

Broadband CATV Amplifier 50 - 1000 MHz

**MAAMSS0041
V1**

Features

- 75 Ohm Input / Output Match
- CTB: -80 dBc
- Noise Figure: 2.7 dB
- Gain: 14.8 dB
- Lead Free SOT-89 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS Compliant and 260°C Re-flow Compatible
- Lead Free Version of MAAMSS0031

Description

M/A-COM's MAAMSS0041 CATV amplifier is a GaAs MMIC which exhibits low distortion in a lead-free surface mount plastic package. The MAAMSS0041 employs a monolithic single stage design featuring a convenient 75 ohm input/output impedance that minimizes the number of external components required.

The MAAMSS0041 provides low noise and high linearity. It is ideally suited for set top boxes, home gateways, and other broadband internet based appliances.

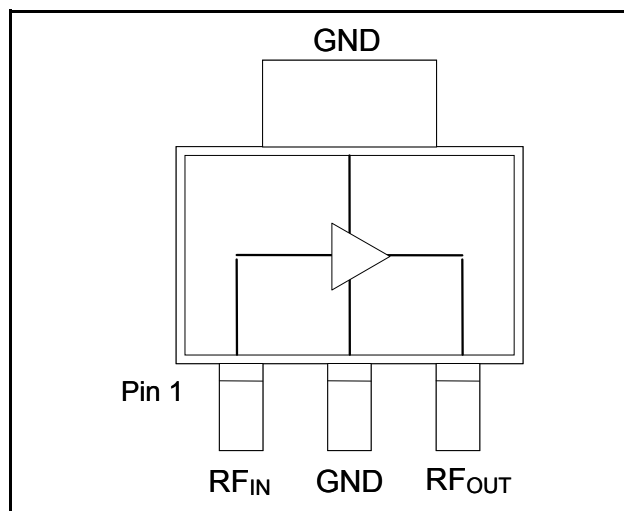
The MAAMSS0041 is fabricated using M/A-COM's PHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information

Part Number	Package
MAAMSS0041	SOT-89 Plastic Package
MAAMSS0041TR-3000	3000 Piece Tape and Reel
MAAMSS0041SMB-01	Sample Test Board (Includes 5 Samples)
MAAMSS0041SMB-02	Enhanced IRL & Gain Sample Test Board (Includes 5 Samples)

Note: Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

PIN No.	PIN Name	Description
1	RFIN	RF Input
2	GND	Ground
3	RFOUT	RF Output / Drain Supply

Absolute Maximum Ratings ^{1,2}

Parameter	Absolute Maximum
RF Input Power	15 dBm
Voltage	10.0 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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

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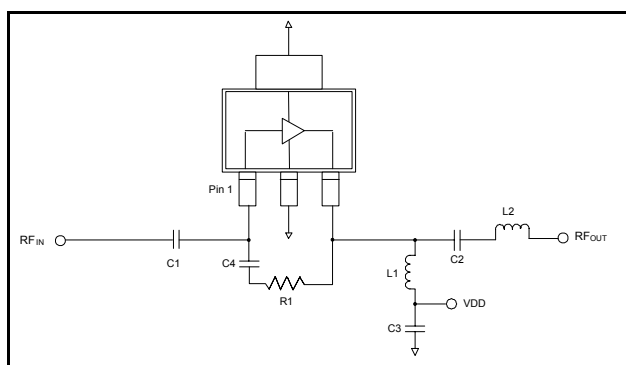
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Electrical Specifications: $T_A = 25^\circ\text{C}$, Freq: 50 - 1000 MHz, $V_{DD} = +8$ Volts, $Z_0 = 75$ Ohms

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain		dB	14.0	14.8	16.0
Gain Flatness ³		dB	—	0.5	1.0
Noise Figure		dB	—	2.7	3.8
Input Return Loss ³		dB	—	20	—
Output Return Loss		dB	—	18	—
Output IP3	6 MHz Spacing, -10 dBm output per tone	dBm	—	36	—
Composite Triple Beat, CTB	132 channels, +23 dBmV/channel at the output.	dBc	—	-80	—
Composite Second Order, CSO	132 channels, +23 dBmV/channel at the output.	dBc	—	-70	—
P1dB		dBm	—	23	—
I_{DD}	+ 8 Volts	mA	—	100	130

3. For improved Input Return Loss and Gain Flatness use the schematic and component values as indicated on page 4.

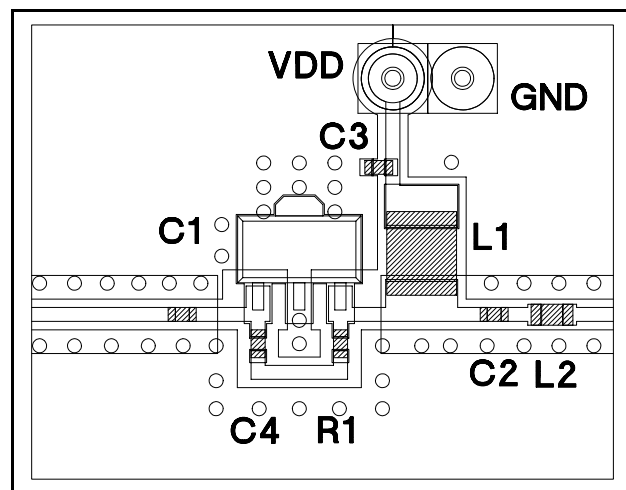
Schematic Including Off-Chip Components



Off-Chip Component Values

Component	Value	Package
C1	0.01 μF	0402
C2	0.01 μF	0402
C3	0.01 μF	0402
C4	0.01 μF	0402
L1	560 nH	1210
L2	8.2 nH	0402
R1	523 Ω	0402

Recommended Board Layout

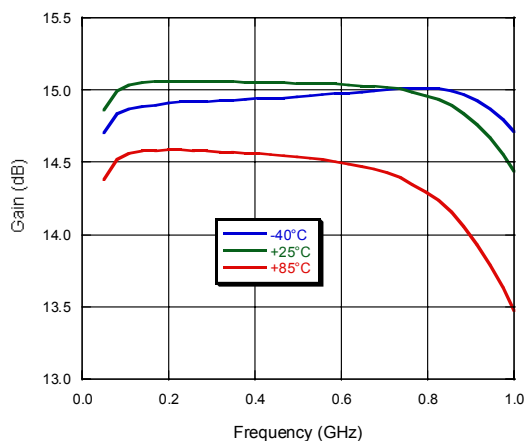


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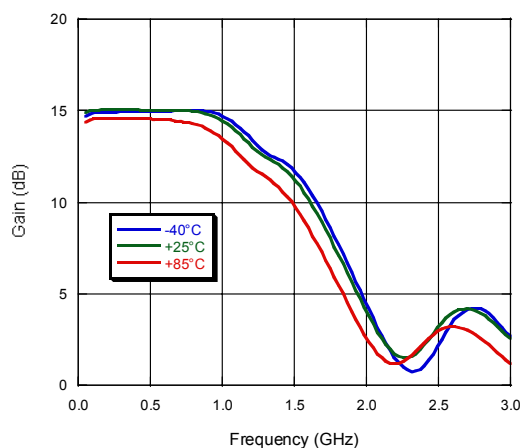
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Typical Performance Curves

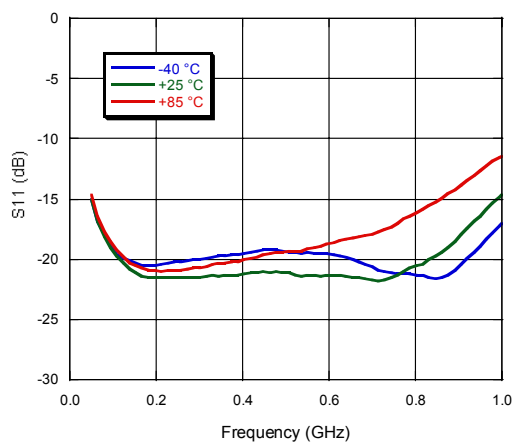
Gain vs. Frequency over Temperature to 1 GHz



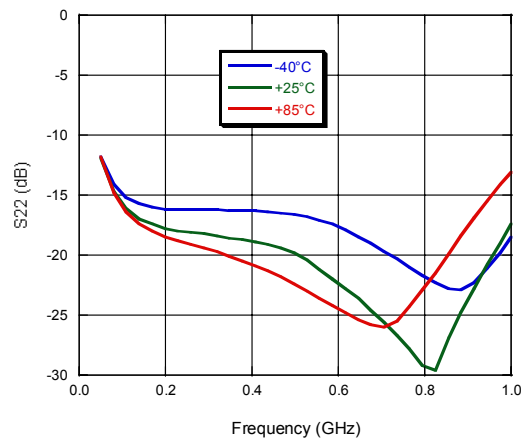
Gain vs. Frequency over Temperature to 3 GHz



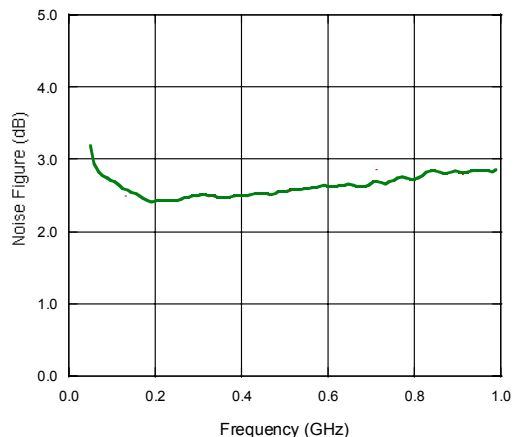
Input Return Loss vs. Frequency over Temperature



Output Return Loss vs. Frequency over Temperature



Noise Figure vs. Frequency



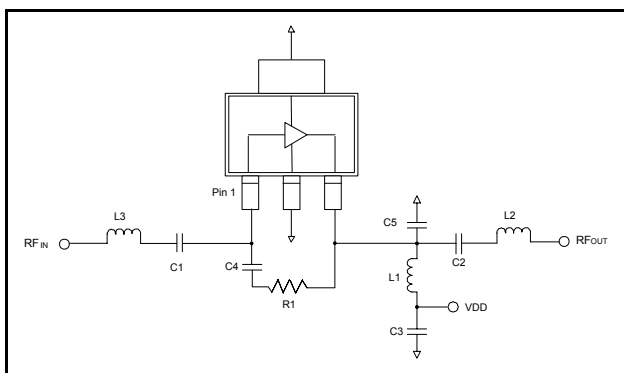
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Enhanced Input Return Loss (IRL) and Gain Flatness

An enhanced input return loss and improved gain flatness circuit has been developed for applications where those parameters are key to system performance. Adding a series inductor, L3, to the input, a shunt capacitor, C5, to the output, and changing the bias inductor, L1, value will improve the input return loss to 25 dB typical from 50 to 1000 MHz. The gain flatness will also improve to less than 0.3 dB from 50 to 1000 MHz.

Schematic Including Off-Chip Components

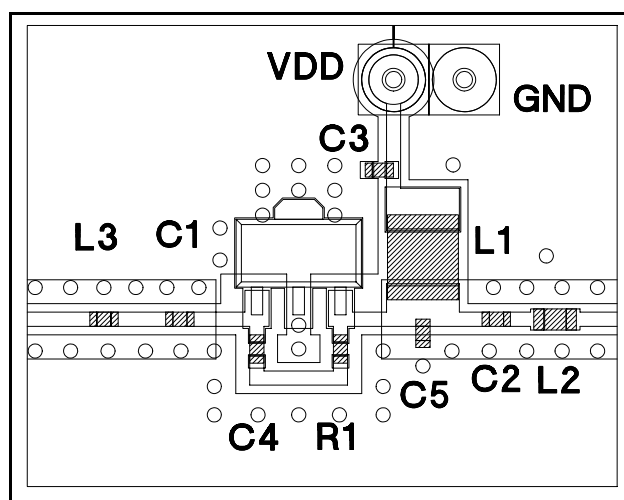


Off-Chip Component Values

Component	Value	Package
C1	0.01 μ F	0402
C2	0.01 μ F	0402
C3	0.01 μ F	0402
C4	0.01 μ F	0402
C5	0.5 pF	0402
L1 *	1000 nH	1210
L2	8.2 nH	0402
L3	5.6 nH	0402
R1	523 Ω	0402

* L1 supplied from EPCOS, part number B82422A1102K100.

Recommended Board Layout

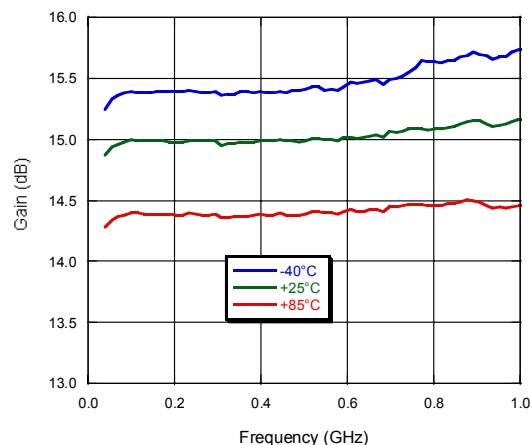


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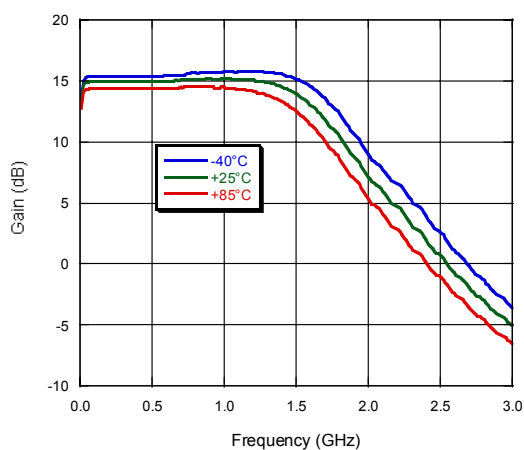
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Typical Performance Curves - Enhanced Input Return Loss (IRL) and Gain Flatness

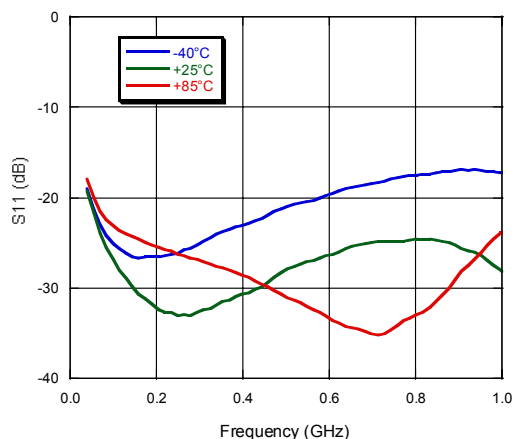
Gain vs. Frequency over Temperature to 1 GHz



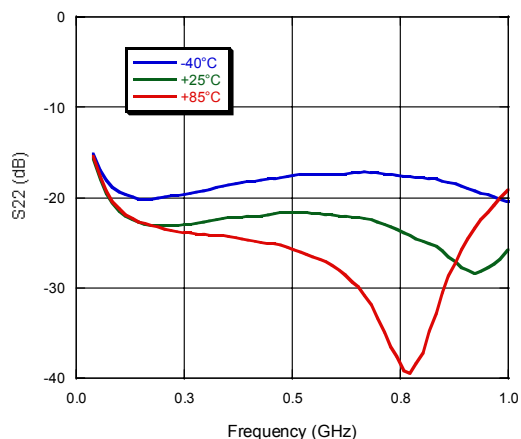
Gain vs. Frequency over Temperature to 3 GHz



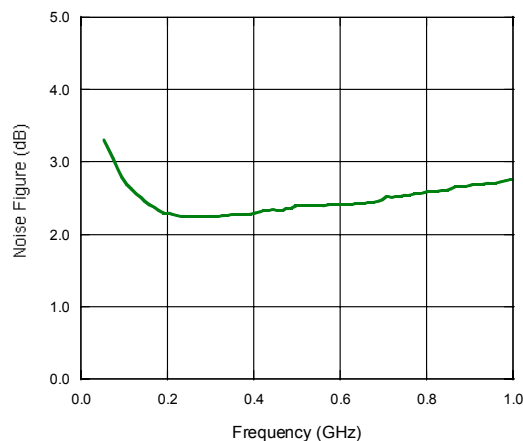
Input Return Loss vs. Frequency over Temperature



Output Return Loss vs. Frequency over Temperature



Noise Figure vs. Frequency



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Lead Free SOT-89 Plastic Package

