

Features

- 75 Ω Input / Output Match
- CTB: -80 dBc
- Noise Figure: 2.7 dB
- Gain: 14.8 dB
- Lead Free SOT-89 Package
- Halogen-Free “Green” Mold Compound
- 260°C Re-flow Compatible
- RoHS* Compliant Version of MAAMSS0031

Description

The 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 Ω 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.

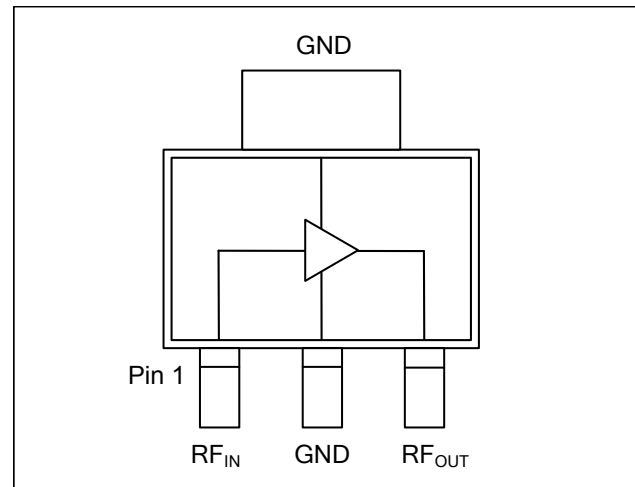
Ordering Information^{1,2}

| Part Number | Package |
|-------------------|----------------------------------|
| MAAMSS0041 | Lead Free SOT-89 Plastic Package |
| MAAMSS0041TR-3000 | 3000 Piece Tape and Reel |
| MAAMSS0041SMB | Sample Test 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 2002/95/EC.

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 | 15 dBm |
| Voltage | 10.0 volts |
| Operating Temperature | -40°C to +85°C |
| Junction Temperature ⁶ | +150°C |
| Storage Temperature | -65°C to +150°C |

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.
5. These operating conditions will ensure MTTF > 1 x 10⁶ hours.
6. Junction Temperature (T_J) = $T_C + \Theta_{jc} * (V * I)$
Typical thermal resistance (Θ_{jc}) = 75° C/W.
 - a) For $T_C = 25^\circ\text{C}$,
 $T_J = 85^\circ\text{C} @ 8\text{ V}, 100\text{ mA}$
 - b) For $T_C = 85^\circ\text{C}$,
 $T_J = 139^\circ\text{C} @ 8\text{ V}, 90\text{ mA}$

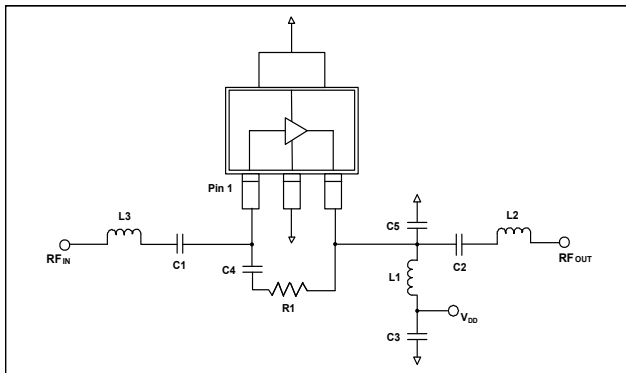
Broadband CATV Amplifier 50 - 1000 MHz

Rev. V4

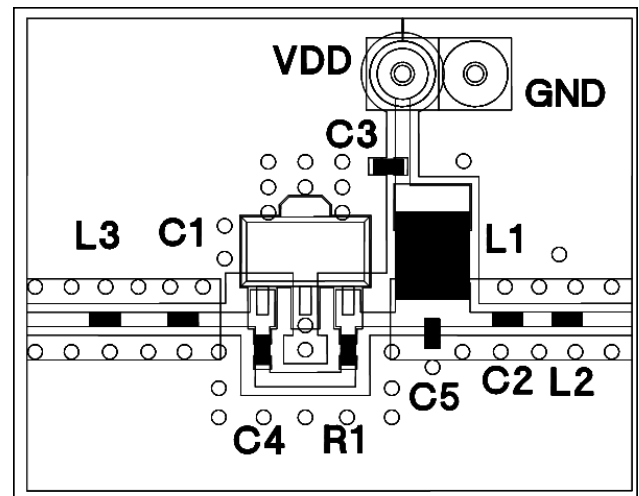
Electrical Specifications: $T_A = 25^\circ\text{C}$, Freq: 50 - 1000 MHz, $V_{DD} = +8$ Volts, $Z_0 = 75 \Omega$

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|-----------------------------|---|-------|------|------|------|
| Gain | | dB | 14.0 | 14.8 | 16.0 |
| Gain Flatness | | dB | — | 0.5 | 1.0 |
| Noise Figure | | dB | — | 2.7 | 3.8 |
| Input Return Loss | | 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 |

Schematic Including Off-Chip Components



Recommended Board Layout



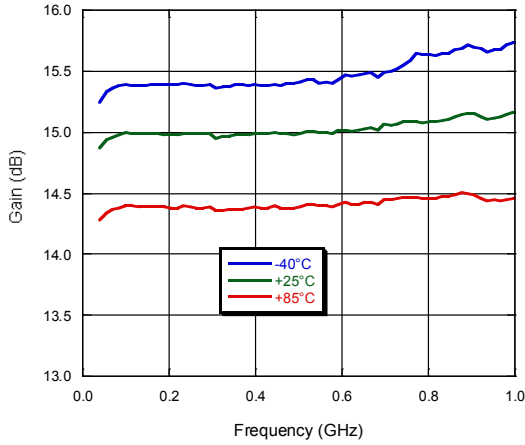
Off-Chip Component Values

| Component | Value | Package |
|-----------------|--------------------|---------|
| C1 - C4 | 0.01 μF | 0402 |
| C5 | 0.5 pF | 0402 |
| L1 ⁷ | 1000 nH | 1210 |
| L2 | 8.2 nH | 0402 |
| L3 | 5.6 nH | 0402 |
| R1 | 523 Ω | 0402 |

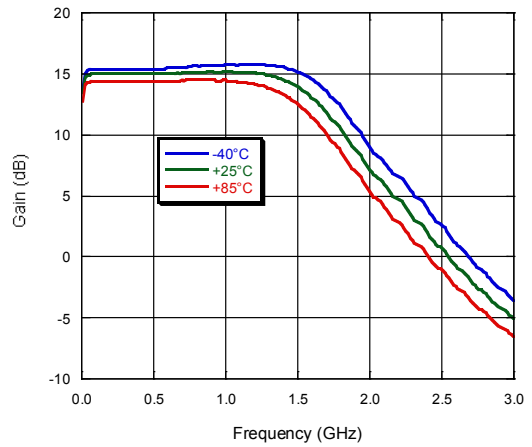
7. L1 supplied from EPCOS, part number B82422A1102K100.

Typical Performance Curves

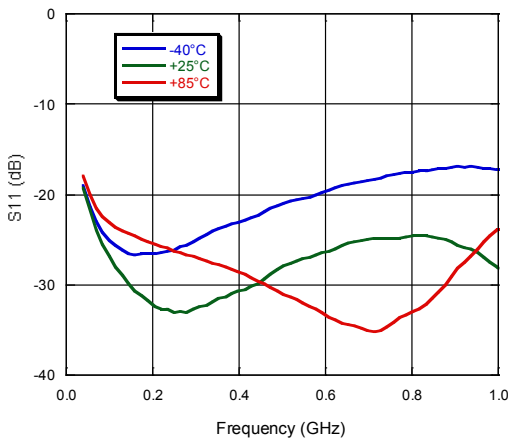
Gain vs. Frequency over Temperature to 1 GHz



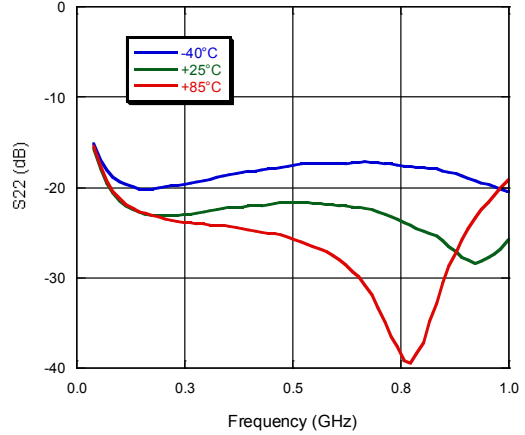
Gain vs. Frequency over Temperature to 3 GHz



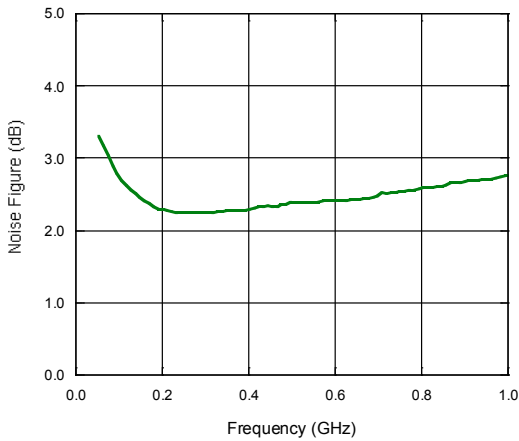
Input Return Loss vs. Frequency over Temperature



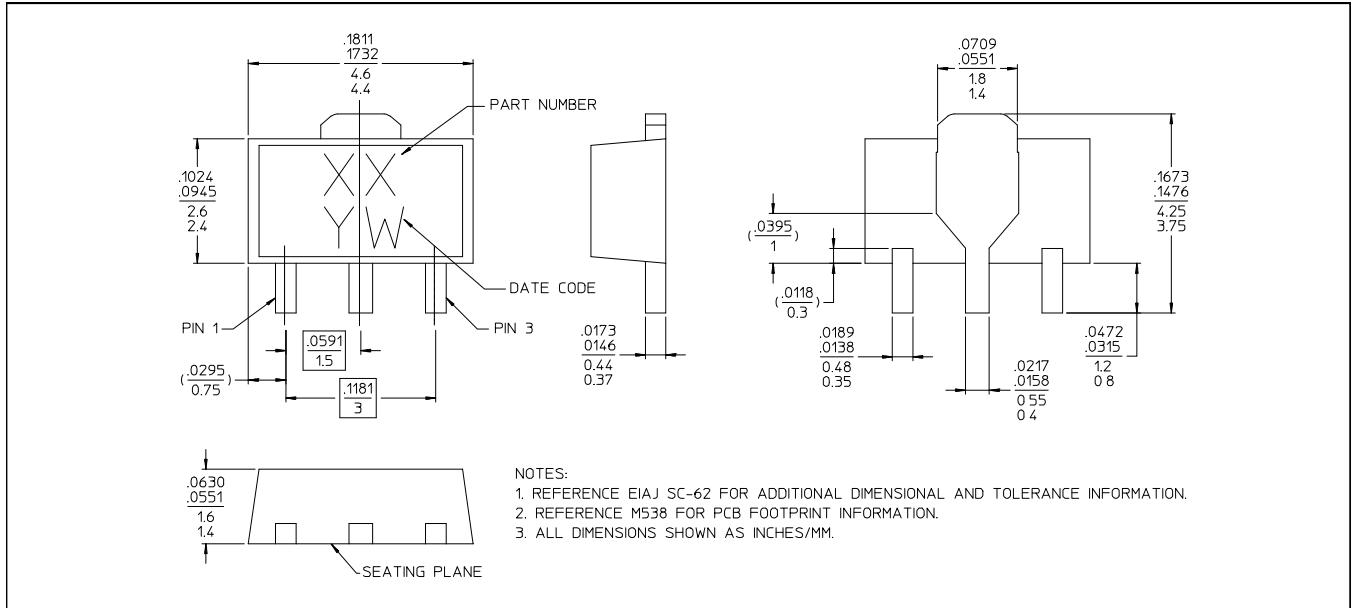
Output Return Loss vs. Frequency over Temperature



Noise Figure vs. Frequency



Lead Free SOT-89 Plastic Package†



† 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.

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