

Low Noise Amplifier 1.575 GHz

Rev. V1

Features

- Low Noise Figure: 1.15 dB
- High Gain: 27 dB
- Low Power Consumption: 5V, 20 mA
- High Dynamic Range
- Lead-Free SOIC-8 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of AM50-0002

Description

M/A-COM's MAALSS0042 is a high performance GaAs MMIC low noise amplifier in a lead-free SOIC 8-lead surface mount plastic package. The MAALSS0042 employs a monolithic 3-stage self-bias design and a simple external matching network to obtain minimum noise figure.

The MAALSS0042 is ideally suited for use where low noise figure, high gain, high dynamic range and low power consumption are required. Typical applications include receiver front ends in the Global Positioning System (GPS) market, as well as standard gain blocks, buffer amps, driver amps, and IF amps in both fixed and portable systems.

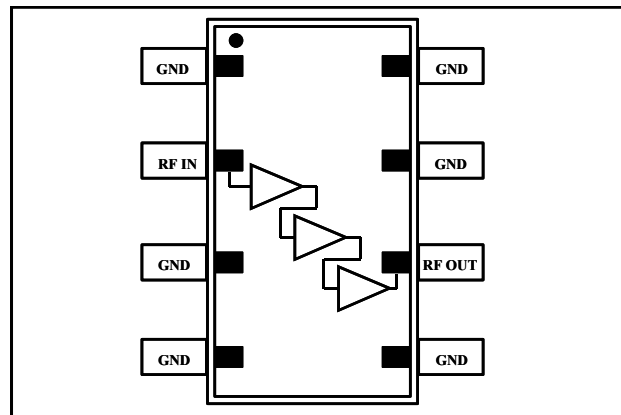
M/A-COM'S MAALSS0042 is fabricated using a mature 0.5-micron gate length GaAs process. The process features full passivation for increased performance reliability.

Ordering Information ^{1,2}

Part Number	Package
MAALSS0042	Bulk Packaging
MAALSS0042TR-3000	3000 piece reel
MAALSS0042SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.
2. Die quantity varies.

Functional Diagram



Pin Configuration ^{3,4,5}

Pin No.	Pin Name	Description
1	GND	Ground
2	RF IN	RF Input
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	RF OUT	RF Output, V _{DD}
7	GND	Ground
8	GND	Ground

3. Pins 1, 3, 4, 5, 7, and 8 must be RF and DC grounded (see Recommended PCB Configuration).
4. Pin 2 is the RF input and must be connected to the simple matching network shown in the Application Schematic.
5. Pin 6 is the RF output. V_{DD} is also applied on Pin 6.

Absolute Maximum Ratings ^{6,7}

Parameter	Absolute Maximum
V _{DD}	+10 VDC
Input Power	17 dBm
Channel Temperature ⁸	+150 °C
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

6. Exceeding any one or combination of these limits may cause permanent damage to this device.
7. M/A-COM does not recommend sustained operation near these survivability limits.
8. Typical thermal resistance (θ_{jc}) = +165 °C/W

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

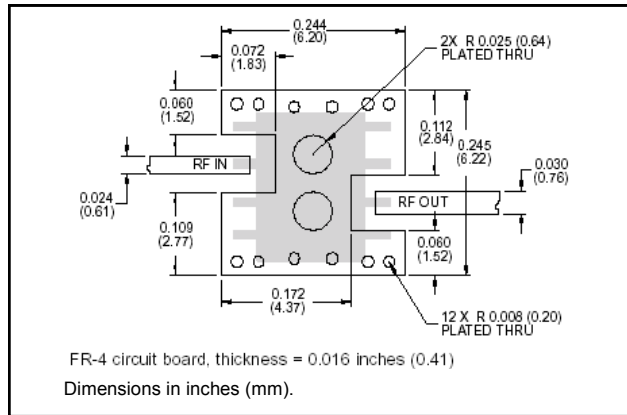
Low Noise Amplifier 1.575 GHz

Rev. V1

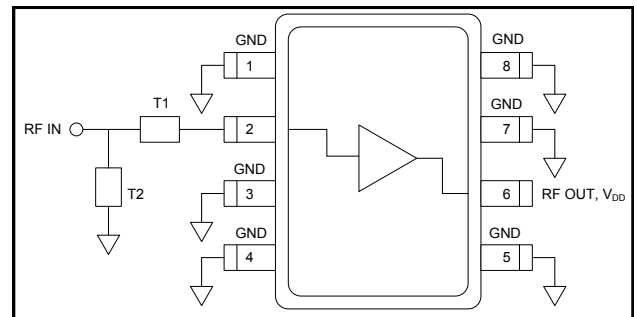
Electrical Specifications: $T_A = +25^\circ\text{C}$, $V_{DD} = +5\text{ V}$, $Z_0 = 50\ \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	dB	25	27	29
Noise Figure	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	dB	-	1.15	1.4
Input VSWR	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	Ratio	-	2.0:1	-
Output VSWR	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	Ratio	-	1.5:1	-
Output P1dB	$F = 1.575\text{ GHz}$	dBm	-	1	-
Input IP_3	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	dBm	-	-14	-
Reverse Isolation	$F = 1.575\text{ GHz}$, $P_{IN} = -35\text{ dBm}$	dB	-	48	-
Bias Current	—	mA	15	20	25

Recommended PCB Configuration

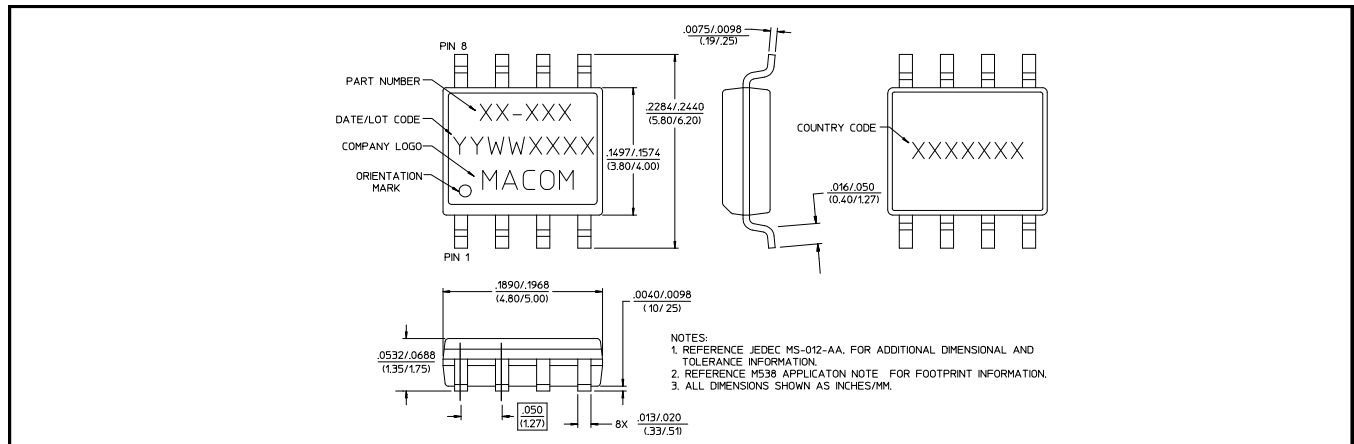


Application Schematic



Frequency = 1.575 GHz		
	Impedance	Electrical Length
T1	57.2 Ω	36.0°
T2	82.7 Ω	16.2°

Lead-Free SOIC-8†



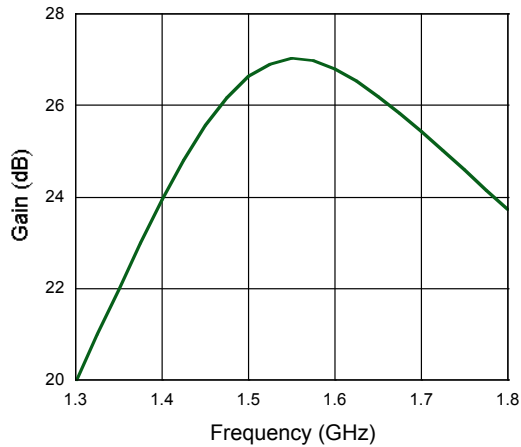
† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

Low Noise Amplifier 1.575 GHz

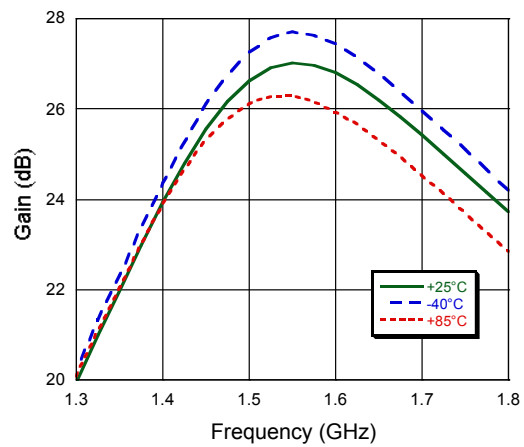
Rev. V1

Typical Performance

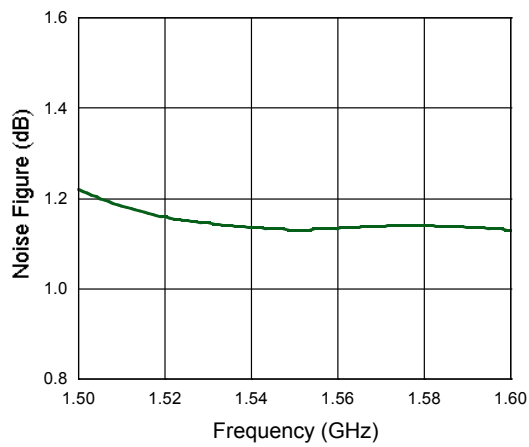
Gain, $T_A = +25^\circ\text{C}$



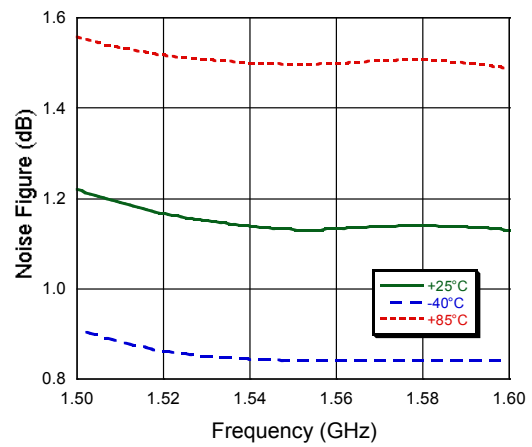
Gain over Temperature



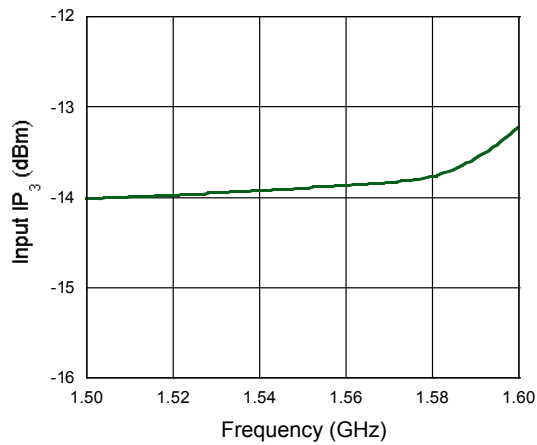
Noise Figure, $T_A = +25^\circ\text{C}$



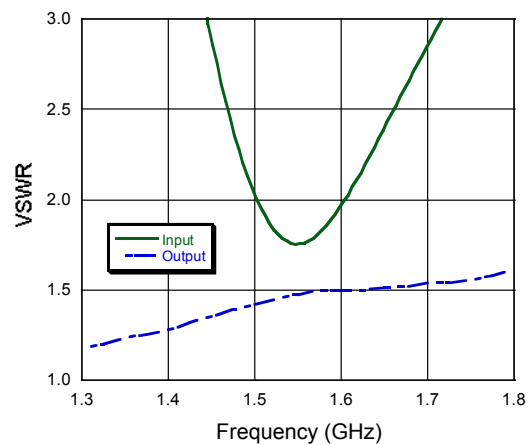
Noise Figure over Temperature



Input IP_3 , $T_A = +25^\circ\text{C}$



VSWR, $T_A = +25^\circ\text{C}$



M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.

4

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.
Visit www.macom.com for additional data sheets and product information.