

Electrical Characterization of MAAMSS0031 CATV Amplifier at +5 Volts and Reduced Gain

Rev. V2

Abstract

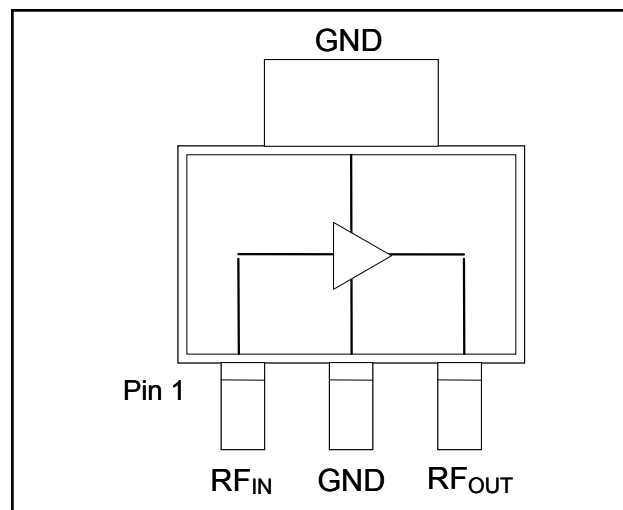
The MAAMSS0031 CATV amplifier is a GaAs MMIC which exhibits low noise and high linearity. It is ideally suited for set top boxes, home gateways, and other broadband internet based appliances.

This amplifier is a monolithic single stage design in a 75 ohm input/output impedance environment. It is designed to have a reduced number of external matching components. The MAAMSS0031 can also be used for +8 volt operation as shown in the datasheet.

Introduction

The purpose of this application note is to present the typical performance of the MAAMSS0031 amplifier when it is operated at +5 volts. It is intended as an aid to engineers for the implementation of the MAAMSS0031 in set top box applications at 5 volts. An enhanced return loss circuit similar to that shown on page 4 of the data sheet is used for the small signal measurements.

Functional Schematic



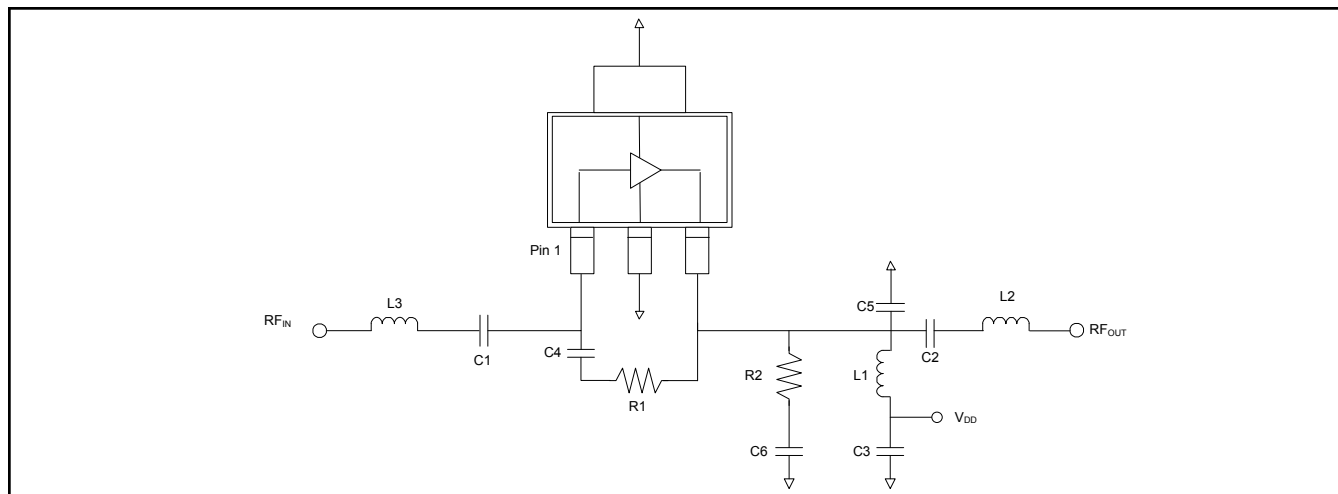
Electrical Specifications: $T_A = 25^\circ\text{C}$, Freq: 50 - 1000 MHz, $V_{DD} = +5$ Volts, $Z_0 = 75$ Ohms

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain		dB	—	9.7	—
Gain Flatness		dB	—	0.5	—
Noise Figure		dB	—	2.7	—
Input Return Loss		dB	—	8	—
Output Return Loss		dB	—	9	—
Output IP3	6 MHz Spacing, -10 dBm output per tone	dBm	—	29	—
Composite Triple Beat, CTB	132 channels, +23 dBmV/channel at the output.	dBc	—	-75	—
Composite Second Order, CSO	132 channels, +23 dBmV/channel at the output.	dBc	—	-66	—
P1dB		dBm	—	18	—
I_{DD}	+ 5 Volts	mA	—	100	—

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Schematic Including Off-Chip Components

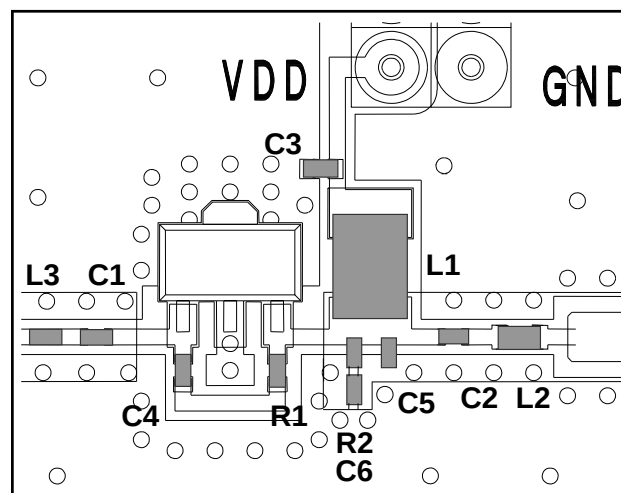


Off-Chip Component Values

Component	Value	Package
C1	0.01 μ F	0402
C2	0.01 μ F	0402
C3	0.01 μ F	0402
C4	0.01 μ F	0402
C5	0.5 pF	0402
C6	1.0 pF	0402
L1 *	1000 nH	1210
L2	8.2 nH	0402
L3	5.6 nH	0402
R1	220 Ω	0402
R2	15 Ω	0402

* L1 supplied from EPCOS, part number B82422A1102K100.

Recommended Board Layout

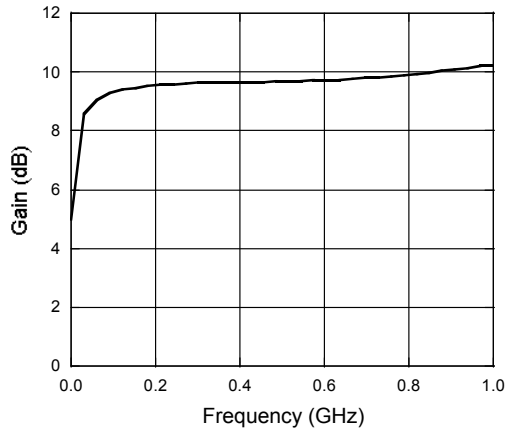


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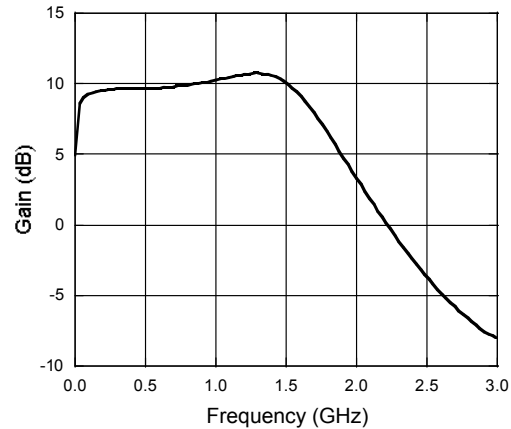
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Typical Performance Curves - $T_A = 25^\circ\text{C}$, $V_{DD} = +5$ Volts, $Z_0 = 75$ Ohms

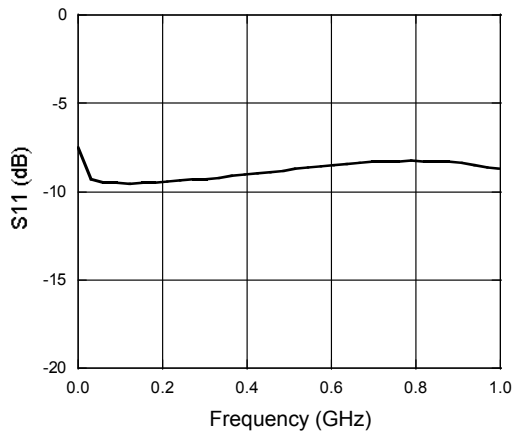
Gain vs. Frequency to 1 GHz



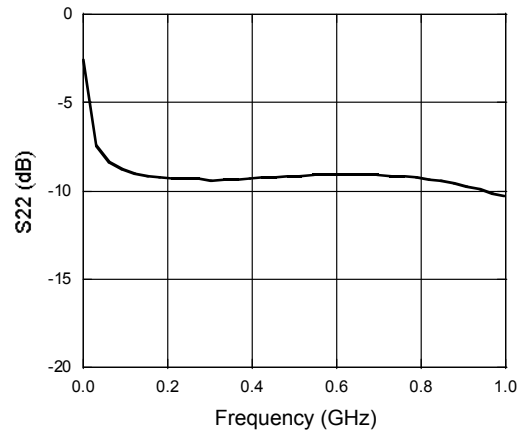
Gain vs. Frequency to 3 GHz



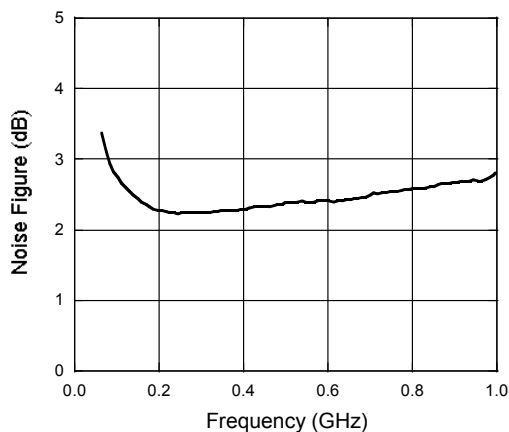
Input Return Loss vs. Frequency



Output Return Loss vs. Frequency



Noise Figure vs. Frequency



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SOT-89 Plastic Package

