

24 - 27 GHz GaAs High Power Amplifier MMIC

Preliminary Data Sheet

24 - 27 GHz HPA

- Two-Stage Monolithic Microwave Integrated Circuit (MMIC) HEMT Amplifier
- Input/Output matched to 50 Ω
- Frequency range: 24 GHz to 27 GHz
- Gain > 12 dB
- $P_{-1dB} > 27$ dBm
- $P_{SAT} > 29$ dBm
- Chip size: 2.71 mm $\times$ 3.0 mm

ESD: Electrostatic discharge sensitive device, observe handling precautions!

Description

This two-stage GaAs MMIC high power amplifier is intended for use in radio link applications. It provides an output power of 27 dBm at 1 dB gain compression. The device is fabricated with a 0.18 micron Pseudomorphic InGaAs/AlGaAs/GaAs High Electron Mobility Transistor processing technology.

Type	Marking	Ordering Code	Package
24 - 27 GHz HPA	–	on request	Chip

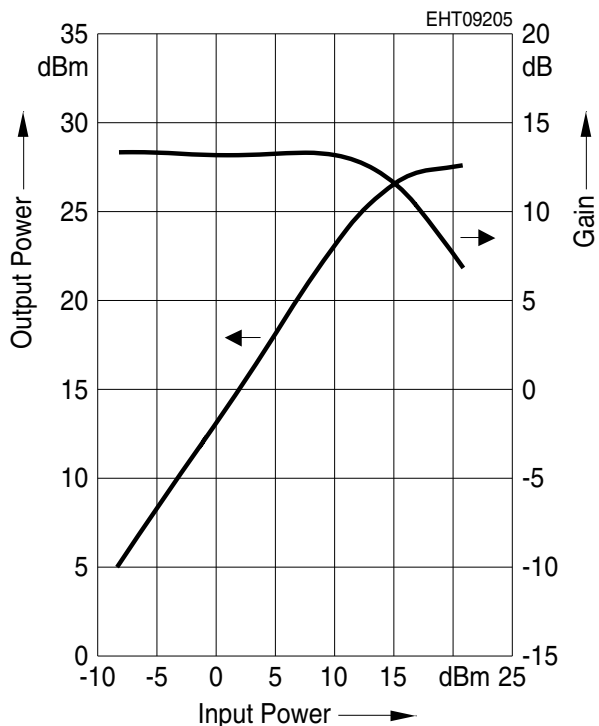
Electrical Specifications

$V_G = 0$ V, $V_D = 5$ V, $I_D = 930$ mA

Parameter	Limit Values			Unit	Test Conditions
	min.	typ.	max.		
Frequency Range	24	–	27	GHz	–
P_{-1dB} @ 26 GHz	–	27	–	dBm	–
P_{SAT} @ 26 GHz	–	29	–	dBm	–
Gain @ 26 GHz	–	12	–	dB	–
Input Return Loss	–	< – 10	–	dB	–
Output Return Loss	–	< – 10	–	dB	–

Measured Data (on chip measurements)

On-wafer measurement: $V_{GS} = 0.1 \text{ V}$, $V_{DS} = 5 \text{ V}$, $I_{DS1} = 290 \text{ mA}$, $I_{DS2} = 640 \text{ mA}$



Maximum Ratings

Parameter	Symbol	Value	Unit
Drain voltage	V_D	5	V
Gate voltage	V_G	- 2 ... + 0.8	V

Technology Data

Parameter	Value
Chip thickness	75 μm
Chip size	2.71 mm $\times$ 3.0 mm
DC/RF Bond pads	100 μm $\times$ 100 μm /80 μm $\times$ 80 μm
Bond pad material	Au (plated gold)
Chip passivation	SiN (silicon nitride)

Recommendation of Bonding Conditions

Parameter	Thermocompression Nailhead, without Ultrasonic	Wedge Bonding	Bond Pull Test Mil 883, > 2 g
Table Temp.	250 °C	250 °C	1 : 2.5 g
Tool Temp.	180 °C	150 °C	2 : 3.1 g
Scrub	100 Hz	–	3 : 3.2 g
Bond Force	50 g	25 g	4 : 3.0 g
Wire Diameter	25 µm	17 µm	5 : 2.8 g

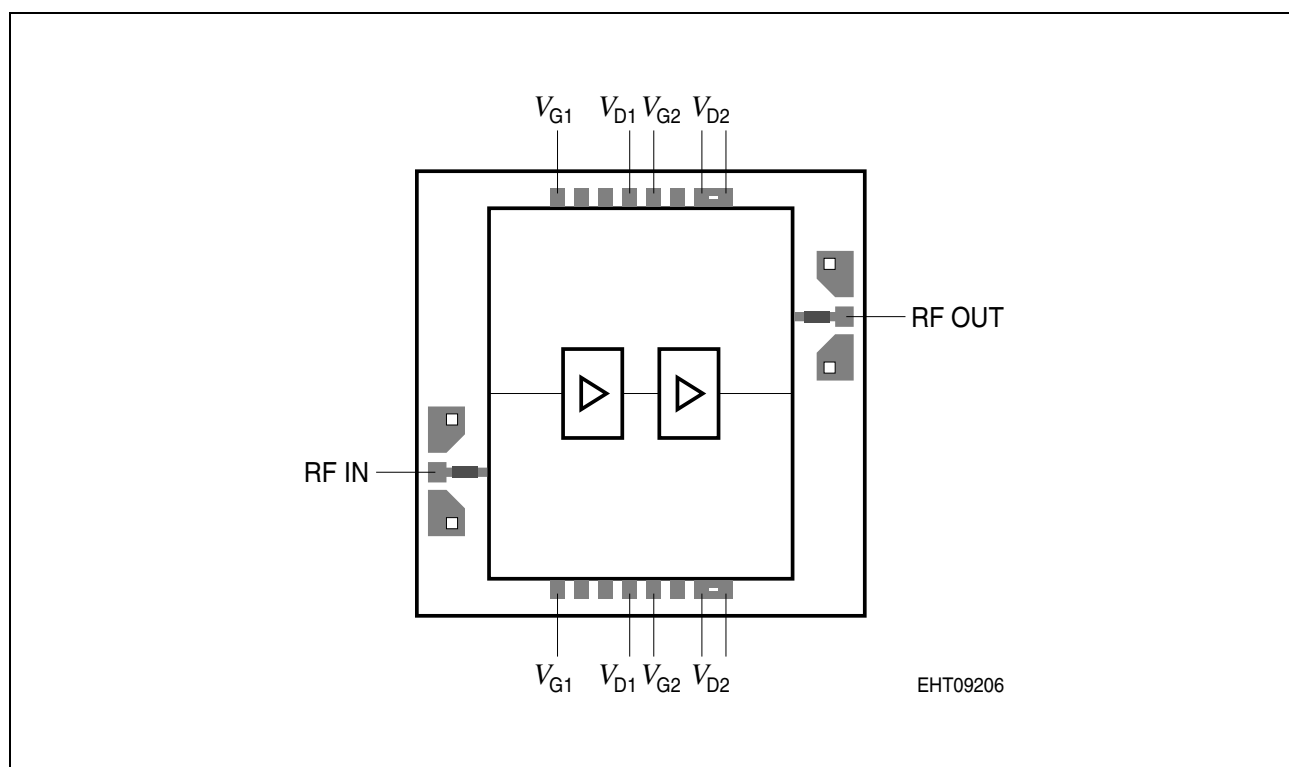


Figure 1 Bond Plan

The gate and drain bias voltages can be applied from only one side of the chip, they are connected internally. Capacitors to ground with approximately 100 pF should be used to block the V_G and V_D bias pads.