



**VWA 0000936 AD**

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**DC to 28 GHz – 16 dB – 20 dBm  
Medium Power QFN MMIC**

## General Description

The **VWA 0000936 AD** is a distributed amplifier designed on a 0.15  $\mu\text{m}$  pHEMT process, packaged in a 5x5mm 24 lead Plastic Surface Mount Package (ROHS). This component uses the VWA50014AA Vectrawave die.

The device is capable of more than +21dBm of output power at saturation regime, up to 28GHz. And more than +19 dBm of output power at 1 dB of gain compression, up to 20GHz. It provides 16 dB of linear gain from DC to 28 GHz. The Design has been optimized to provide high efficiency. The supply current is as low as 200 mA when operating with  $V_D=+9V$ . This component needs an RF Output external bias-tee to bias the drain and an RF input external DC-Block.

## Applications

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

## Features

- Distributed amplifier pHEMT GaAs MMIC
- Wide band: DC to 28 GHz.
- Flat group delay
- 50 $\Omega$ RF Single ended input and output
- DC coupled IN, DC coupled Out
- P1dB >+19dBm DC to 20GHz
- High output Psat >+21dBm DC to 28GHz
- Small signal gain : 16dB from DC to 28GHz
- Power supply: 200 mA @ +9V
- Package : QFN 5x5mm 24 Lead

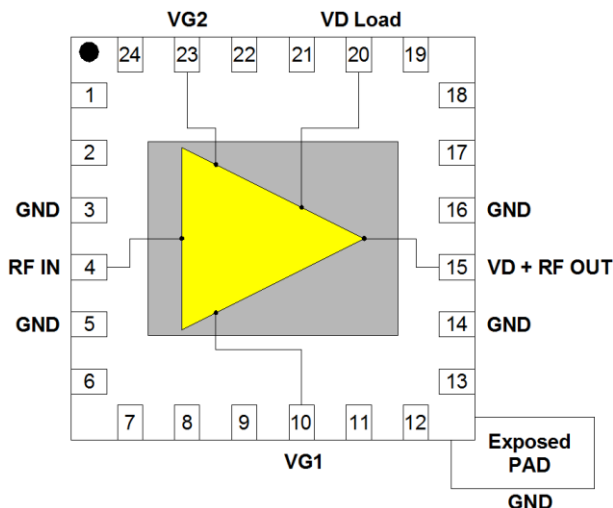
## Tools

S2P file can be provided for system design simulation. DXF drawing file is available for mechanical design. Evaluation board available on request.

## Ordering information

Product code	Definition
VWA 0000936 AD	QFN 5x5mm 24Lead MPA
VWA 0000957 AA	VWA 0000936 AD Evaluation board

## Functional diagram / Pinout



PINOUT			
PIN	NAME	PIN	NAME
1	NC	13	NC
2	NC	14	GND
3	GND	15	RFOUT
4	RFIN	16	GND
5	GND	17	NC
6	NC	18	NC
7	NC	19	NC
8	NC	20	VDload
9	NC	21	NC
10	VG1	22	NC
11	NC	23	VG2
12	NC	24	NC

### Typical Characteristics (Ambient temperature T= 25°C)

Operating conditions:

VD = +9V, VG2=+2V, VG1=0V, ID = 200 mA typ.

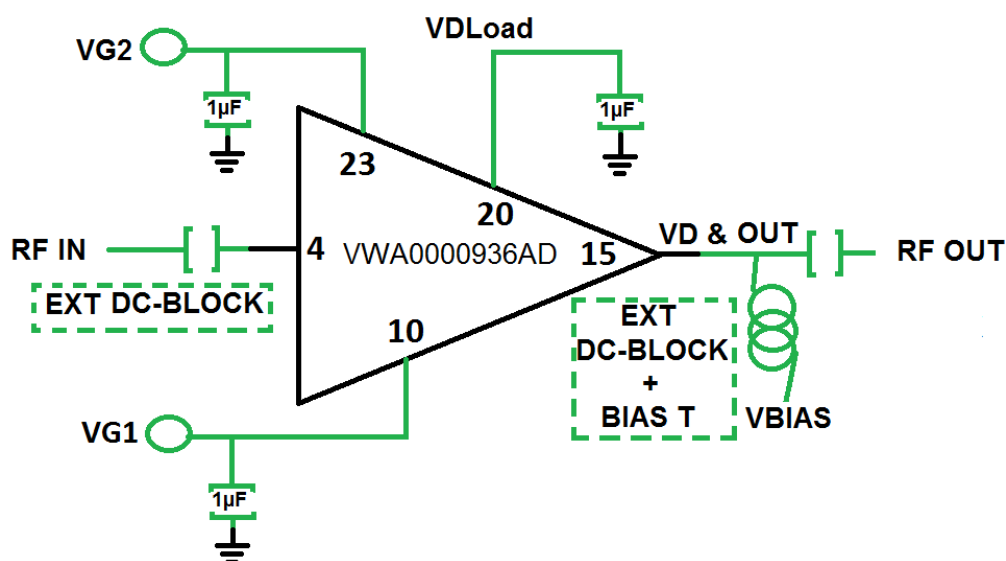
Parameter measured	Symbol	Min	Typ	Max	Unit
Frequency range	F	DC		28	GHz
Small signal gain	G		16		dB
Small signal gain flatness	$\Delta G$		+/-1		dB
Input return loss	S11		-10	-6	dB
Output return loss	S22		-12	-10	dB
Output P1 dB from DC to 20GHz	P1dB		20		dBm
Saturated output power	PSat		22		dBm
Drain supply voltage	VD		9		V
Supply current	ID		200		mA

### Absolute maximum ratings

Maximum ratings	Symbols	Min	Max	Units
Positive external DC bias voltage	VD		+9.5	V
Gate control input access for second stage	VG2	-1	VD/2	V
Gate control input access for first stage	VG1	-1.5	0.15	V
RF input power (In)	Pin max		20	dBm
Continuous power dissipation (@ 85°C)	Pcw		2	W
Storage temperature	Tst	-55	+125	°C
Operating temperature	Top	-40	+85	°C

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

### Application circuit



1µF : 0402 capacitor, must be placed as close as possible to the QFN access

**Access description**

Pin number	Name	Description	Electrical interface
4	RF IN	HF Amplifier input, This access is DC coupled and internally matched to 50Ohms.	
23	VG2	Gate control input access for second stage distributed amplifier structure. Apply +2V for nominal biasing conditions.	
10	VG1	Gate control input access for first stage distributed amplifier structure. Apply 0V for nominal biasing conditions.	
20	VDLoad	Drain termination load decoupling access.	
15	VD & RF OUT	HF Amplifier output, This access is DC coupled and internally matched to 50Ohms. It is also used to feed the drain current (ID), by using a wide bandwidth external Bias-T structure.	
Exposed PAD	GND	Ground paddle must be connected to HF and DC Ground	
3, 5, 14, 16	GND	This PINS must be connected to HF and DC Ground	

**Typical performances characteristics (Ambient temperature T= 25°C)**

Operating conditions:

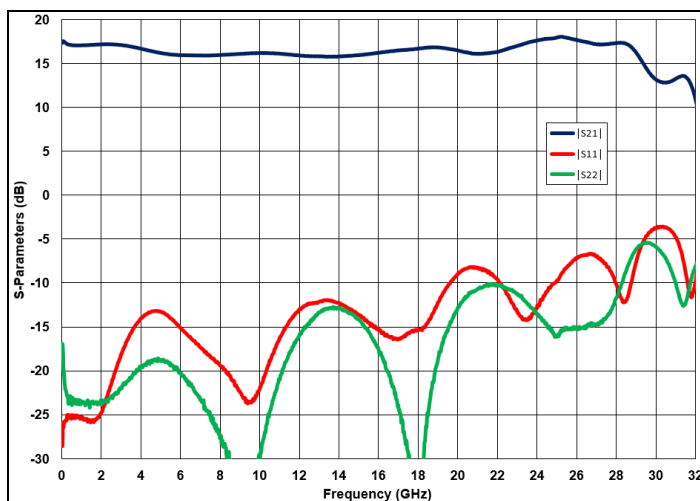
VD = +9V, VG2=+2V, VG1=0V, ID = 200 mA typ.

Measurement conditions :

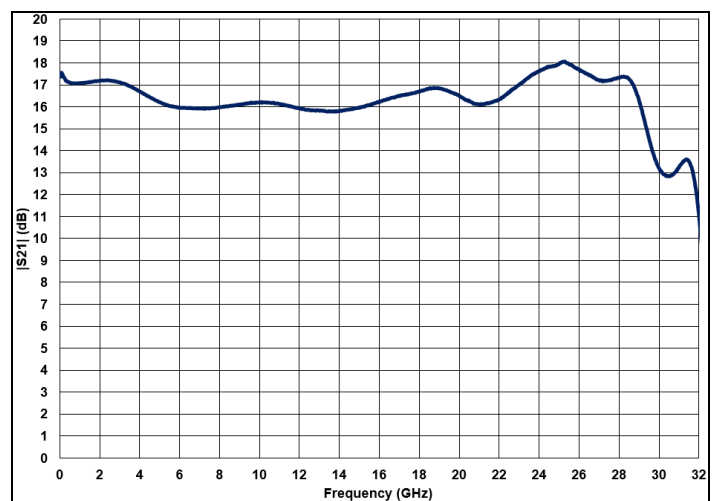
Structure : QFN reported on PCB

Measurement method : Test under probes on the PCB ( measurement reference planes at the probes)

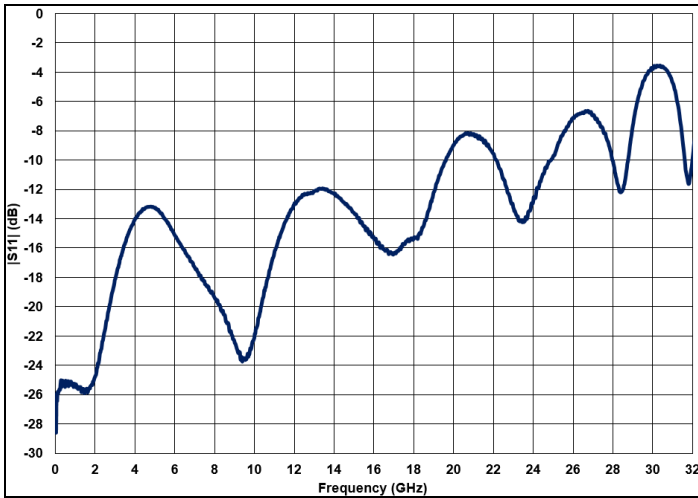
**Gain and return loss (dB)**



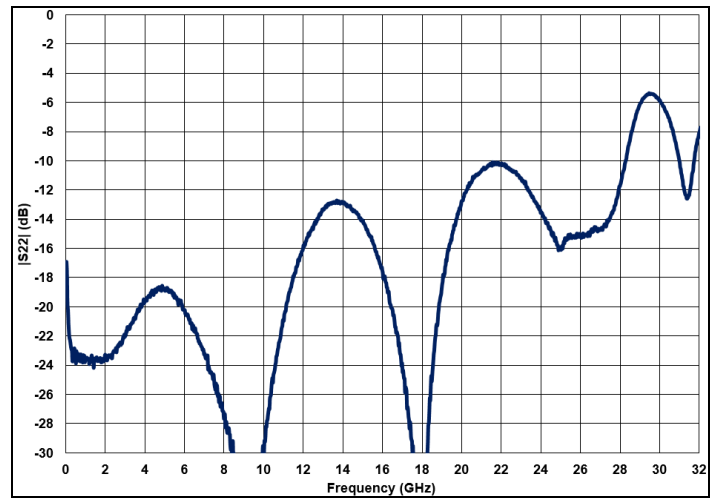
**Gain (dB)**



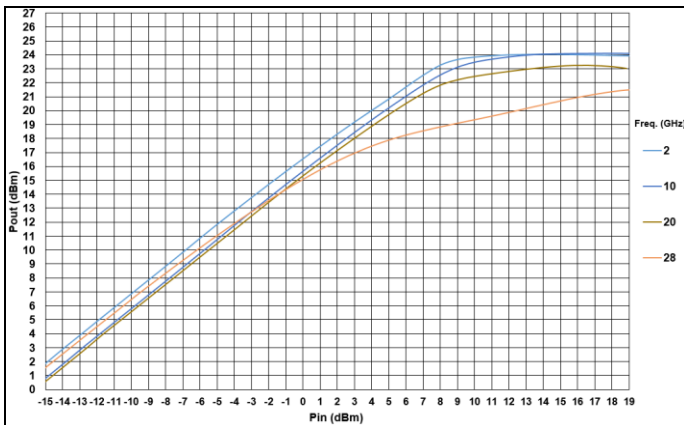
**Input return loss (dB):**



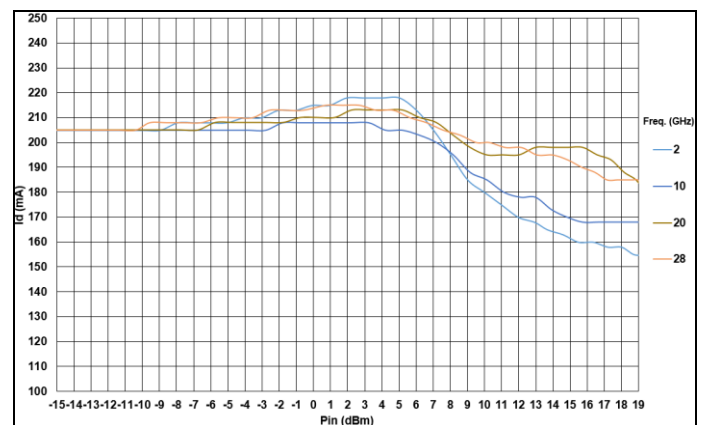
**Output return loss (dB):**



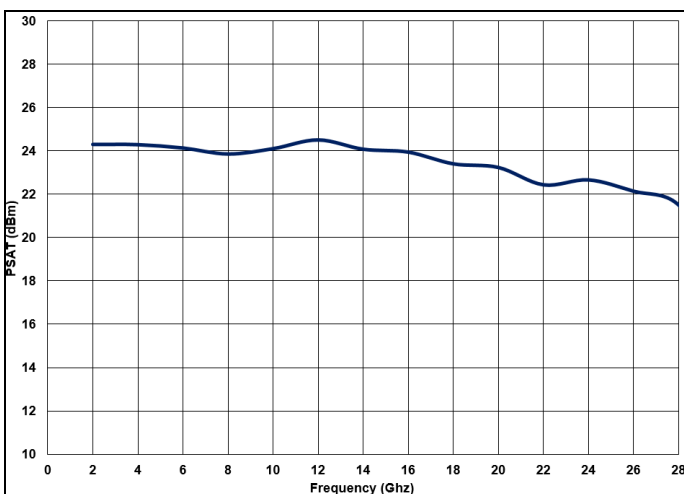
**Output power VS Input Power :**



**Drain current VS Input power**



**Saturation power VS Frequency**



**P1dB VS Frequency**

