tyco Electronics

LEAD FREE

MACOM

Low Noise CATV Amplifier
50 - 870 MHz

MAAMSS0040
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
- Lead Free 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.

Ordering Information

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

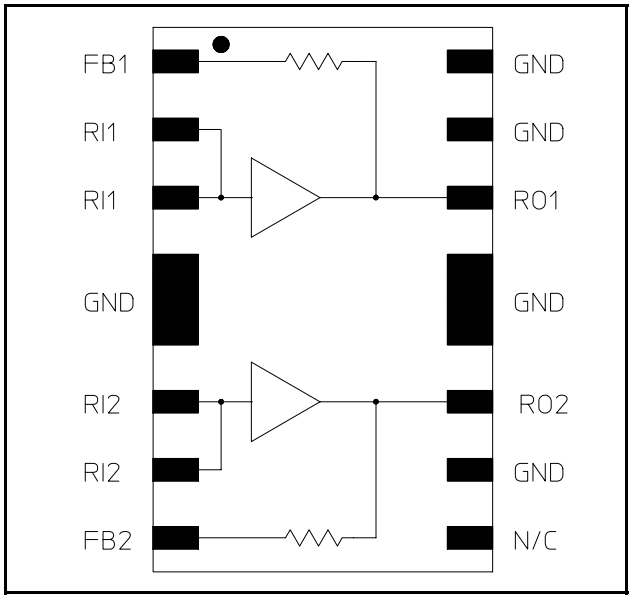
Note: Reference Application Note M513 for reel size information.

Absolute Maximum Ratings [1]

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

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

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

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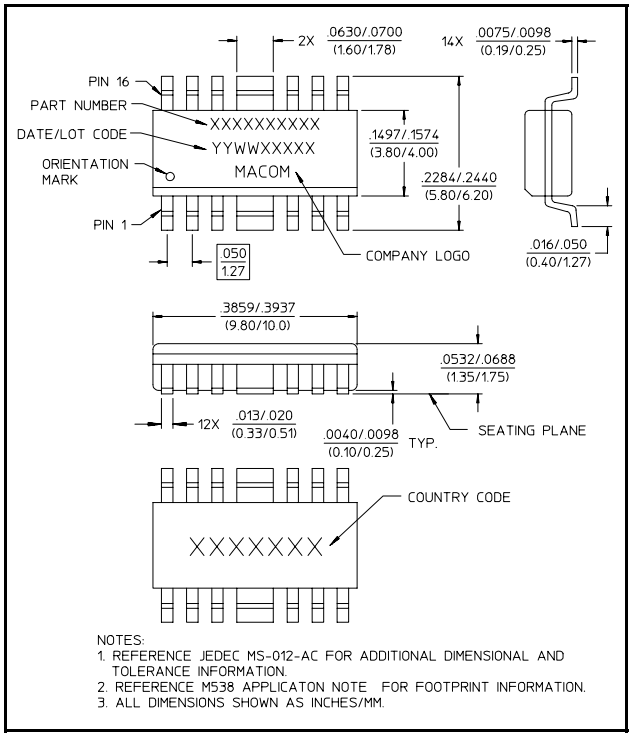
Low Noise CATV Amplifier 50 - 870 MHz

MAAMSS0040 V1

Electrical Specifications: T_A = 25°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.

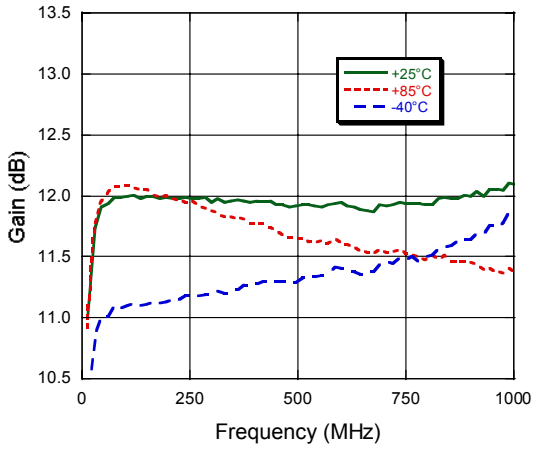
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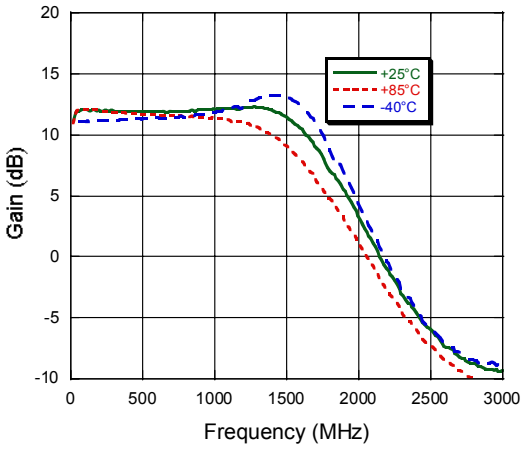
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Typical Performance Curves

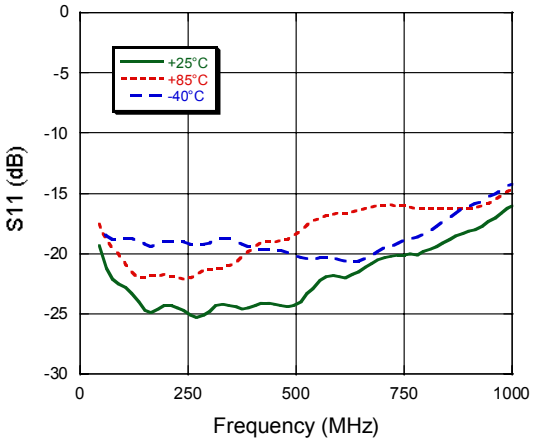
Gain vs. Frequency over Temperature



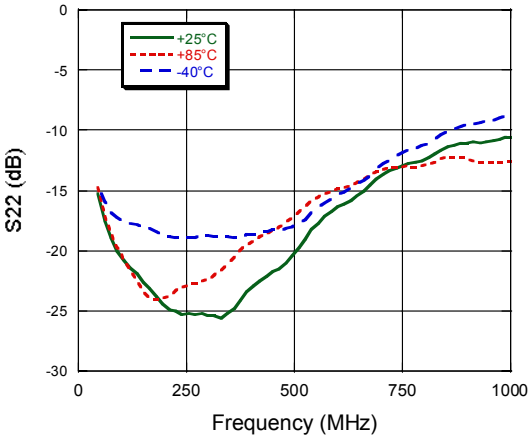
Gain vs. Frequency to 3 GHz over Temperature



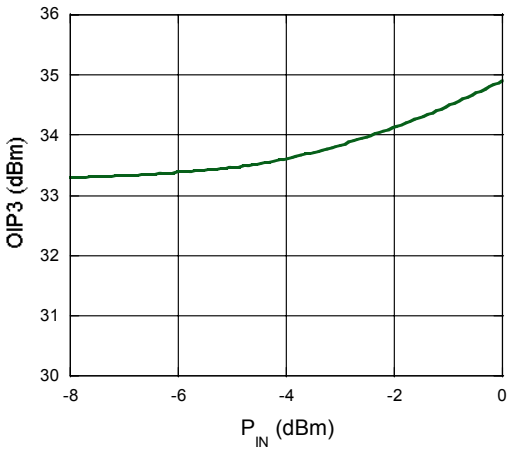
Input Return Loss vs. Frequency over Temperature



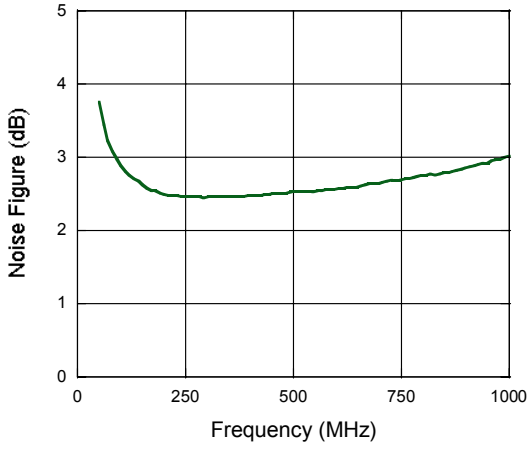
Output Return Loss vs. Frequency over Temperature



OIP3 vs. P_{IN} at 400 MHz, 25°C



Noise Figure vs. Frequency, 25°C



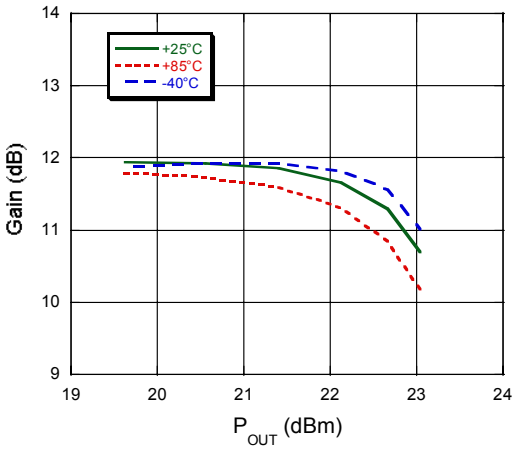
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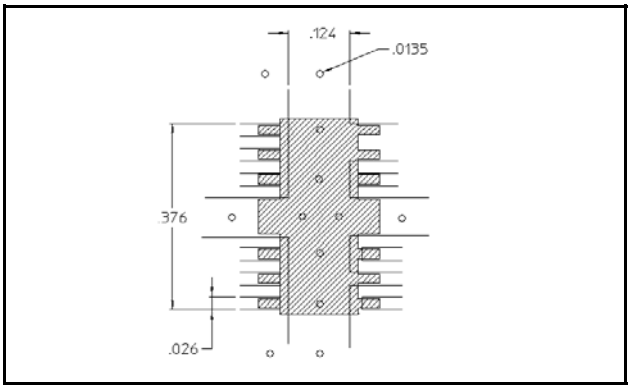
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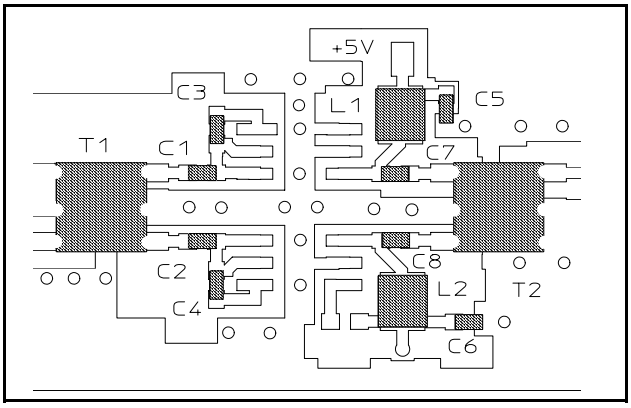
Gain vs P_{OUT} at 400 MHz vs. Temperature



Recommended PCB Configuration with 0.031" thick FR4



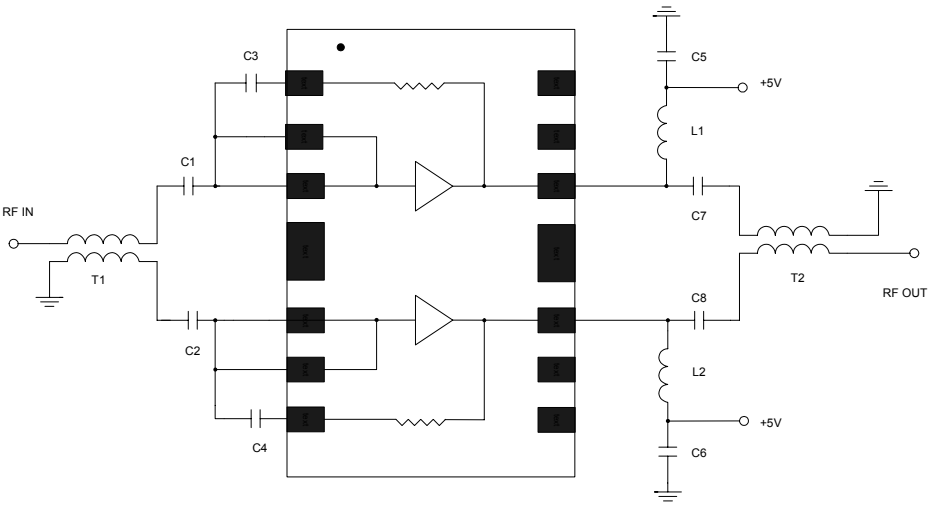
Recommended Test Circuit Layout



External Circuitry Parts List

Qty	Description	
8	Capacitor, 0.01 µF, 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



The 1:1 baluns, T1 & T2, are M/A-COM part number ETN1-1-13TR.

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