MAALSS0034

Miniature Broadband Gain Stage
70 - 3000 MHz

Rev. V2

Features

- Low Noise Figure
- High IP_3
- Single +3 V to +5 V Supply Voltage
- Lead-Free SOT-89 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Re-flow Compatible

Description

M/A-COM's MAALSS0034 broadband gain stage is a GaAs MMIC amplifier in a lead-free SOT-89 surface mount plastic package. It can be operated from a single 3 to 5 volt supply.

The MAALSS0034 employs a monolithic single-stage self-biased design featuring a convenient 50-ohm input impedance that minimizes the number of external components required. The broadband design provides low noise figure and high IP3 from 70 to 3000 MHz.

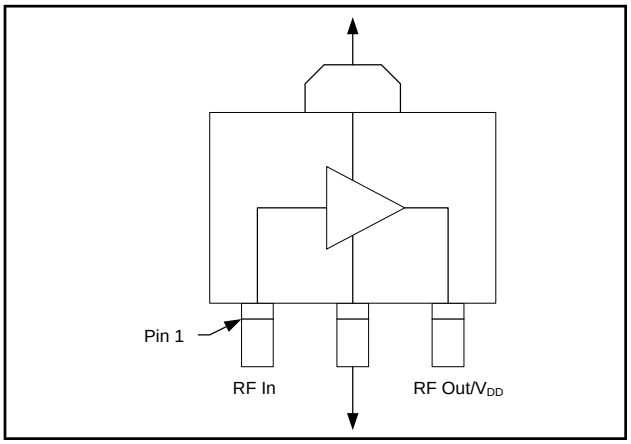
M/A-COM fabricates the MAALSS0034 using an E/D MESFET process to realize low noise and high dynamic range. The process features full passivation for performance and reliability.

Ordering Information[1,2]

Part Number	Package
MAALSS0034	Bulk Packaging
MAALSS0034TR-3000	3000 piece reel
MAALSS0034SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Functional Block Diagram



Pin Configuration

Pin	Pin Name	Description
1	RF In	RF Input
2	GND	Ground
3	RF Out/V_{DD}	RF Output & Voltage Bias

Maximum Operating Conditions[3]

Parameter	Maximum Operating Condition
RF Output Power	23 dBm
Junction Temperature[4]	150°C
Operating Temperature	-40°C to +85°C

3. Operating at or within these conditions will ensure MTTF > 1 x 10^6 hours.
4. Typical thermal resistance (θjc) = 100°C/W.

Absolute Maximum Ratings[5,6]

Parameter	Absolute Maximum
RF Output Power	24 dBm
Voltage	6.0 volts
Storage Temperature	-65°C to +150°C
Junction Temperature	200°C

5. Exceeding any one or combination of these limits may cause permanent damage to this device.
6. M/A-COM does not recommend sustained operation near these survivability limits.

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

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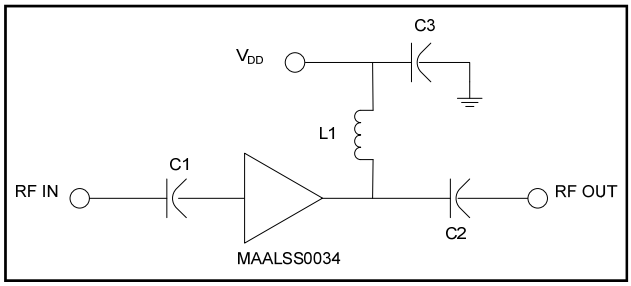
Electrical Specifications: Z_0 = 50 Ω, T_A = 25 °C, V_{DD} = +5 V (unless otherwise specified)

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	0.9 GHz	dB	—	14.5	—
	1.9 GHz	dB	11.0	12.0	13.0
	1.9 GHz (V_{DD} = +3V)	dB	10.5	11.5	13.0
	3.0 GHz	dB	—	9.20	—
Noise Figure	0.9 GHz	dB	—	1.55	—
	1.9 GHz	dB	—	1.60	2.0
	1.9 GHz (V_{DD} = +3V)	dB	—	1.50	2.0
	3.0 GHz	dB	—	1.70	—
Input Return Loss	0.9 GHz	dB	—	10	—
	1.9 GHz	dB	—	15	—
	3.0 GHz	dB	—	18	—
Output Return Loss	0.9 GHz	dB	—	9	—
	1.9 GHz	dB	—	14	—
	3.0 GHz	dB	—	18	—
Output P1dB	0.9 GHz	dBm	—	22	—
	1.9 GHz	dBm	—	23	—
	3.0 GHz	dBm	—	23	—
Output IP_3	Two tone, -12 dBm/tone, 1 MHz spacing				
	0.9 GHz	dBm	—	33	—
	1.9 GHz	dBm	—	36	—
	3.0 GHz	dBm	—	37	—
Current	V_{DD} = +5 V	mA	50	88	110
	V_{DD} = +3 V	mA	35	70	100

Application Schematic

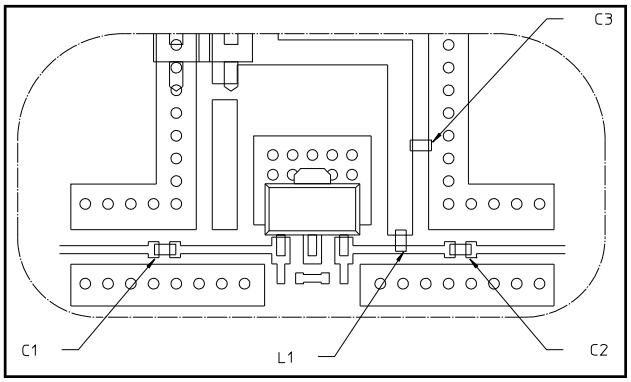


Component List [7], 500 - 3000 MHz

Part	Value	Case Style	Manufacturer	Purpose
C1,C2	39 pF	0402	Murata	DC Block
C3	0.1µF	0402	Murata	RF Bypass
L1	12 nH	0402	Coilcraft	RF Choke/Tuning

7. Please contact M/A-COM application group for lower frequency application circuitry.

Recommended PCB Configuration



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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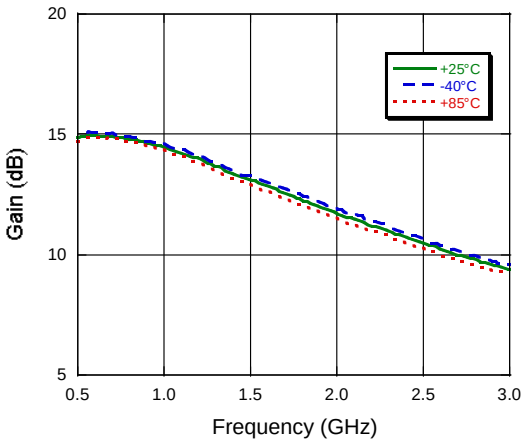
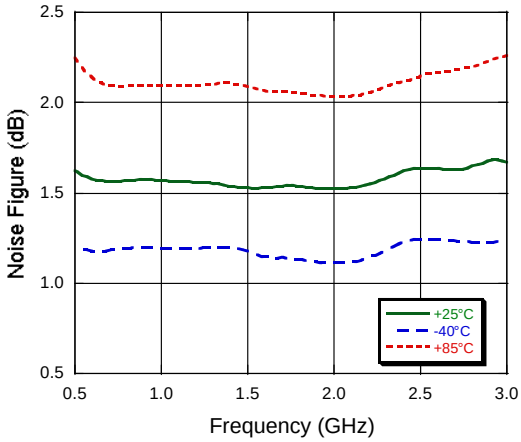
Typical Performance Curves, V_{DD} = +5 V

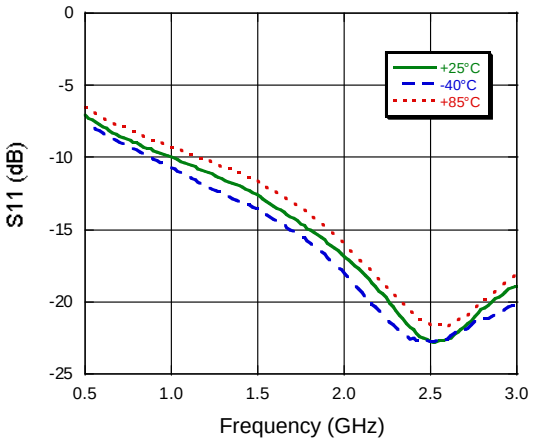
Gain



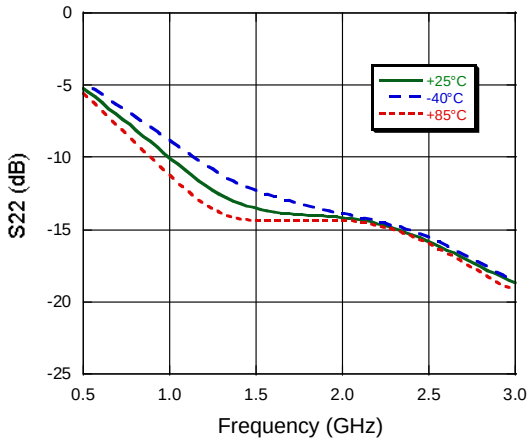
Noise Figure



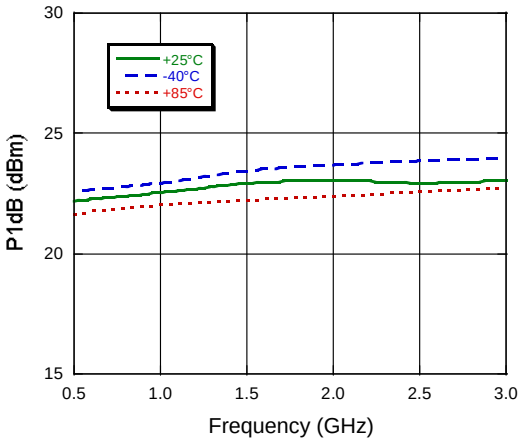
Input Return Loss



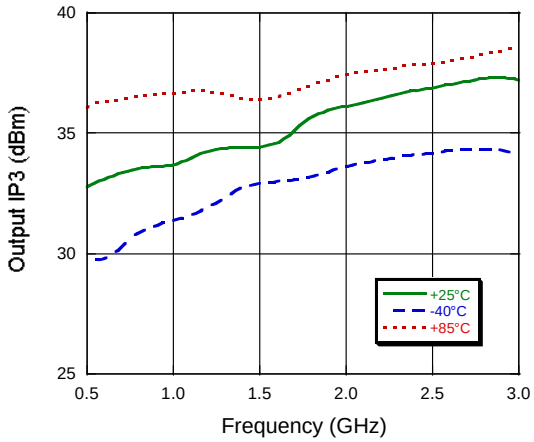
Output Return Loss



Output P1dB



Output IP3, Input Power = -12 dBm



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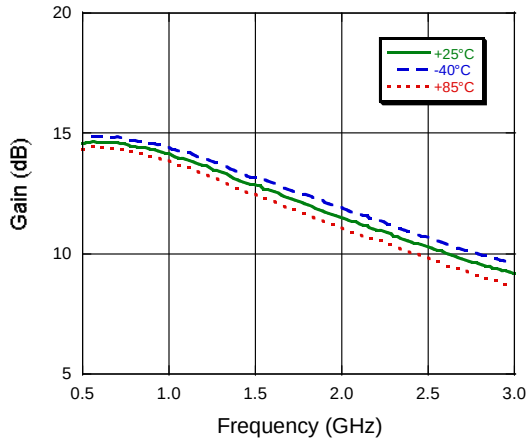
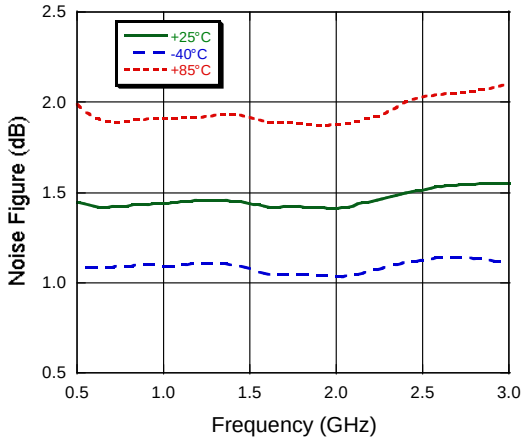
Typical Performance Curves, V_{DD} = +3 V

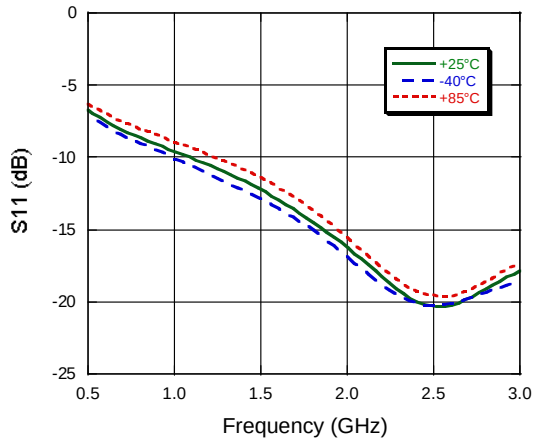
Gain



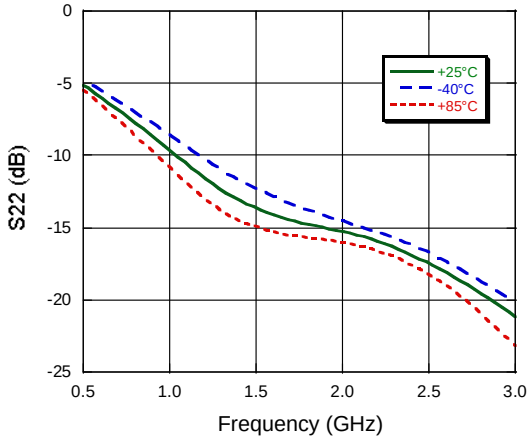
Noise Figure



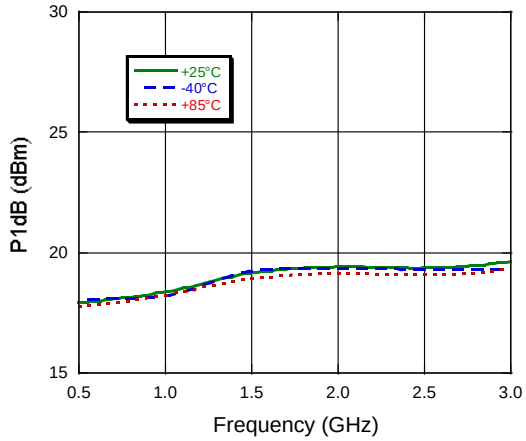
Input Return Loss



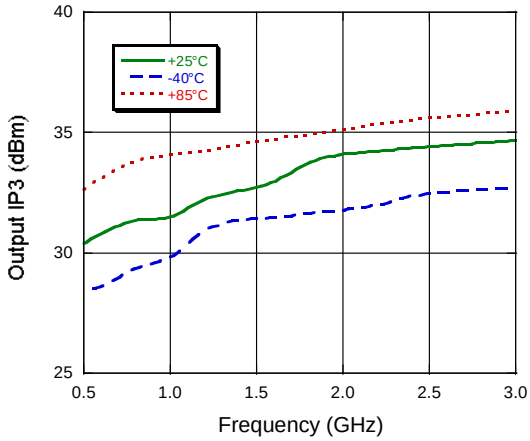
Output Return Loss



Output P1dB



Output IP3, Input Power = -12 dBm



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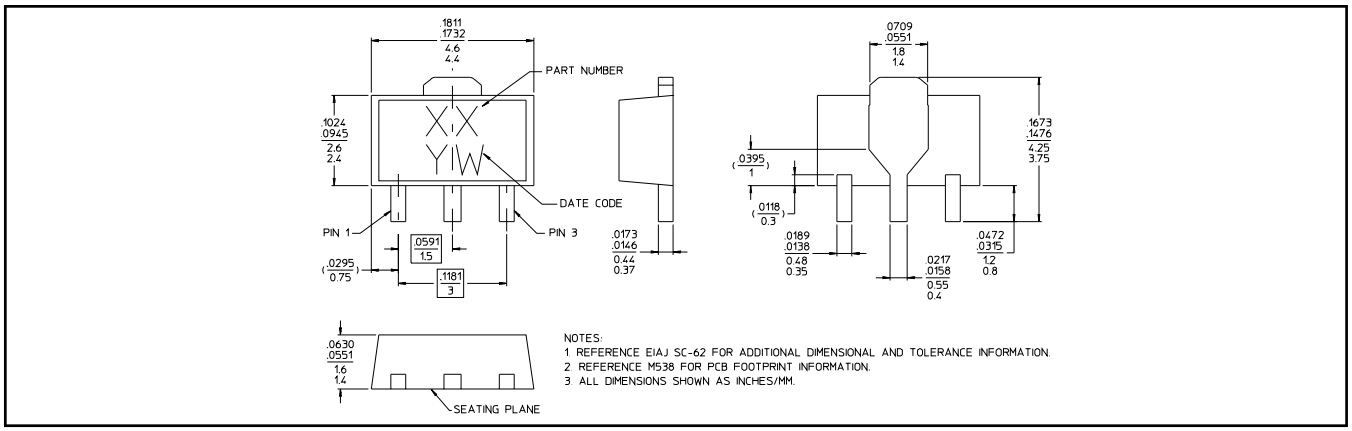
Lead-Free SOT-89†



† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

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