MAAL-007304

Low Noise Amplifier
0.5 - 3.0 GHz

Rev. V4

Features

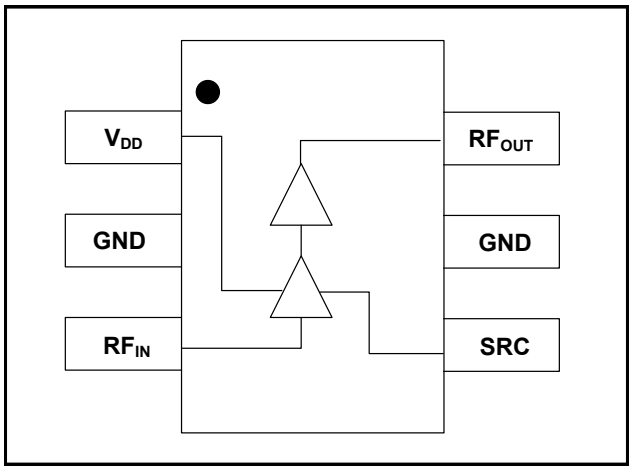
- Low Noise Figure: 0.7 dB at 2.3 GHz
- Single +3 to +5 V Supply Bias
- Low Current: 11.5 mA typical
- Lead-Free SOT-26 Plastic Package
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MAAL-007304 low noise amplifier is a GaAs MMIC amplifier in a lead-free SOT-26 surface mount plastic package. The MAAL-007304 employs a monolithic 2-stage self-biased design and can be biased between +3 to +5 volts, depending on system requirements. The MAAL-007304 offers low noise, low current, and high gain. It can be tuned for various applications from 0.5 to 3 GHz.

M/A-COM fabricates the MAAL-007304 using a low noise pHEMT process to realize low noise and high gain. The process features full passivation for performance and reliability.

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description
1	V_{DD}	Bias
2	GND	Ground
3	RF_{IN}	RF Input
4	SRC	Source
5	GND	Ground
6	RF_{OUT}	RF Output

Ordering Information [1,2]

Part Number	Package
MAAL-007304-000000	Bulk Packaging
MAAL-007304-TR3000	3000 piece reel
MAAL-007304-001SMB	Sample Board 2.3 - 2.5 GHz Tuning

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

Absolute Maximum Ratings [3,4]

Parameter	Absolute Maximum
RF Input Power	+10 dBm
Voltage	6.0 volts
Operating Temperature	-40°C to +85°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 does not recommend sustained operation near these survivability limits.

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

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.

For further information and support please visit:
https://www.macom.com/support

Low Noise Amplifier
0.5 - 3.0 GHz

Rev. V4

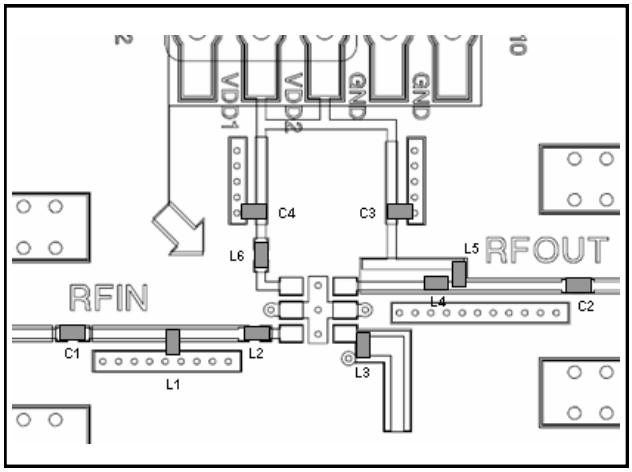
Electrical Specifications: F = 2.3 GHz, V_{DD} = +3 V, T_A = +25°C, Z_O = 50 Ω

Parameter	Units	Min.	Typ.	Max.
Gain	dB	24.0	25.5	27.0
Noise Figure	dB	—	0.7	0.85
Current	mA	—	11.5	13.0

Typical Performance: F = 2.3 GHz, V_{DD} = +3 V, T_A = +25°C, Z_O = 50 Ω

Parameter	Units	Typ.
Input Return Loss	dB	15
Output Return Loss	dB	10
Input IP_3	dBm	-6
Output IP_3	dBm	19
Output P1dB	dBm	7

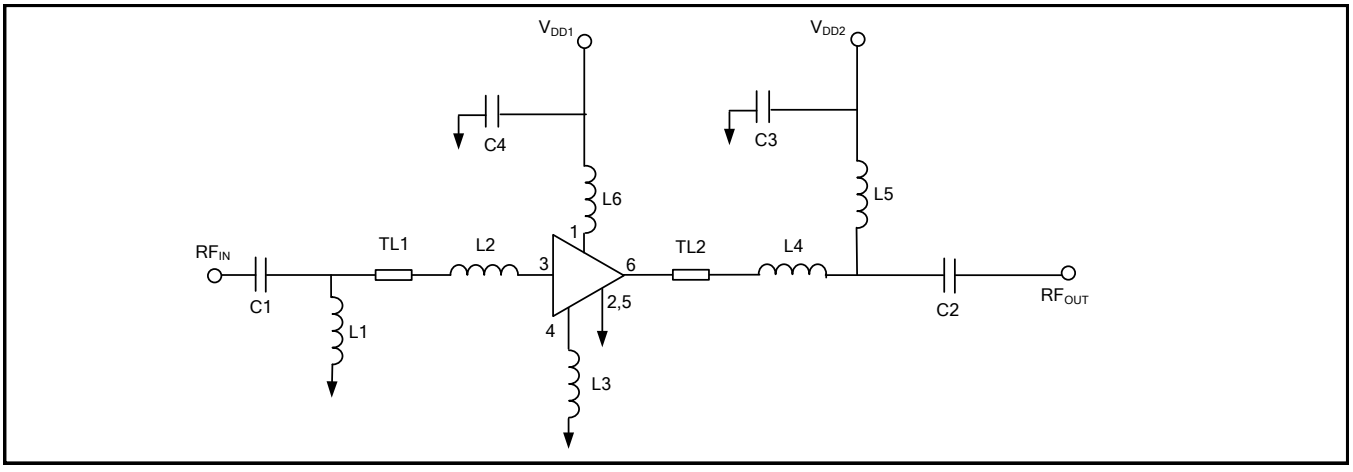
Recommended PCB Configuration



External Parts List

Component	Value	Footprint	Manufacturer
C1	3 pF	0603	ATC
C2	8.2 pF	0603	ATC
C3, C4	0.1 µF	0402	Panasonic
L1	5.6 nH	0402	Panasonic
L2, L5	6.8 nH	0402	Coilcraft
L3	1.5 nH	0402	Toko
L4	3.9 nH	0402	Toko
L6	7.5 nH	0402	Coilcraft
TL1	47.5 Ω, 34° @ 2.3 GHz		
TL2	47.5 Ω, 15.5° @ 2.3 GHz		

Schematic

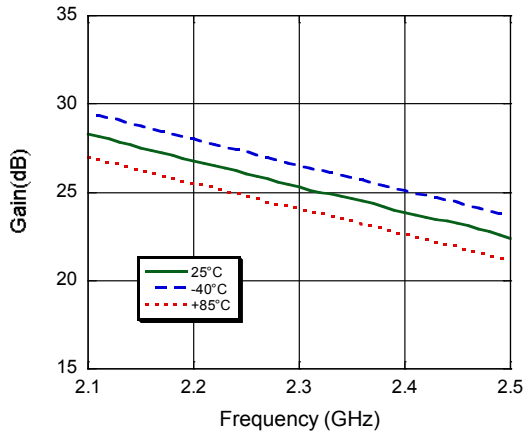


M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.
Visit www.macom.com for additional data sheets and product information.

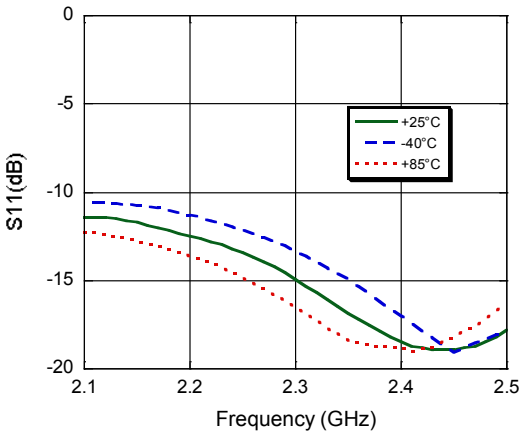
For further information and support please visit:
https://www.macom.com/support

Typical Performance Curves

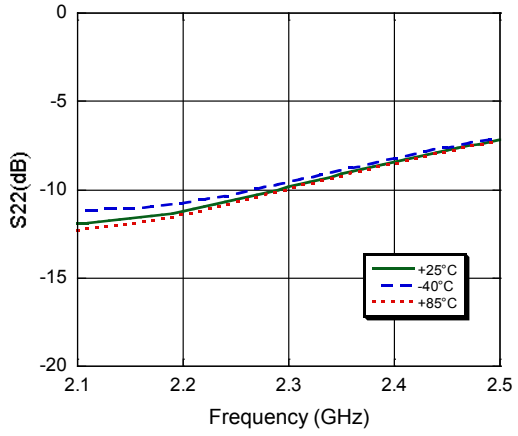
Gain



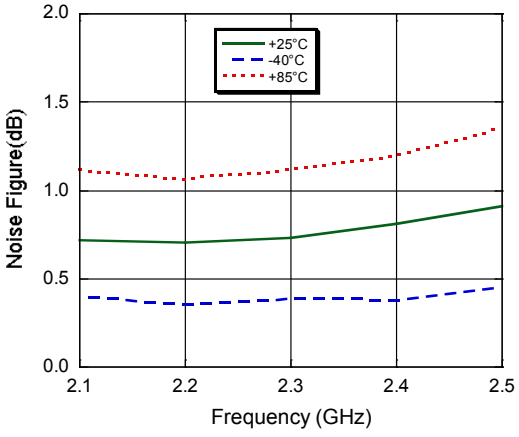
Input Return Loss



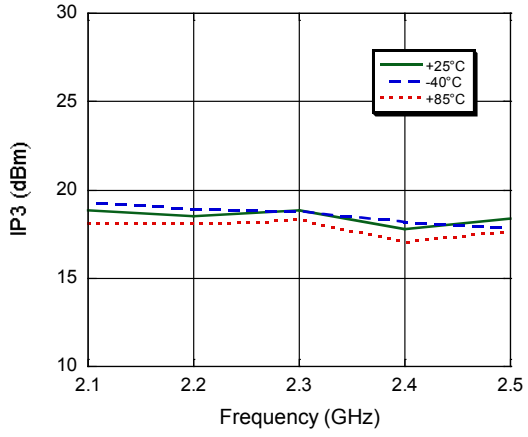
Output Return Loss



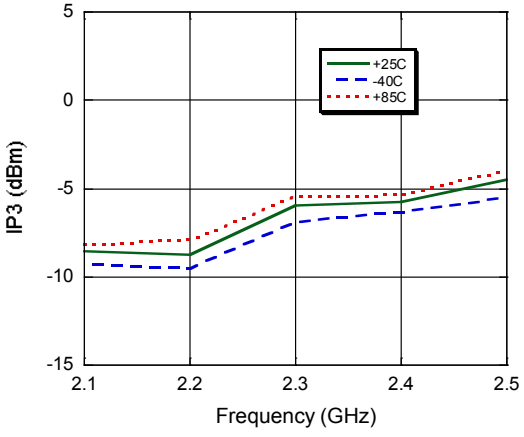
Noise Figure



Output IP3



Input IP3

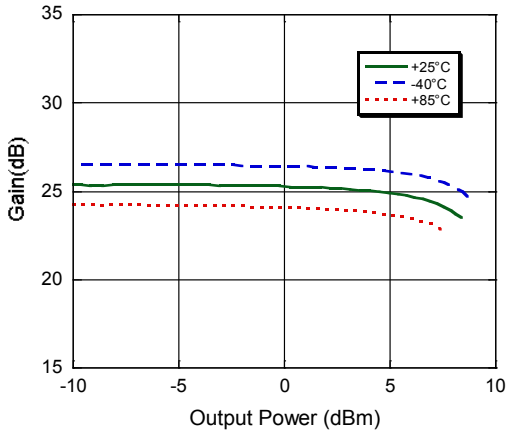


M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.
Visit www.macom.com for additional data sheets and product information.

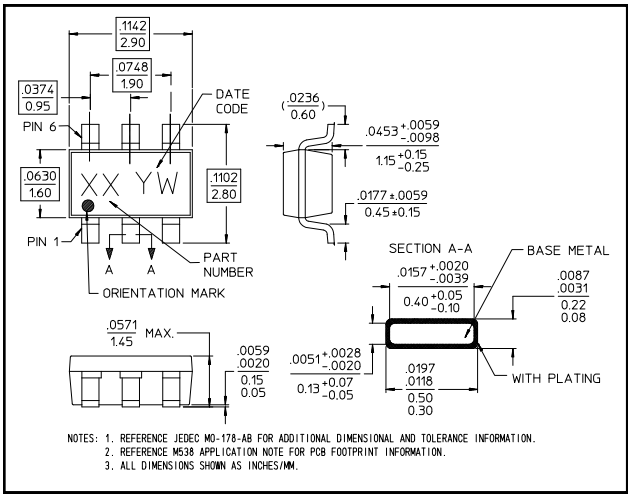
For further information and support please visit:
https://www.macom.com/support

Typical Performance Curves

P1dB @ 2.3 GHz



Lead-Free SOT-26 Plastic Package†



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

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.

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.

For further information and support please visit:
https://www.macom.com/support

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 estoppels 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.