

General Description

The **VWA5001175AA** is a Microwave Monolithic Integrated Circuit (MMIC) designed in HEMT (High Electron Mobility Transistor) structure for operating frequency range from 33 to 36GHz.

The MMIC is developed on a 150nm GaN/SiC process and is internally matched to 50Ω RF accesses. It provides an output power of 1W, and associated Power Added Efficiency of 25%.

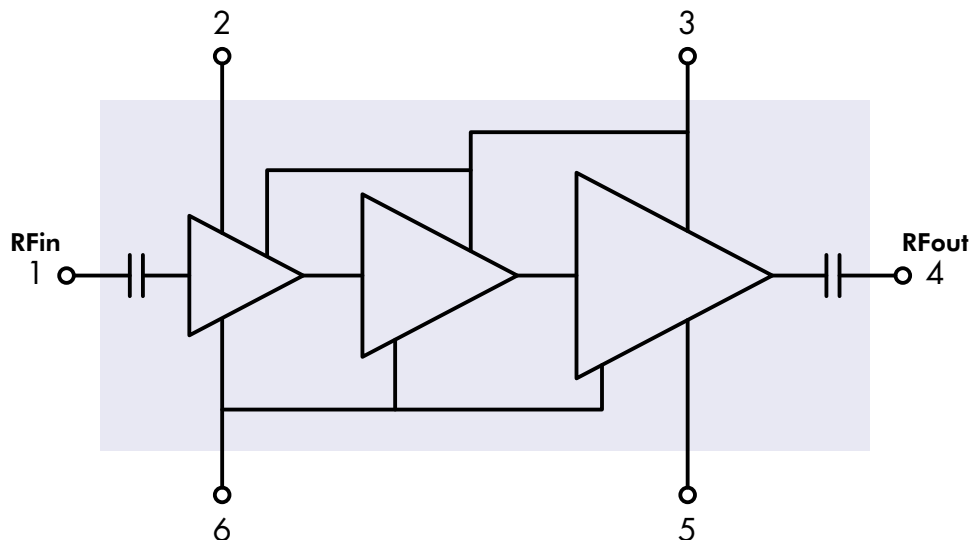
Features

- Operating frequency range: 33 to 36GHz
- Output Power: 30dBm @Pin= 9dBm
- PAE: 25% @Pin= 9dBm
- Linear Gain: 27dB
- DC bias: $V_D = +22V$, $I_{DQ} = 110mA$, $V_G = -1.5V$ (Typical)
- Chip size: 4.86 x 1.62 x 0.1mm

Applications

- Driver
- Instrumentations
- Telecommunications

Functional Block Diagram & Pins Assignment



Function	Pin number
RF in	1
VG_N / VG_S	2 / 6
VD_N / VD_S	3 / 5
RF out	4

Electrical Specifications

Test conditions unless otherwise noted:

- $I_{DQ} = 110\text{mA}$
- $V_G = -1.5\text{V}$ Typical
- $T_{\text{amb}} = +25^\circ\text{C}$
- Post layout simulation
- $V_D = 22\text{V}$

Symbol	Parameter	Min	Typ	Max	Unit
F	Frequency range	33		36	GHz
BW	Operating Bandwidth		3		GHz
G	Small signal gain		27		dB
S11	Input Return loss		-10		dB
S22	Output Return loss		-10		dB
P _{OUT}	Output power (P _{in} =9dBm)		30		dBm
PAE	Power Added Efficiency (P _{in} =9dBm)		25		%
I _D	Drain current (P _{in} =9dBm)		0.3		A
V _D	Drain voltage		22		V
P1dB	P1dB compression		NA		dBm
ΔG	Small signal gain temperature coefficient		NA		dB/°C

Recommended Operating Conditions

Symbol	Parameter	Value	Unit
V _D	Quiescent drain voltage	22	V
I _{DQ}	Quiescent drain current	110	mA
V _G	Quiescent gate voltage (Typical)	-1.5	V

Absolute Maximum Ratings

Symbol	Maximum Ratings	Min	Unit
V _D	Drain voltage	28	V
I _D	Maximum saturated drain current	0.5	A
V _G	Gate voltage	-10 to -1	V
P _{DISS}	Power dissipated (T _{carrier} =85°C) pulsed mode	NA	W
P _{IN}	Maximum input power	15	dBm
T _j	Junction temperature	225	°C
T _a	Operating temperature	-40/+85	°C
T _{stg}	Storage temperature	-55/150	°C

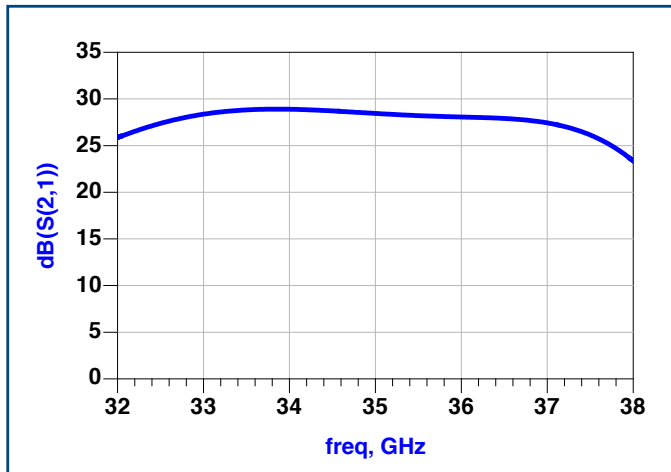
Operation of this device above any of these parameters may cause permanent damage.

Typical performances (Small signal / post-layout simulation)

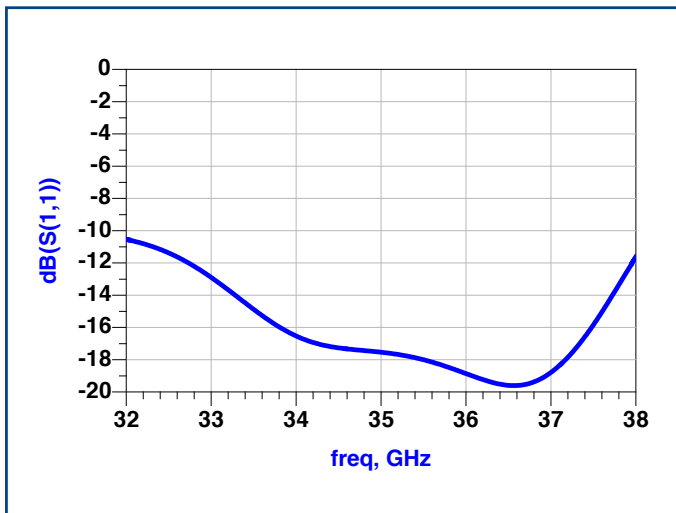
Simulation condition unless otherwise noted:

- $V_D = +22V$
- $I_{DQ} = 110mA$
- $P_{in} = -20dBm$
- $T_{amb} = +25^{\circ}C$

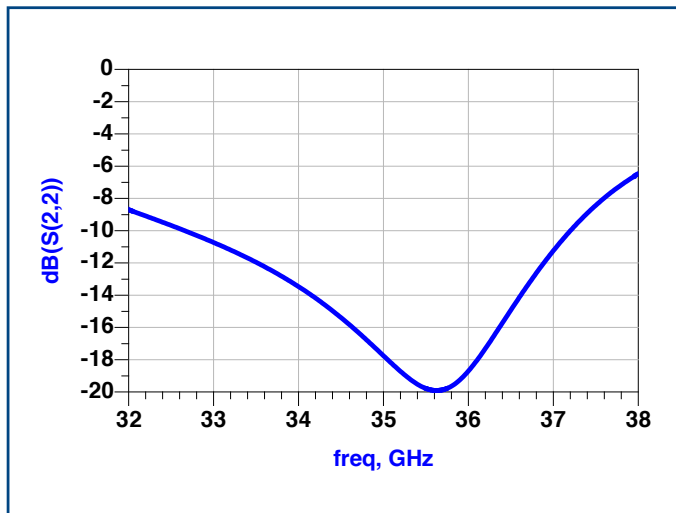
Small Signal Gain (dB)



Input Return Losses (dB)



Output Return Losses (dB)

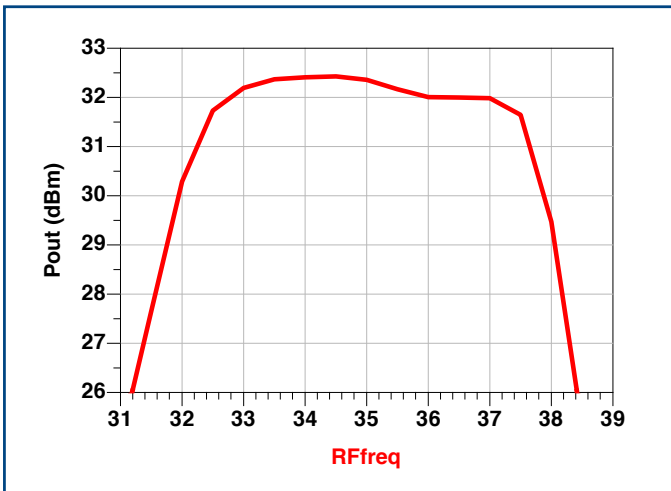


Typical performances (Large signal / post-layout simulation)

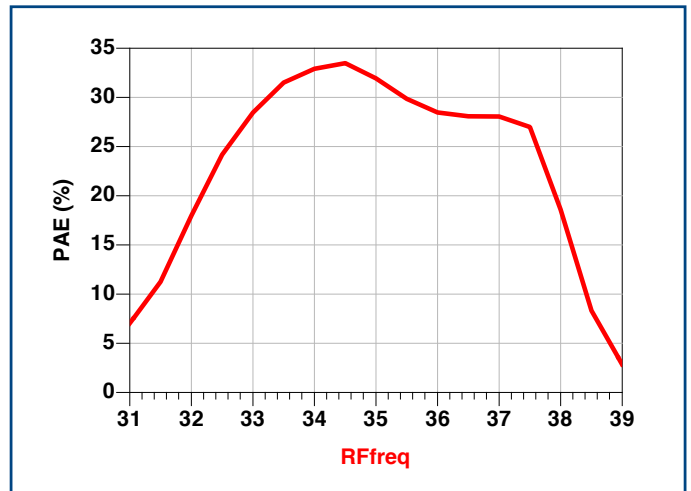
Simulation condition unless otherwise noted:

- $V_D = +22V$
- $I_{DQ} = 110mA$
- $P_{in} = +9dBm$
- $T_{amb} = +25^{\circ}C$

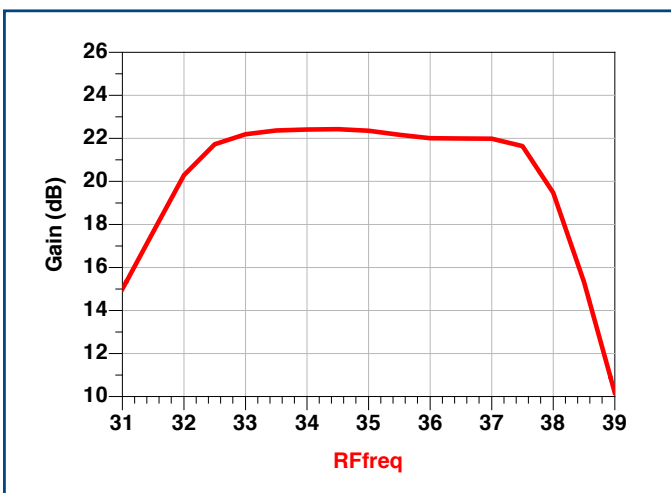
Output power vs frequency



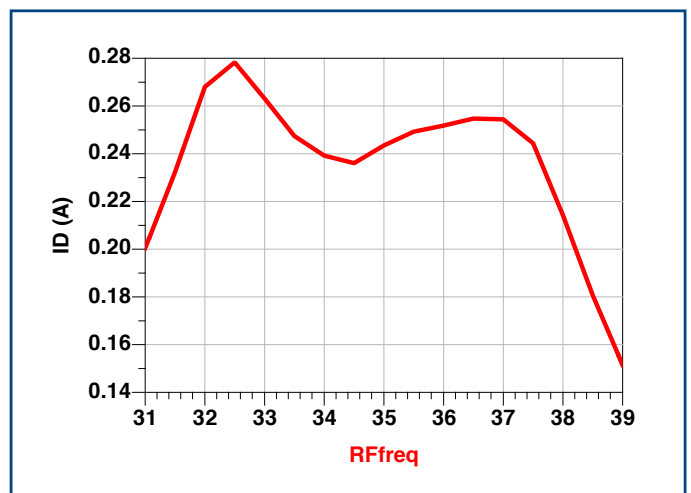
PAE vs frequency



Power gain vs frequency



Drain current vs frequency



Die Layout & Pin Out



Die thickness = 100 μm
Die size tolerance = 50 μm

Pad number	Pad center		Size ($\mu\text{m} \times \mu\text{m}$)	Name	Function
	X (μm)	Y (μm)			
1	105	810	180 x 90	RFin	RF Input
2	527	1500	100 x 100	VG_N	Gate Bias
3	3866	1500	200 x 100	VD_N	Drain Bias
4	4755	810	180 x 90	RFout	RF Output
5	3866	120	180 x 100	VD_S	Drain Bias
6	527	120	100 x 100	VG_S	Gate Bias

Ordering Information

Product Code	Definition
VWA 5001175 AA	33 to 36GHz – 1W GaN/SiC Medium Power Amplifier in die form

Associated Material

Product Code	Definition
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
Measurements 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

Represented by