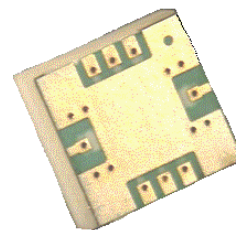


Preliminary Information

# AMMP-6220

## 6-20 GHz Low Noise Amplifier Data Sheet

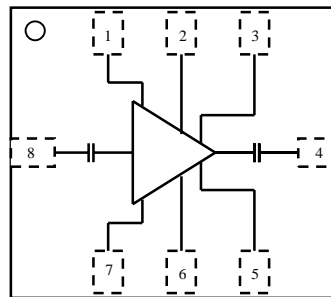


### Features

- 5x5mm Surface Mount Package
- Broad band performance 6-20 GHz
- Low Noise Figure: 2.2 dB
- High Gain: 23 dB
- Single Supply Bias: 3V, 60 mA
- Integrated DC block and choke

### Applications

- Microwave Radio systems
- Satellite VSAT and DBS systems
- Commercial grade military
- 802.16 & 802.20 WiMax BWA systems
- WLL and MMDS loops



Pin	Function
1	
2	$V_d$
3	
4	RF <sub>Out</sub>
5	
6	
7	
8	RF <sub>In</sub>

PACKAGE  
BASE  
GND

### Description

Agilent's AMMP-6220 is a high gain, low-noise amplifier that operates from 6 GHz to 20 GHz. It has a 2 dB noise figure and over 20 dB gain and designed to be easy-to-use with drop into any surface mount PCB application. Popular applications include microwave radios, 802.16 and satellite VSAT or DBS receivers. The fully integrated microwave circuit eliminated the complex tuning and assembly processes typically required by hybrid (discrete-FET) amplifiers. The surface mount package allows elimination of "chip & wire" assembly for lower cost. The device has good input and output match and is unconditionally stable. The MMIC has fully integrated input and output DC blocking capacitors, bias choke, and single supply self bias. The backside of the package is both RF and DC ground that simplifies the assembly process. It is fabricated in a PHEMT process to provide exceptional low noise and gain performance.

### AMMP-6220: DC & RF Specifications

Sym	Parameters/Conditions	Typ.	Min/Max	
$V_d$	Drain Supply Voltage	V	3	
$I_d$	Drain Supply Current	mA	60	
Gain	Small-signal Gain	dB	23	18
NF	Noise Figure	dB	2.2	2.6
RL <sub>in</sub>	Input Return Loss (8-20 GHz)	dB	-13	-10
RL <sub>out</sub>	Output Return Loss	dB	-15	-10
P-1dB	Power @ 1dB Gain Comp	dBm	10	
Isol	Reverse Isolation	dB	-40	
OIP3	Output 3 <sup>rd</sup> Order Intercept Pt.	dBm	+23	

This preliminary data is provided to assist you in the evaluation of product(s) currently under development. Until Agilent Technologies releases this product for general sales, Agilent Technologies reserves the right to alter prices, specifications, features, capabilities, functions, release dates, and remove availability of the product(s) at anytime.

Revision Date: 4/28/04

Revision Number: 5.0

## AMMP-6220 Typical Performances

( $T_A = 25^\circ\text{C}$ ,  $V_d = 3\text{ V}$ ,  $I_D = 60\text{ mA}$ ,  $Z_{in} = Z_{out} = 50\ \Omega$ )

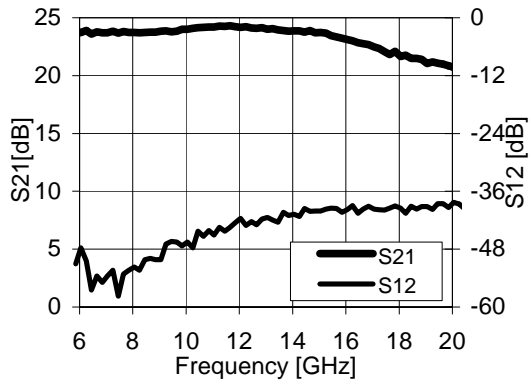


Figure 1. Typical Gain and Reverse Isolation

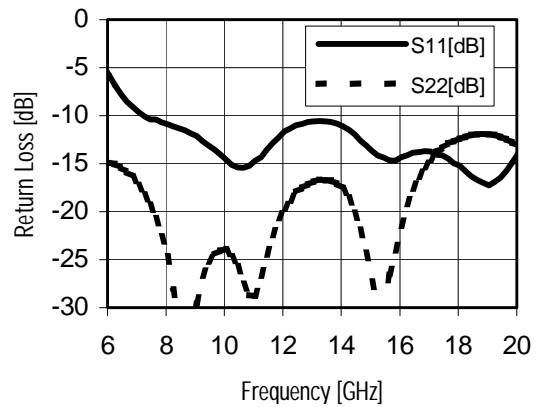


Figure 2. Typical Input & Output Return Loss

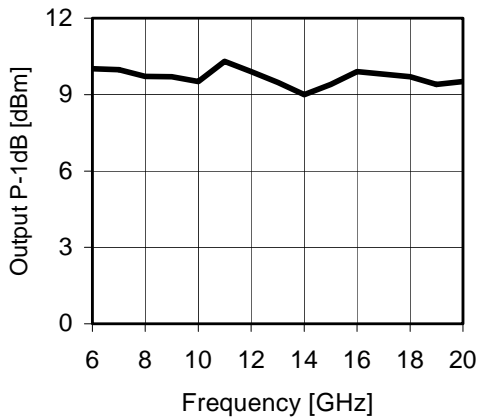


Figure 3. Typical Output Power P-1dB

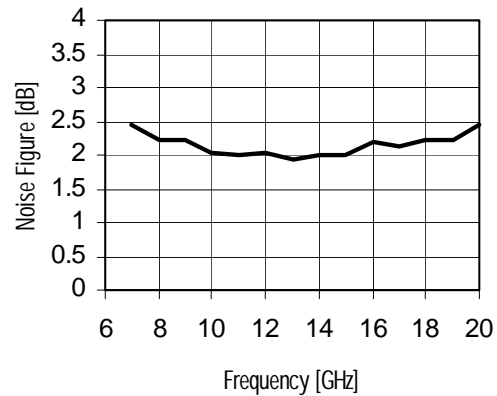


Figure 4. Typical Noise Figure

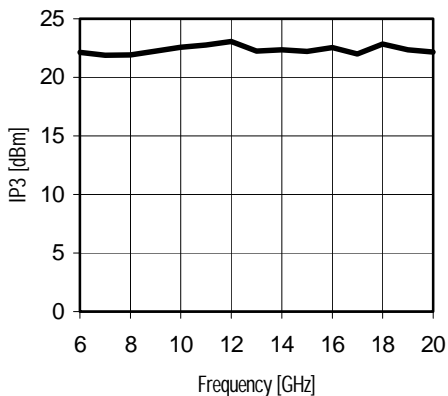


Figure 5. Typical OIP3 (Third Order Intercept)

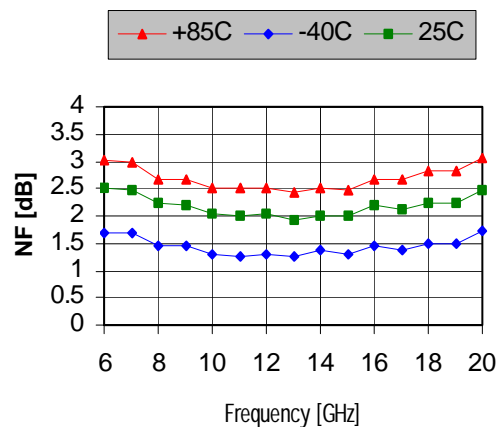


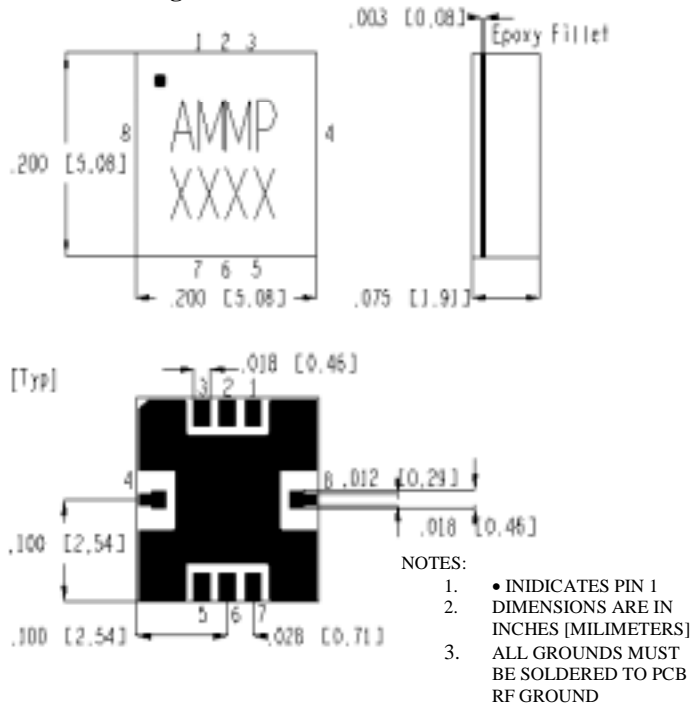
Figure 6. Noise Figure over Temperature

This preliminary data is provided to assist you in the evaluation of product(s) currently under development. Until Agilent Technologies releases this product for general sales, Agilent Technologies reserves the right to alter prices, specifications, features, capabilities, functions, release dates, and remove availability of the product(s) at anytime.

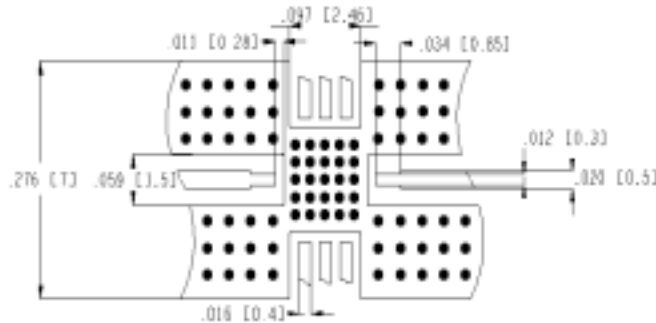
Revision Date: 4/28/04

Revision Number: 5.0

## Outline Drawing

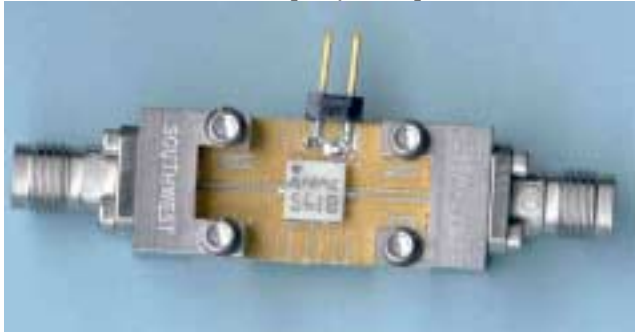


## Suggested PCB Material and Land Pattern



## Evaluation Test Circuit (Demo Board)

(Available to customer on qualified request)



## Recommended SMT Attachment

This preliminary data is provided to assist you in the evaluation of product(s) currently under development. Until Agilent Technologies releases this product for general sales, Agilent Technologies reserves the right to alter prices, specifications, features, capabilities, functions, release dates, and remove availability of the product(s) at anytime.

Revision Date: 4/28/04

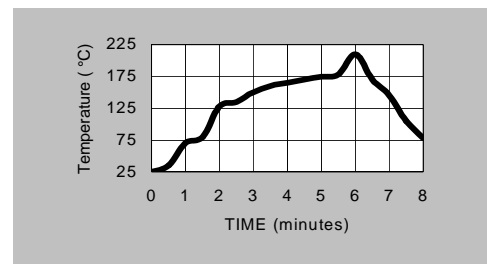
Revision Number: 5.0

The AMMP Packaged Devices are compatible with high volume surface mount PCB assembly processes.

The PCB material and mounting pattern, as defined in the data sheet, optimizes RF performance and is strongly recommended. An electronic drawing of the land pattern is available from [www.agilent.com/view/rf](http://www.agilent.com/view/rf) or upon request from Agilent Application Engineering.

## Manual Assembly for Prototypes

1. Follow ESD precautions while handling packages.
2. Handling should be along the edges with tweezers or from topside if using a vacuum collet.
3. Recommended attachment is solder paste. Please see recommended solder reflow profile. Conductive epoxy is not recommended. Hand soldering is not recommended.
4. Apply solder paste using either a stencil printer or dot placement. The volume of solder paste will be dependent on PCB and component layout and should be controlled to ensure consistent mechanical and electrical performance. **Excessive solder will degrade RF performance.**
5. Follow solder paste and vendor's recommendations when developing a solder reflow profile. A standard profile will have a steady ramp up from room temperature to the pre-heat temperature to avoid damage due to thermal shock.
6. Packages have been qualified to withstand a peak temperature of 235°C for 15 seconds. Verify that the profile will not expose device beyond these limits.
7. Clean off flux per vendor's recommendations.
8. Clean the module with Acetone. Rinse with alcohol. Allow the module to fully dry before testing.



Recommended solder reflow profile

For product information and a complete list of Agilent contacts and distributors, please go to our website:

[www.agilent.com/semiconductors](http://www.agilent.com/semiconductors)

E-mail: [SemiconductorSupport@agilent.com](mailto:SemiconductorSupport@agilent.com)

Data subject to change.

Copyright © 2004 Agilent Technologies, Inc.