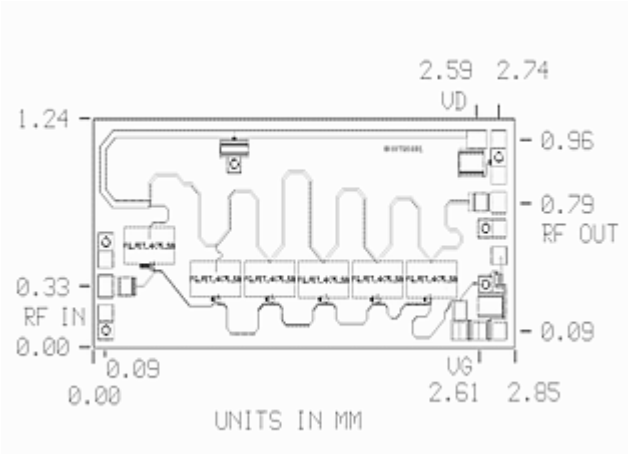
MMA-022020B

2 - 20 GHz GaAs MMIC
Medium Power Amplifier
Data Sheet
March 2007

Features:

- **Usable Frequency Range: 1 - 22 GHz**
- **P1dB: 22.5 dBm**
- **Gain: 8.0 dB**
- **Fully Matched Input/Output**
- **On-Chip DC Bias RF Choke**
- **On-Chip Input/Output DC Blocking**
- **Die Size: 2.85 x 1.24 x 0.1 mm**
- **Robust 0.25um pHEMT Technology**
- **MTTF > 1.0E6 Hours @ +85 °C Ambient**



Description:

The MMA-022020B is a 2 - 20GHz broadband medium power amplifier with 22.5 dBm output power. It is realized in advanced 0.25um AlGaAs/InGaAs pHEMT technology. The usable frequency range extends to 1 – 22 GHz. With on-chip input/output blocking capacitors and DC supply RF choke circuitry, it only requires simple DC bias circuits and RF connections for broad range applications.

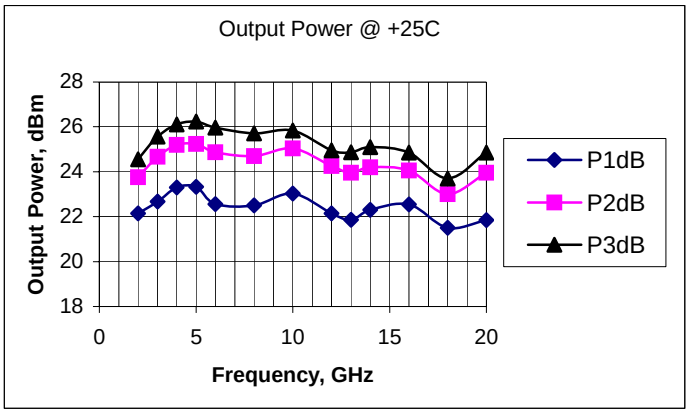
Electrical Specifications: (At VDD = + 7.0V, IDD = 220 mA, VGG = - 0.50V, T_A =25 °C)

Parameter	Units	Min.	Typ.	Max.
Frequency Range	GHz	2		20
Small Signal Gain	dB	7.0	8.0	
Gain Flatness	+/-dB		1.5	
Input Return Loss	dB		-10	-8.5
Output Return Loss 2-18 GHz	dB		-12	-10
Output Return Loss 18-20 GHz	dB		-9	-7.5
Output P1dB	dBm	+20	+22.5	
Noise Figure	dB		5.4	
DC Drain Voltage, VDD	V		+7.0	+9.5
DC Gain Voltage, VGG	V	-2.0	-0.5	0.0
DC Current, IDD	mA		220	260
Thermal Resistance	°C/W		38	

MEASURED DATA (1)

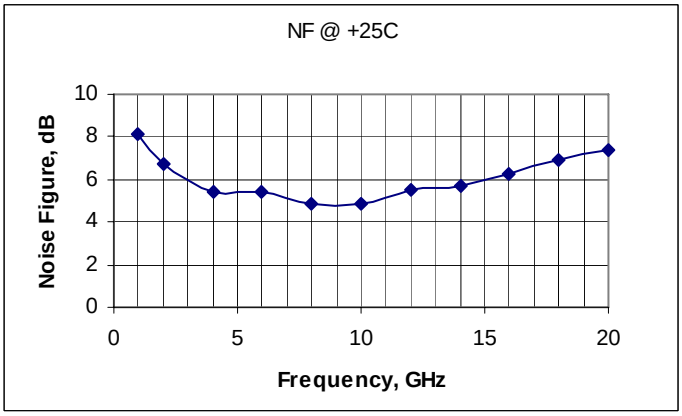
Output Power

VDD = +7.0V, IDD = 220mA, VG = -0.50V

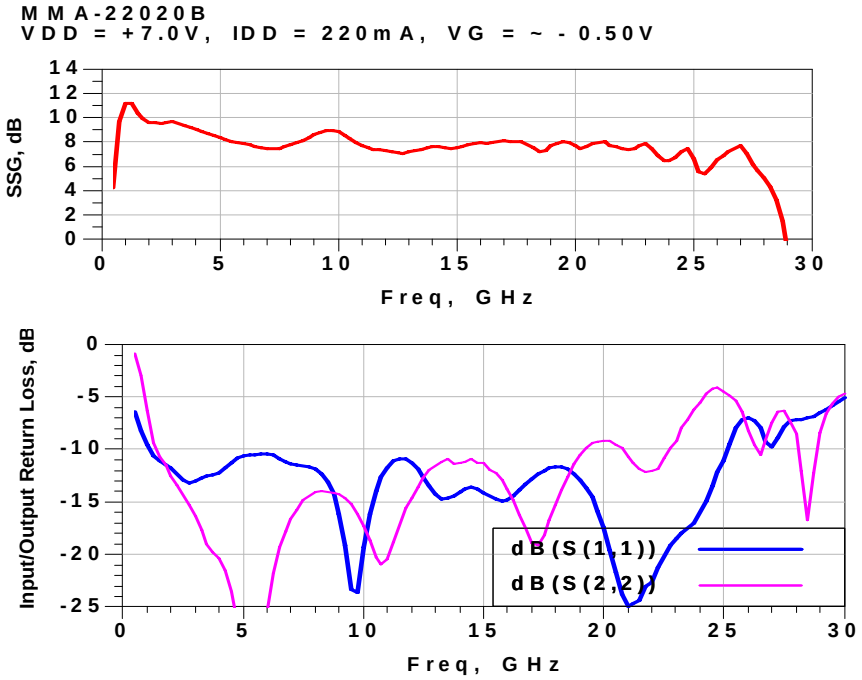


Noise Figure

VDD = +7.0V, IDD = 220mA, VG = -0.50V

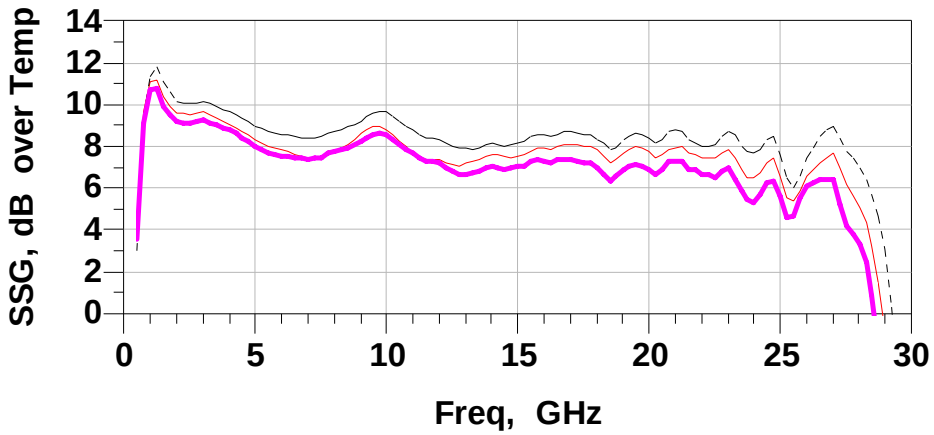


Small Signal Gain and VSWR at +25°C



Small Signal Gain over Temperature Range

MMA-22020B
VDD = +7.0V, IDD = 220mA, VG = ~ - 0.50V



_____ @ +25 ºC, _____ @ -40 ºC, _____ @ +85 ºC

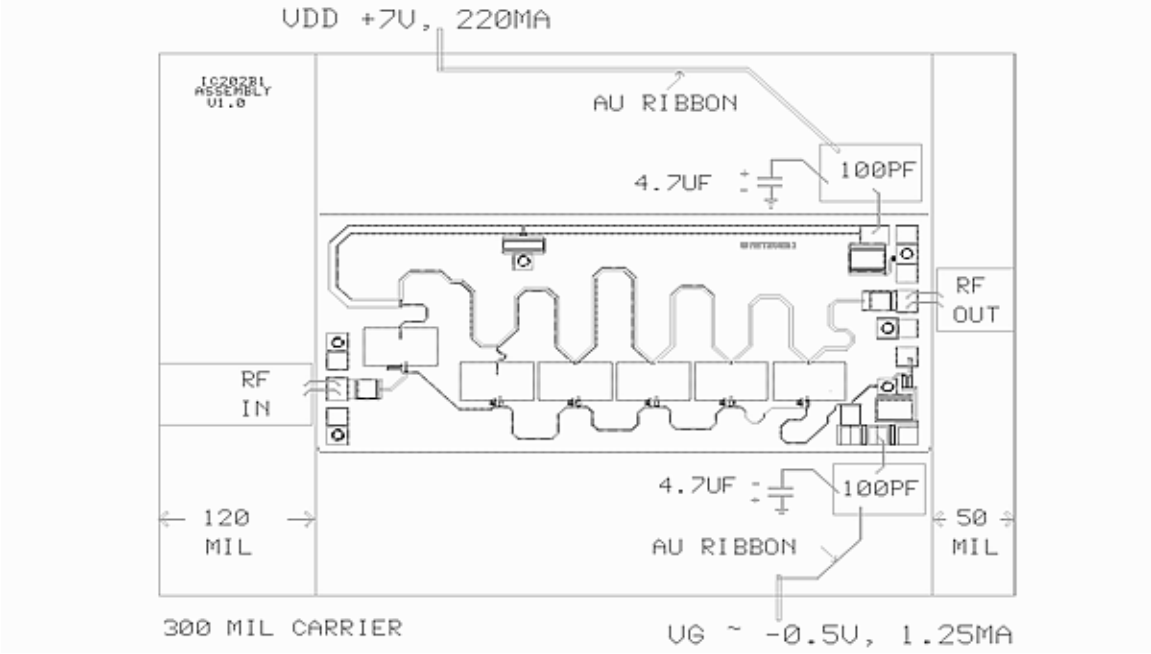
(1) Test module per the assembly diagram of this data sheet. Two SMA Connectors and microstrip line losses, approximately 0.5dB at 10GHz, and 0.9dB at 20GHz, are de-embedded. Data include RF bond-wires.

Absolute Maximum Ratings (*):

Parameter	Rating
Drain Voltage, VDD	+ 9.5 V
Gate Voltage, VGG	- 2 V
Current, IDD	300 mA
Channel Temperature	+175 ºC
Operating Temperature	-55 ºC to +85 ºC
Storage Temperature	-65 ºC to +175 ºC
RF Input Power	+ 20 dBm

(*) Operation exceeding the limits can cause permanent damage.

MMA-022020B Bonding/Assembly Diagram



Bonding/Assembly Recommendations:

1. Use epoxy with good thermal and electrical conductivity to attach the device. Curing temperature should maintain at approximately +150 °C.
2. Use 1.0 mil diameter Au wire, 2 parallel each pad for RF input and output pads. Keep the wire length less than 10 mils to minimize its impact to high frequency performance.