

### Features

- 75  $\Omega$  Input / Output Match
- 3.8 dB Noise Figure
- 9 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-007807 CATV amplifier is a GaAs MMIC which exhibits low distortion in a miniature lead-free surface mount package. The MAAM-007807 employs a monolithic single stage design featuring a convenient 75  $\Omega$  input/output impedance that minimizes the number of external components required.

The MAAM-007807 provides low noise and high linearity. It is ideally suited for set top boxes, home gateways and other broadband internet based appliances.

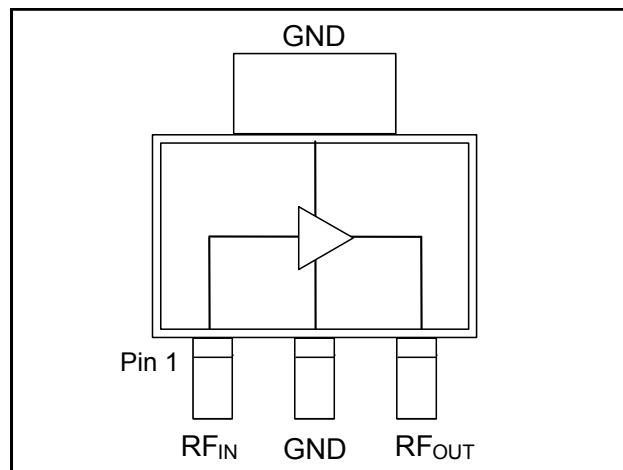
The MAAM-007807 is fabricated using M/A-COM’s pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

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

| Part Number        | Package           |
|--------------------|-------------------|
| MAAM-007807-TR1000 | 1000 piece reel   |
| MAAM-007807-TR3000 | 3000 piece reel   |
| MAAM-007807-000SMB | Sample Test Board |

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

### 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                    | 8 dBm            |
| Voltage                           | 8.0 volts        |
| Operating Temperature             | -40°C to +85°C   |
| Junction Temperature <sup>6</sup> | +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 10<sup>6</sup> hours.
6. Junction Temperature ( $T_J$ ) =  $T_C + \Theta_{jc} * (V * I)$   
Typical thermal resistance ( $\Theta_{jc}$ ) = 86° C/W.
  - a) For  $T_C = 25^\circ\text{C}$ ,  
 $T_J = 51^\circ\text{C} @ 5\text{ V}, 60\text{ mA}$
  - b) For  $T_C = 85^\circ\text{C}$ ,  
 $T_J = 109^\circ\text{C} @ 5\text{ V}, 55\text{ mA}$

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

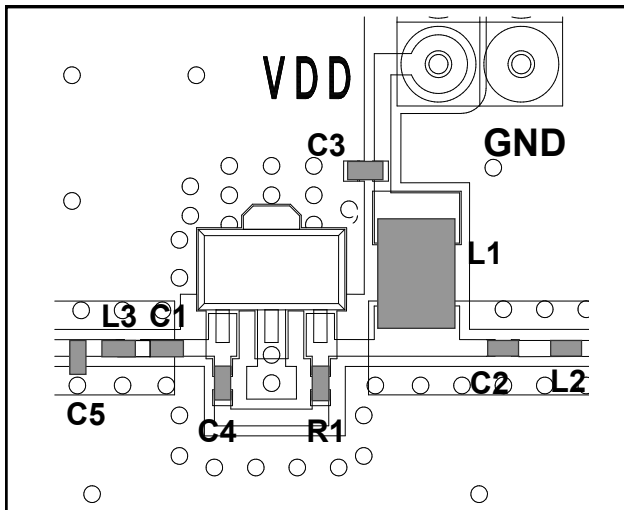
## Broadband CATV Amplifier 50 - 1000 MHz

Rev. V2

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

| Parameter                   | Test Conditions                                | Units | Min. | Typ. | Max. |
|-----------------------------|--|-------|------|------|------|
| Gain                        | —  | dB    | 8    | 9    | 10   |
| Gain Flatness               | —  | dB    | —    | 0.4  | 0.8  |
| Noise Figure                | —  | dB    | —    | 3.8  | 4.8  |
| Input Return Loss           | —  | dB    | —    | 18   | —    |
| Output Return Loss          | —  | dB    | —    | 18   | —    |
| Output IP3                  | 6 MHz Spacing, +4 dBm output per tone          | dBm   | —    | 35   | —    |
| Composite Triple Beat, CTB  | 132 channels, +15 dBmV / channel at the input. | dBc   | —    | -75  | —    |
| Composite Second Order, CSO | 132 channels, +15 dBmV / channel at the input. | dBc   | —    | -65  | —    |
| P1dB                        | —  | dBm   | —    | 17   | —    |
| $I_{DD}$                    | 5 Volts  | mA    | 50   | 60   | 70   |

### Recommended Board Layout



### Off-Chip Component Values

| Component       | Value              | Package |
|-----------------|--------------------|---------|
| C1 - C4         | 0.01 $\mu\text{F}$ | 0402    |
| C5              | 0.8 pF             | 0402    |
| L1 <sup>7</sup> | 1 $\mu\text{H}$    | 1210    |
| L2              | 3.3 nH             | 0402    |
| L3              | 6.8 nH             | 0402    |
| R1              | 300 $\Omega$       | 0402    |

7. L1 supplied from EPCOS, part number B82422A1102K100

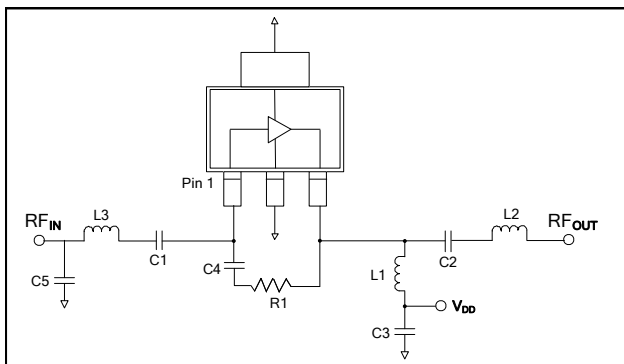
### Handling Procedures

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 electricity. Proper ESD control techniques should be used when handling these devices.

### Schematic Including Off-Chip Components

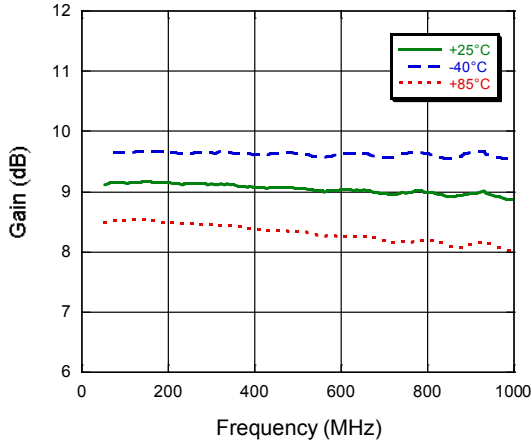


## Broadband CATV Amplifier 50 - 1000 MHz

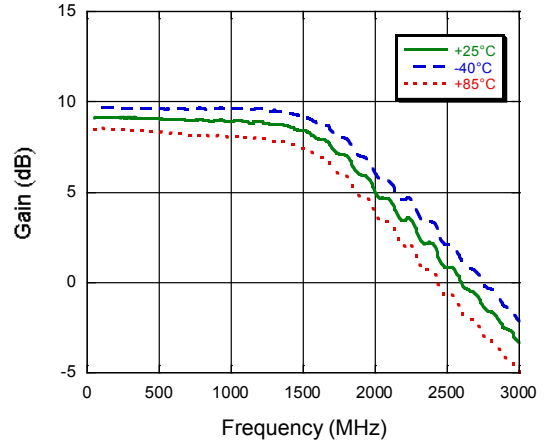
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### Typical Performance Curves

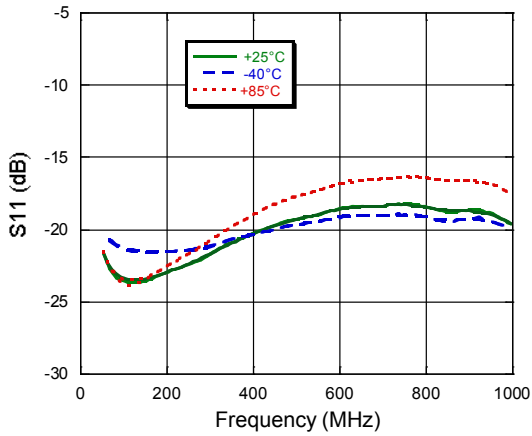
Gain vs. Frequency over Temperature



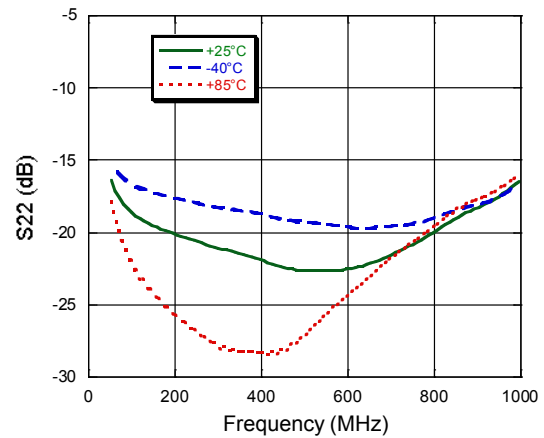
Gain vs. Frequency over Temperature to 3 GHz



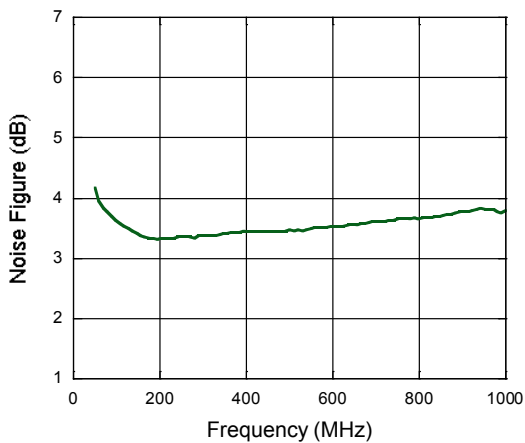
S11 vs. Frequency over Temperature



S22



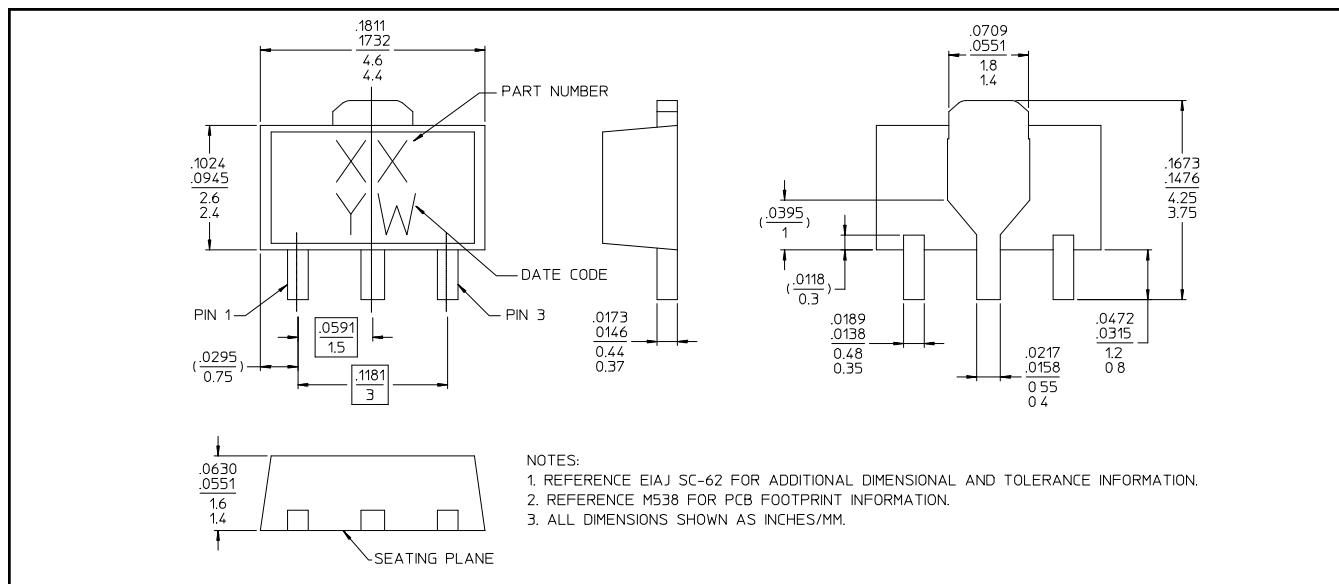
Noise Figure @ +25° C



## Broadband CATV Amplifier 50 - 1000 MHz

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### 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.

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