AGMPA171228

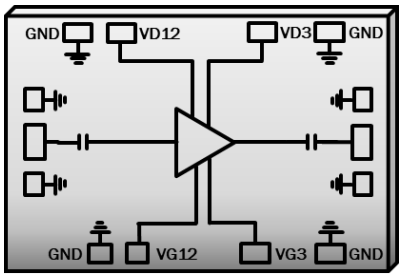
GaN HEMT MMIC
17 – 21GHz 4W Power Amplifier

Typical Applications

- Point-to-Point Radio
- K-Band SATCOM

Features

- Frequency Range: 17.2 – 21.2 GHz
- Gain: 30 dB
- PAE: 35% @ 36 dBm Pout
- Psat: + 37dBm
- Bias: VD = +20V, IDQ = 200mA, VG = -3.0
- 50Ω Matched Input/Output DC blocked
- Chip Size: 3.0 x 2.0 x 0.07 mm



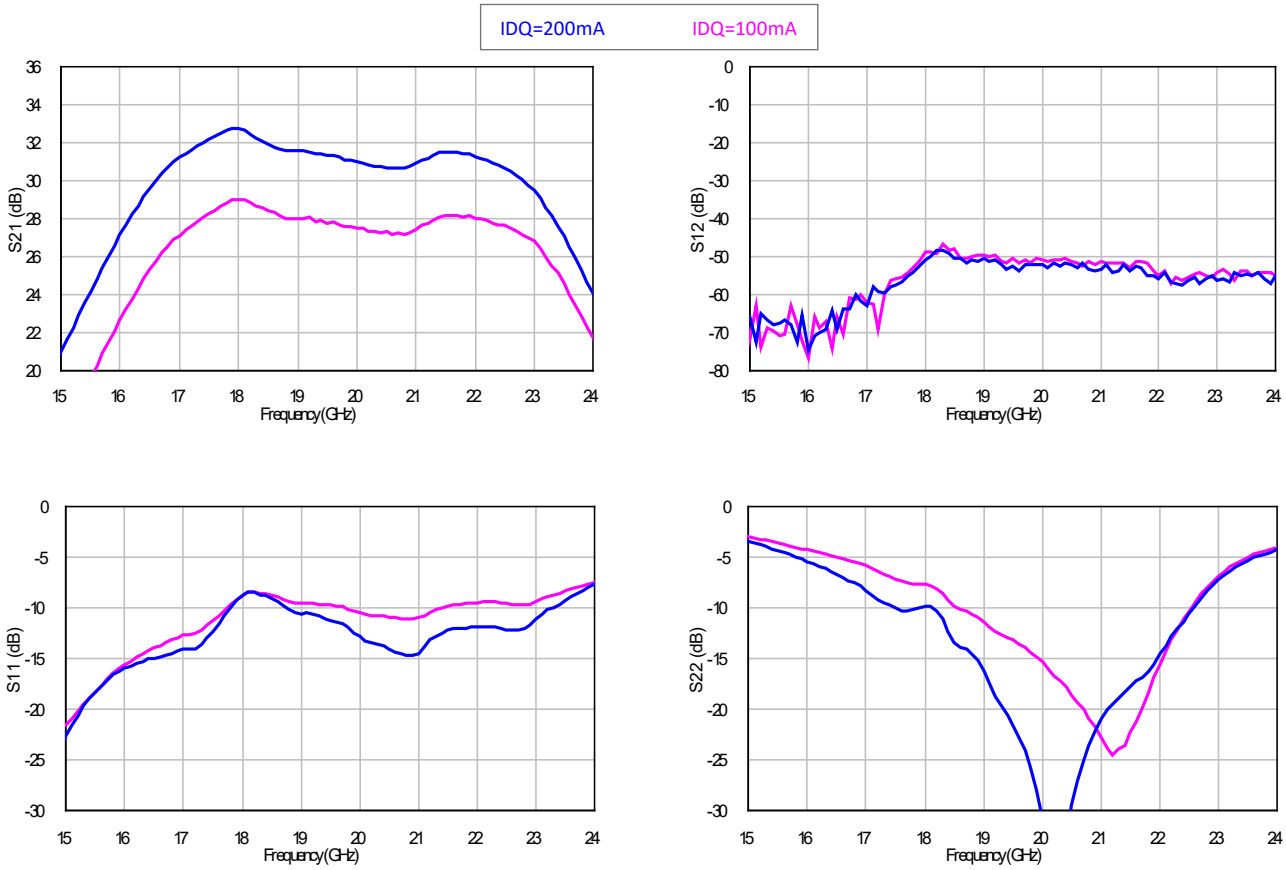


Electrical Specifications (TA = +25°C, VD = +20V, IDQ = 200mA, VG = -3.0)

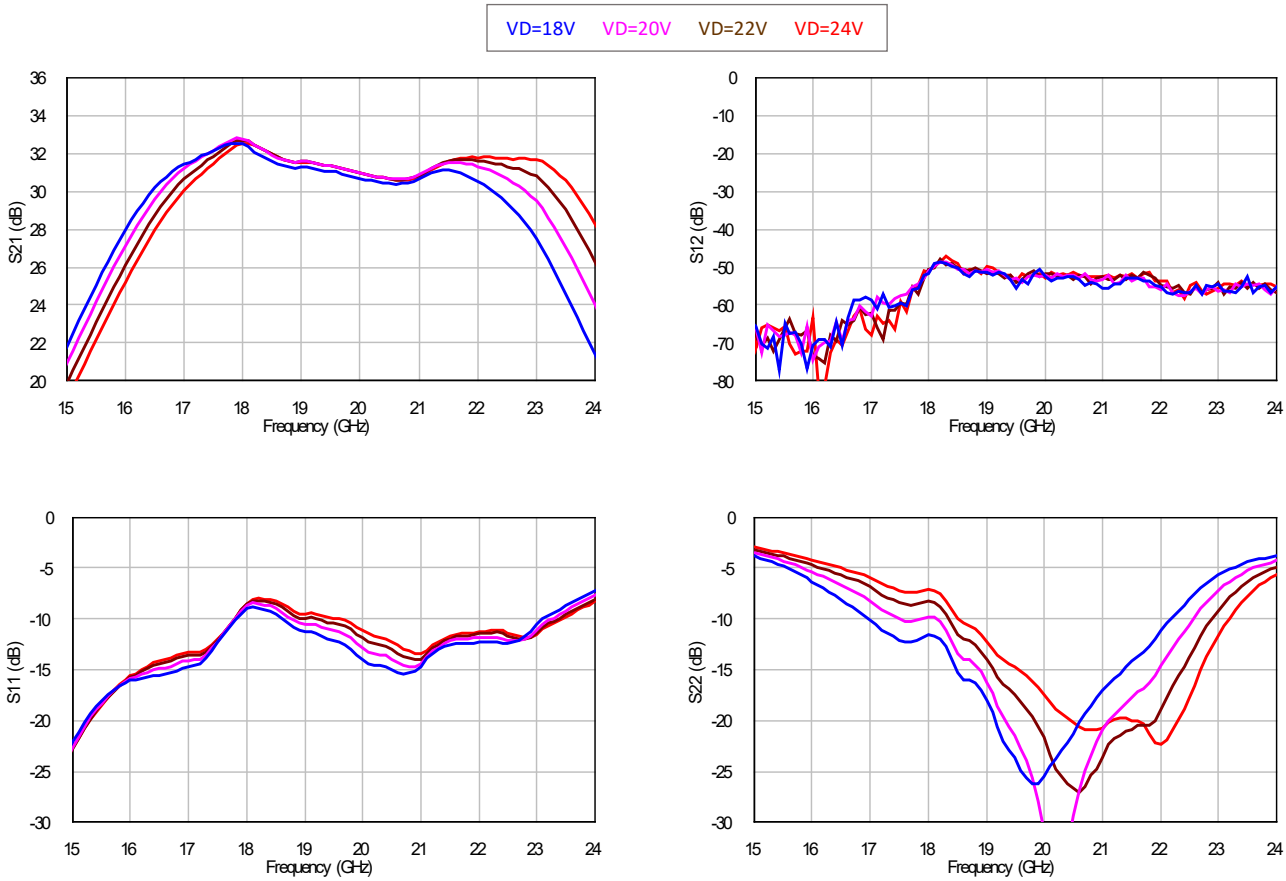
Parameter	Units	Minimum	Typical	Maximum
Frequency	GHz	17.2		21.2
Gain	dB		30	
Gain Flatness	dB		± 1.0	
Input Return Loss	dB	7		
Output Return Loss	dB	8		
PAE	%		35	
Psat	dBm		37	
Supply Voltage	V		+20	
Supply Current	mA		200	
DC Dissipated Power	W		4	
Package Type			Die	

Performance Graphs

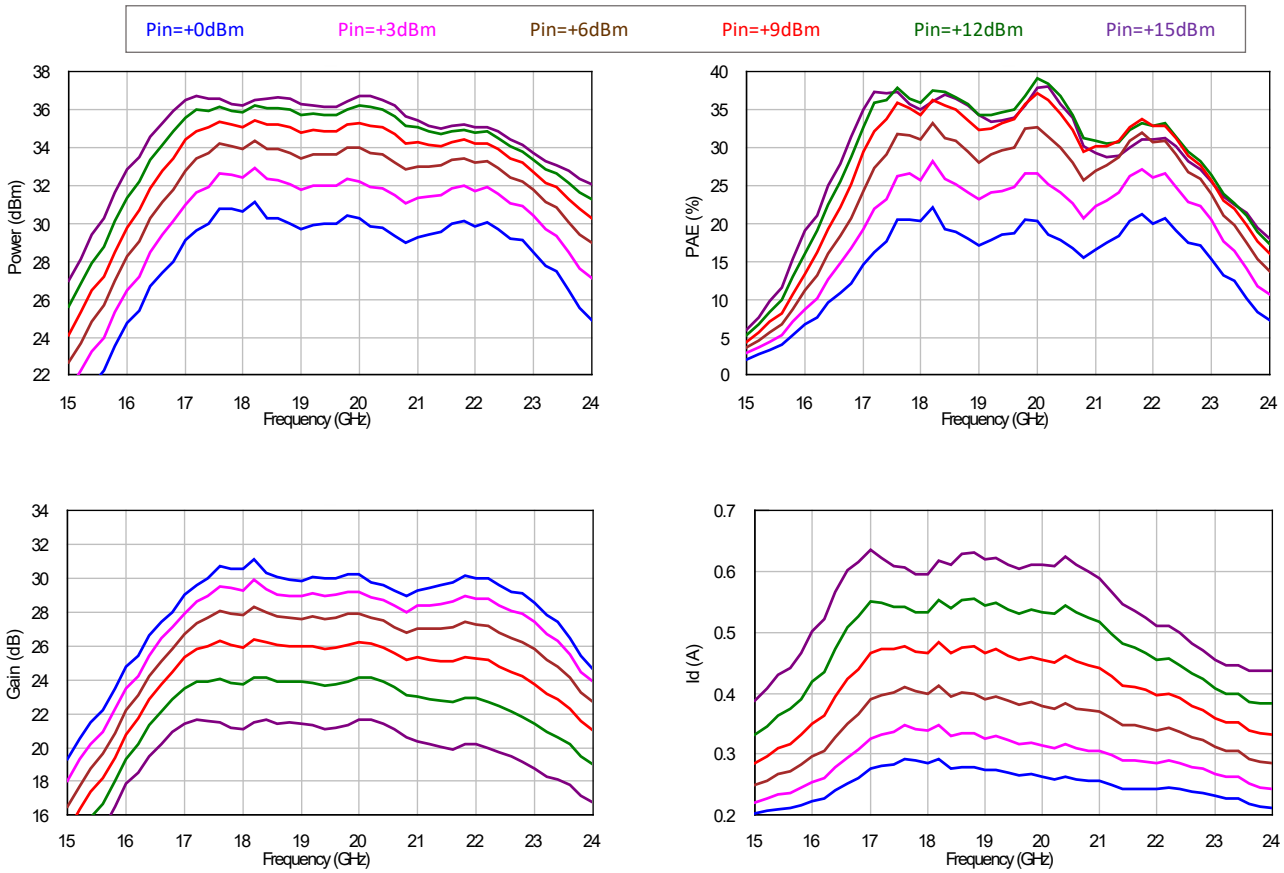
S-Parameters vs. IDQ (25°C, VD=+20V)



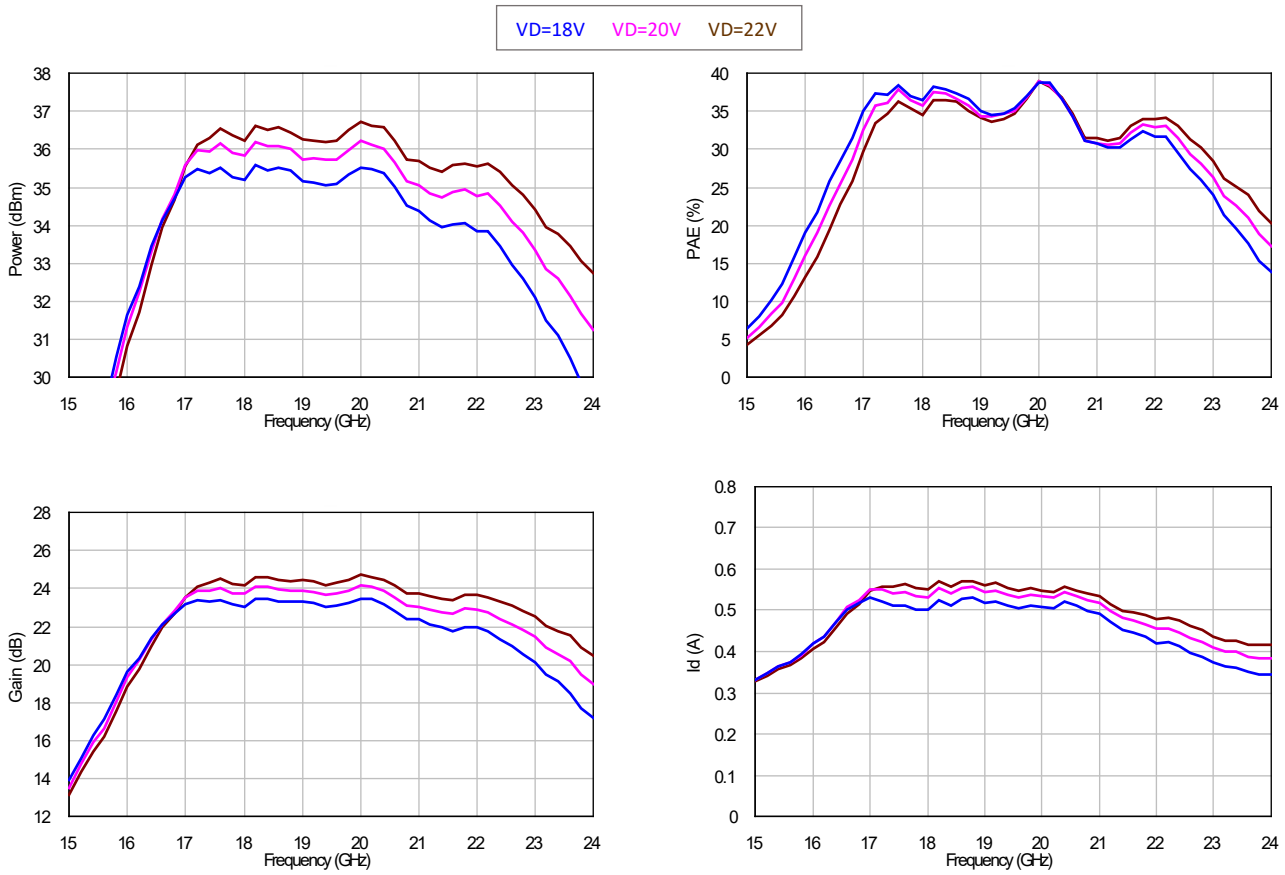
S-Parameters vs. VD (25°C, IDQ=200mA)



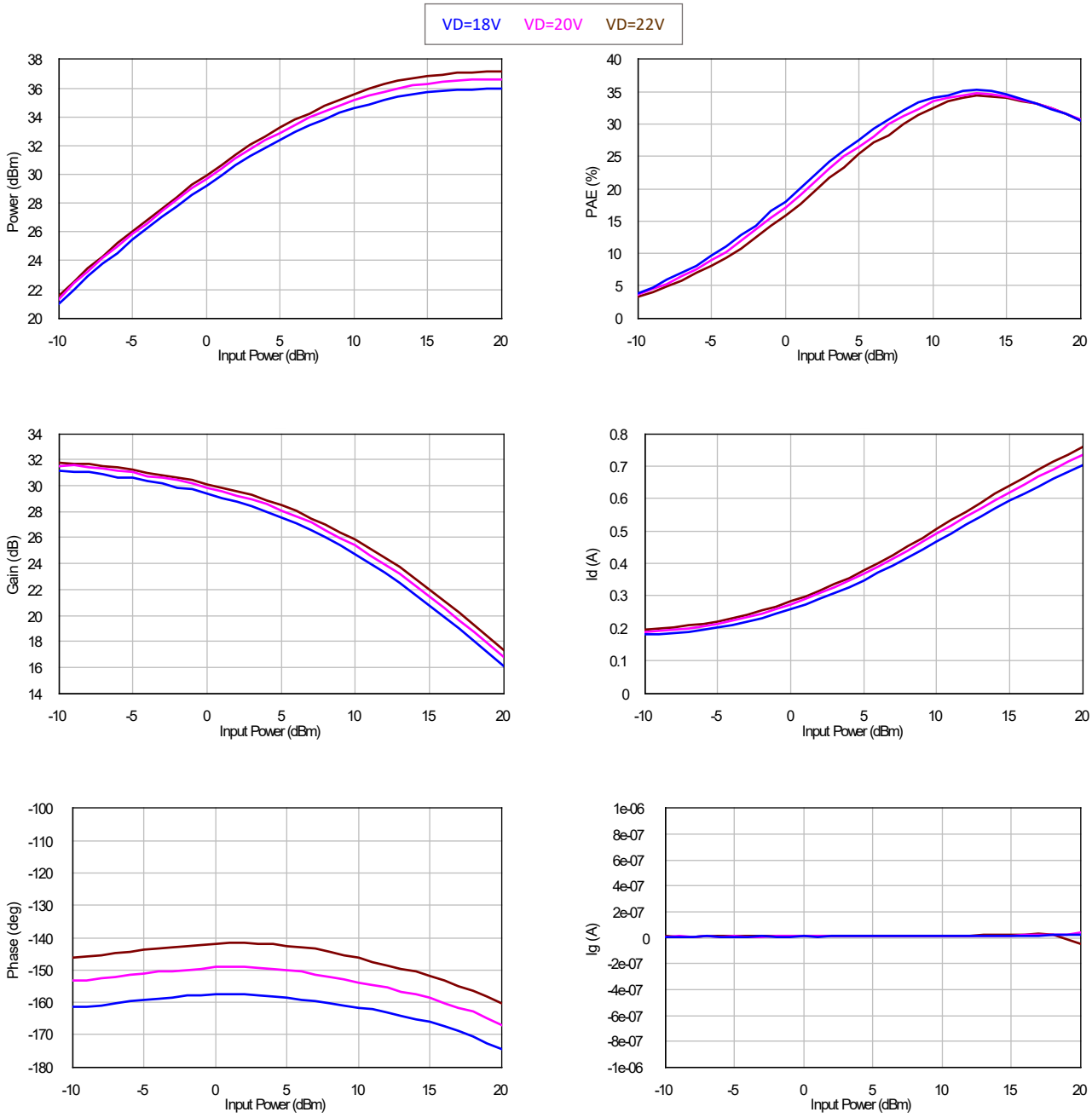
Frequency Response vs. Input Power (25°C, VD = +20V, IDQ=200mA, VG = -3.0V)



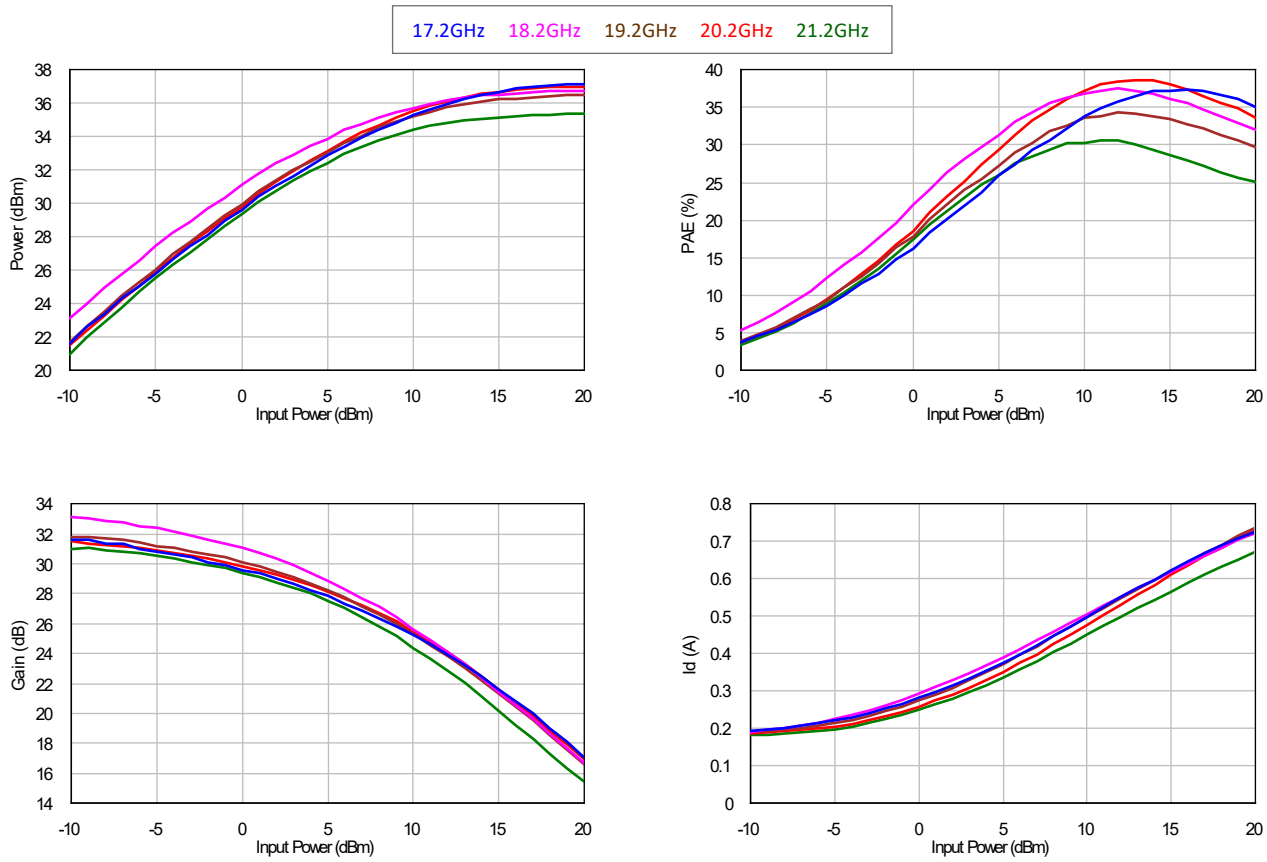
Frequency Response vs. VD (25°C, IDQ=200mA, VG = -3.0V, Pin = +12dBm)



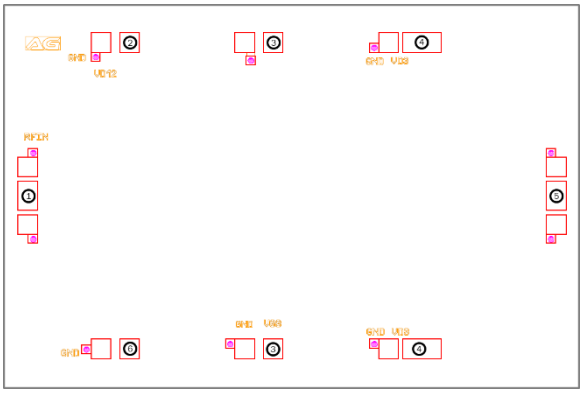
Power Sweep vs. VD (25°C, IDQ=200mA, VG = -3.0V, Freq=19GHz)



Power Sweep vs. Frequency (25°C, IDQ=200mA, VG = -3.0V)



Outline Drawing



Pad Descriptions

Pad	Function	Pad Size	Description
1	RFIN	102x152µm	AC coupled 50Ω Matched
5	RFOUT	102x152µm	AC coupled 50Ω Matched
4	VD3T	202x102µm	3rd Stage Drain Power Supply voltage, Bypass capacitors needed*
4	VD3B	202x102µm	3rd Stage Drain Power Supply voltage, Bypass capacitors needed*
2	VD12	102x102µm	1st & 2nd Stage Drain Power Supply voltage, Bypass capacitors needed*
6	VG12	102x102µm	1st & 2nd Stage Gate Power Supply voltage, Bypass capacitors needed*
3	VG3T	102x102µm	3rd Stage Gate Power Supply voltage, Bypass capacitors needed*
3	VG3B	102x102µm	3rd Stage Gate Power Supply voltage, Bypass capacitors needed*
Die Bottom	GND	Backside	Epoxy/Solder to Baseplate

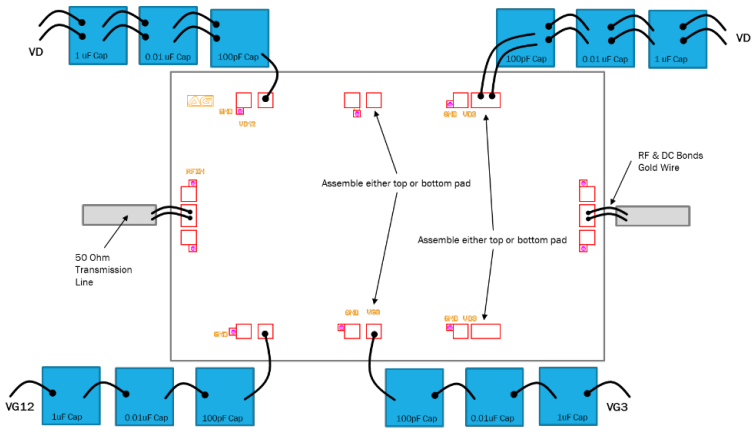
*See Assembly Diagram

Absolute Maximum Ratings

Parameter	Rating
Drain Bias Voltage (VDD)	+24V DC
RF Input Power (RFIN)	+26dBm*
Channel Temperature	250°C
Storage Temperature	-65 to 150°C
Operating Temperature	-55 to 85°C

*To be tested

Assembly Diagram



Assembly Notes:

1. Die Thickness is 70µm
2. Bondpad metallization: 5µm gold
3. Backside metallization: 5µm gold
4. High thermal conductivity Silver Epoxy or AuSn Eutectic attach MMIC



Die Packaging Information

- GP-4 (Gel-Pak)

Biasing and Operation

The amplifier is biased with a positive drain supply and negative gate supply. Performance is optimized when the drain voltage is set to Vdq. The preferred biasing procedure is as follows:

Turn ON procedure:

1. Set VG to -5.0V.
2. Set VD to Vdq.
3. Adjust VG more positive until Id = Idq.
4. Apply RF signal.

Turn OFF procedure:

1. Turn off RF signal.
2. Reduce VG to -5.0V. Id should be 0mA.
3. Turn off VD.
4. Turn off VG.

Important Notice

The information contained in this Data Sheet and any associated documents is believed to be reliable; however, AmpliTech makes no warranties regarding the Data Sheet Information and assumes no responsibility of liability whatsoever for the use of the said information. All Data Sheet information is subject to change without notice.