

General Description

The **VWA500068AA** is a block amplifier designed on a 0.15 μ m pHEMT process.

The device is capable of more than +20dBm of output power at saturation regime and more than +17dBm of output power at 1dB of gain compression. It provides a flat 17dB of linear gain from 2.9GHz to 3.4GHz. The supply current is 200mA when operating with a single power supply $V_D = +4.5V$.

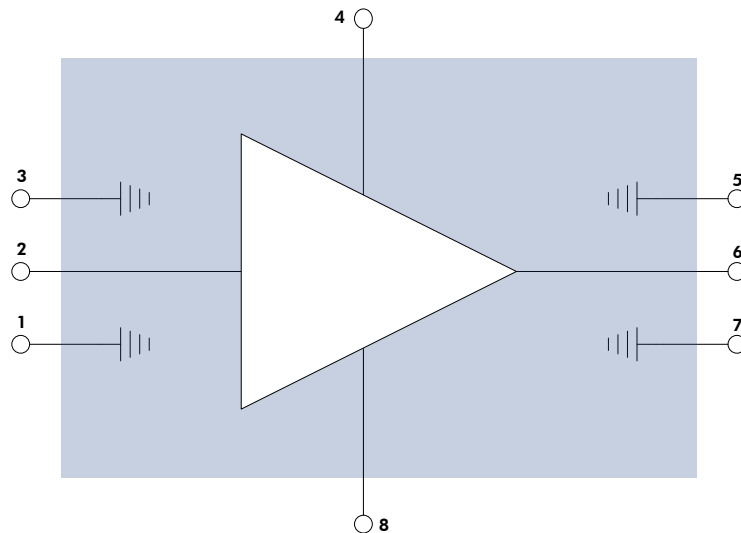
Features

- Gain block amplifier pHEMT GaAs MMIC
- Wide band: 2.9 to 3.4GHz.
- 50 Ω RF Ac coupled input and output
- $P_{1dB} > +17dBm$
- Output $P_{sat} > +20dBm$
- Small signal gain: 17dB from 2.9GHz to 3.4GHz
- Power supply : 200mA @ +4.5V
- Chip size: 2.27 x 1.77 x 0.1 (mm)

Applications

- Wide band MPA
- Radar / ECM / ECCM
- Test and measurement
- Broadband / datalink communication

Pins Assignment & Functional Block Diagram



Symbol	Pad N°
RF in	2
V_D	4
V_G	8
RF out	6
GND	1/3/5/7

Electrical Specifications

Test conditions unless otherwise noted:

- $T_{amb.} = +25^{\circ}\text{C}$
- $V_G = 0\text{V}$
- $V_D = +4.5\text{V}$

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	2.9		3.4	Ghz
NF	Simulated Noise figure			3	dB
G	Small signal gain	16	17		dB
ΔG	Small signal gain flatness		+/-0.4		dB
S11	Input return loss		-15	-11	dB
S22	Output return loss		-15	-11	dB
NF	Noise figure		4.5		dB
P1dB	Output P1dB		17		dBm
P_{SAT}	Saturated output power	15.5	20		dBm
I_D	Associated Drain Current (Pin=24dBm)		200		mA

Environmental parameters

Symbol	Parameter	Values	Unit
T_a	Operating temperature range	-40/+85	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-55/+85	$^{\circ}\text{C}$

Absolute Maximum Ratings

Symbol	Parameter	Values (max)	Unit
V_D	Positive external DC bias voltage	7	V
Pin max	RF input power	15	dBm
T_j	Junction temperature	150	$^{\circ}\text{C}$
T Process	Temperature process max 20 seconds	325	$^{\circ}\text{C}$
P_{cw}	Continious power dissipation (@ 85 $^{\circ}\text{C}$)	1.4	W

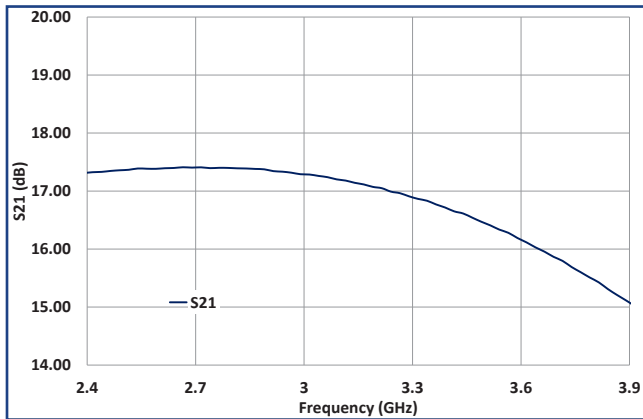
Operation of this device above any of these parameters may cause permanent damage.

Typical Performance (Test Under Probes)

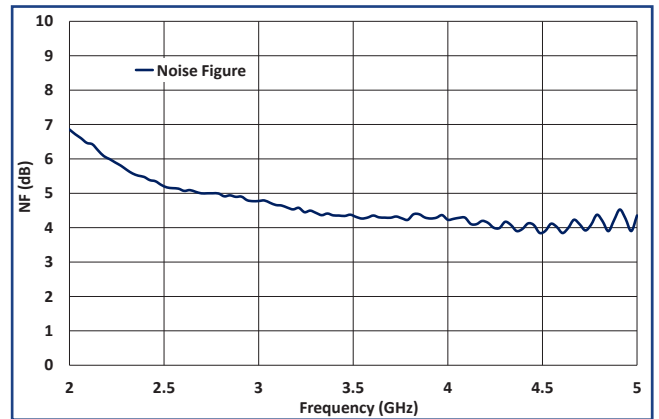
Test conditions unless otherwise noted:

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- $V_D = +4.5V$
- $I_D = 200\text{ mA}$
- $V_G = 0V$

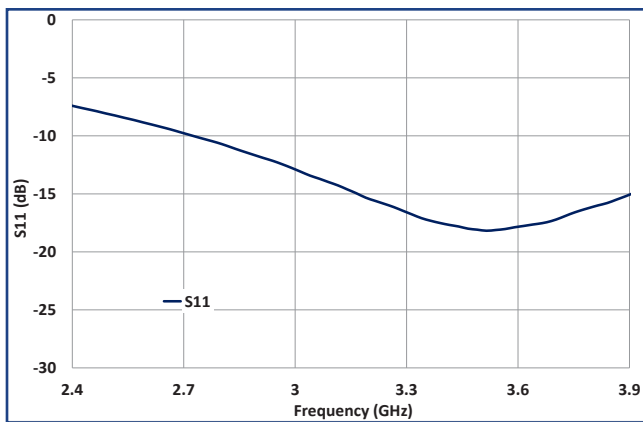
Small Signal Gain



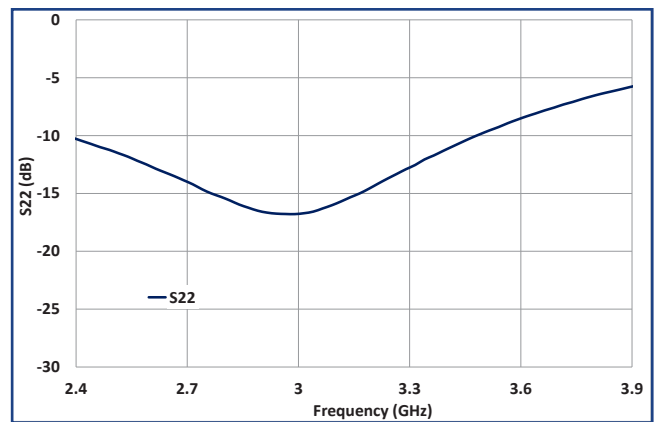
Noise Figure



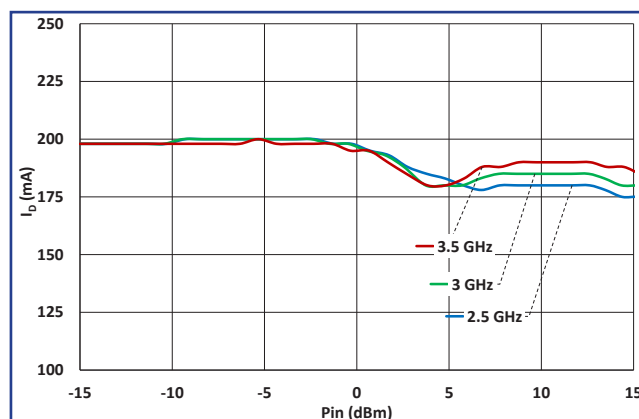
Input Return Loss



Output Return Loss



I_D vs Input Power for various Frequency

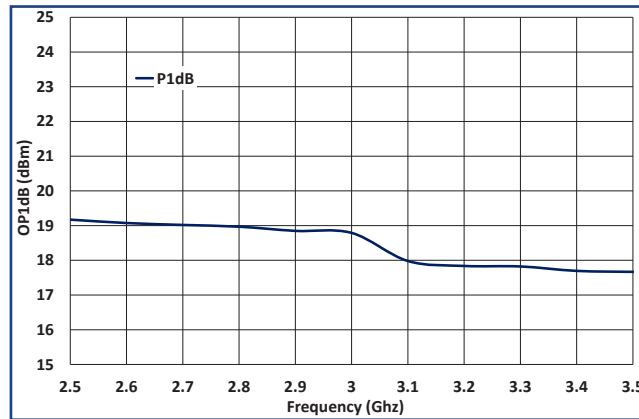


Typical Performance (Test Under Probes)

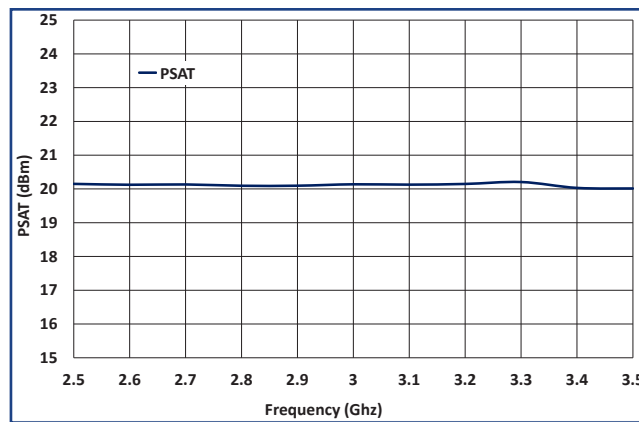
Test conditions unless otherwise noted:

- $T_{amb.} = +25^{\circ}\text{C}$
- $V_D = +4.5\text{V}$
- $I_D = 200\text{ mA}$
- $V_G = 0\text{V}$

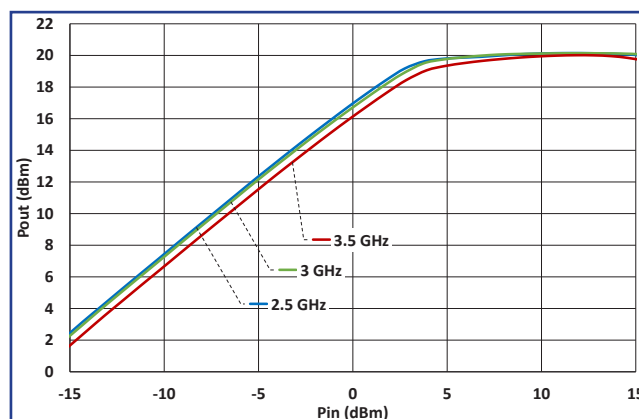
Output P1dB



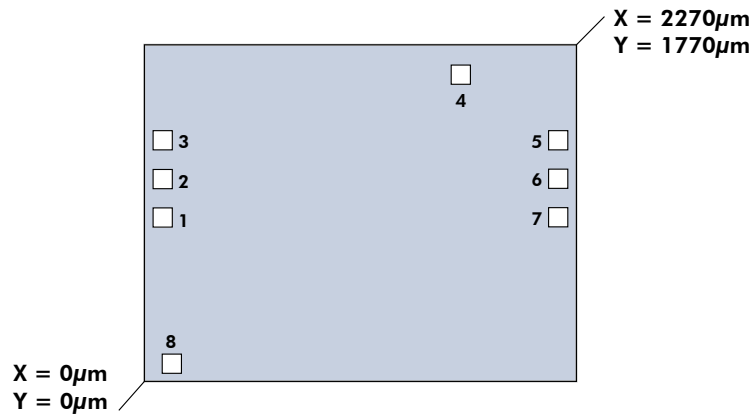
Saturated Output Power



Output Power vs Input Power for various Frequency



Die Layout



Pinout and Bonding Pad Coordinates

Die Pin Out				
Pad	X (µm)	Y (µm)	Size (µm x µm)	Function
1	86	866	100x100	GND
2	96	1067	100x100	RF In
3	96	1267	100x100	GND
4	1662	1612	100x100	V _D
5	2174	1267	100x100	GND
6	2174	1067	100x100	RF Out
7	2174	866	100x100	GND
8	143	95	100x100	V _G

Die thickness = 100µm

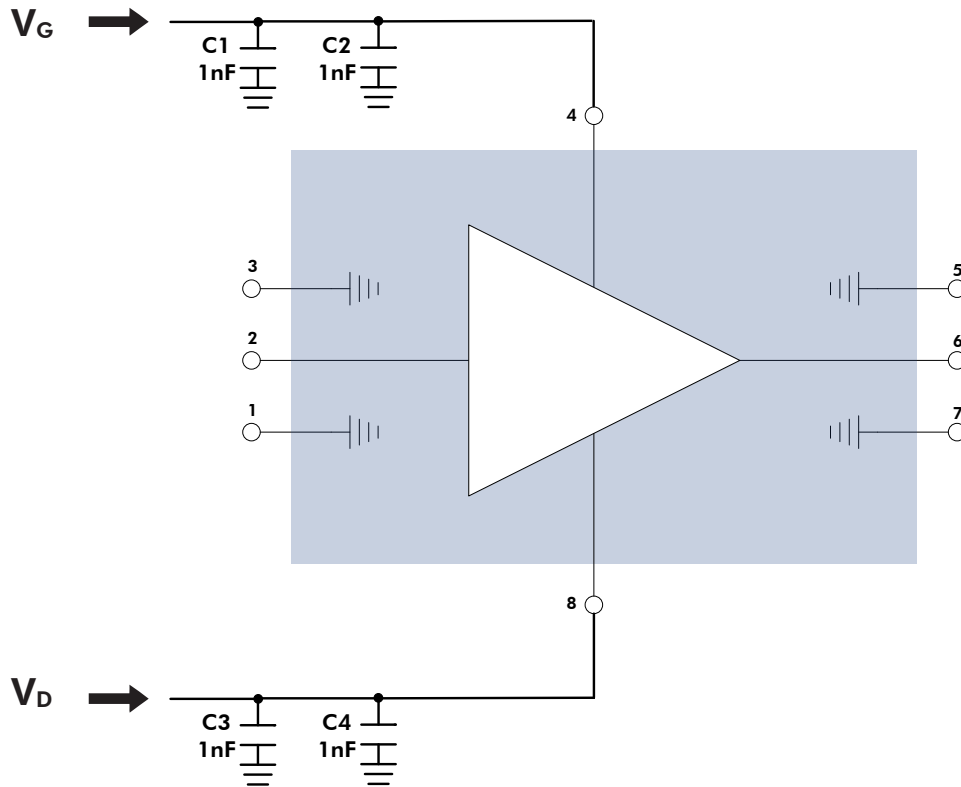
Die bottom must be connected to ground (RF and DC)

Access Description

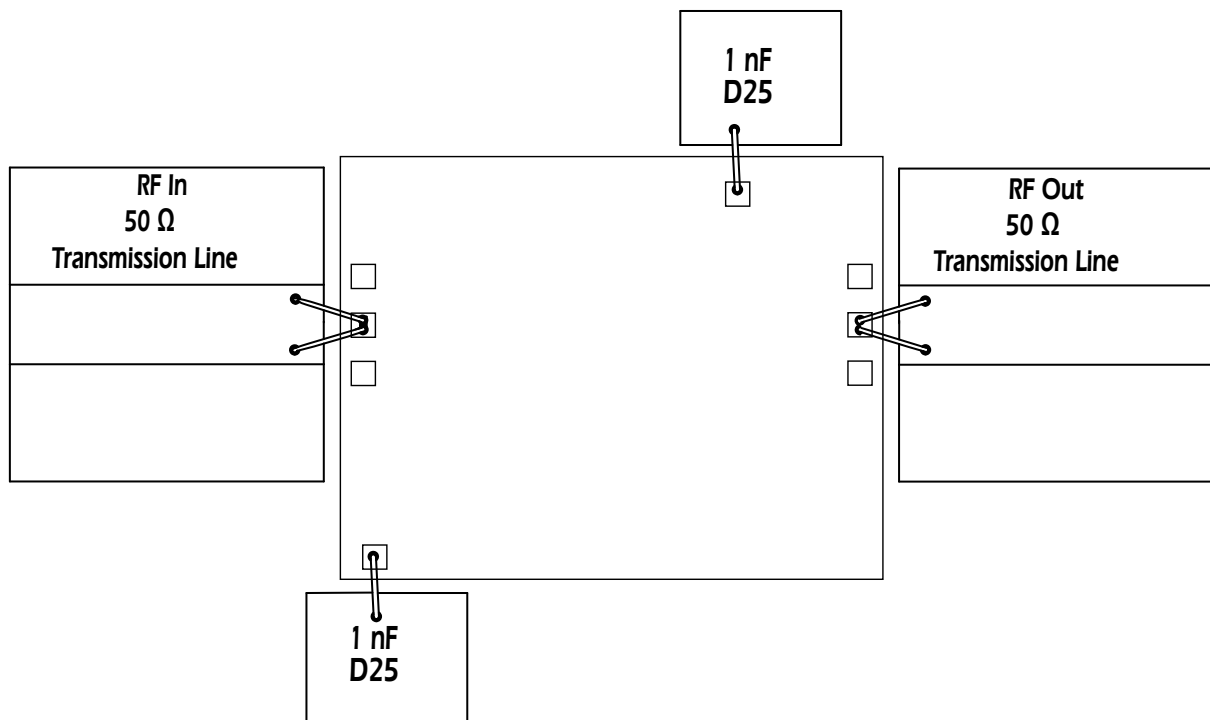
Pin Number	Name	Description	Electrical interface
2	RF In	AC coupled, amplifier input access	
6	RF Out	AC coupled amplifier output access.	
4	V _D	1rst stage and second stage common Drain biasing access.	
8	V _G	1rst stage and second stage common, Gate biasing access.	
Die Bottom	GND	Die must be connected to HF and DC Ground	

Application circuit

- C1 and 4: 1 μ F
- C2 and 3: 1nF - Should be Mim capacitor close to the die



Typical Assembly Diagram



Ordering Information

Product Code	Definition
VWA 5000068 AA	2.9 To 3.4GHz / 17dB / 20dBm

Associated Material

Material	Status
Packaged die	Contact factory
Die Evaluation Board (die EVB)	Contact factory
Packaged die Evaluation Board (packaged die EVB)	Contact factory
Mechanical files (DXF)	Contact factory
Measuments files (S2P)	Contact factory

Product Compliance Information

Solderability :

Use only AuSn (80/20) solder and limit exposure to temperature above 300 °C TO 3 - 4 minutes, maximum

ESD Sensitivity Rating :

Test : Human Body Model (HBM)
 Standard : JEDEC Standard JESD22-A114



CAUTION ! ESD-Sensitive device

RoHS-Compliance :

This part is compliant with EU 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C15H12Br4O2) Free
- PFOS Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about Vectrawave:

Vectrawave SA
 5, rue Louis de Broglie
 22 300 Lannion
 France

www.vectrawave.com
 Email sales: contact_sales@vectrawave.com
 Tel sales:+33 (0)2 57 63 00 20

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