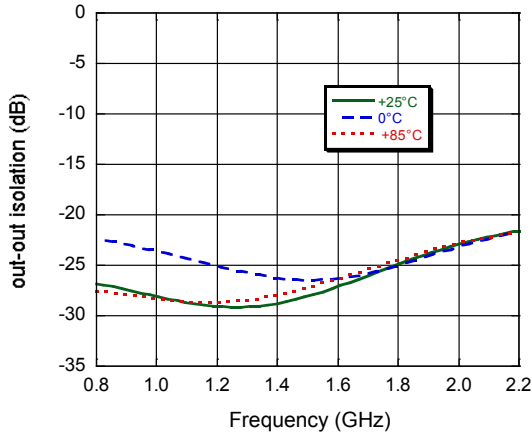


## Satellite Communications Single Ended 2-Way Active Splitter 950 - 2150 MHz

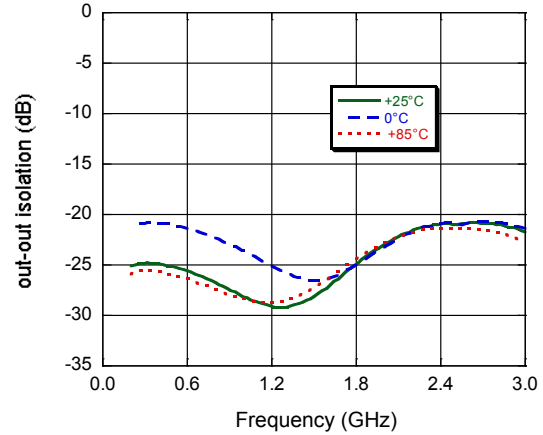
Rev. V1

### Typical Performance Curves

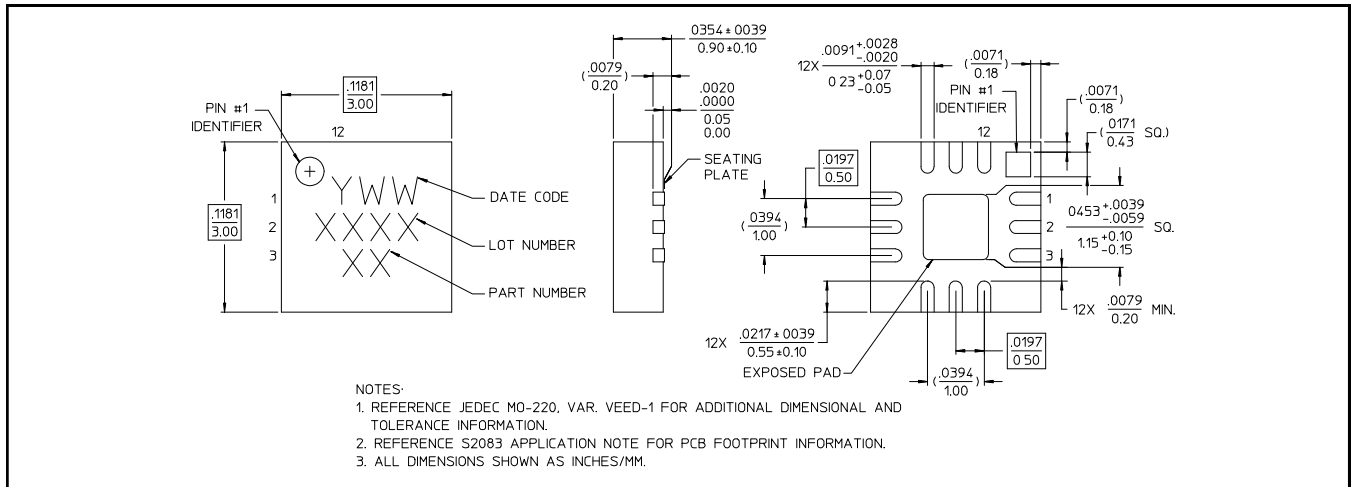
Out - Out Isolation



Out - Out Isolation to 3 GHz



### Lead-Free 3 mm 12-Lead PQFN<sup>†</sup>



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.  
Plating is 100% matte tin plating over copper.

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 estoppel 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.