

Broadband CATV Amplifier 50 - 1000 MHz

M/A-COM Products
Rev. V1

Features

- 75 Ω 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

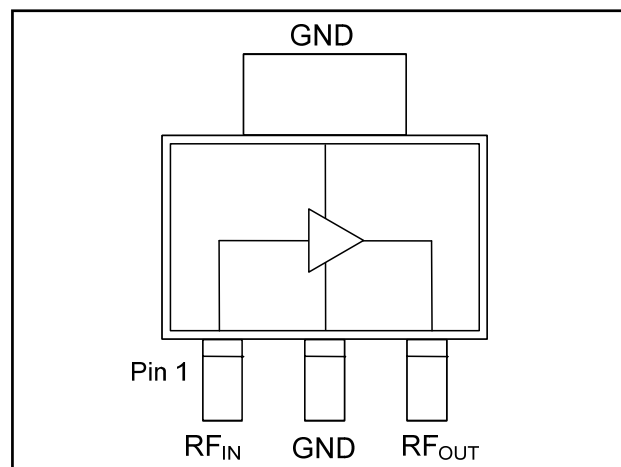
Description

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 Ω 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 _{IN}	RF Input
2	GND	Ground
3	RF _{OUT}	RF Output / Drain Supply

Absolute Maximum Ratings^{3,4,5}

Parameter	Absolute Maximum
RF Input Power	10 dBm
Voltage	10.0 volts
Operating Temperature	-20°C to +85°C
Junction Temperature ⁶	+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 10⁶ hours.
- Junction Temperature (T_J) = $T_C + \theta_{jc} * (V * I)$
Typical thermal resistance (θ_{jc}) = 75° C/W.
a) For $T_C = 25^\circ\text{C}$,
 $T_J = 66^\circ\text{C}$ @ 5 V, 110 mA
b) For $T_C = 85^\circ\text{C}$,
 $T_J = 123^\circ\text{C}$ @ 5 V, 100 mA

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

Ordering Information^{1,2}

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.

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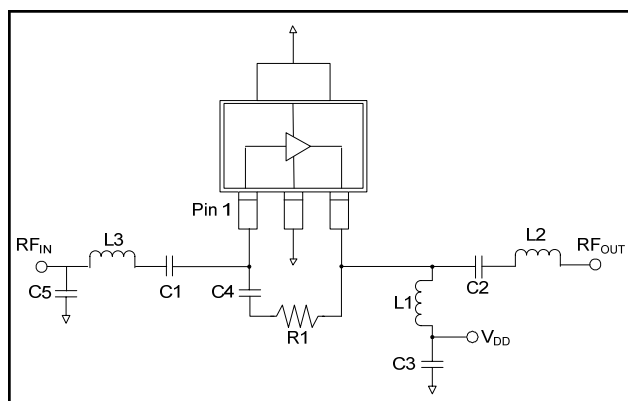
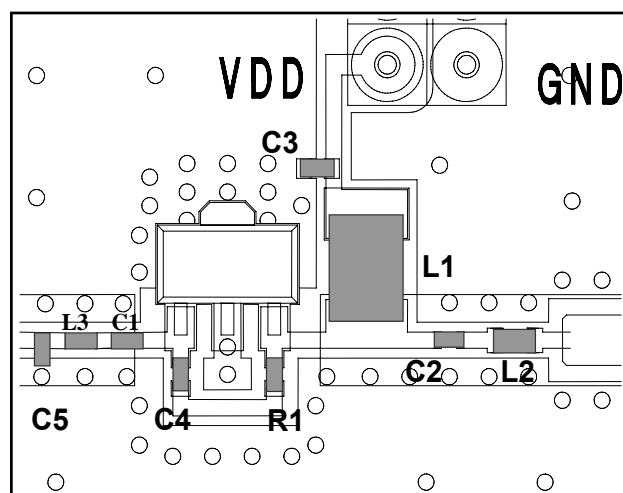
- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298
Visit www.macom.com for additional data sheets and product information.

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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 μF	0402
C5	0.8 pF	0402
L1 ⁷	1 μH	1210
L2	4.7 nH	0402
L3	6.8 nH	0402
R1	523 Ω	0402

7. L1 supplied from EPCOS, part number B82422A1102K100

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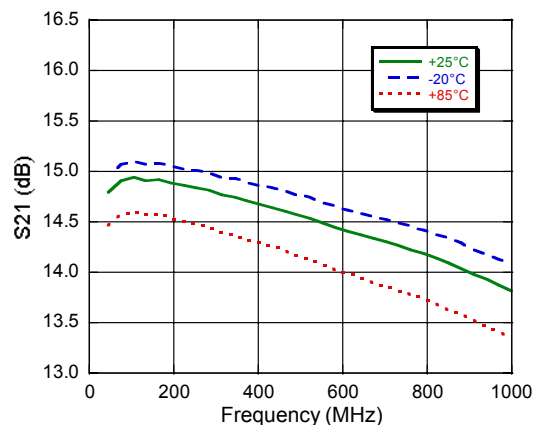
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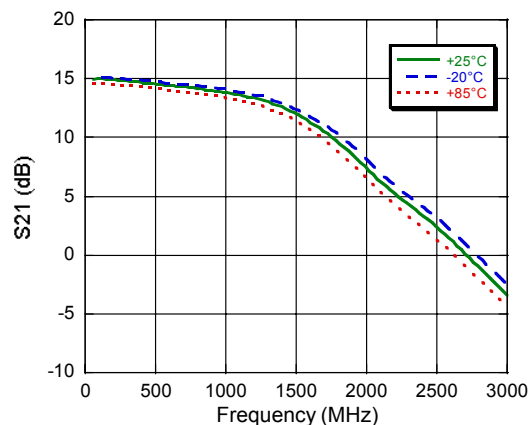
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Typical Performance Curves

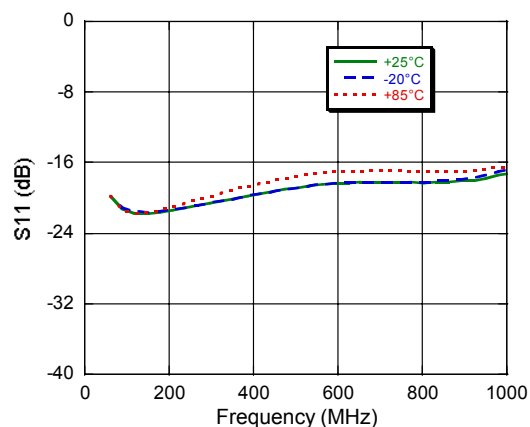
Gain vs. Frequency over Temperature to 1 GHz



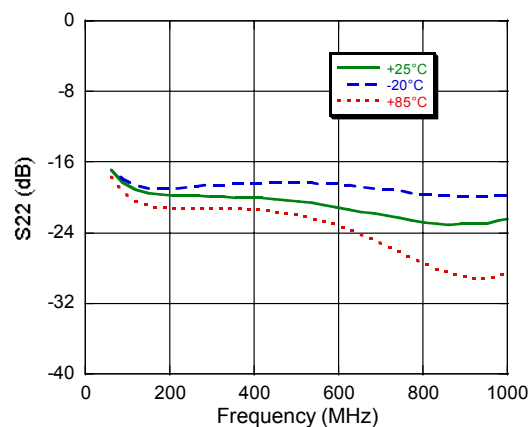
Gain vs. Frequency over Temperature to 3 GHz



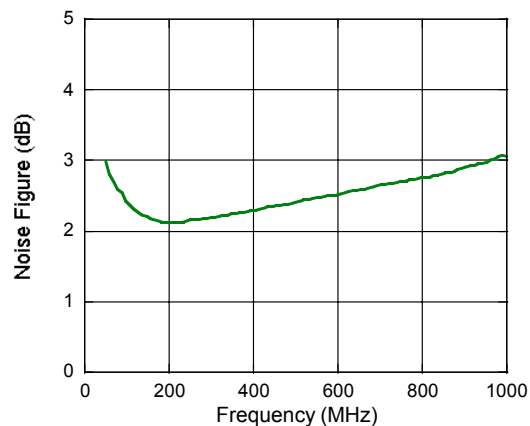
Input Return Loss vs. Frequency over Temperature



Output Return Loss vs. Frequency over Temperature



Noise Figure vs. Frequency



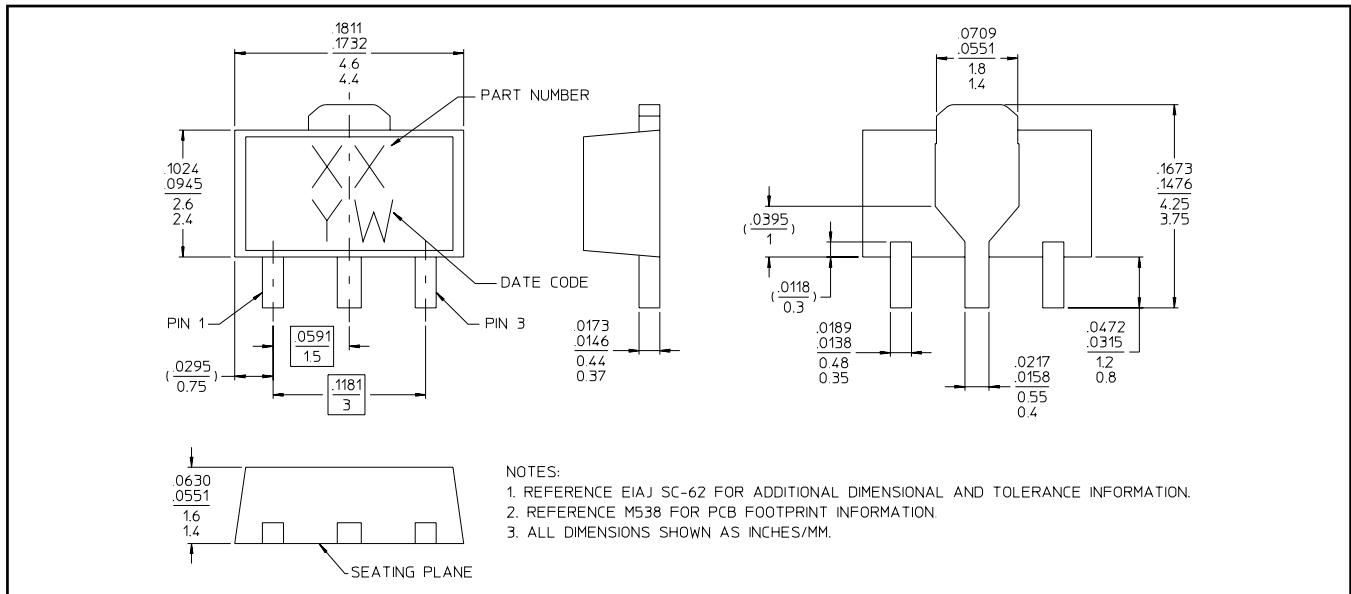
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Lead Free SOT-89 Plastic Package[†]



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

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.