MAAM-009116

High Dynamic Range IF Amplifier
50 - 1000 MHz

Rev. V2

Features

- Single +5 V Supply Voltage
- 18 dB Gain
- +22 dBm P1dB
- +40 dBm OIP3
- 2.4 dB Noise Figure
- Lead-Free SOT-89 Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Re-flow Compatible

Description

The MAAM-009116 is a high dynamic range amplifier in a lead-free SOT-89 surface mount plastic package. It can be operated from a single 5 volt supply.

The MAAM-009116 offers a combination of low noise figure, high gain, and high output IP3 making this an ideal IF amplifier for receiver and transmitter applications.

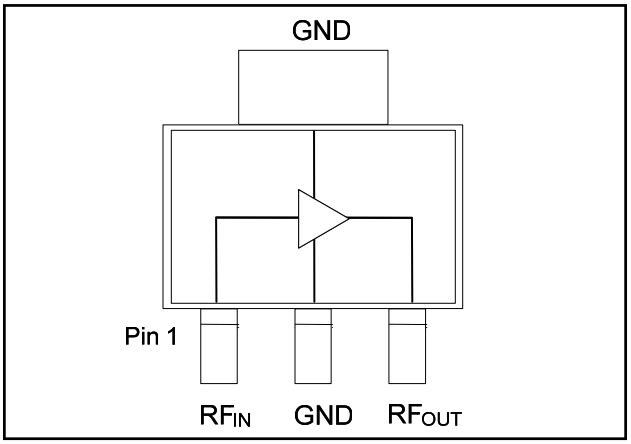
The MAAM-009116 is fabricated using M/A-COM Technology Solutions MESFET process to realize low noise and high dynamic range. The process features full passivation for performance and reliability.

Ordering Information [1,2]

Part Number	Package
MAAM-009116-000000	Bulk Packaging
MAAM-009116-TR3000	3000 piece reel
MAAM-009116-001SMB	500 MHz Configuration

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

Functional Block Diagram



Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF Input	3	RF Output/Bias
2	Ground	4	Ground

Maximum Operating Conditions[3]

Parameter	Maximum Operating Conditions
Junction Temperature [4]	150°C
RF Output Power	22 dBm
Operating Temperature	-40°C to +85°C

3. These operating conditions will ensure MTTF > 1 x 10^6 hours.
4. Junction Temperature (T_J) = T_C + Θjc * ((V * I) - (P_{OUT} - P_{IN}))
   Typical thermal resistance (Θjc) = 70° C/W.
   a) For T_C = 25°C,
   T_J = 88 °C @ 5 V, 180 mA, P_{OUT} = 5 dBm, P_{IN} = -13 dBm
   b) For T_C = 85°C,
   T_J = 143 °C @ 5 V, 165 mA, P_{OUT} = 4.7 dBm, P_{IN} = -13 dBm

Absolute Maximum Ratings[5,6]

Parameter	Absolute Maximum
RF Input Power	20 dBm
Voltage	6 volts
Storage Temperature	-55°C to +150°C
Junction Temperature	175°C

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

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

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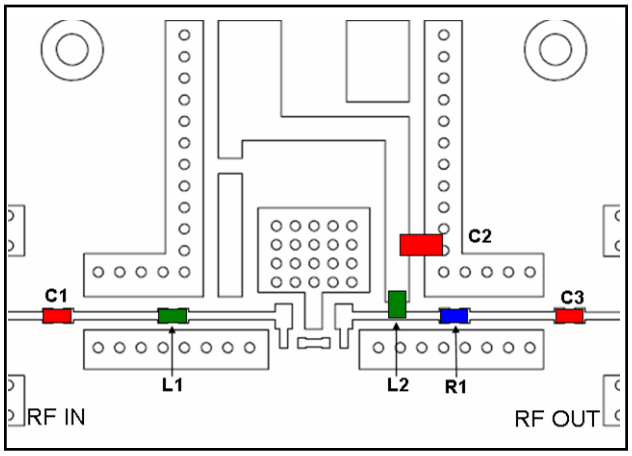
Electrical Specifications for Single Ended Performance: Z_0 = 50 Ω, T_A = 25 °C, V_{DD} = +5 V

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	500 MHz	dB	15	18	—
Noise Figure	500 MHz	dB	—	2.4	—
Input Return Loss	500 MHz	dB	—	13	—
Output Return Loss	500 MHz	dB	—	12	—
Output P1dB	500 MHz	dBm	—	22	—
Output IP_3	500 MHz	dBm	37	40	—
Current	V_{DD} = +5 V	mA	—	180	200

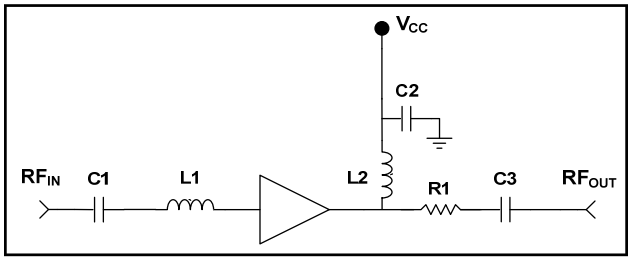
PCB Layout



Parts List

Part	Value	Case Style	Manufacturer
C1,C3	1000 pF	0402	Murata
C2	0.018 µF	0805	Murata
L1	22 nH	0402	Coilcraft
L2	150 nH	0603	Coilcraft
R1	8.2 Ω	0402	Panasonic

Application Schematic



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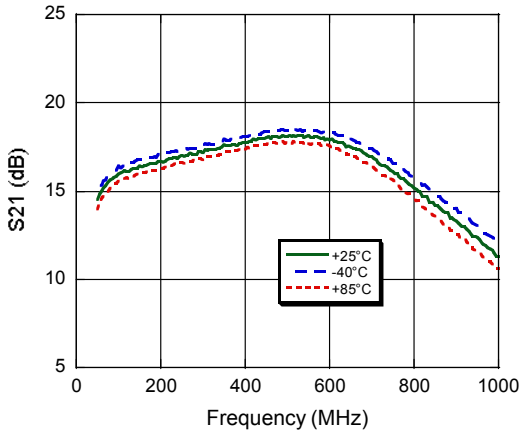
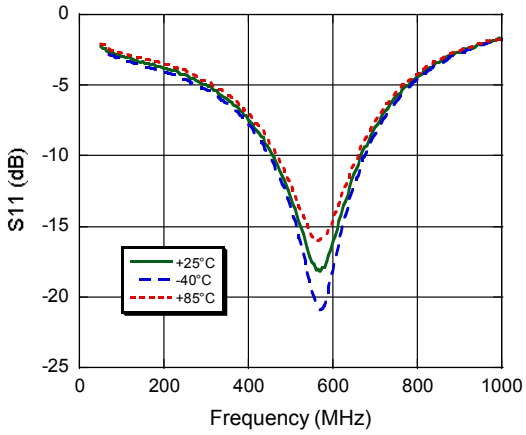
Typical Performance Curves

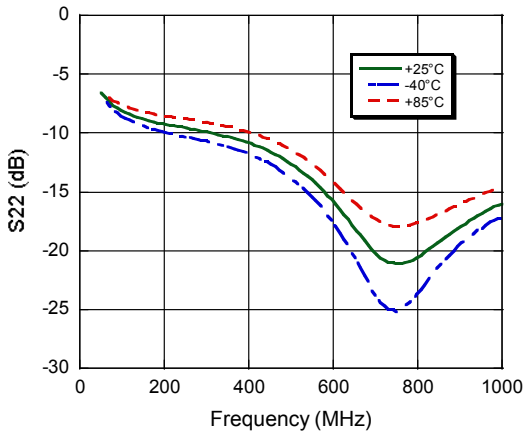
Gain



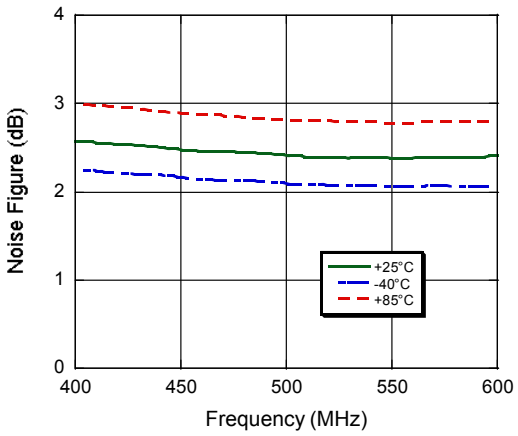
Input Return Loss



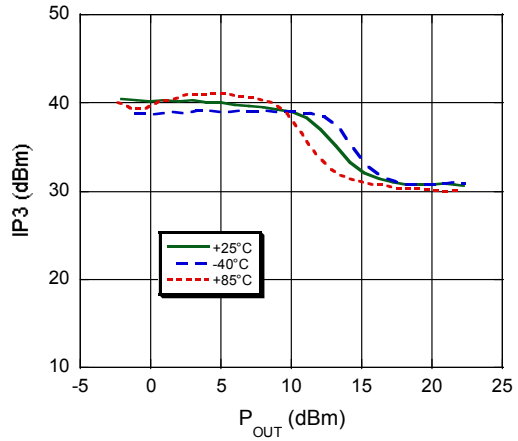
Output Return Loss



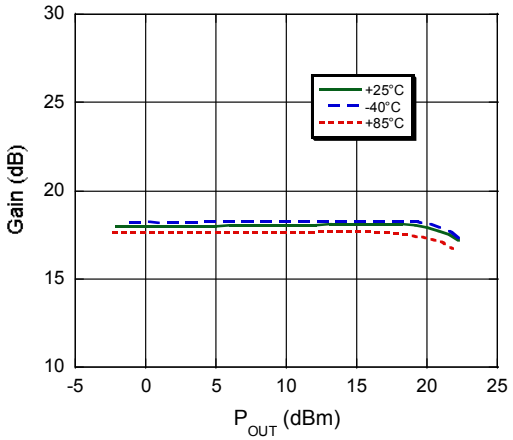
Noise Figure



IP3



Gain



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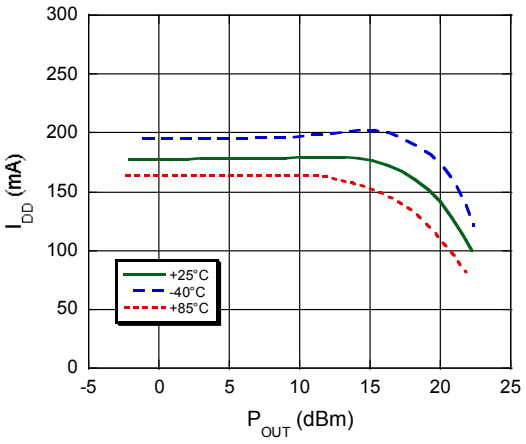
Typical Performance Curves

Current



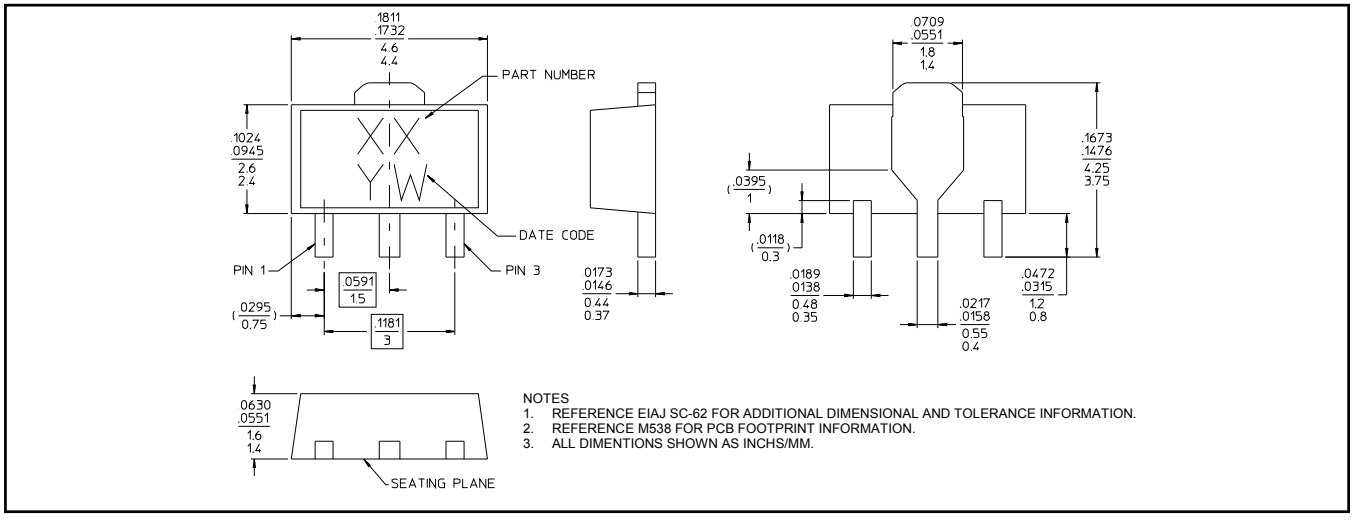
Handling Procedures

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.

Lead Free SOT-89 Plastic Package†



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

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