

Low Noise CATV Amplifier 50 - 870 MHz

Rev. V1

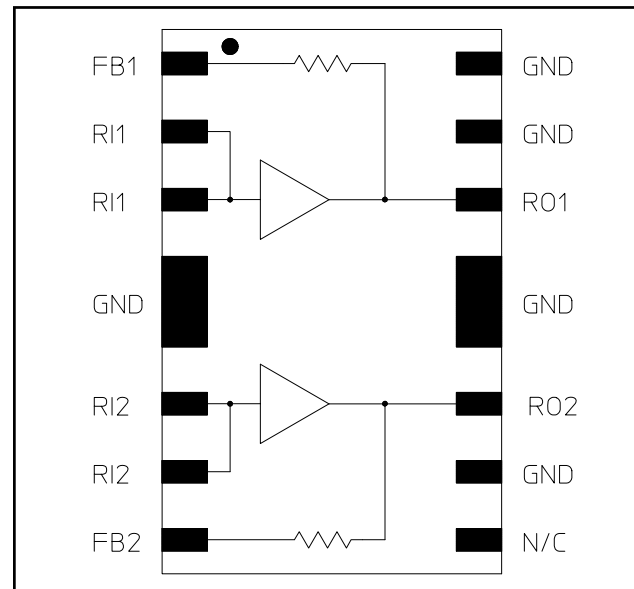
Features

- Low Noise Figure
- Low Distortion
- Surface Mount Package
- Push-Pull Design Application
- Single Positive Supply
- Lead Free SOIC-16 Package
- 100% Matte Tin Plating
- Halogen-Free "Green" Mold Compound
- 260°C Re-flow Compatible
- RoHS* Version of MAAMSS0001

Description

M/A-COM's MAAMSS0040 is a GaAs PHEMT MMIC amplifier in a lead-free surface mount SOIC-16 package. The MMIC design is configured as a pair of cascode PHEMT amplifiers for broadband performance. It is designed for integration in a 75-ohm push-pull low distortion amplifier circuit. The device is ideally suited for use in CATV, DBS, and DTV applications where low noise figure, low distortion and high linearity are required.

Functional Schematic



Pin Configuration

| PIN No. | PIN Name | Description |
|---------|----------|---------------|
| 1 | FB1 | Feedback 1 |
| 2 | RI1 | RF Input 1 |
| 3 | RI1 | RF Input 1 |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | RI2 | RF Input 2 |
| 7 | RI2 | RF Input 2 |
| 8 | FB2 | Feedback 2 |
| 9 | N/C | No Connection |
| 10 | GND | Ground |
| 11 | RO2 | RF Output 2 |
| 12 | GND | Ground |
| 13 | GND | Ground |
| 14 | RO1 | RF Output 1 |
| 15 | GND | Ground |
| 16 | GND | Ground |

Ordering Information ¹

| Part Number | Package |
|---------------|--|
| MAAMSS0040 | Bulk Packaging |
| MAAMSS0040TR | 1000 piece reel |
| MAAMSS0040SMB | Sample Test Board (Includes 5 Samples) |

1. Reference Application Note M513 for reel size information.

Absolute Maximum Ratings ²

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Input Power | +20 dBm |
| Operating Voltage | +10 volts |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

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

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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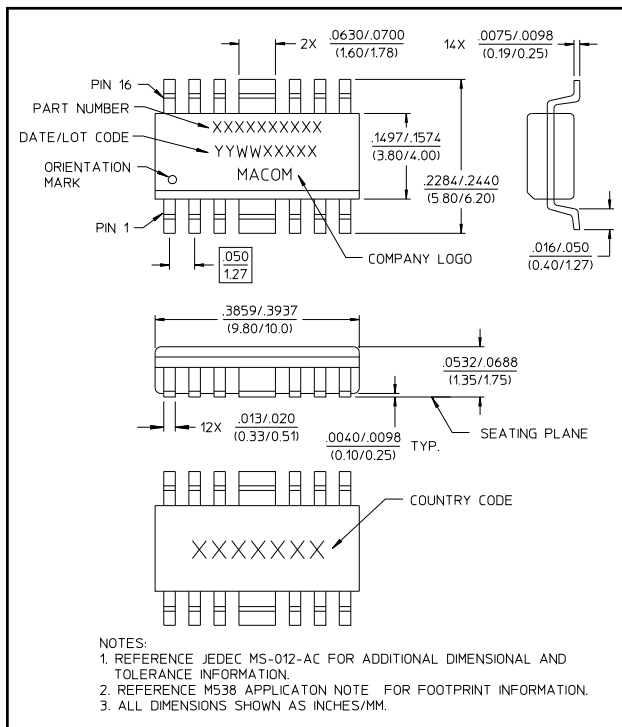
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Electrical Specifications: $T_A = 25^\circ\text{C}$, Freq: 50 - 870 MHz, $V_{DD} = +5$ Volts, $Z_0 = 75$ ohms,
Test Circuit with M/A-COM Balun ETN1-1-13TR

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|-----------------------------|--|----------|--------|------------|----------|
| Gain | — | dB | 11.5 | 12.0 | 13.0 |
| Gain Flatness | — | dB | — | 0.35 | — |
| Noise Figure | 50-150 MHz 150-870 MHz | dB dB | — — | 3.8 2.8 | 4.0 — |
| Input Return Loss | — | dB | — | 15 | — |
| Output Return Loss | — | dB | — | 11 | — |
| IP3 | Two tones at 397 & 403 MHz, +4 dBm output per tone | dBm | — | 33 | — |
| Composite Triple Beat, CTB | 135 Channels, +25 dBmV/Channel at the output | dBc | — | -72.5 | -70 |
| Composite Second Order, CSO | 135 Channels, +25 dBmV/Channel at the output | dBc | — | -75 | -70 |
| Cross modulation | 135 Channels, +25 dBmV/Channel at the output | dBc | — | -64 | — |
| P1dB | 400 MHz | dBm | — | 23 | — |
| I_{DD} | + 5 Volts | mA | — | 190 | 225 |

Lead Free SOIC-16



Handling Procedures

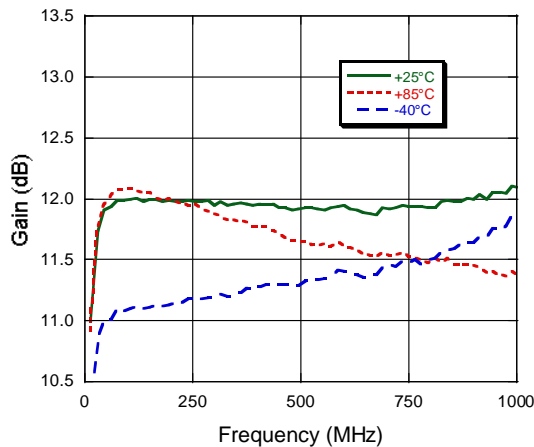
Please observe the following precautions to avoid damage:

Static Sensitivity

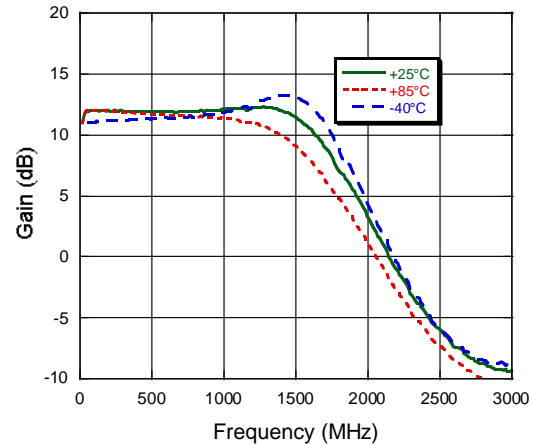
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

Gain vs. Frequency over Temperature

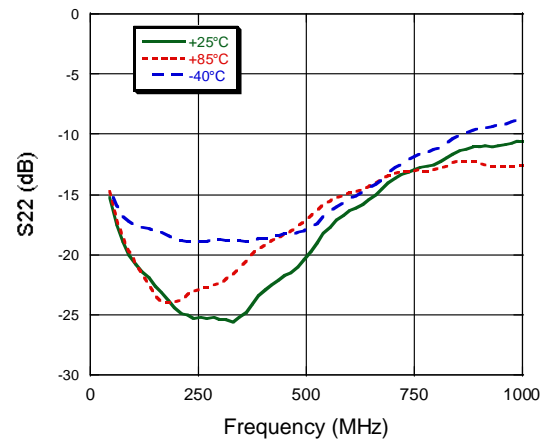
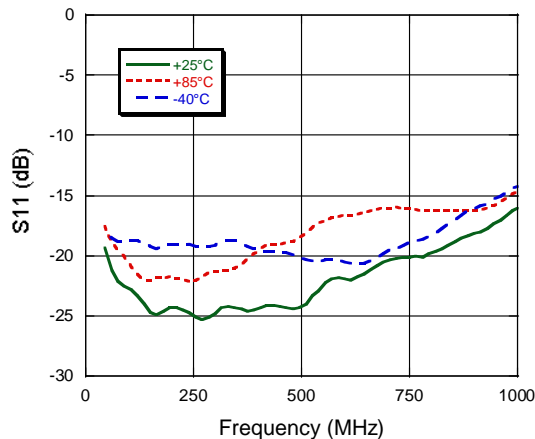


Gain vs. Frequency to 3 GHz over Temperature

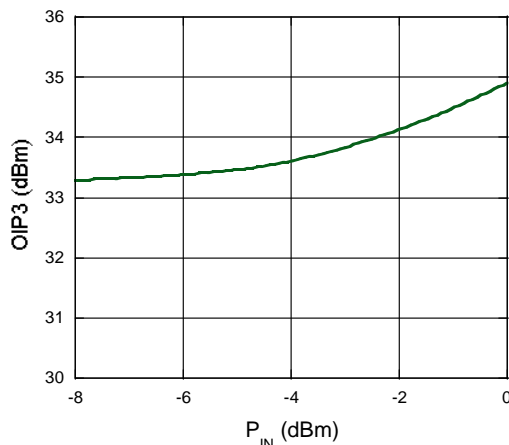


In-

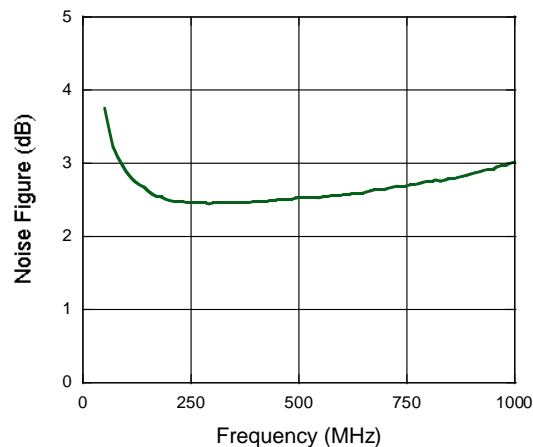
Output Return Loss vs. Frequency over Temperature



OIP3 vs. P_{IN} at 400 MHz, 25°C

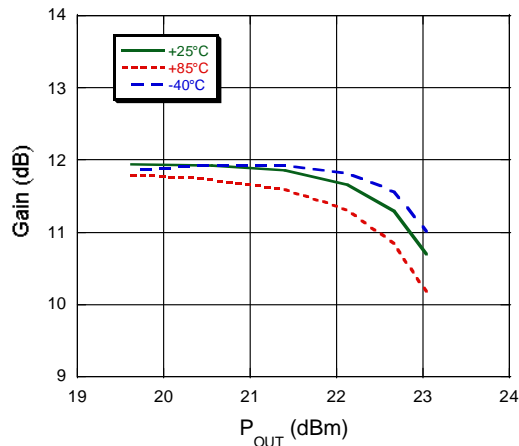


Noise Figure vs. Frequency, 25°C

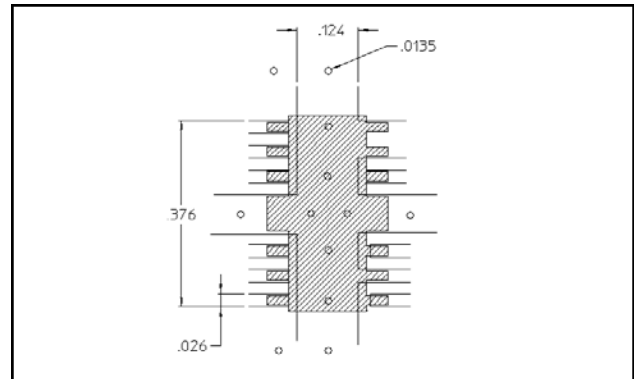


Typical Performance Curves

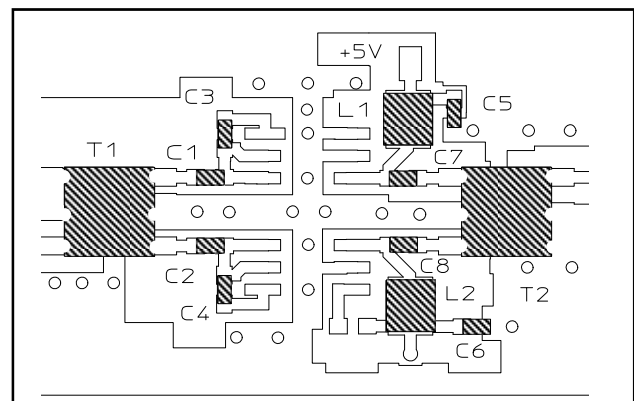
Gain vs P_{OUT} at 400 MHz vs. Temperature



Recommended PCB Configuration with 0.031" thick FR4



Recommended Test Circuit Layout



External Circuitry Parts List

| Qty | Description | |
|-----|---|----------|
| 8 | Capacitor, 0.01 μ F, 0603, SMT, 10% | (C1-C8) |
| 2 | Inductor, 390 nH, 1008, SMT, 10% | (L1, L2) |
| 2 | Balun, 1:1, M/A-COM, ETN1-1-13TR, SMT | (T1, T2) |

Test Circuit Schematic

