

Electronics

# Low Noise FTTx Amplifier 50 - 1000 MHz

### 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-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.

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

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

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

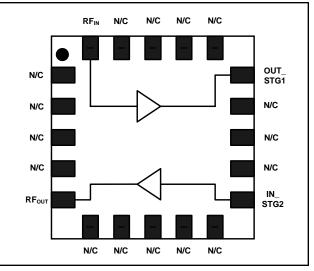
 M/A-COM does not recommend sustained operation near these survivability limits.

# RoHS Compliant



MAAM-007796 V1

### **Functional Schematic**



### 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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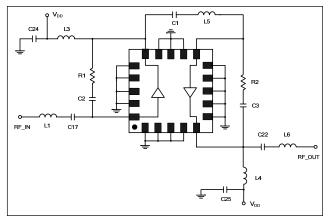
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MAAM-007796 V1

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

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Gain	RF <sub>IN</sub> to RF <sub>OUT</sub>	dB	20	21	22
Gain Flatness	RF <sub>IN</sub> to RF <sub>OUT</sub>	dB	0	0.4	0.7
Noise Figure	RF <sub>IN</sub> to RF <sub>OUT</sub>	dB	3	3.8	4.8
Input Return Loss	RF <sub>IN</sub>	dB	-	15	-
Output Return Loss	RFout	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 <sub>DD</sub>	V <sub>DD</sub> = +5 Volts	mA	140	160	180

### **Test Circuit Schematic**



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

Component	Value	Package
C1-C3, C17, C22, C24-C25	0.01 µF	0402
L1	5.6 nH	0402
L3, L4	1.0 µH	1210
L5	3.9 nH	0402
L6	4.7 nH	0402
R1, R2	300 Ω	0402

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

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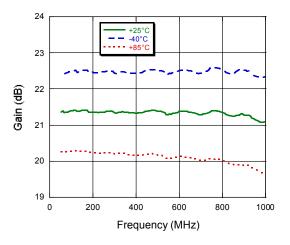
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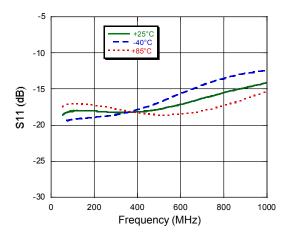
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### **Typical Performance Curves**

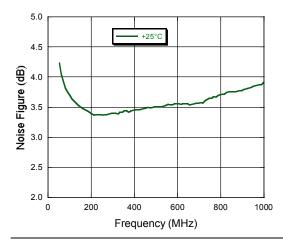
#### Gain vs. Frequency over Temperature to 1 GHz



### Input Return Loss vs. Frequency over Temperature



#### Noise Figure vs. Frequency

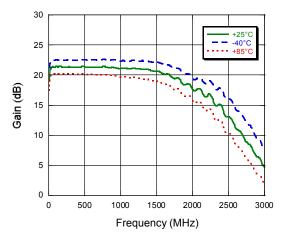


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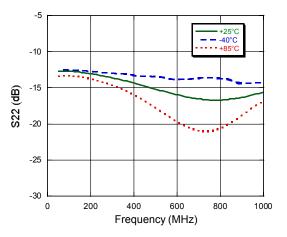




Gain vs. Frequency over Temperature to 3 GHz



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



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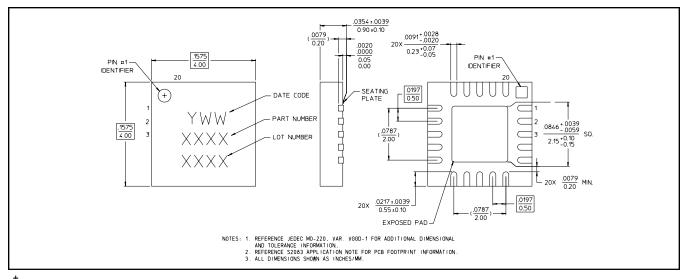
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MAAM-007796 V1

# Lead-Free 4 mm 20-Lead PQFN<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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