

## Low Noise FTTx Amplifier 50 - 1000 MHz

Rev. V3

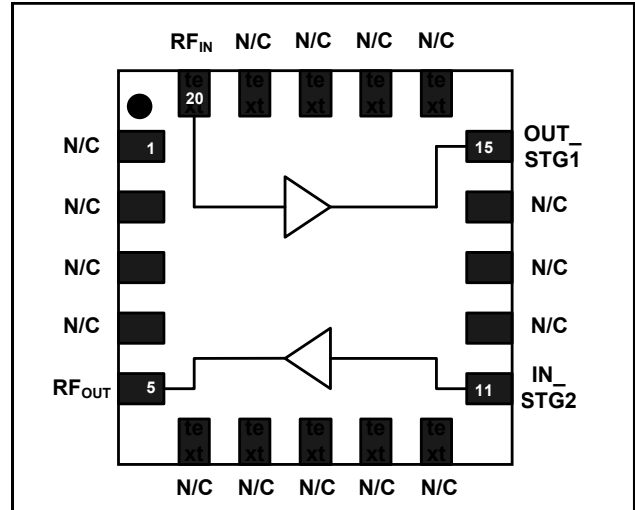
### Features

- Low Distortion
- Low Noise Figure
- Lead-Free 4 mm 20-Lead PQFN Package
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible

### Description

M/A-COM’s MAAM-007796 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>1,2</sup>

Part Number	Package
MAAM-007796-TR1000	1000 piece reel
MAAM-007796-TR3000	3000 piece reel
MAAM-007796-000SMB	Sample Test Board

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

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

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.

### Pin Configuration <sup>5</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	STAGE 2 RF Input
12	N/C	No Connection
13	N/C	No Connection
14	N/C	No Connection
15	OUT_STG1	STAGE 1 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

5. 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.

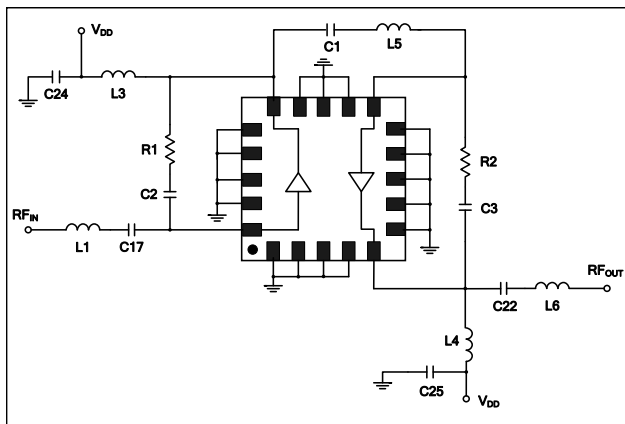
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**Electrical Specifications:**  $T_A = 25^\circ\text{C}$ , Freq: 50 - 1000 MHz,  $V_{DD} = +5$  Volts,  $Z_0 = 75 \Omega$

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	5.3
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	-68
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	180

### Test Circuit Schematic



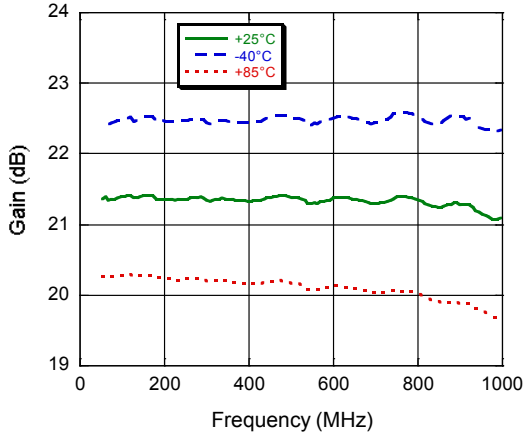
### Off-Chip Component Values <sup>6</sup>

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

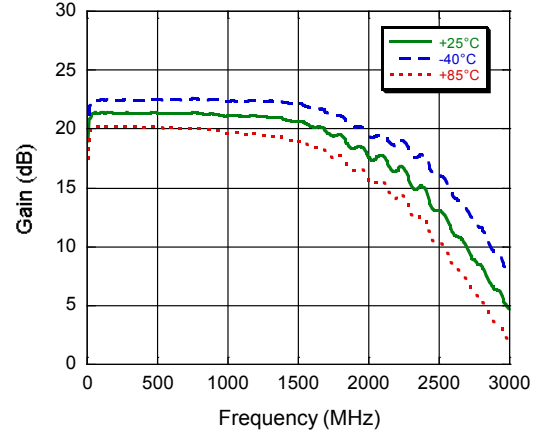
6. L3 and L4 supplied from EPCOS, part number B82422A1102K100.

## Typical Performance Curves

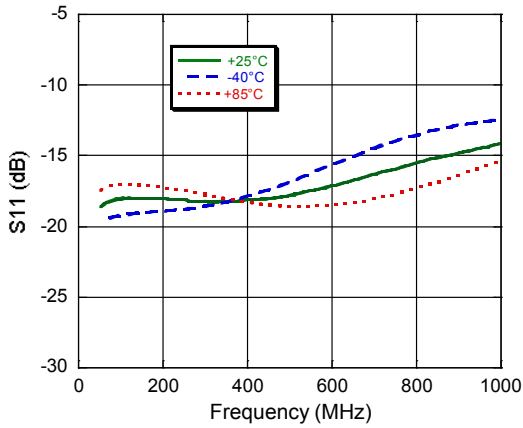
**Gain vs. Frequency over Temperature to 1 GHz**



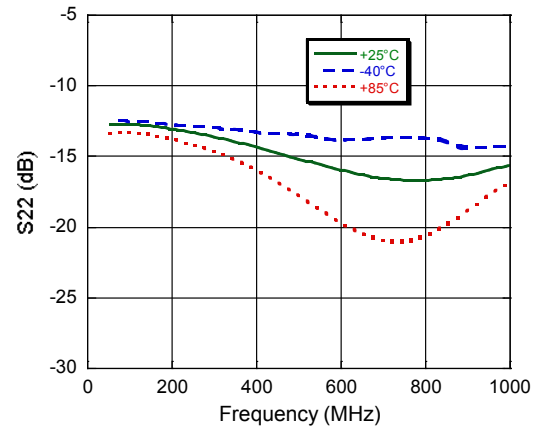
**Gain vs. Frequency over Temperature to 3 GHz**



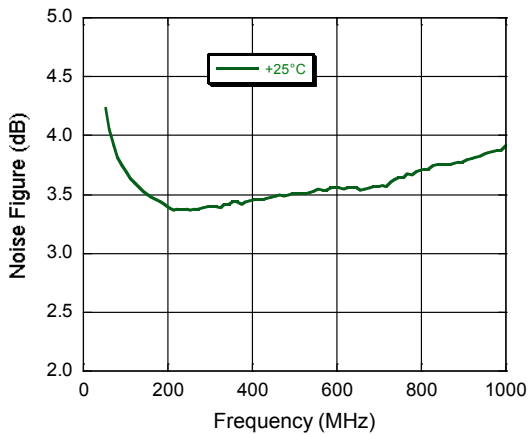
**Input Return Loss vs. Frequency over Temperature**



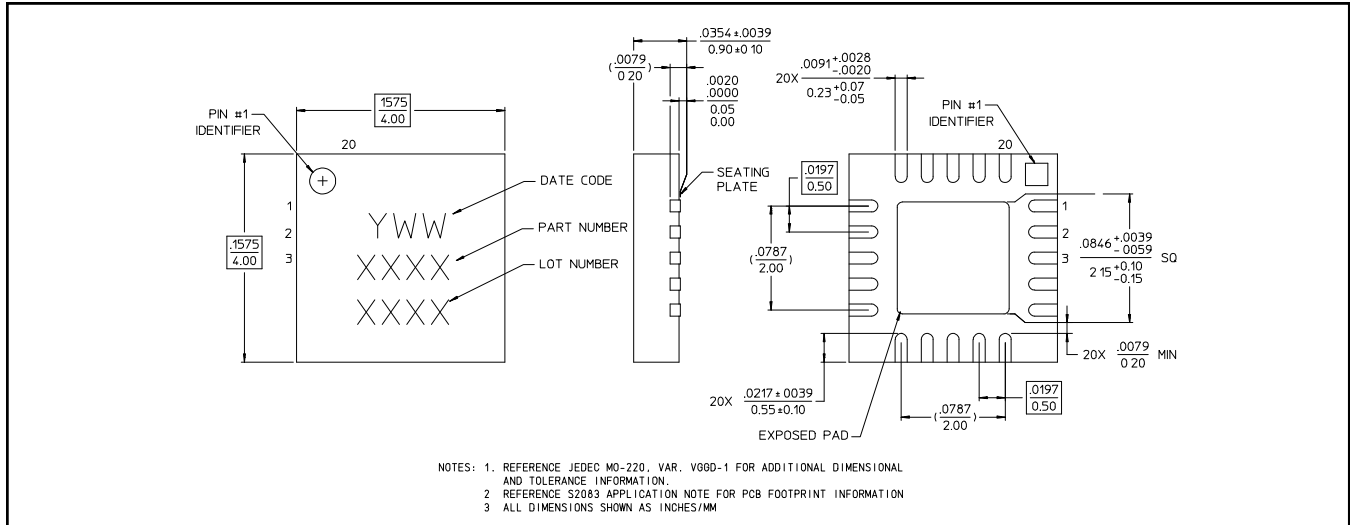
**Output Return Loss vs. Frequency over Temperature**



**Noise Figure vs. Frequency**



## Lead-Free 4 mm 20-Lead PQFN†



† Reference Application Note S2083 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.  
Plating is 100% matte tin over copper.

### 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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5

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