

Broadband CATV Amplifier 50 - 1000 MHz

Rev. V1

Features

- 75 Ω Input / Output Match
- CTB: -75 dBc
- Noise Figure: 1.9 dB
- Gain: 17 dB
- Lead Free SOT-89 Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAM-009633 CATV amplifier is a GaAs MMIC which exhibits low distortion in a lead free miniature surface mount plastic package. This device employs a monolithic single stage design featuring a convenient 75 Ω input/output impedance that minimizes the number of external components required.

The MAAM-009633 provides low noise and high linearity. It is ideally suited for set top boxes, home gateways, FTTX, Drop Amplifiers, and other broadband internet based applications.

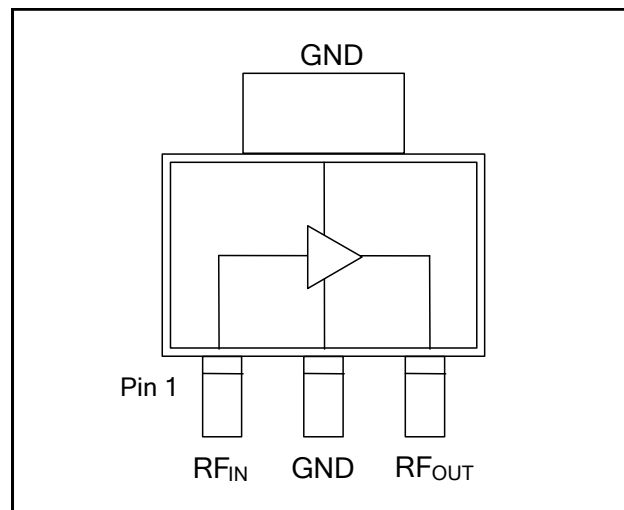
The MAAM-009633 is fabricated using M/A-COM Technology’s pHEMT process to realize low noise and low distortion. The process features full passivation for robust performance and reliability.

Ordering Information ^{1,2}

Part Number	Package
MAAM-009633-TR1000	1000 piece reel
MAAM-009633-TR3000	3000 piece reel
MAAM-009633-001SMB	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 _{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	10.0 volts
Operating Temperature	-40°C to +85°C
Junction Temperature ⁶	+160°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 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}) = 81° C/W.
a) For $T_C = 25^\circ\text{C}$,
 $T_J = 103^\circ\text{C} @ 8\text{ V}, 120\text{ mA}$
b) For $T_C = 85^\circ\text{C}$,
 $T_J = 156^\circ\text{C} @ 8\text{ V}, 110\text{ mA}$

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

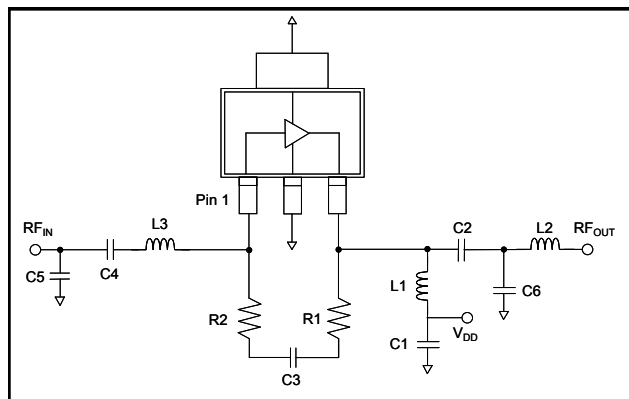
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Electrical Specifications: $T_A = 25^\circ\text{C}$, Freq: 50 - 1000 MHz, $V_{DD} = 8$ Volts, $Z_0 = 75 \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain		dB	15.8	17	17.8
Gain Flatness		dB	—	0.5	1
Noise Figure		dB	—	1.9	3.5
Input Return Loss		dB	—	20	—
Output Return Loss		dB	—	20	—
Output IP2	6 MHz Spacing, -10 dBm output per tone	dBm	—	56	—
Output IP3	6 MHz Spacing, -10 dBm output per tone	dBm	—	37	—
Composite Triple Beat, CTB	132 channels, +30 dBmV / channel at the output.	dBc	—	-75	—
Composite Second Order, CSO	132 channels, +30 dBmV / channel at the output.	dBc	—	-60	—
P1dB		dBm	—	23	—
I_{DD}	8 Volts	mA	—	120	140

Schematic Including Off-Chip Components

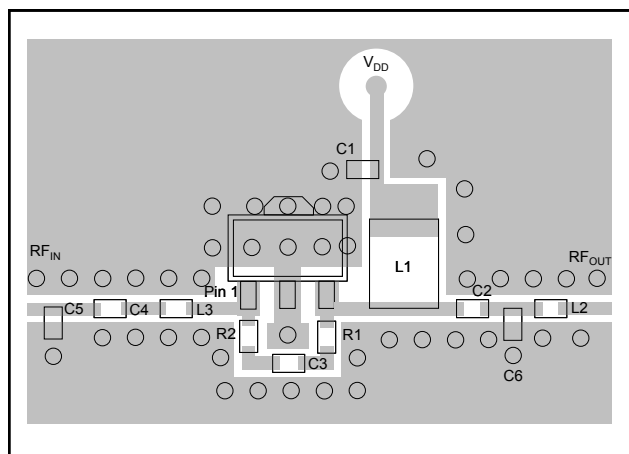


Off-Chip Component Values

Component	Value	Package
C1,C3,C4	0.01 μF	0402
C2	470 pF	0402
C5, C6	0.5 pF	0402
L1 ⁷	1 μH	1210
L2	7.5 nH	0402
L3	8.2 nH	0402
R1	560 Ω	0402
R2	91 Ω	0402

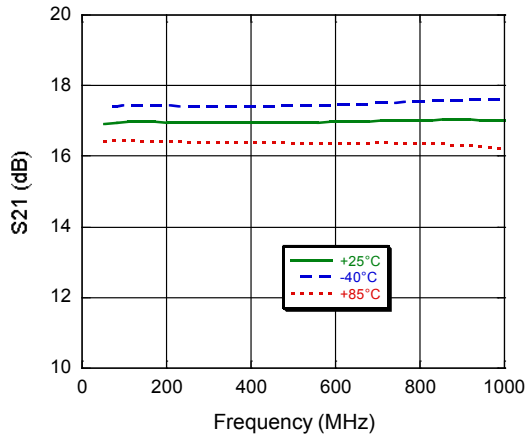
7. L1 supplied from EPCOS, part number B82422A1102K100

Recommended Board Layout

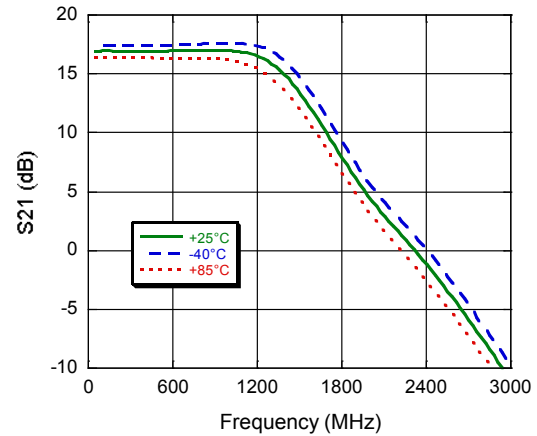


Typical Performance Curves over temperature

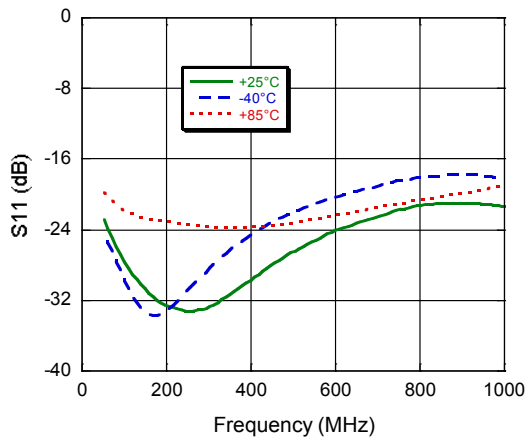
Gain to 1000 MHz



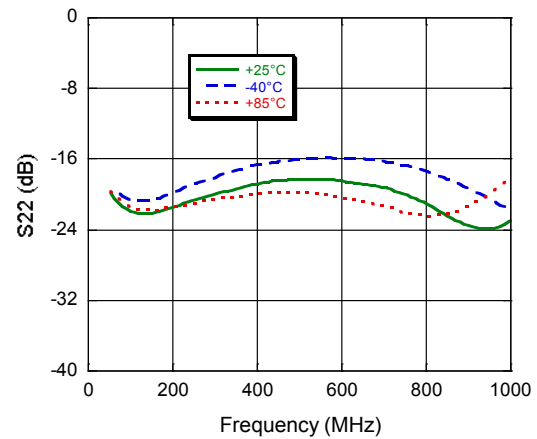
Gain to 3000 MHz



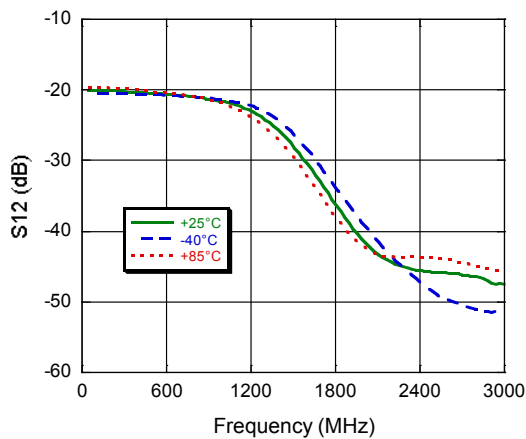
Input Return Loss



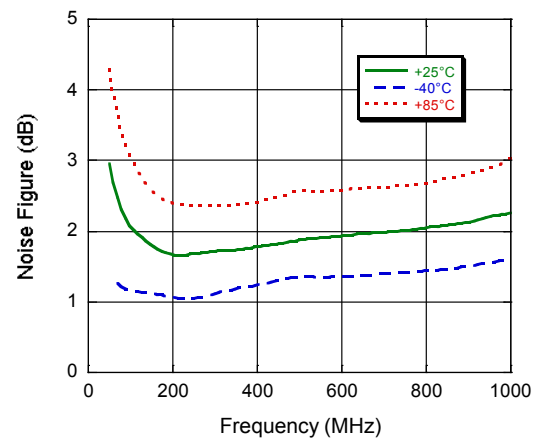
Output Return Loss



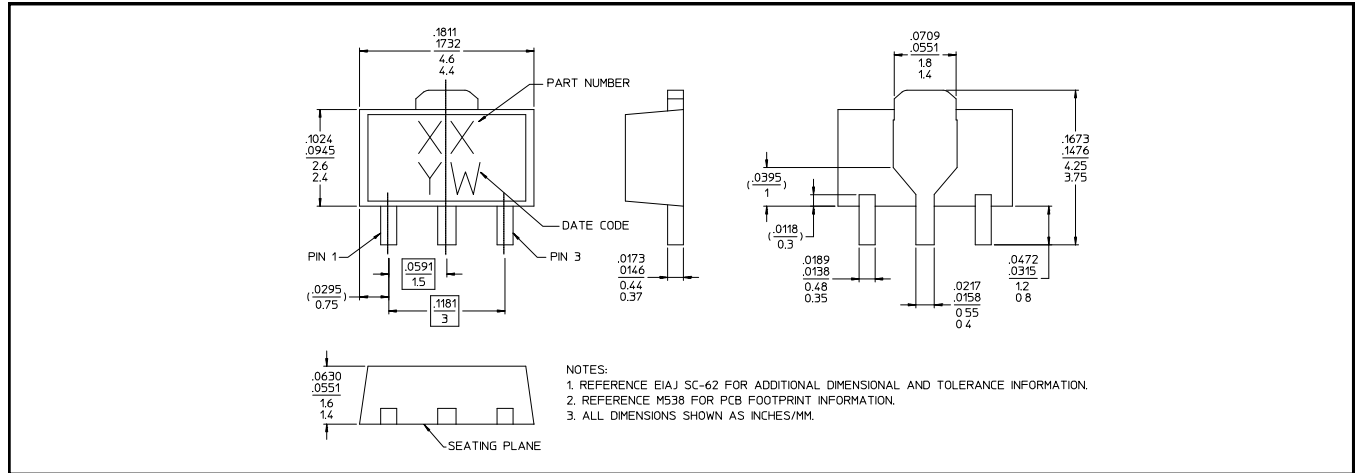
Reverse Isolation to 3000 MHz



Noise Figure



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. An external protection circuit using an anti-parallel diode pair can be used to protect the IC.

Please reference application note AN3028 on <https://www.macomtech.com> for further detail.

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