

**Low Noise FTTx Amplifier  
50 - 1000 MHz**

**MAAM-008644  
V1**

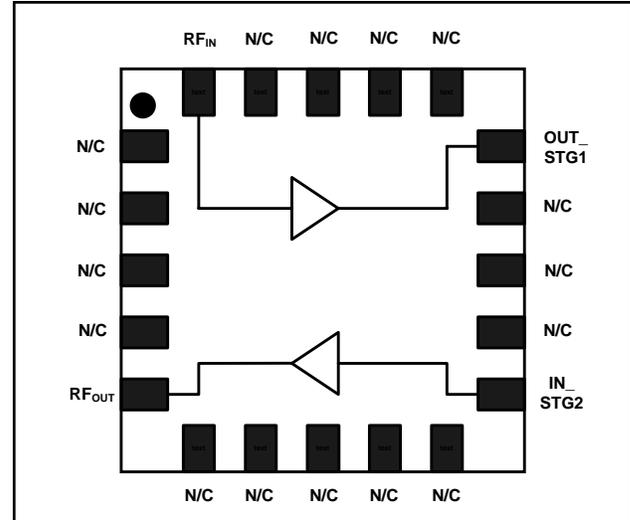
**Features**

- Low Distortion
- Low Noise Figure
- Lead-Free 4 mm 20-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible

**Description**

M/A-COM's MAAM-008644 is a GaAs PHEMT MMIC amplifier in a lead-free 4 mm 20-lead PQFN package. The Amplifier is designed to meet the high gain, high linearity and low noise requirements of FTTx receivers.

**Functional Schematic**



**Ordering Information <sup>1</sup>**

Part Number	Package
MAAM-008644-TR1000	1000 piece reel
MAAM-008644-TR3000	3000 piece reel
MAAM-008644-001SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

**Absolute Maximum Ratings <sup>2,3</sup>**

Parameter	Absolute Maximum
Input Power	+5 dBm
Operating Voltage	+10 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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

**Pin Configuration <sup>4</sup>**

Pin No.	Pin Name	Description
1	N/C	No Connection
2	N/C	No Connection
3	N/C	No Connection
4	N/C	No Connection
5	RF Out	RF Output
6	N/C	No Connection
7	N/C	No Connection
8	N/C	No Connection
9	N/C	No Connection
10	N/C	No Connection
11	IN_STG2	STAGE2 RF INPUT
12	N/C	No Connection
13	N/C	No Connection
14	N/C	No Connection
15	OUT_STG1	STAGE1 RF OUTPUT
16	N/C	No Connection
17	N/C	No Connection
18	N/C	No Connection
19	N/C	No Connection
20	RF In	RF Input

4. The exposed pad centered on the package bottom must be connected to RF and DC ground.

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

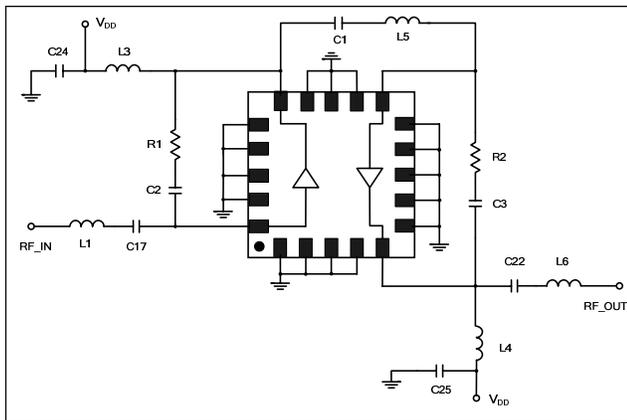
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**Electrical Specifications:  $T_A = 25^\circ\text{C}$ , Freq: 50 - 1000 MHz,  $V_{DD} = +5$  Volts,  $Z_0 = 75$  ohms**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Gain	$RF_{IN}$ to $RF_{OUT}$	dB	20	21	22
Gain Flatness	$RF_{IN}$ to $RF_{OUT}$	dB	0	0.4	0.7
Noise Figure	$RF_{IN}$ to $RF_{OUT}$	dB	3	3.8	4.8
Input Return Loss	$RF_{IN}$	dB	-	15	-
Output Return Loss	$RF_{OUT}$	dB	-	15	-
Output IP3	Two tones at 397 & 403 MHz, +5 dBm output per tone	dBm	-	35	-
Composite Triple Beat, CTB	132 Channels, +20 dBmV/Channel at the Output	dBc	-	-70	-
Composite Second Order, CSO	132 Channels, +20 dBmV/Channel at the Output	dBc	-	-70	-
Cross modulation	132 Channels, +20 dBmV/Channel at the Output	dBc	-	-70	-
P1dB	400 MHz	dBm	-	20	-
$I_{DD}$	$V_{DD} = +5$ Volts	mA	140	160	165

**Test Circuit Schematic**



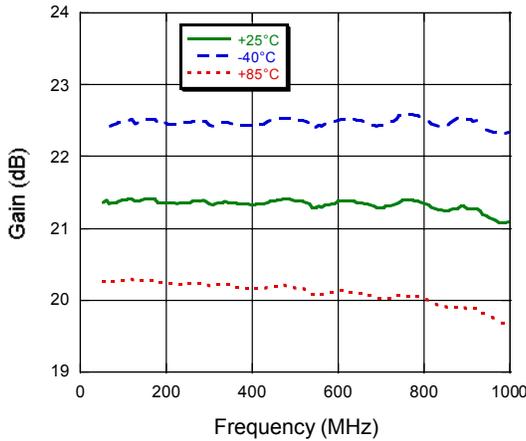
**Off-Chip Component Values<sup>5</sup>**

Component	Value	Package
C1-C3, C17, C22, C24-C25	0.01 $\mu\text{F}$	0402
L1	5.6 nH	0402
L3, L4	1.0 $\mu\text{H}$	1210
L5	3.9 nH	0402
L6	4.7 nH	0402
R1, R2	300 $\Omega$	0402

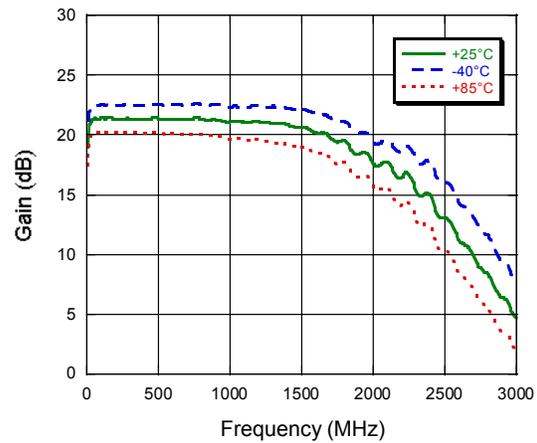
5. L3 and L4 supplied from EPCOS, part number B82422A1102K100.

**Typical Performance Curves**

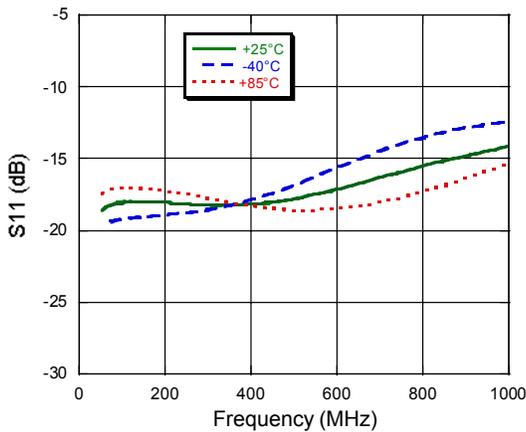
**Gain vs. Frequency over Temperature to 1 GHz**



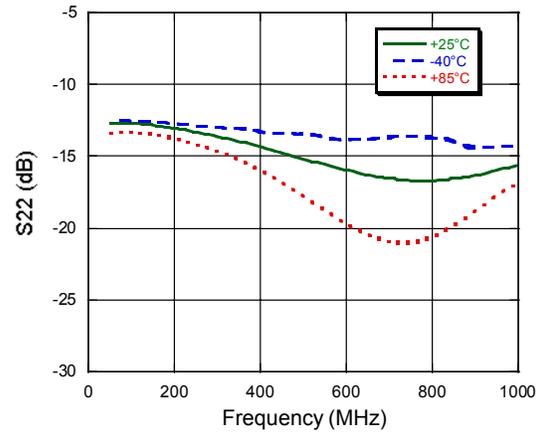
**Gain vs. Frequency over Temperature to 3 GHz**



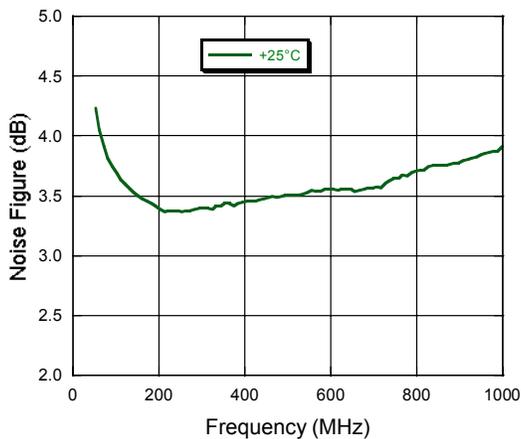
**Input Return Loss vs. Frequency over Temperature**



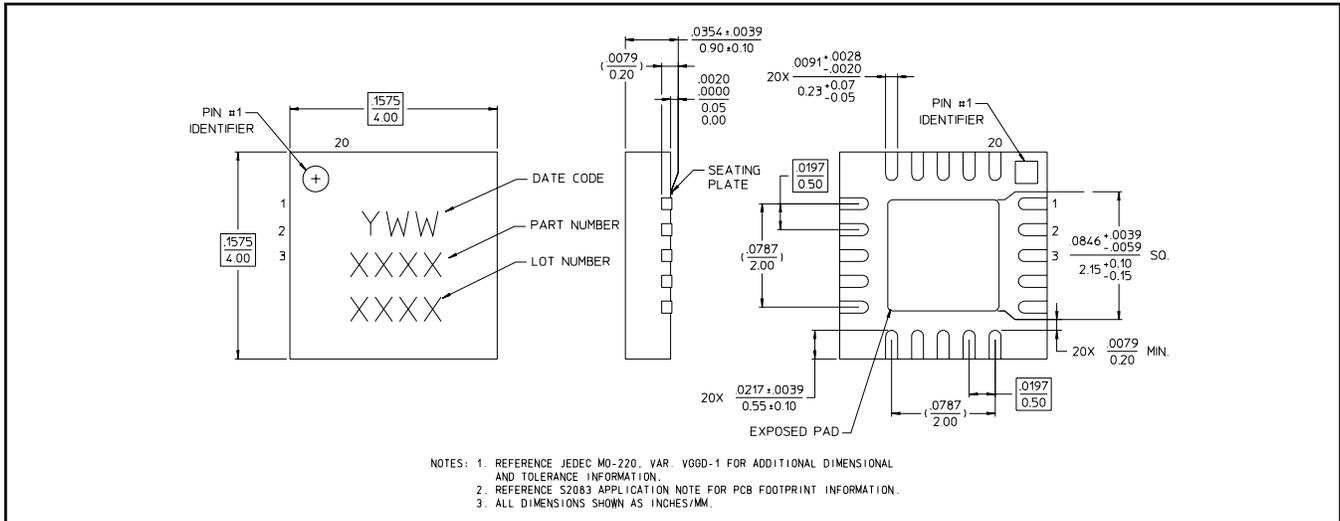
**Output Return Loss vs. Frequency over Temperature**



**Noise Figure vs. Frequency**



**Lead-Free 4 mm 20-Lead PQFN†**



† 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.