

## Features

- Low Power Consumption: 5V, 85 mA.
- 16 dB Flat Gain: 50 MHz - 2700 MHz
- Low Noise: 2.7 dB
- Power Down Control:  $I_{DD} < 4$  mA
- Current Adjust
- Low Distortion Performance
- Lead-Free 2mm PDFN-8LD Plastic Package
- Halogen-Free “Green” Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

## Description

The MAAM-011117 provides high gain, low noise and low distortion amplification for 75 Ω customer premises equipment (CPE).

The MAAM-011117 incorporates a power-down function to reduce the overall current consumption to less than 4 mA for standby operation.

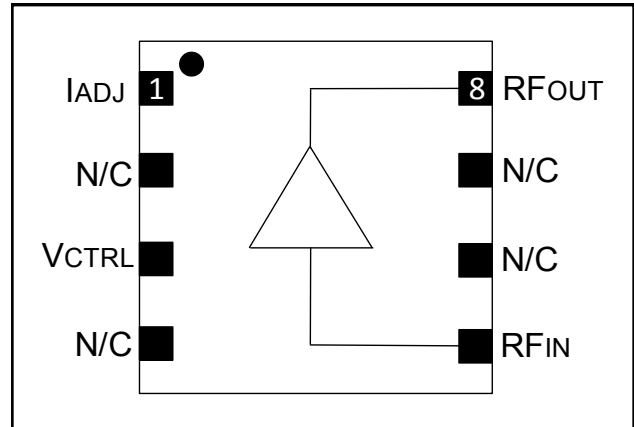
The MAAM-011117 is packaged in a 2mm 8-lead package and requires a minimal number of off-chip components resulting in a highly integrated low cost solution.

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

Part Number	Package
MAAM-011117-TR3000	3000 piece reel
MAAM-011117-001SMB	Sample 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	IADJ	Current Control
2	N/C	No Connection
3	VCTRL	Power Down LO:0V; HI:3.3V
4	N/C	No Connection
5	RFIN	RF Input (75Ω)
6	N/C	No Connection
7	N/C	No Connection
8	RFOUT	RF Output (75Ω)
9	Paddle <sup>4</sup>	RF and DC Ground

3. M/A-COM Technology Solutions recommends connecting unused package pins to ground.
4. 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.

## 75Ω , 5V RF Amplifier 50 - 2700 MHz

Rev. V2

**Electrical Specifications:  $T_A = 25^\circ\text{C}$ , Freq: 50 - 2700 MHz,  $V_{DD} = +5$  Volts,  $Z_0 = 75 \Omega$**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	14.7	16	17.2
Gain Flatness	—	dB	—	±0.5	—
Noise Figure	50MHz-1.2GHz 1.2GHz-2.7GHz	dB	—	2.7 3.0	—
Reverse Isolation	—	dB	—	20	—
Input Return Loss	—	dB	—	12	—
Output Return Loss	—	dB	—	16	—
Output IP2 <sup>5</sup>	Swept frequency: 50MHz—870GHz, IM Tone at 100 MHz	dBm	—	58	—
	Input tones at 2.5GHz and 2.6GHz, IM Tone at 100 MHz	dBm	—	45	—
	Input tones at 1.0GHz and 1.1GHz, Input Power = -15dBm, Output tone 2.1GHz	dBm	—	50	—
Output IP3 <sup>5</sup>	Swept frequency from 50MHz-870 MHz	dBm	—	35	—
	Swept frequency from 870MHz-2 GHz			30	
	Swept frequency from 2GHz-2.7 GHz			26	
Composite Triple Beat, CTB	79 Channels, +15 dBmV / Channel at I/P	dBc	—	75	—
Composite Second Order, CSO	79 Channels, +15 dBmV / Channel at I/P	dBc	—	65	—
Cross Modulation	79 Channels, +15 dBmV / Channel at I/P	dBc	—	65	—
Output P1dB	1 GHz	dBm	—	19.5	—
$I_{DD}$	Power Up: $V_{DD}=5\text{V}$ , $V_{CTRL}=3.3\text{V}$	mA	—	85	105
	Power Down: $V_{DD}=5\text{V}$ , $V_{CTRL}=0\text{V}$	mA	—	3.5	—

5. Measured with two tones, 100 MHz spacing, -15 dBm input power per tone.

### $V_{CTRL}$ Logic Voltages ( $V_{DD} = +5\text{V}$ )

Parameter	Units	Min	Typ	Max
$V_{CTRL}$ Logic Low	V	-0.5	0	0.2
$V_{CTRL}$ Logic High	V	1.2	3.3	3.47
$I_{CTRL}$ Logic Low	mA	-0.5	-	1
$I_{CTRL}$ Logic High	mA	-0.5	-	1

### Handling Procedure - 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.

### ESD Sensitivity Ratings:

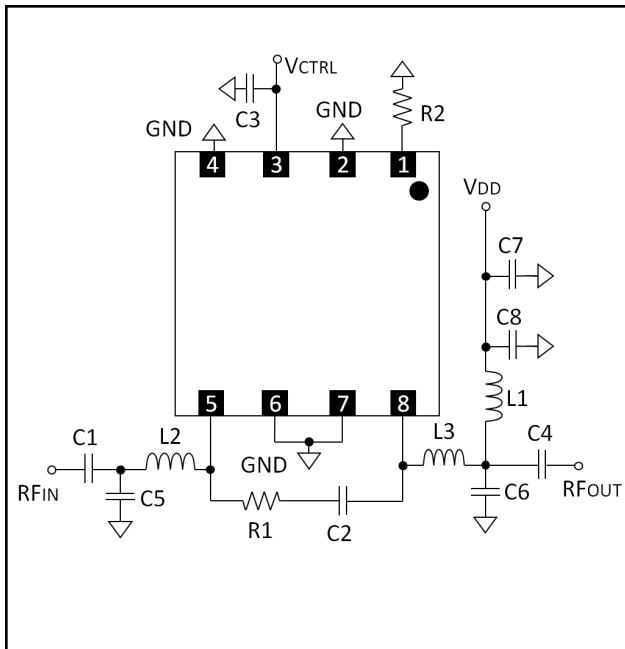
HBM ESD Rating: Class 0A  
CDM ESD Rating: Class II

### Absolute Maximum Ratings <sup>6, 7</sup>

Parameter	Absolute Maximum
Input Power	+7 dBm
Operating Voltage	+10 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM Technology does not recommend sustained operation near these survivability limits.

## Schematic Including Off-Chip Components

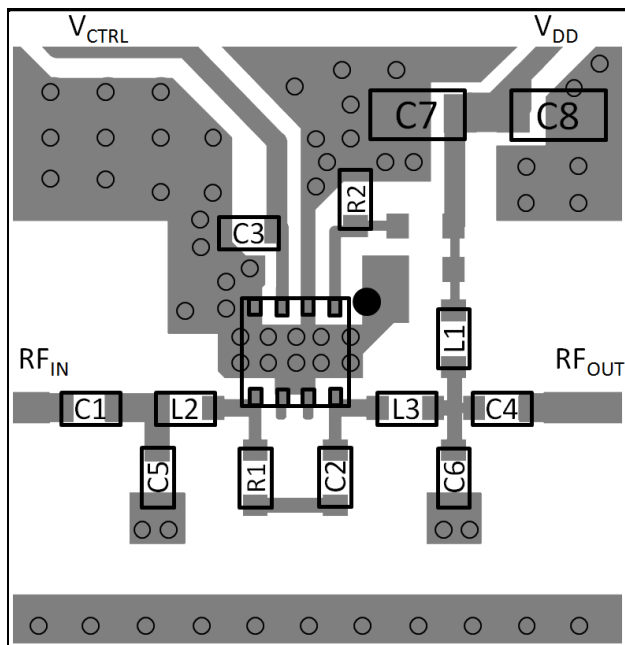


## Parts List <sup>8</sup>

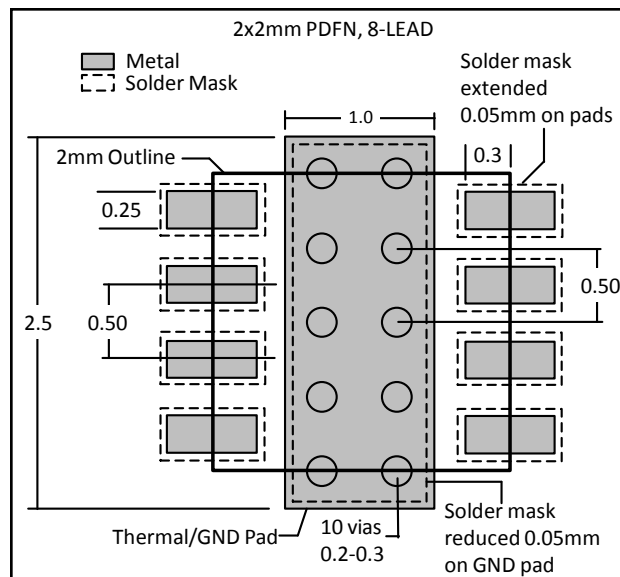
Component	Value	Package
C1 - C3	10 nF	0402
C4	220 pF	0402
C5	0.7 pF	0402
C6	0.2 pF	0402
C7	100 nF	0603
C8	1 μF	0603
R1	510 Ω	0402
R2	510 kΩ	0402
L1	Ferrite Bead	0402
L2	3.0 nH	0402
L3	3.3 nH	0402

8. Ferrite Bead from Murata, part number BLM15HD182SN

## Recommended Board Layout

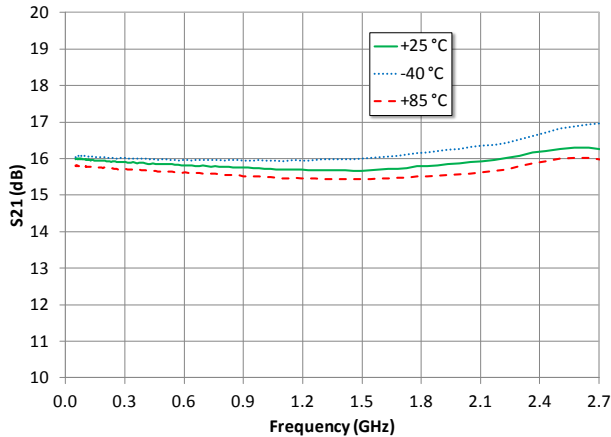


## PCB Land Pattern

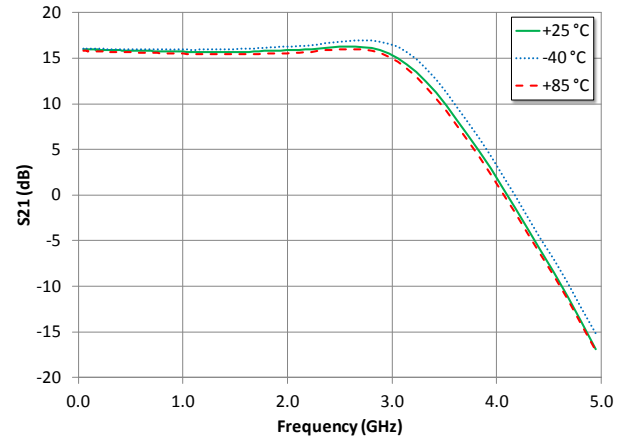


**Typical Performance Curves:  $V_{DD}=+5V$ ;  $I_{DD}=85mA$ , Power-Up Mode**

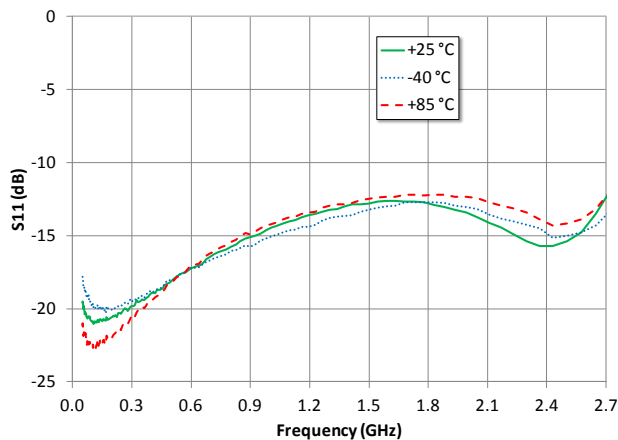
**Gain to 2.7 GHz**



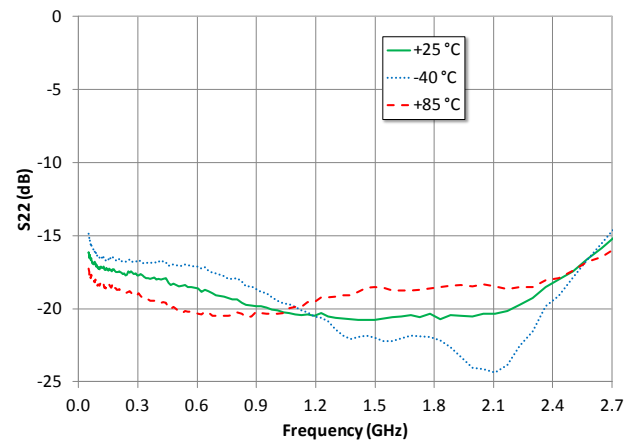
**Gain to 5 GHz**



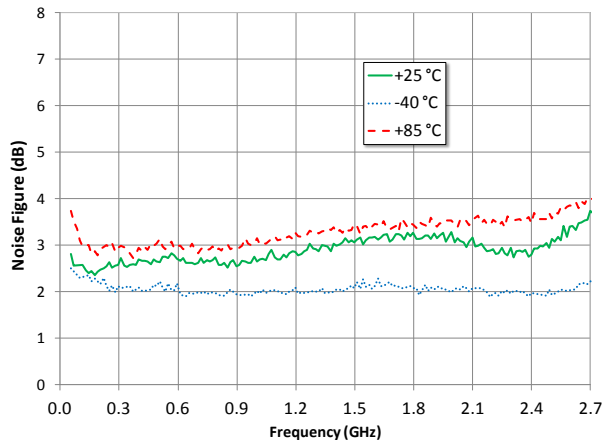
**Input Return Loss**



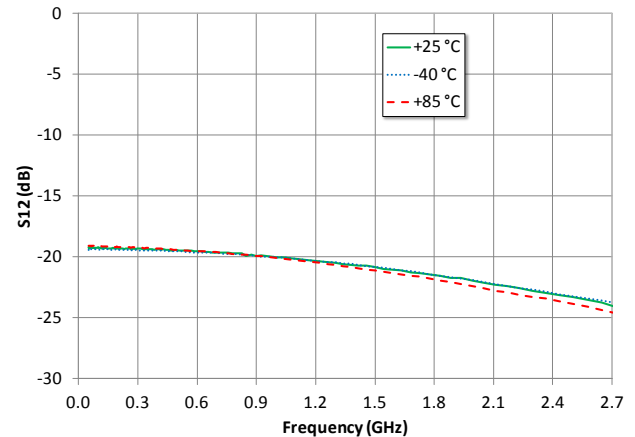
**Output Return Loss**



**Noise Figure**



**Reverse Isolation**



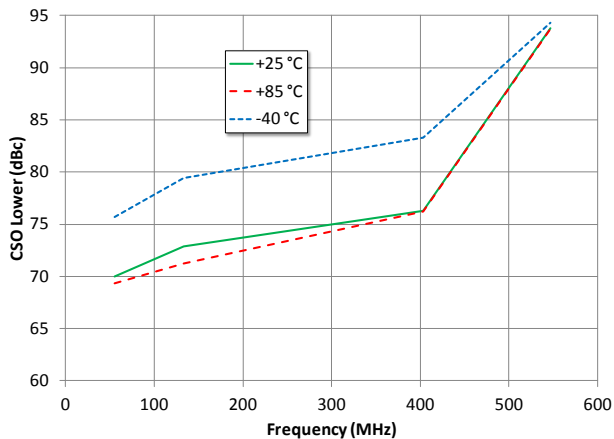
**75Ω , 5V RF Amplifier**  
**50 - 2700 MHz**

Rev. V2

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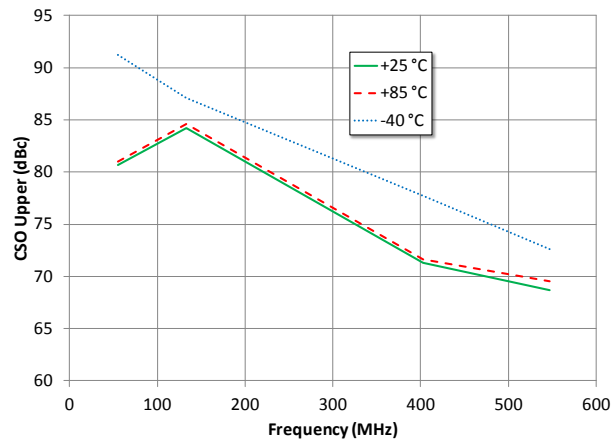
**CSO Lower**

79ch, +15 dBmV/ch Flat Input Power



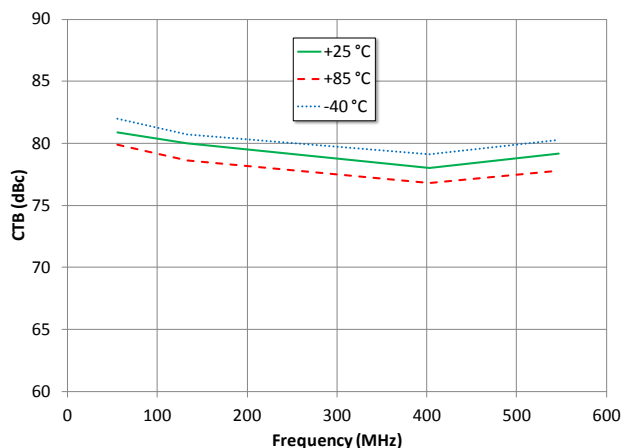
**CSO Upper**

79ch, +15 dBmV/ch Flat Input Power



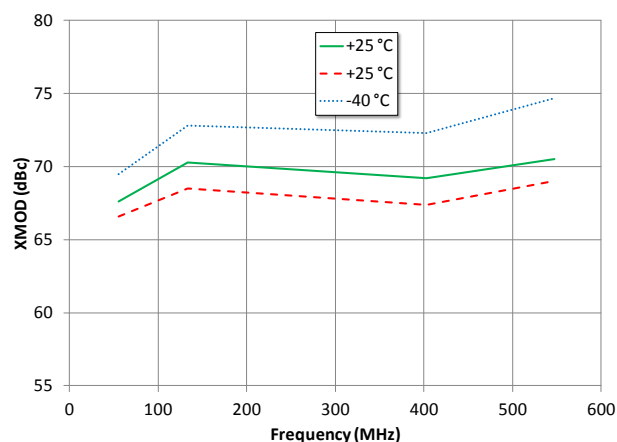
**CTB**

79ch, +15 dBmV/ch Flat Input Power

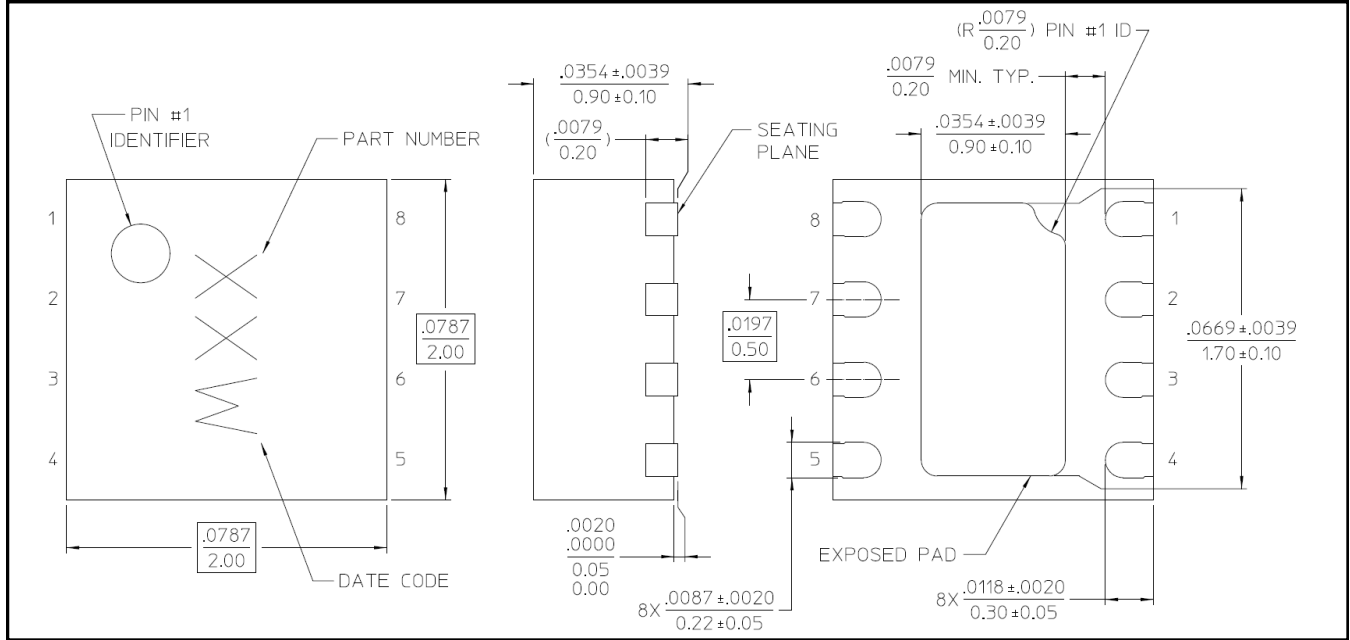


**Cross Modulation**

79ch, +15 dBmV/ch Flat Input Power



**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.  
 Reference JEDEC MO-229 for additional dimensional and tolerance information  
 All dimensions shown as in/mm