

## 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.

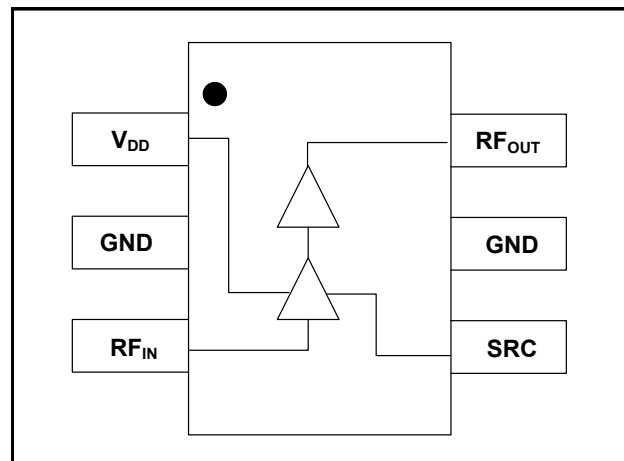
M/A-COM fabricates the MAAL-007304 using a low noise pHEMT process to realize low noise and high gain. The process features full passivation for performance and reliability.

### Ordering Information <sup>1,2</sup>

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.

### Functional Schematic



### Pin Configuration

Pin No.	Pin Name	Description
1	V <sub>DD</sub>	Bias
2	GND	Ground
3	RF <sub>IN</sub>	RF Input
4	SRC	Source
5	GND	Ground
6	RF <sub>OUT</sub>	RF Output

### Absolute Maximum Ratings <sup>3,4</sup>

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.

# Low Noise Amplifier

## 0.5 - 3.0 GHz

Rev. V4

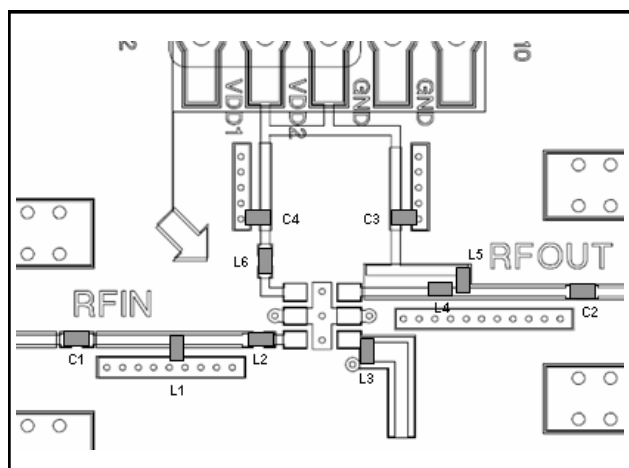
**Electrical Specifications:  $F = 2.3 \text{ GHz}$ ,  $V_{DD} = +3 \text{ V}$ ,  $T_A = +25^\circ\text{C}$ ,  $Z_O = 50 \Omega$** 

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:  $F = 2.3 \text{ GHz}$ ,  $V_{DD} = +3 \text{ V}$ ,  $T_A = +25^\circ\text{C}$ ,  $Z_O = 50 \Omega$** 

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

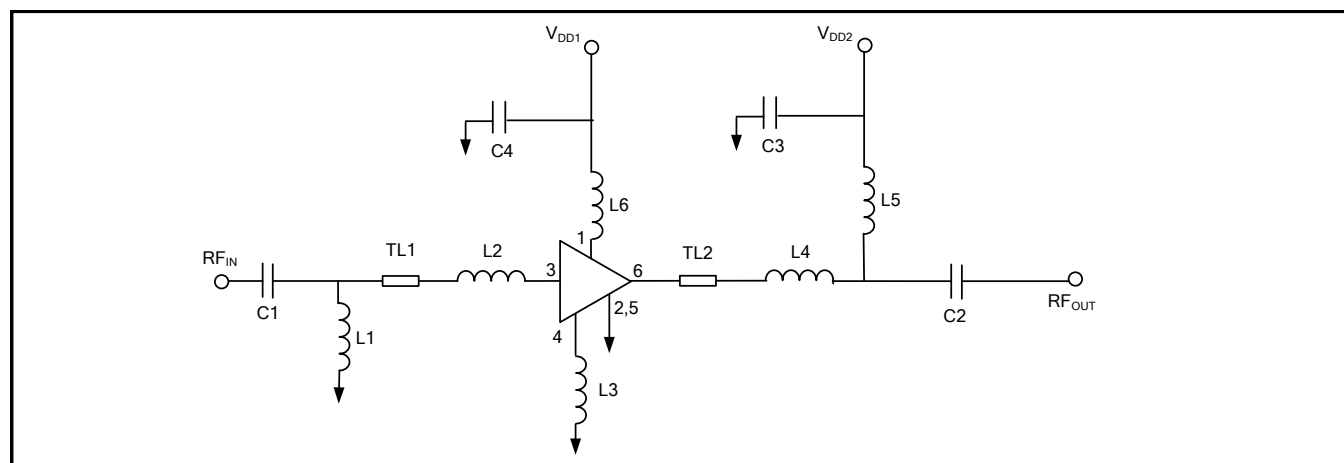
### Recommended PCB Configuration



### External Parts List

Component	Value	Footprint	Manufacturer
C1	3 pF	0603	ATC
C2	8.2 pF	0603	ATC
C3, C4	0.1 $\mu\text{F}$	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 $\Omega$ , 34° @ 2.3 GHz		
TL2	47.5 $\Omega$ , 15.5° @ 2.3 GHz		

### Schematic

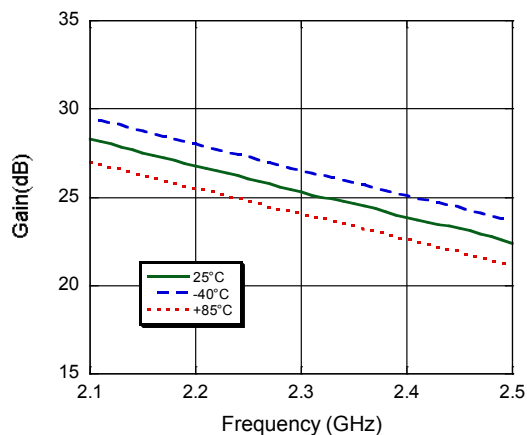


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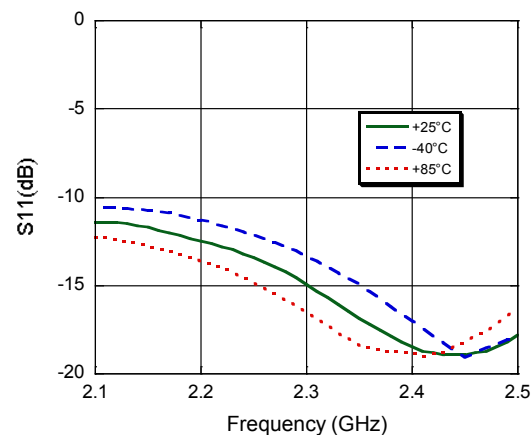
Rev. V4

### Typical Performance Curves

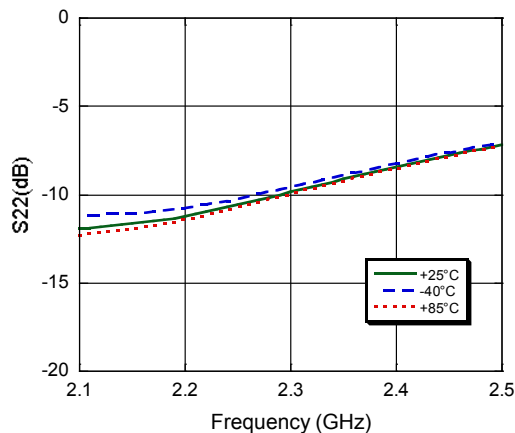
**Gain**



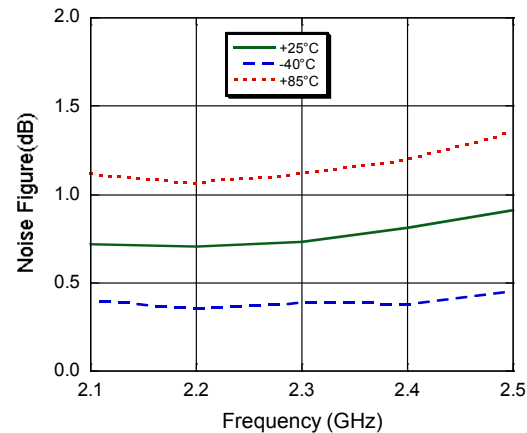
**Input Return Loss**



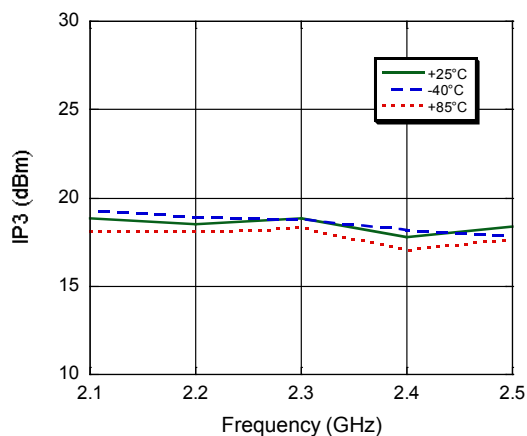
**Output Return Loss**



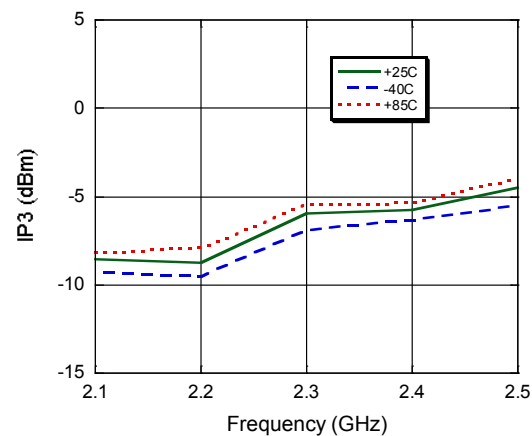
**Noise Figure**



**Output IP3**



**Input IP3**

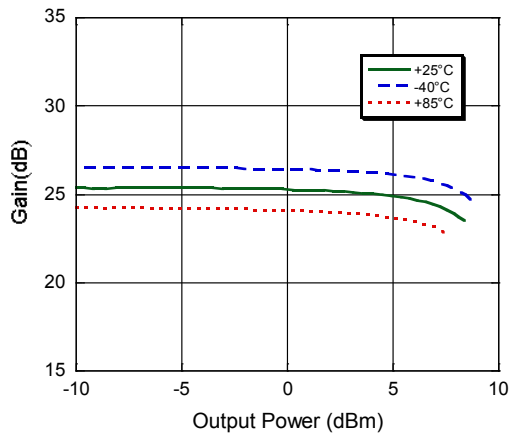


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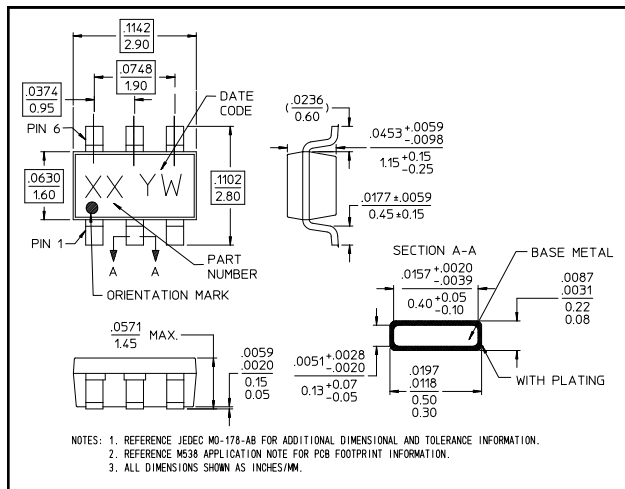
Rev. V4

### Typical Performance Curves

#### P1dB @ 2.3 GHz



### Lead-Free SOT-26 Plastic Package<sup>†</sup>



<sup>†</sup> 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.

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