

## Features

- 75  $\Omega$  Input / Output Match
- -63 dBc CTB
- 3.0 dB Noise Figure
- 15 dB Gain
- Lead-Free SOT-89 Package
- Halogen-Free "Green" Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

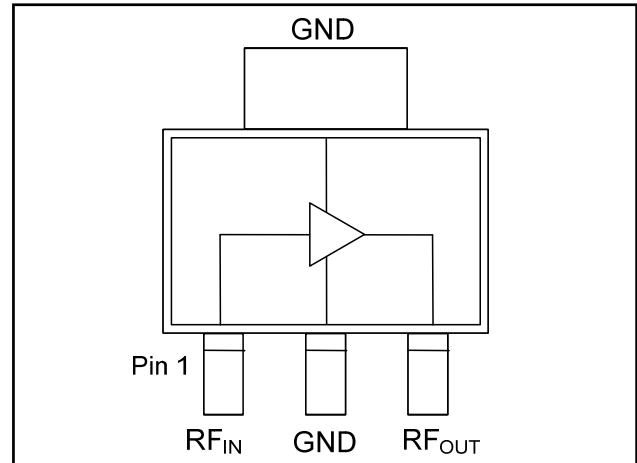
## Description

M/A-COM's MAAM-009100 CATV amplifier is a GaAs MMIC which exhibits low distortion in a lead-free miniature surface mount plastic package. The MAAM-009100 employs a monolithic single stage design featuring a convenient 75  $\Omega$  input/output impedance that minimizes the number of external components required.

The MAAM-009100 provides low noise and high linearity. It is ideally suited for set top boxes, home gateways, FTTX, Drop Amplifiers, and other broadband internet based appliances.

The MAAM-009100 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.

## Functional Schematic



## Pin Configuration

Pin No.	Pin Name	Description
1	RF <sub>IN</sub>	RF Input
2	GND	Ground
3	RF <sub>OUT</sub>	RF Output / Drain Supply

## Absolute Maximum Ratings<sup>3,4,5</sup>

Parameter	Absolute Maximum
RF Input Power	10 dBm
Voltage	10.0 volts
Operating Temperature	-20°C to +85°C
Junction Temperature <sup>6</sup>	+150°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 does not recommend sustained operation near these survivability limits.
- These operating conditions will ensure MTTF > 1 x 10<sup>6</sup> hours.
- Junction Temperature ( $T_J$ ) =  $T_C + \Theta_{jc} * (V * I)$   
Typical thermal resistance ( $\Theta_{jc}$ ) = 75° C/W.
  - For  $T_C = 25^\circ\text{C}$ ,  
 $T_J = 66^\circ\text{C} @ 5\text{ V}, 110\text{ mA}$
  - For  $T_C = 85^\circ\text{C}$ ,  
 $T_J = 123^\circ\text{C} @ 5\text{ V}, 100\text{ mA}$

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

Part Number	Package
MAAM-009100-000000	Bulk Packaging
MAAM-009100-TR1000	1000 piece reel
MAAM-009100-TR3000	3000 piece reel
MAAM-009100-001SMB	Sample Test Board

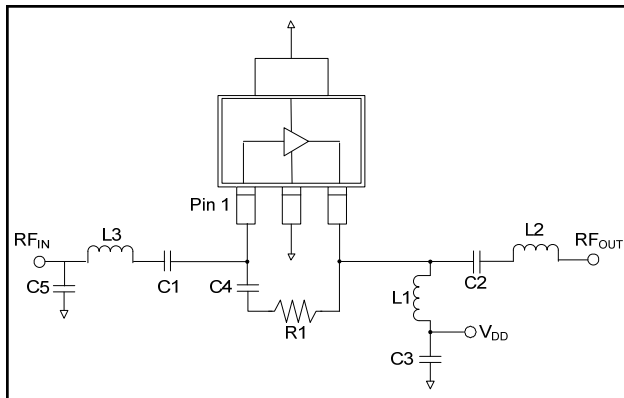
- Reference Application Note M513 for reel size information.
- All sample boards include 5 loose parts.

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

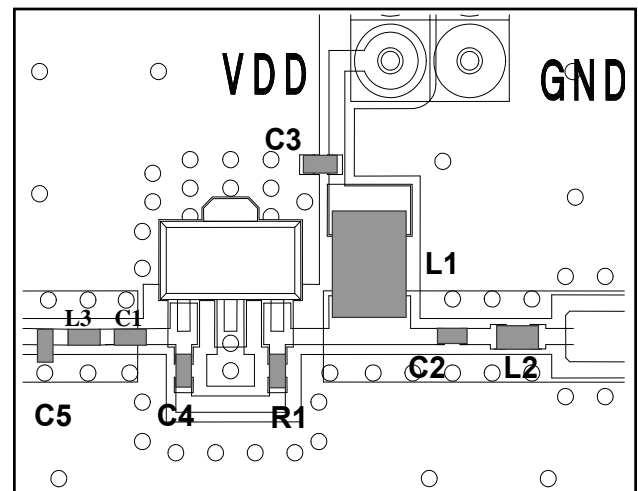
### Electrical Specifications: $T_A = 25^\circ\text{C}$ , Freq: 50 - 1000 MHz, $V_{DD} = 5$ Volts, $Z_0 = 75 \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	50 MHz 1 GHz	dB	14 13.2	14.8 13.8	16 15.2
Gain Flatness		dB	—	1.0	—
Noise Figure		dB	—	3.0	4.0
Input Return Loss		dB	—	16	—
Output Return Loss		dB	—	20	—
Output IP2	6 MHz Spacing, +5 dBm output per tone	dBm	—	60	—
Output IP3	6 MHz Spacing, +5 dBm output per tone	dBm	—	34	—
Composite Triple Beat, CTB	132 channels, +30 dBmV / output per channel	dBc	—	-63	—
Composite Second Order, CSO	132 channels, +30 dBmV / output per channel	dBc	—	-63	—
P1dB	400 MHz	dBm	—	18	—
$I_{DD}$	5 Volts	mA	—	105	130

### Schematic Including Off-Chip Components



### Recommended Board Layout



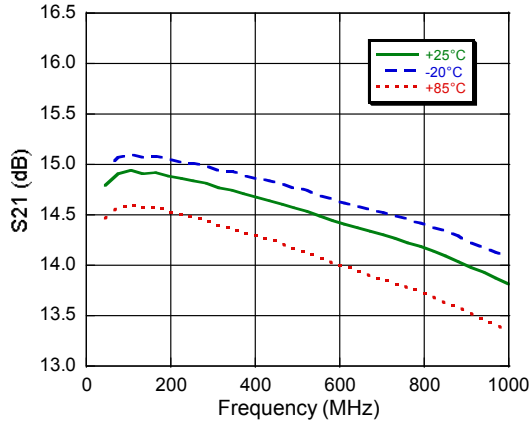
### Off-Chip Component Values

Component	Value	Package
C1,C2,C3,C4	0.01 $\mu\text{F}$	0402
C5	0.8 pF	0402
L1 <sup>7</sup>	1 $\mu\text{H}$	1210
L2	4.7 nH	0402
L3	6.8 nH	0402
R1	523 $\Omega$	0402

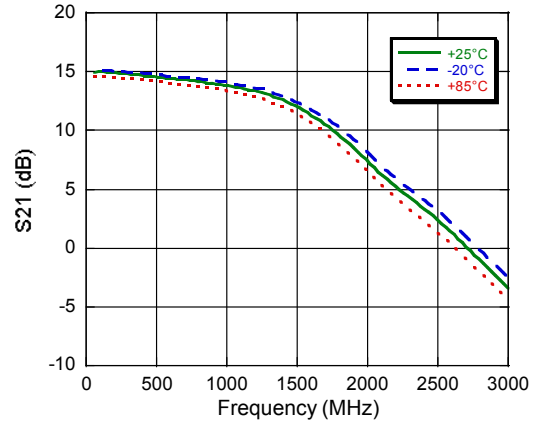
7. L1 supplied from EPCOS, part number B82422A1102K100

## Typical Performance Curves

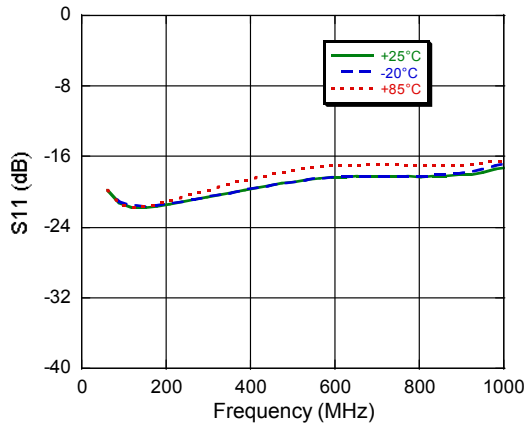
**Gain vs. Frequency over Temperature to 1 GHz**



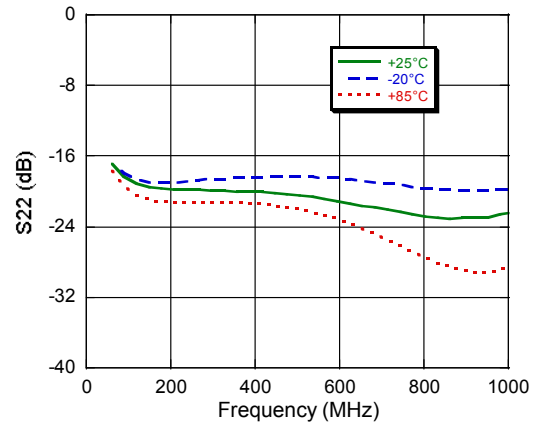
**Gain vs. Frequency over Temperature to 3 GHz**



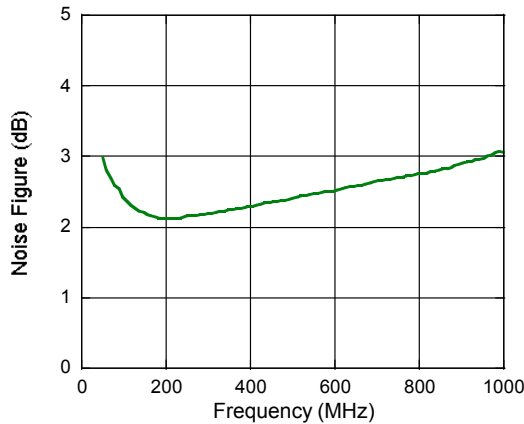
**Input Return Loss vs. Frequency over Temperature**



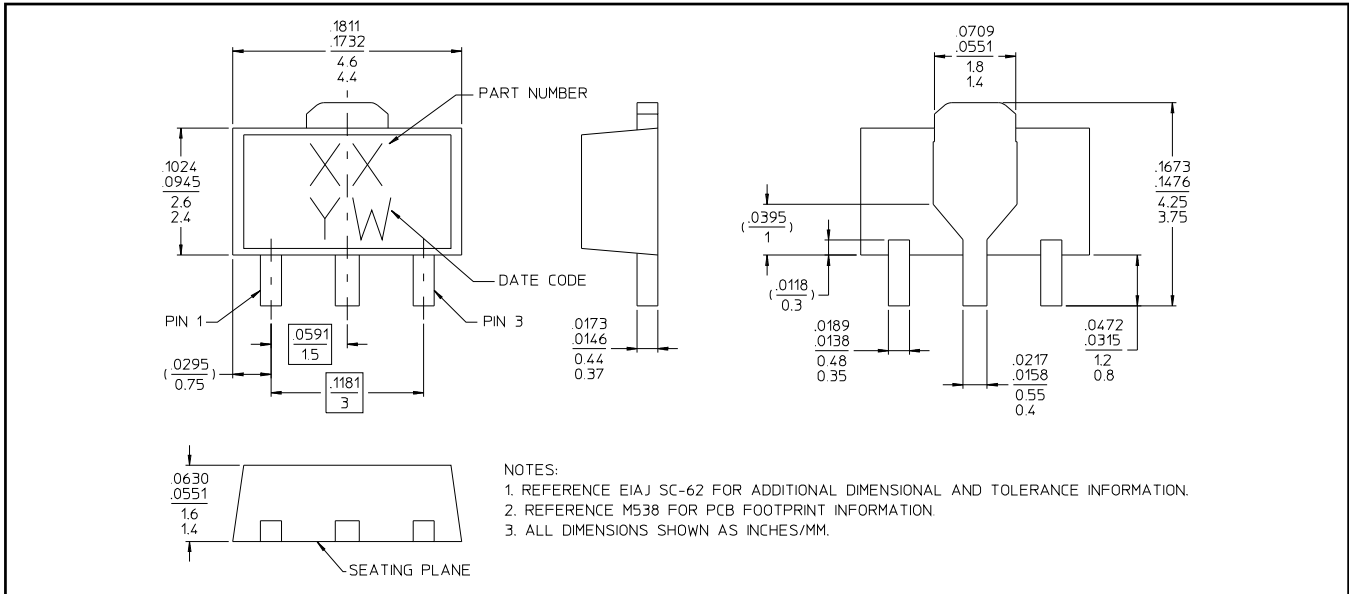
**Output Return Loss vs. Frequency over Temperature**



**Noise Figure vs. Frequency**



## Lead Free SOT-89 Plastic Package<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 over copper.

## 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.