

Low Noise Amplifier 0.5 - 3.0 GHz

**MAAL-007304
V1**

Features

- Low Noise Figure: 0.7 dB at 2.3 GHz
- Single +3 to +5 V Supply Voltage
- Low Current, 10 mA typical
- Lead-Free SOT26-6LD
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 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 typically runs from a single 3.0 volt supply. Any voltage between 3.0 and 5.0 volts can be used, 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.

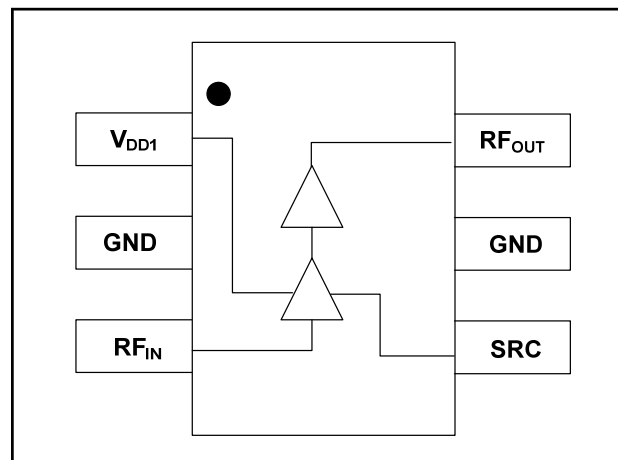
M/A-COM fabricates the MAAL-007304 using a low noise PHEMT process to realize low noise and high gain. The process features full passivation for performance and reliability.

Ordering Information ¹

Part Number	Package
MAAL-007304-000000	Bulk Packaging
MAAL-007304-TR3000	3000 piece reel
MAAL-007304-000SMB	Sample Board Assy Application use only
MAAL-007304-001SMB	2.3 - 2.5 GHz Configuration

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description
1	V _{DD1}	First stage positive supply voltage
2	GND	RF and DC Ground
3	RF _{IN}	RF Input of the amplifier
4	SRC	First stage source
5	GND	RF and DC Ground
6	RF _{OUT}	RF Output of the amplifier

Absolute Maximum Ratings ^{2,3}

Parameter	Absolute Maximum
RF Input Power	-15 dBm
Voltage	6.0 volts
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

3. M/A-COM does not recommend sustained operation near - these survivability limits.

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

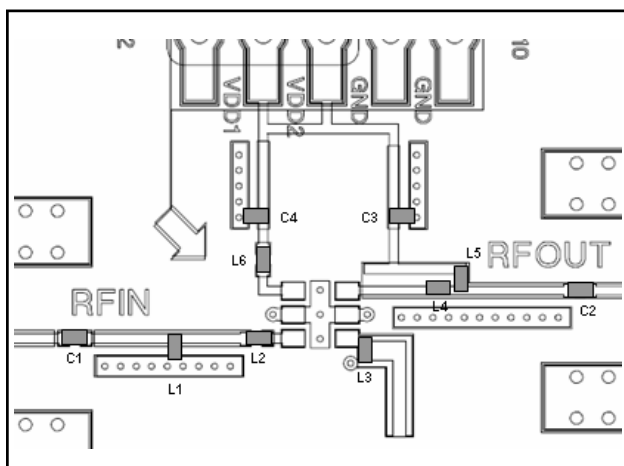
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Electrical Specifications: $V_{DD} = +3\text{ V}$, $T_A = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	2.3 GHz	dB	24.0	25.5	27.0
Noise Figure	2.3 GHz	dB	—	0.7	0.85
Input Return Loss	2.3 GHz	dB	—	15	—
Output Return Loss	2.3 GHz	dB	—	10	—
Output P1dB	500 – 3000 MHz	dBm	—	7	—
Output IP ₃	500 – 3000 MHz	dBm	—	18	—
Current	—	mA	—	11.5	13.0

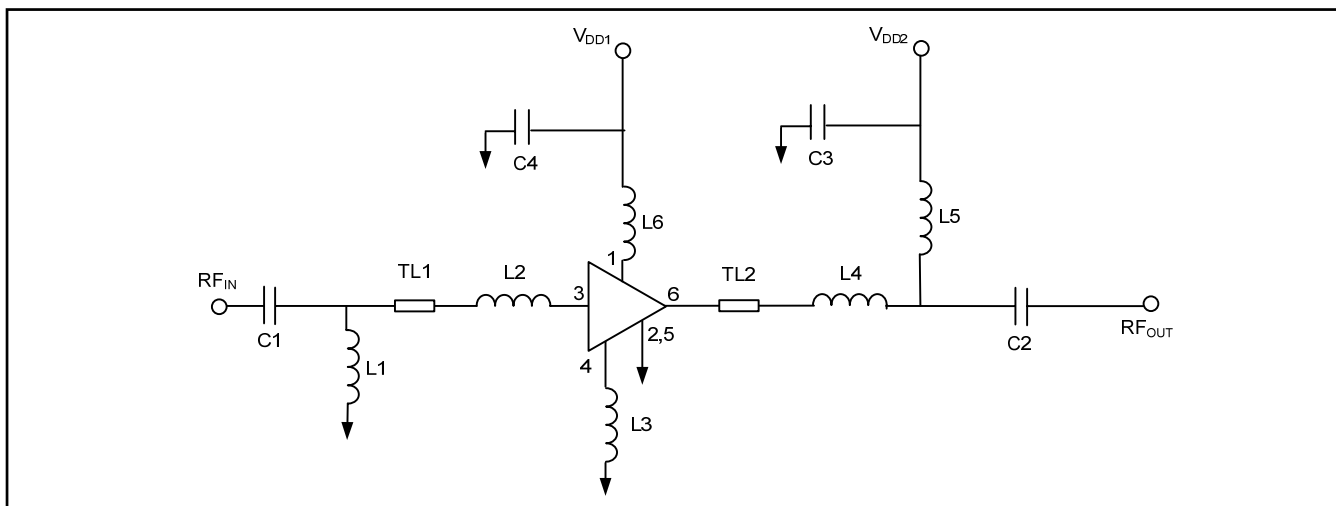
Recommended PCB Configuration



Parts List

Component	Value	Footprint	Manufacturer
C1	3 pF	0603	ATC
C2	8.2 pF	0603	ATC
C3, C4	0.1 μ F	0402	Panasonic
L1	5.6 nH	0402	Panasonic
L2, L5	6.8 nH	0402	Coilcraft
L3	1.5 nH	0402	Toko
L4	4.7 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

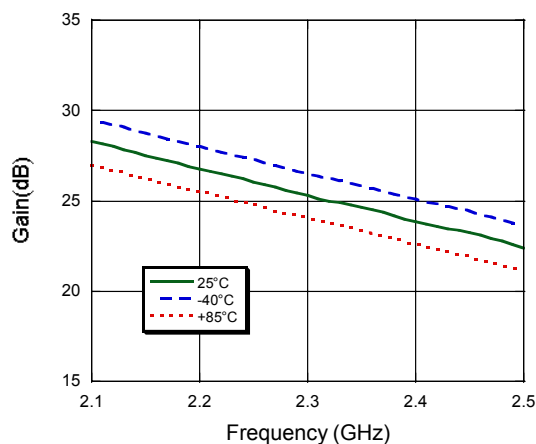


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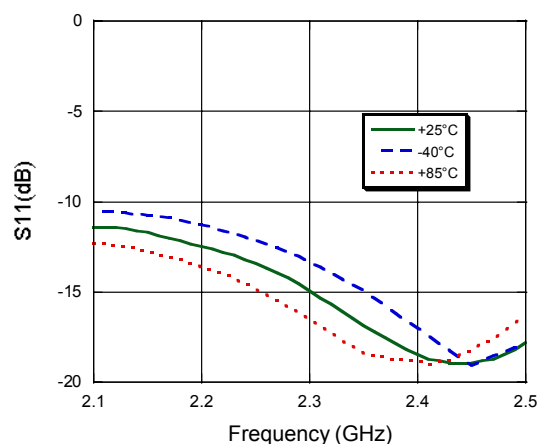
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Typical Performance Curves @ 2.3 GHz

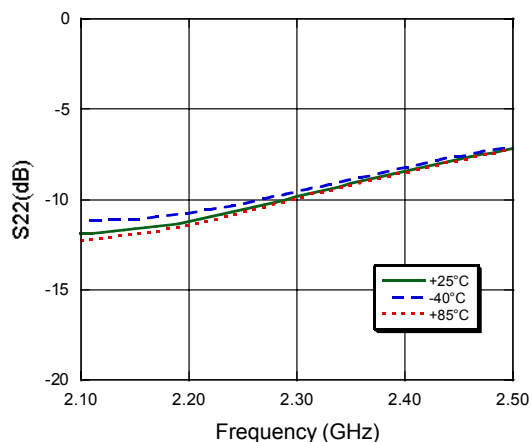
Gain



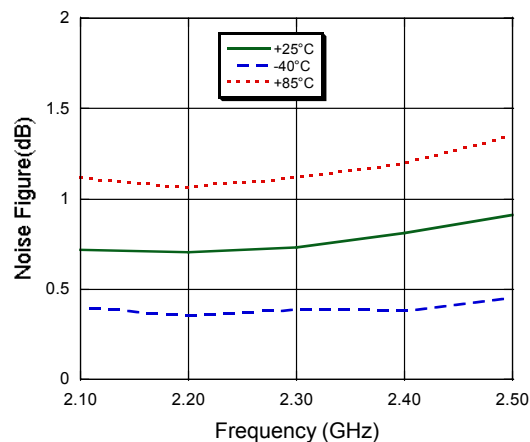
Input Return Loss



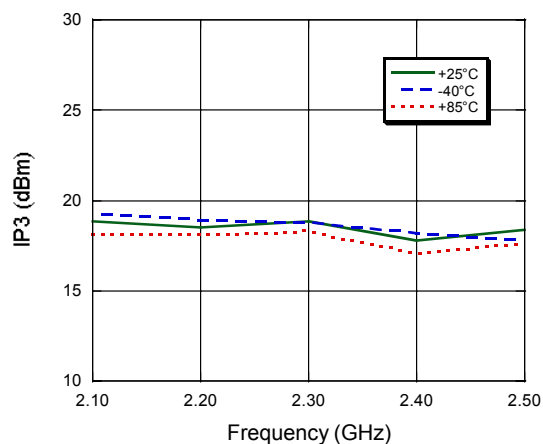
Output Return Loss



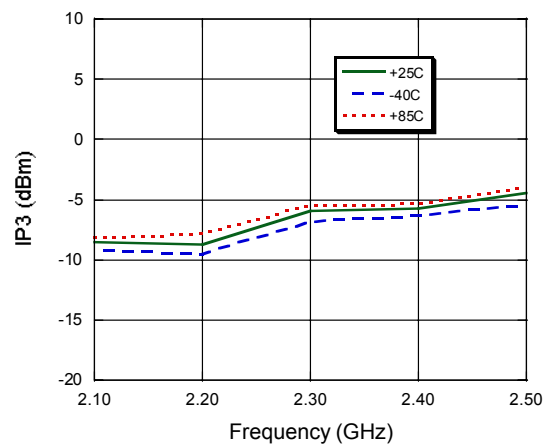
Noise Figure



Output IP3



Input IP3

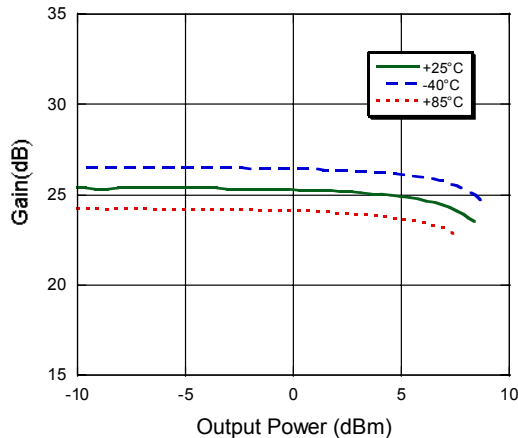


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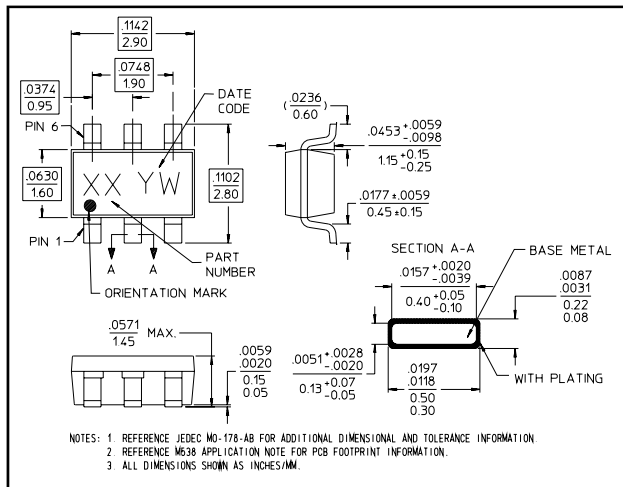
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Typical Performance Curves

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.