MAAM-011117

75 Ω, 5 V RF Amplifier
50 - 2700 MHz

Rev. V3

Features

- Low Power Consumption: 5 V, 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 2 mm PDFN-8LD Plastic Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant

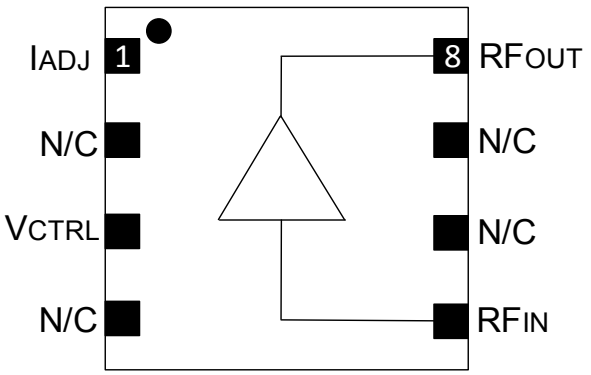
Description

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

Functional Schematic



Pin Configuration[3]

Pin No.	Pin Name	Description
1	I_{ADJ}	Current Control
2	N/C	No Connection
3	V_{CTRL}	Power Down LO: 0 V; HI: 3.3 V
4	N/C	No Connection
5	RF_{IN}	RF Input (75 Ω)
6	N/C	No Connection
7	N/C	No Connection
8	RF_{OUT}	RF Output (75 Ω)
9	Paddle[4]	RF and DC Ground

3. MACOM recommends connecting unused package pins to ground.
4. The exposed pad centered on the package bottom must be connected to RF and DC ground.

Ordering Information[1,2]

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.

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

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Electrical Specifications: T_A = 25°C, Freq: 50 - 2700 MHz, V_{DD} = +5 Volts, Z_0 = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	14.7	16	17.2
Gain Flatness	—	dB	—	±0.5	—
Noise Figure	50 MHz - 1.2 GHz 1.2 GHz - 2.7 GHz	dB	—	2.7 3.0	—
Reverse Isolation	—	dB	—	20	—
Input Return Loss	—	dB	—	12	—
Output Return Loss	—	dB	—	16	—
Output IP2[5]	Swept frequency: 50 MHz - 870 GHz, IM Tone at 100 MHz	dBm	—	58	—
	Input tones at 2.5 GHz and 2.6 GHz, IM Tone at 100 MHz	dBm	—	45	—
	Input tones at 1.0 GHz and 1.1 GHz, Input Power = -15 dBm, Output tone 2.1 GHz	dBm	—	50	—
Output IP3[5]	Swept frequency from 50 MHz - 870 MHz Swept frequency from 870 MHz - 2 GHz Swept frequency from 2.0 - 2.7 GHz	dBm	—	35 30 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, XMOD	79 Channels, +15 dBmV / Channel at I/P	dBc	—	-65	—
Output P1dB	1 GHz	dBm	—	19.5	—
I_{DD}	Power Up: V_{DD} = 5 V, V_{CTRL} = 3.3 V Power Down: V_{DD} = 5 V, V_{CTRL} = 0 V	mA	—	85 3.5	105 —

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

V_{CTRL} Logic Voltages (V_{DD} = +5 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

Absolute Maximum Ratings[6,7,8]

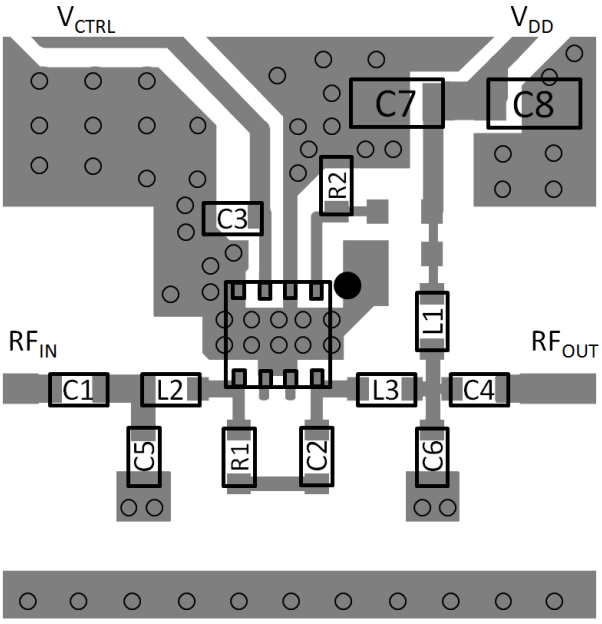
Parameter	Absolute Maximum
Input Power	7 dBm
Operating Voltage	10 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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.
8. Junction Temperature (T_J) = T_C + Θjc * (V * I)
   Typical thermal resistance (Θjc) = 73° CW.
   a) For T_C = +25°C,
   T_J = 57°C @ 5 V, 85 mA
   b) For T_C = +85°C,
   T_J = 117°C @ 5 V, 85 mA

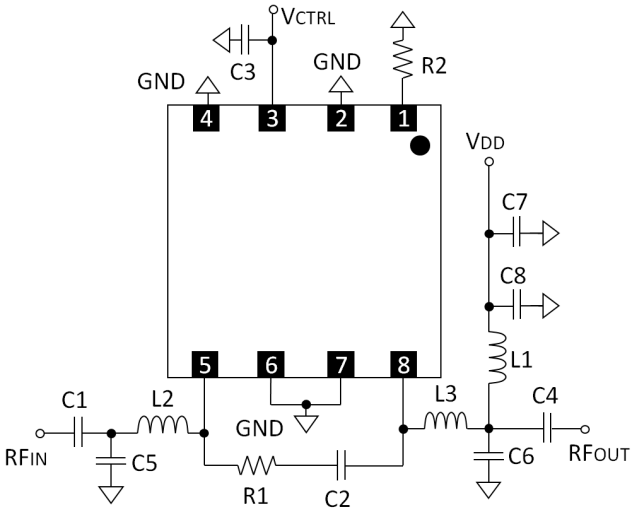
Handling Procedure - Static Sensitivity

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 HBM Class 0A, CDM Class II devices.

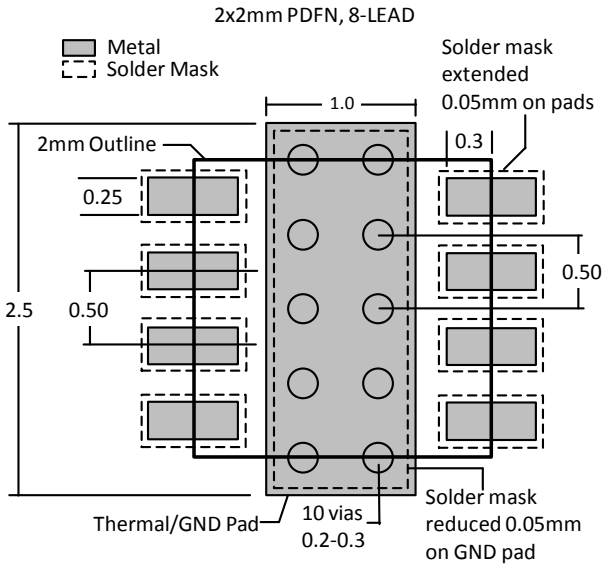
Recommended Board Layout



Schematic Including Off-Chip Components



PCB Land Pattern



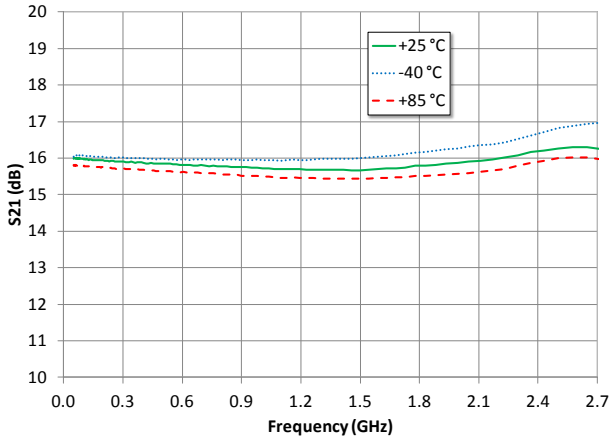
Parts List[9]

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

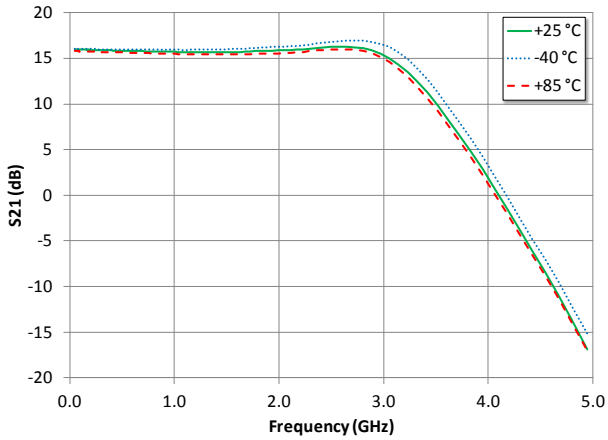
9. Ferrite Bead from Murata, part number BLM15HD182SN.

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

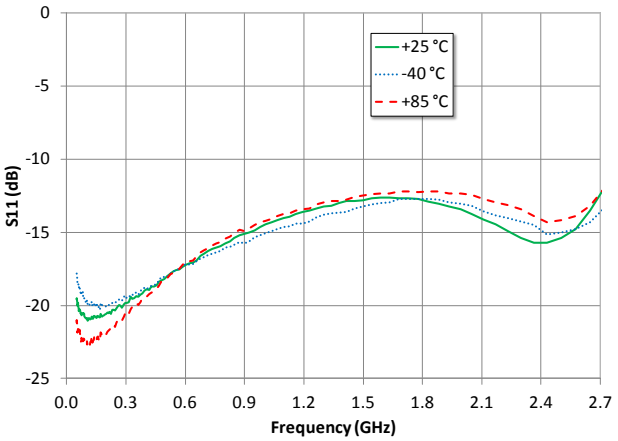
Gain to 2.7 GHz



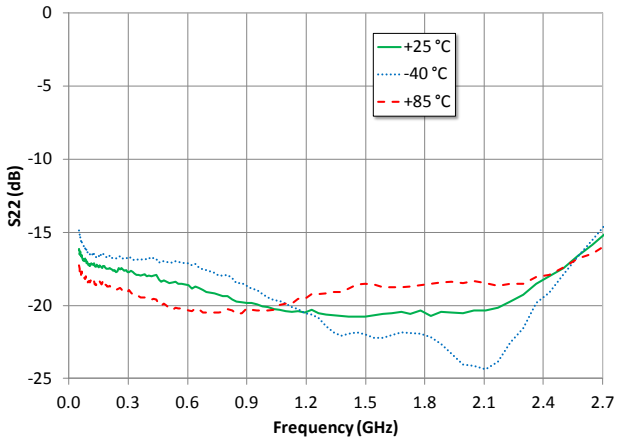
Gain to 5 GHz



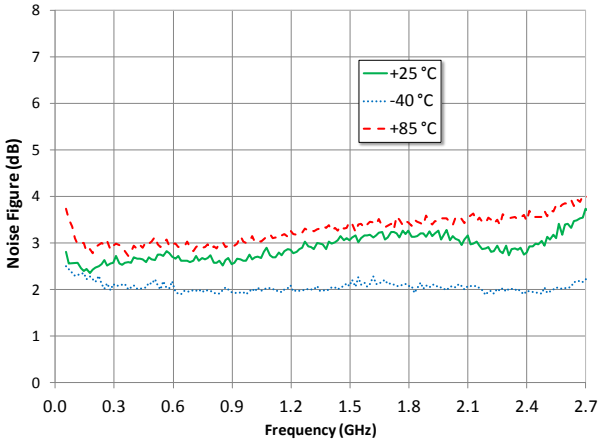
Input Return Loss



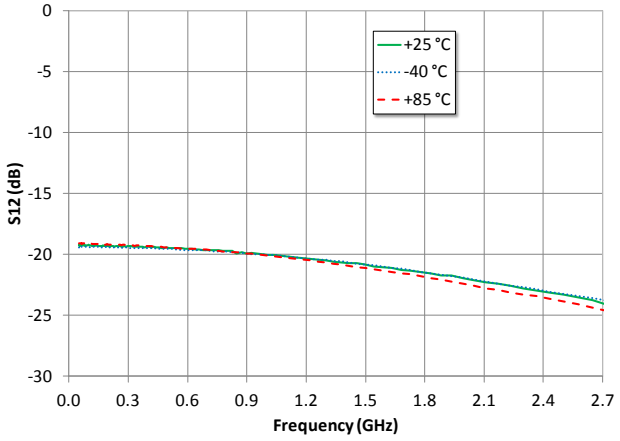
Output Return Loss



Noise Figure

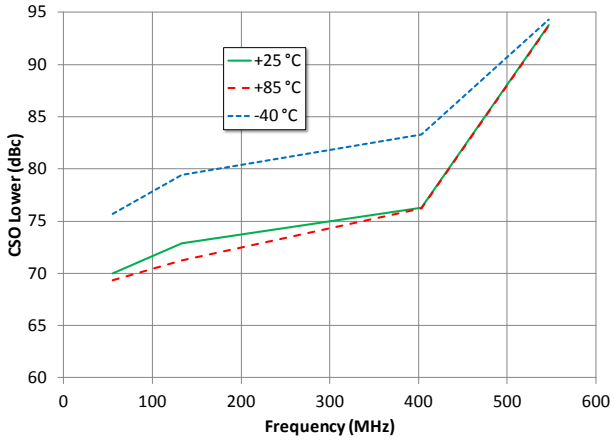


Reverse Isolation

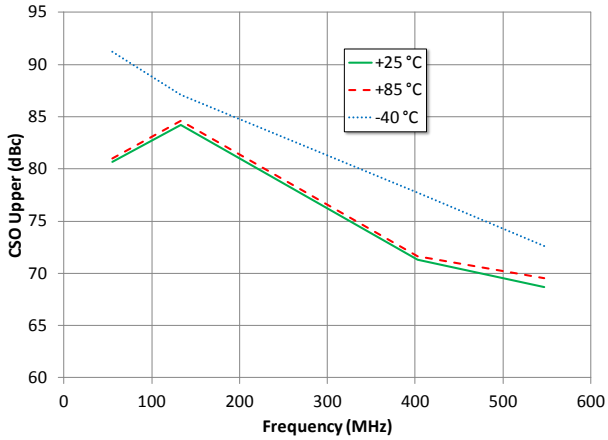


Typical Performance Curves: V_{DD} = +5 V; I_{DD} = 85 mA, Power-Up Mode

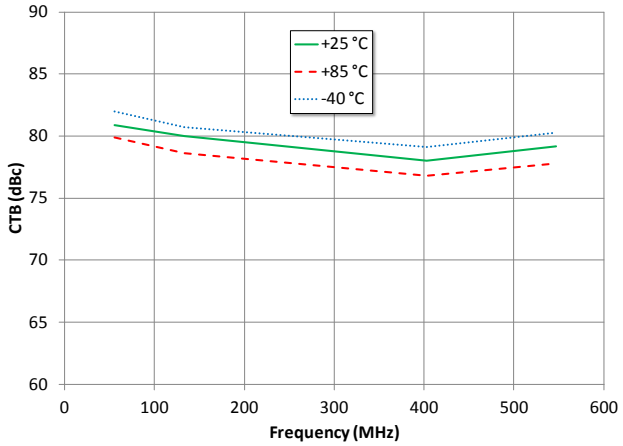
CSO Lower
79ch, +15 dBmV/ch Flat Input Power



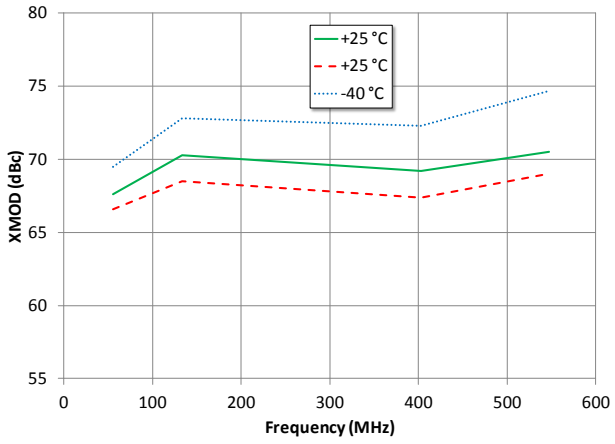
CSO Upper
79ch, +15 dBmV/ch Flat Input Power



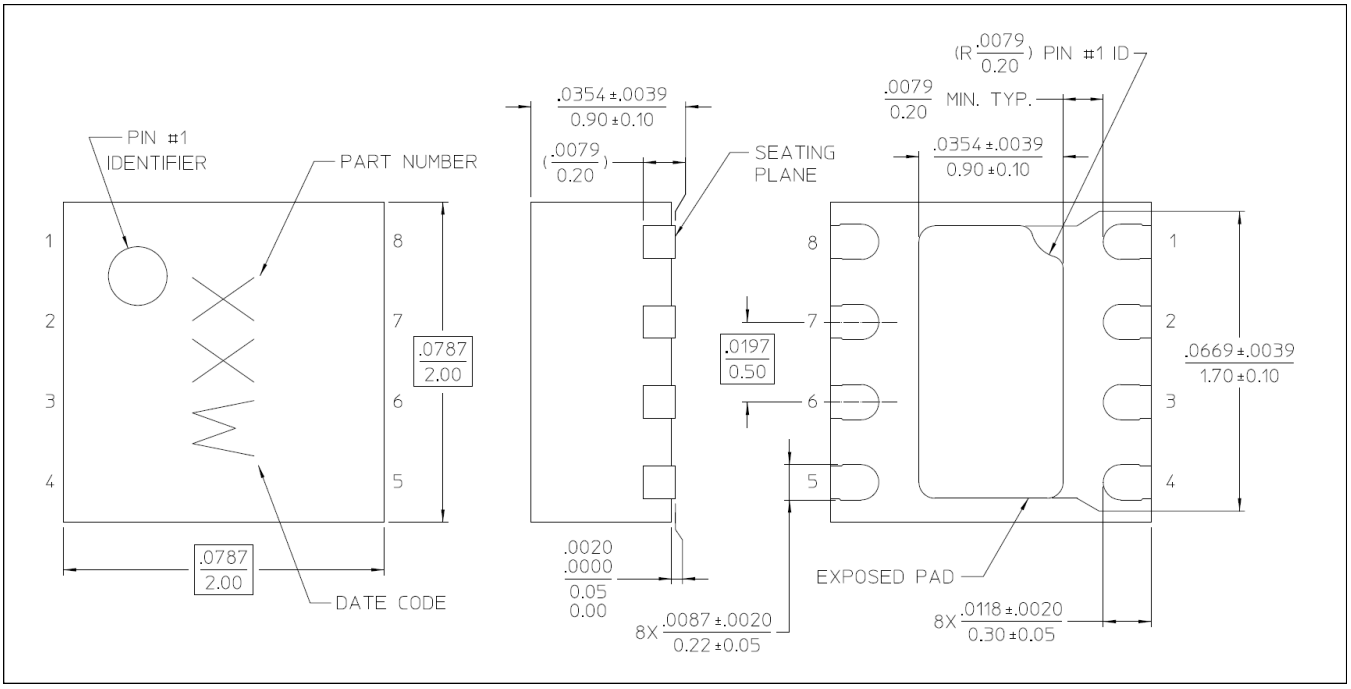
CTB
79ch, +15 dBmV/ch Flat Input Power



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