MAAM-010373

Broadband CATV Amplifier
50 - 1100 MHz

Rev. V2

Features

- 75 Ω Input / Output Match
- Low Noise Figure: 2.2 dB
- High Gain: 22 dB
- High Linearity: -74 dBc CTB, -62 dBc CSO
- High ESD Threshold: HBM Class 1B
- Lead Free SOT-89 Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAM-010373 CATV amplifier is a GaAs MMIC that exhibits low distortion and high gain in a lead-free surface mount package.

The MAAM-010373 employs a monolithic single stage design featuring a convenient 75 Ω input/ output impedance that minimizes the number of external components required.

The MAAM-010373 is fabricated using a pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

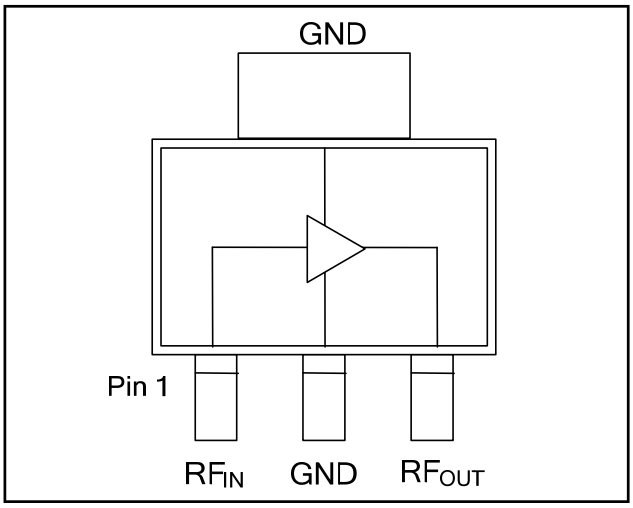
Ordering Information [1,2]

Part Number	Package
MAAM-010373-000000	Bulk Packaging
MAAM-010373-TR1000	1000 piece reel
MAAM-010373-TR3000	3000 piece reel
MAAM-010373-001SMB	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	6 dBm
Voltage	10 volts
Operating Temperature	-40°C to +85°C
Junction Temperature[6]	+150°C
Storage Temperature	-65°C to +150°C

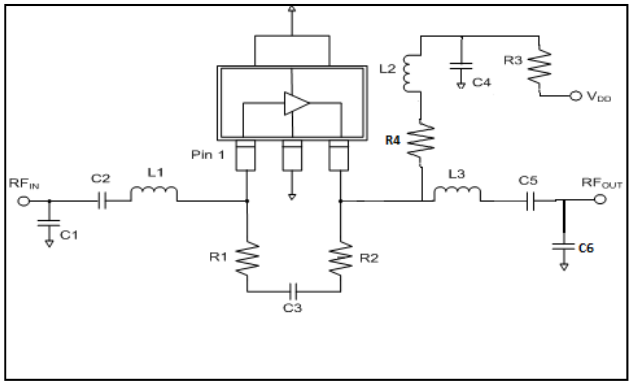
3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.
5. Operating at nominal conditions with $T_J \leq +150°C$ will ensure MTTF > 1 x 10^6 hours.
6. Junction Temperature (T_J) = T_C + Θjc * ((V * I) - (P_{OUT} - P_{IN}))
   Typical thermal resistance (Θjc) = 32 °C/W.
   a) For T_C = 25 °C,
   T_J = 63 °C @ 8 V, 148 mA
   b) For T_C = 85 °C,
   T_J = 123 °C @ 8 V, 148 mA

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400
• **India** Tel: +91.80.43537383 • **China** Tel: +86.21.2407.1588
Visit www.macomtech.com for additional data sheets and product information.

Electrical Specifications: T_A = 25°C, Freq: 50 - 1000 MHz, V_{DD} = 8 Volts, Z_0 = 75 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	—	dB	20	22	24
Gain Flatness	—	dB	—	+/- 0.5	1
Noise Figure	—	dB	—	2.2	3
Input Return Loss	—	dB	—	18	—
Output Return Loss	—	dB	—	20	—
Reverse Isolation	—	dB	—	25	—
Output IP3	6 MHz Spacing, -10 dBm output per tone	dBm	—	40	—
Output IP2	6 MHz Spacing, -10 dBm output per tone	dBm	—	50	—
Composite Triple Beat, CTB	80 ch. NTSC flat, +33 dBmV / ch. at the output	dBc	—	-74	—
Composite Second Order, CSO	80 ch. NTSC flat +33 dBmV / ch. at the output	dBc	—	-62	—
P1dB	403.25 MHz	dBm	—	25	—
I_{DD}	8 Volts	mA	—	148	165

Schematic Including Off-Chip Components

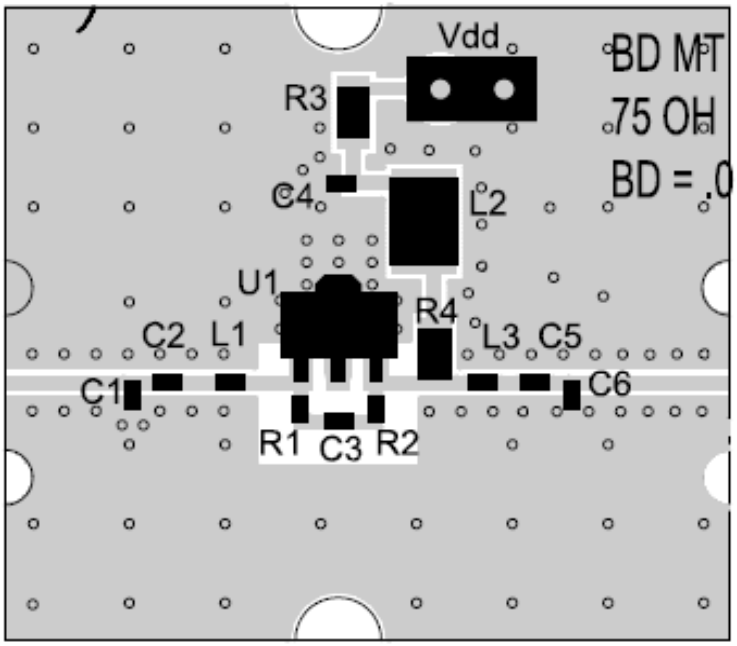


Off-Chip Component Values

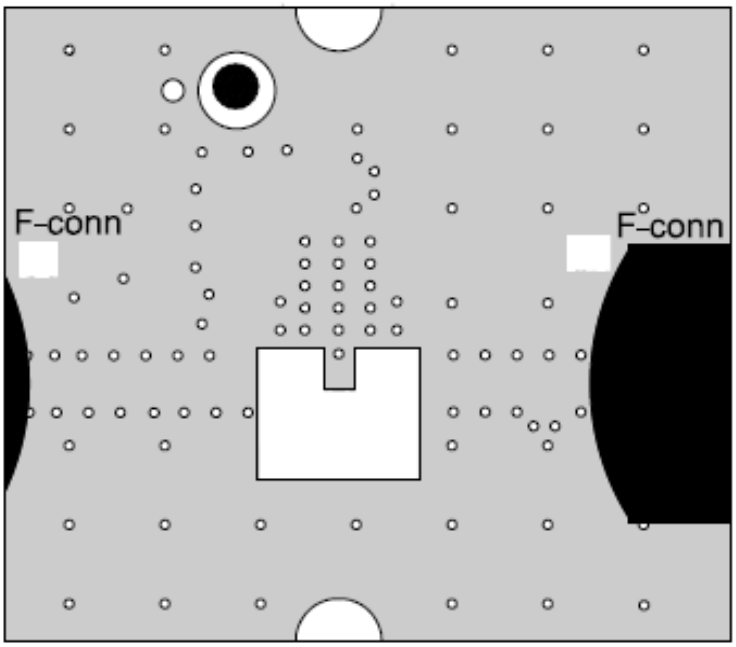
Component	Value	Package
C1	1.5 pF	0402
C2, C3, C4	0.01 µF	0402
C5	270 pF	0402
C6	0.5 pF	0402
L1	10 nH	0402
L2[7]	1 µH	1210
L3	8.2 nH	0402
R1	360 Ω	0402
R2	715 Ω	0402
R3	0 Ω	0805
R4	2Ω	0805

7. L2 is EPCOS part number B82422A1102K100.

Recommended PCB Layout—Component Side Metal Layer (Viewed from Top)

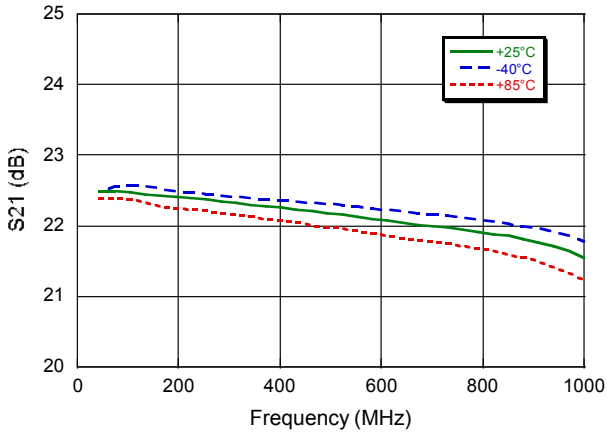


Recommended PCB Layout—Bottom Side Metal Layer (Viewed from Bottom)

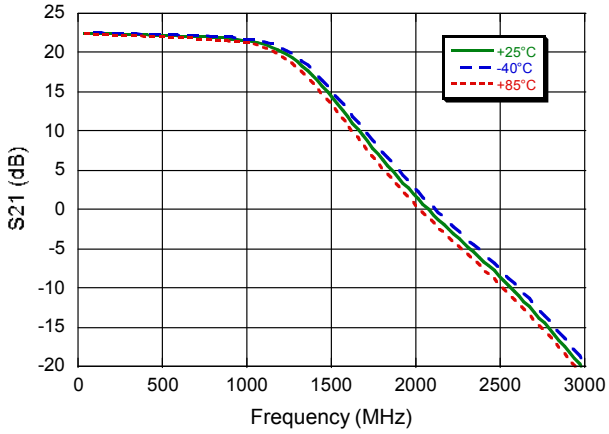


Typical Performance Curves:

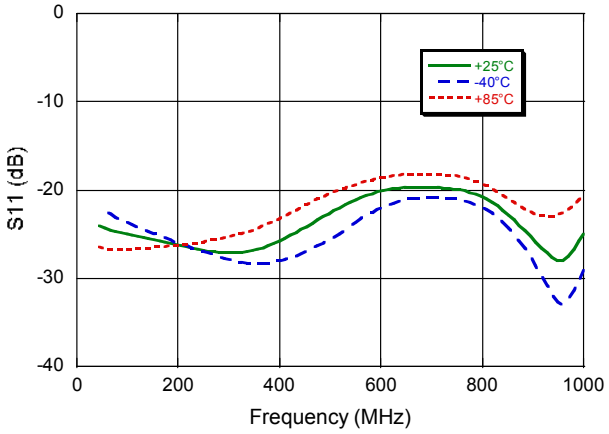
Gain to 1000 MHz



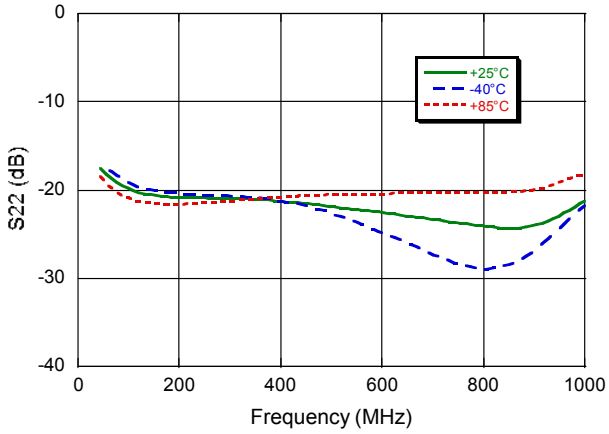
Gain to 3000 MHz



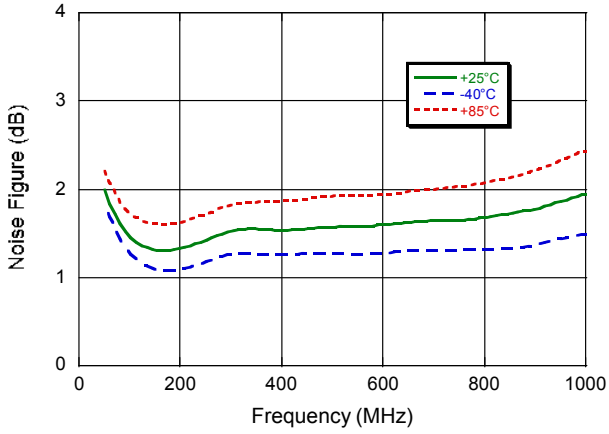
Input Return Loss



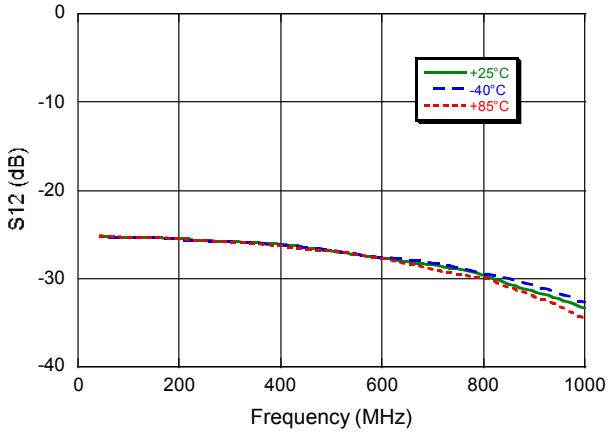
Output Return Loss



Noise Figure



Reverse Isolation



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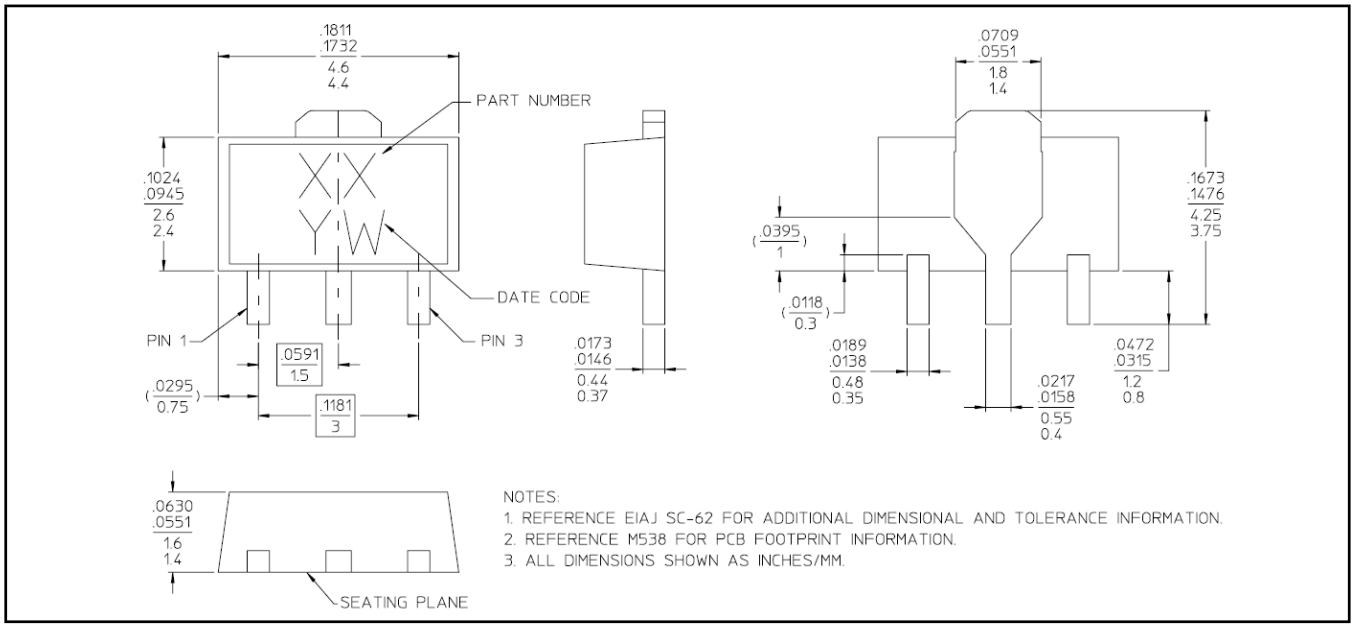
Lead-Free SOT-89 Plastic Package†



† 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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