MAAM-008822

Broadband CATV Single Ended 3-Way Active Splitter
50 - 1100 MHz

Rev. V1

Features

- 3-Way Splitter
- Single Ended Input and Outputs
- 1.3 dB Gain at output port 1
- 4.5 dB Gain at output ports 2 & 3
- +15 dBmV /Channel Input
- 4.5 dB Noise Figure at output port 1
- 4.0 dB Noise Figure at output ports 2 & 3
- Single +5 Volt Supply
- Lead-Free 2 mm 8-Lead PDFN Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MAAM-008822 CATV 3-way active splitter is a GaAs MMIC which exhibits low noise figure and distortion in a lead-free 2mm 8-lead PDFN plastic package. The design features 75 Ω inputs and outputs.

The MAAM-008822 is ideally suited for multi-tuner set top boxes, home gateways, and other broadband internet based appliances.

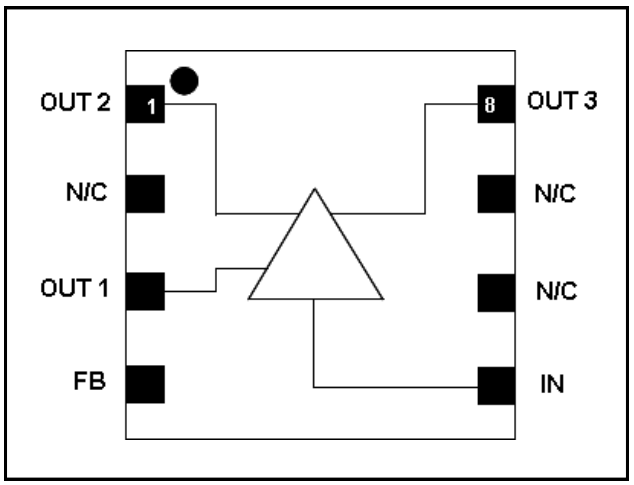
The MAAM-008822 is fabricated using M/A-COM's PHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information [1,2]

Part Number	Package
MAAM-008822-TR1000	1000 piece reel
MAAM-008822-TR3000	3000 piece reel
MAAM-008822-001SMB	Sample Test Board

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

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description
1	OUT2	RF Output 2
2	N/C	No Connection
3	OUT1	RF Output 1
4	FB	Feedback/Bias
5	IN	RF Input
6	N/C	No Connection
7	N/C	No Connection
8	OUT3	RF Output 3
9	Paddle[3]	RF and DC Ground

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.

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Electrical Specifications: Freq. = 1000 MHz, T_A = 25°C, V_{DD} = +5 Volts, Z_0 = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	IN to OUT1 IN to OUT2, IN to OUT3	dB	1 3	1.3 4.5	3 5.5
Gain Flatness	IN to OUT1, IN to OUT2, IN to OUT3	dB	-	0.5	-
Noise Figure	IN to OUT1 IN to OUT2; IN to OUT3	dB	- -	4.5 4.0	- -
Input Return Loss	IN	dB	-	16	-
Output Return Loss	OUT1 OUT2, OUT3	dB	- -	8 19	- -
Composite Triple Beat, CTB	132 channels, +15 dBmV/channel at the input All Outputs	dBc	-	-63	-
Composite Second Order, CSO	132 channels, +15 dBmV/channel at the input All Outputs	dBc	-	-60	-
Reverse Isolation	OUT1 to IN OUT2 to IN, OUT3 to IN	dB	- -	-30 -27	- -
Output to Output Isolation	OUT1 to OUT2; OUT1 to OUT3 OUT2 to OUT3	dB	- -	21 18	- -
Output Power at 1dB Compression, P1dB	OUT1 OUT2, OUT3	dBm	- -	7.5 11	- -
Output 3rd Order Intercept Point, OIP3	500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout OUT1 OUT2, OUT3	dBm	- -	23 24	- -
Output 2nd Order Intercept Point, OIP2	500 MHz, 2-tone, 6 MHz spacing, -15 dBm Pout OUT1 OUT2, OUT3	dBm	- -	45 48	- -
IDD	VDD= +5 Volts	mA	-	120	150

Absolute Maximum Ratings [4,5,6,7]

Parameter	Absolute Maximum
Max Input Power	+12 dBm
Vbias	+10.0 V
Operating Temperature	-20°C to +85°C
Junction Temperature	150°C
Storage Temperature	-65°C to +150°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 10^6 hours.
7. Junction Temperature (T_J) = T_C + Θjc * ((V * I) - (P_{OUT} - P_{IN}))
   Typical thermal resistance (Θjc) = 77° C/W.
   a) For T_C = 25°C,
   T_J = 71 °C @ 5 V, 120 mA
   b) For T_C = 85°C,
   T_J = 127 °C @ 5 V, 110 mA

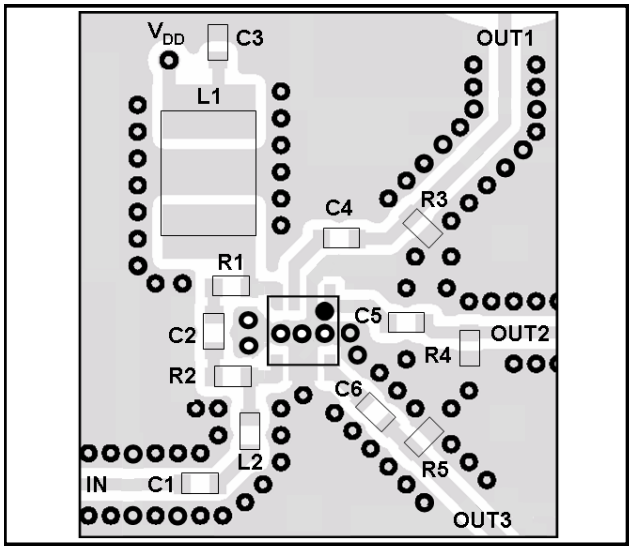
Handling Procedures

Please observe the following precautions to avoid damage:

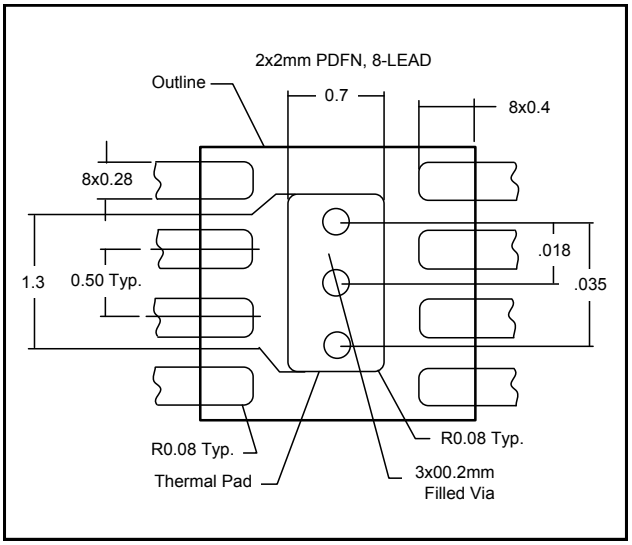
Static Sensitivity

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.

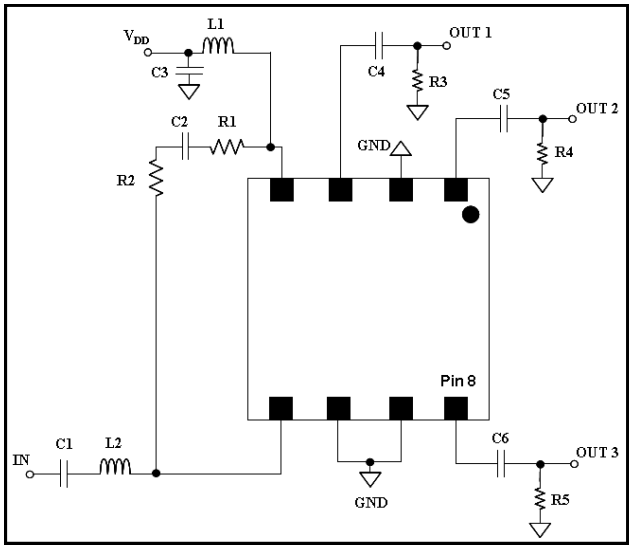
Recommended PCB



PCB Land Pattern



Schematic Including Off-Chip Components[8]



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

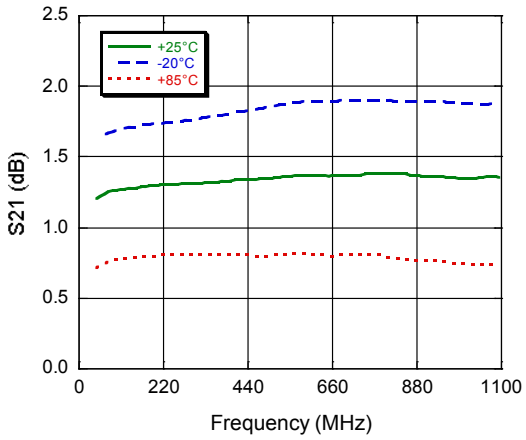
Off-Chip Component Values [9]

Component	Value	Package
C1 - C6	0.01 µF	0402
L1[7]	1 µH	1210
L2	3.9 nH	0402
R1, R2	180 ohm	0402
R3	750 ohm	0402
R4, R5	270 ohm	0402

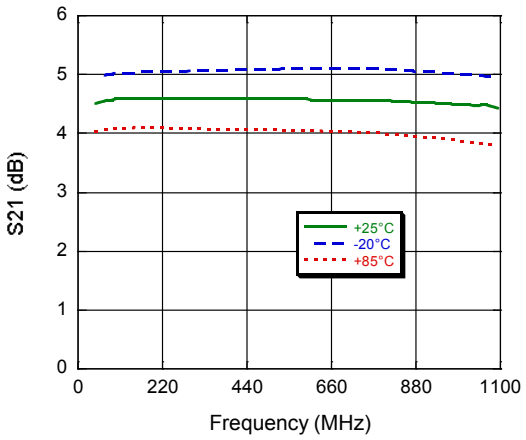
9. L1 supplied from EPCOS, part number B82422A1102K100.

Typical Performance Curves

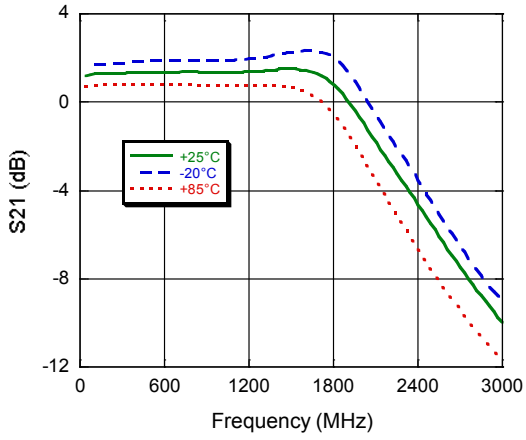
Gain to 1100 MHz__OUT1



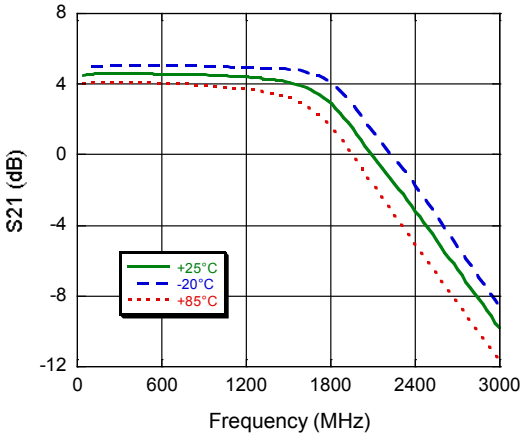
Gain to 1100 MHz__OUT2 & OUT3



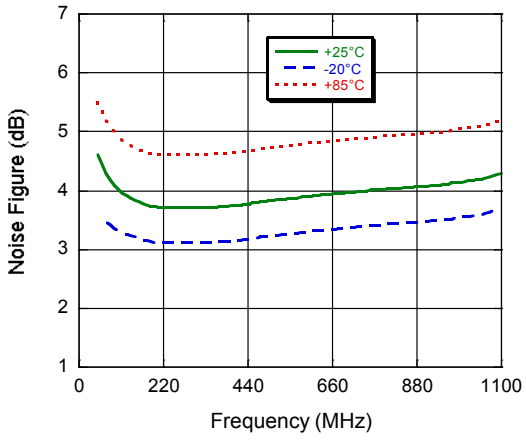
Gain to 3000 MHz__OUT1



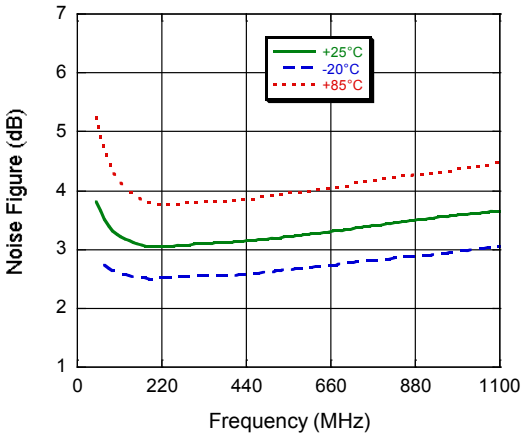
Gain to 3000 MHz__OUT2 & OUT3



Noise Figure__OUT1

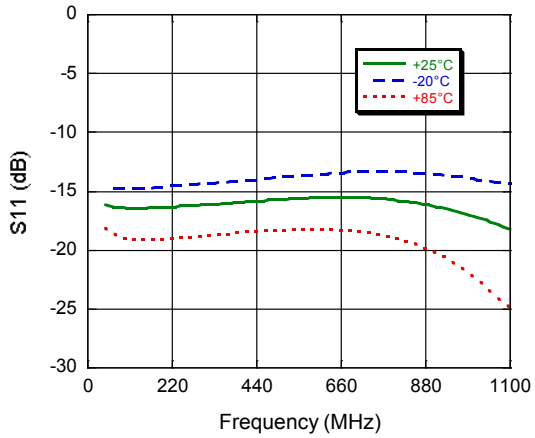


Noise Figure__OUT2 & OUT3

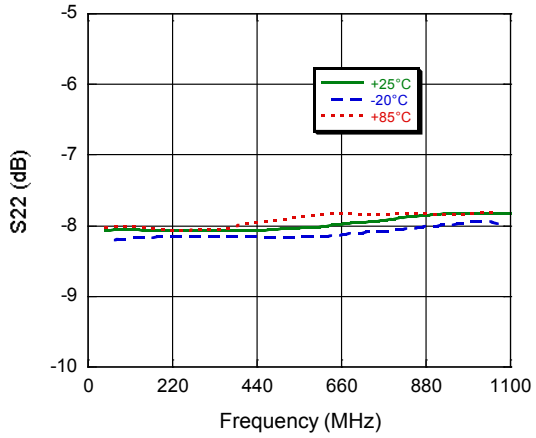


Typical Performance Curves

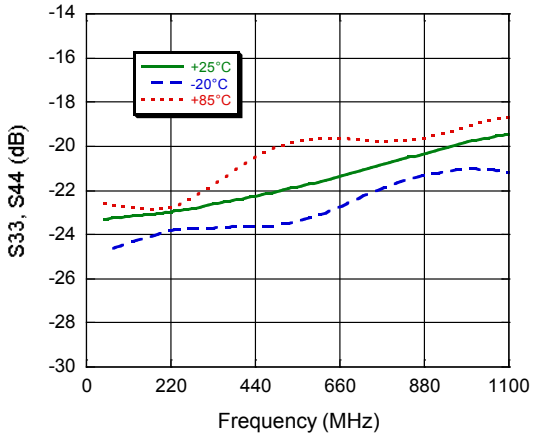
Input Return Loss



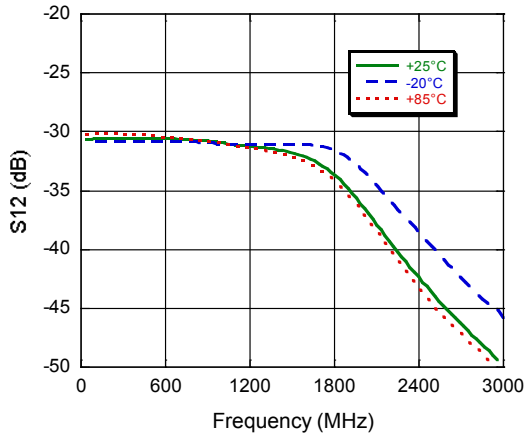
Output Return Loss__OUT1



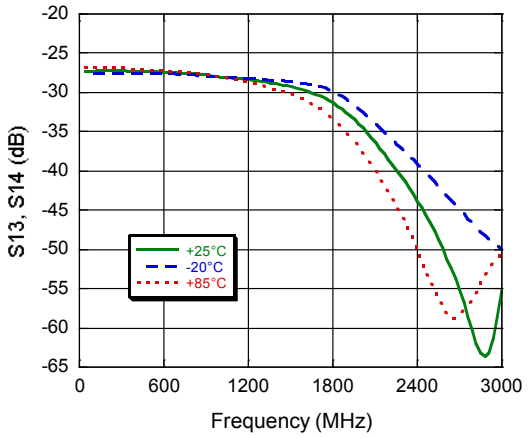
Output Return Loss__OUT2 & OUT3



Reverse Isolation__OUT1-IN

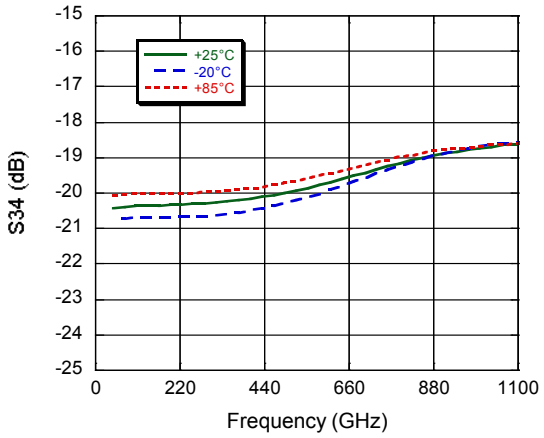


Reverse Isolation__OUT2-IN &OUT3-IN

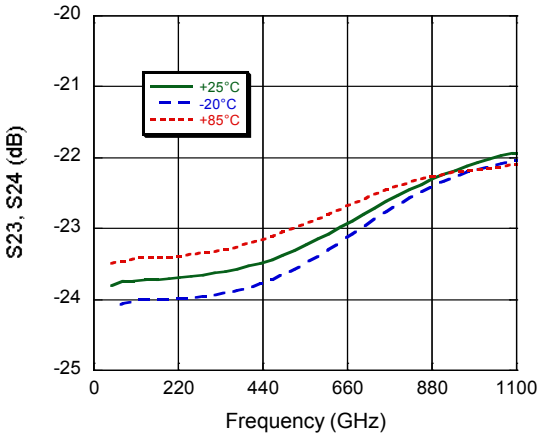


Typical Performance Curves

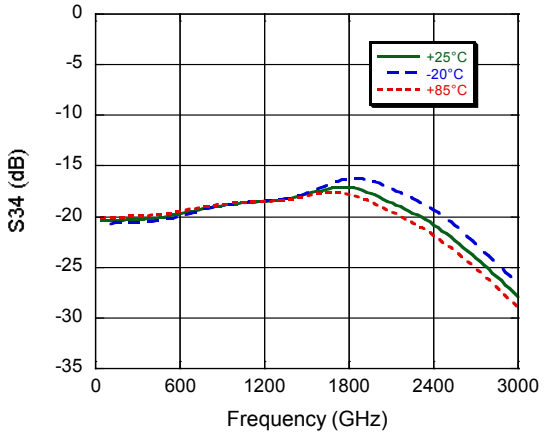
OUT-OUT Isolation to 1100 MHz
OUT2-OUT3



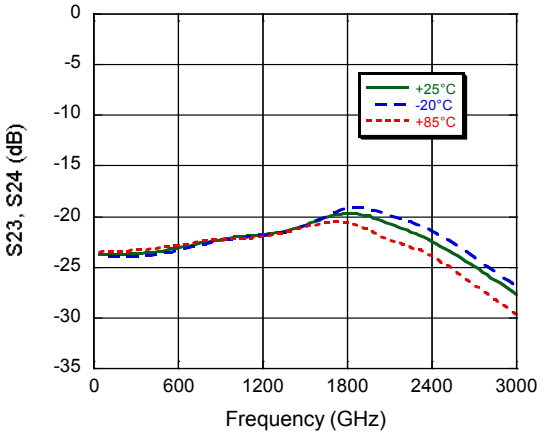
OUT-OUT Isolation to 1100 MHz
OUT1-OUT2 & OUT1-OUT3



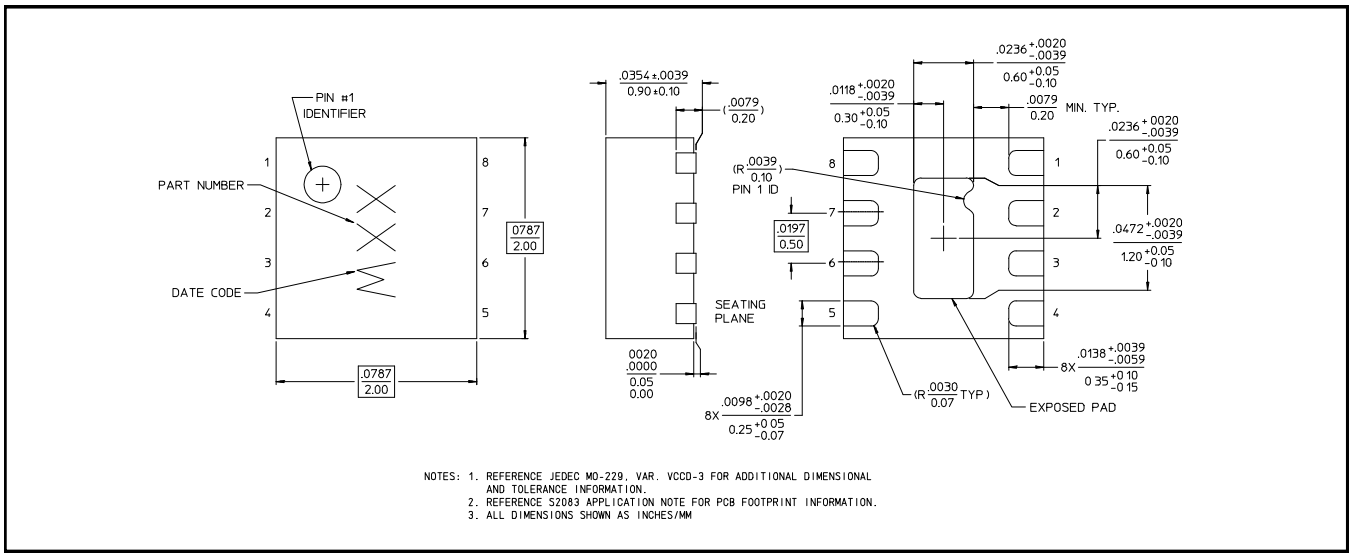
OUT-OUT Isolation to 3000 MHz
OUT2-OUT3



OUT-OUT Isolation to 3000 MHz
OUT1-OUT2 & OUT1-OUT3



Lead-Free 2 mm 8-Lead PDFN†



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