product datasheet
arralis.com

W band MMIC Power Amplifier

W-PA-9296 Previously named TU-W1330305

GaAs PHEMT MMIC Power Amplifier, 92 - 96GHz

Overview

W-PA-9296 is a 4-stage MMIC power amplifier that covers frequencies from 92GHz to 96GHz. This MMIC provides up to 20dB of flat, stable gain, and a power output of more than 18dBm from a 4V supply voltage and <210mA current.

All bond pads and the die backside are gold plated. This MMIC is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown is measured with the chip in a 50 Ohm environment and contacted with RF probes.

- An Evaluation Board for this device is available with WR-10 Interfaces to fast and effieciently verify the performance of the MMIC.
- W band 92-96GHz Amplified Modules are also available as Gain and Power blocks; W-PA-9296-GM and W-PA-9296-PM available on request.
- A mirrored version ‘W-PA-9296-M’ of this MMIC is also available on request.

Features

- 92 – 96GHz.
- 20 dB gain.
- 18dBm Psat.
- Unconditionally stable.

Applications

- Narrow bandwidth millimeter-wave imaging.
- High resolution radar.
- Sensing.
- P2P communications;
- short haul/high capacity/low interference links.
- Medical.
- High power amplifier.

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	90		100	GHz
Gain	19	20		dB
Input Return Loss	8	15		dB
Output Return Loss	3	6		dB
Maximum OP Power		18		dBm
Drain Voltage		4		V
Nominal Gate Voltage*		0		V
Current		210		mA

Notes
The tests indicated have all been performed with 100pF de-coupling capacitors on all bias pads.
All tests are carried out at 25°C.

*Should be adjusted to ensure the correct current is drawn.

Absolute Maximum Ratings

Parameter	Rating
Gate Voltage	-5V to 0.2V dc
Drain Voltage	5V
Drain Current	400mA
RF Input Power	5dBm
Storage Temperature	−65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	−40°C to +85°C

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features proprietary protection circuitry, damage may occur on devices subjected to ESD. Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Measured Performance Data

(Vdd= 4V, Vgg=0V, Idd=208mA)

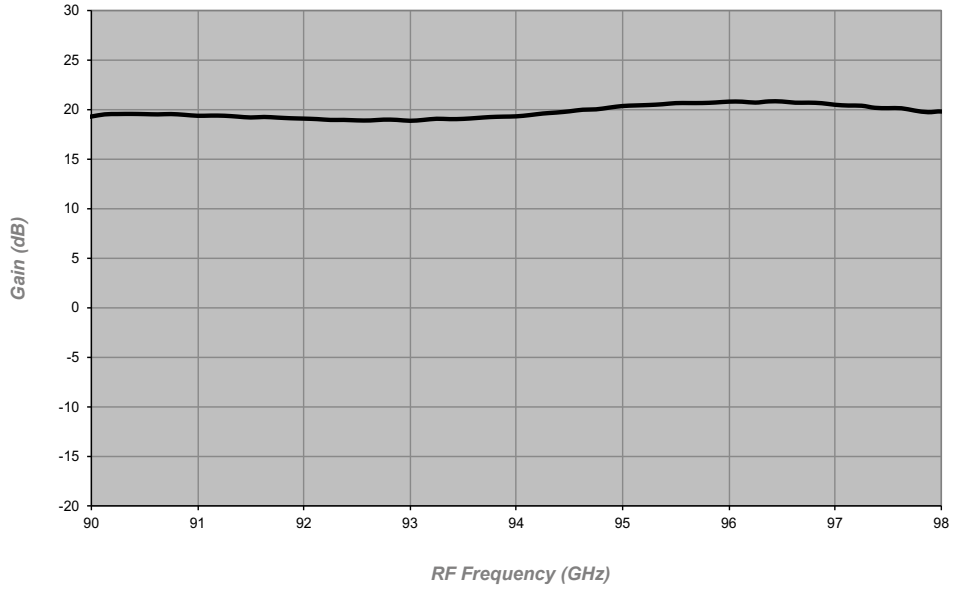


Figure 1
Gain

(Vdd= 4V, Vgg=0V, Idd=208mA)

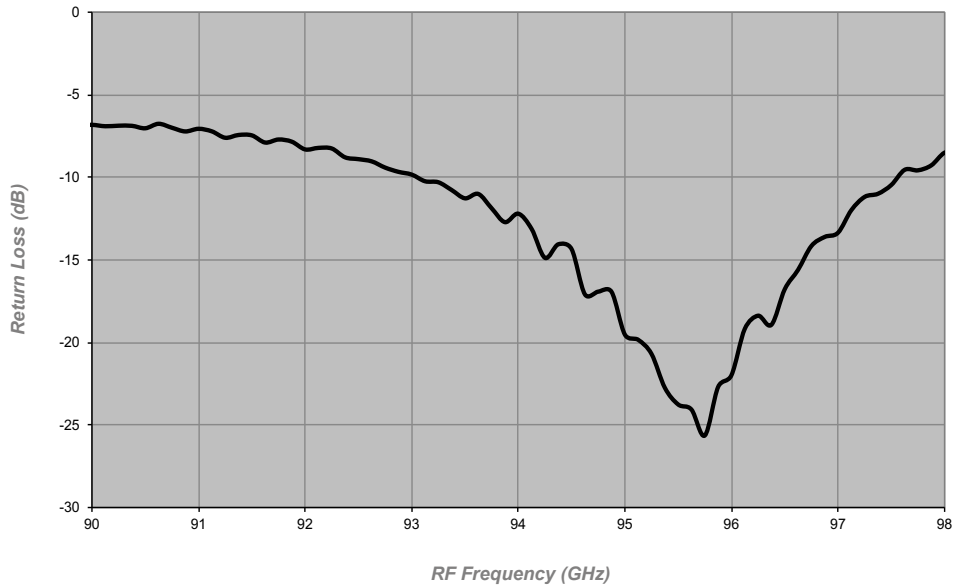


Figure 2
Input Return Loss

Measured Performance Data

(Vdd= 4V, Vgg=0V, Idd=208mA)

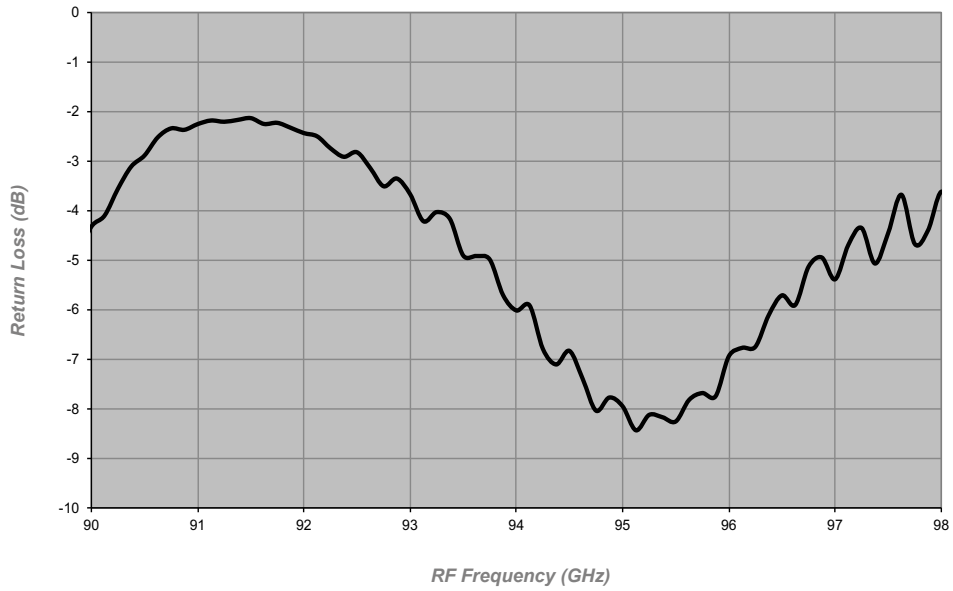


Figure 3
Output Return Loss

(Vdd= 4V, Vgg=0V, Idd=208mA)

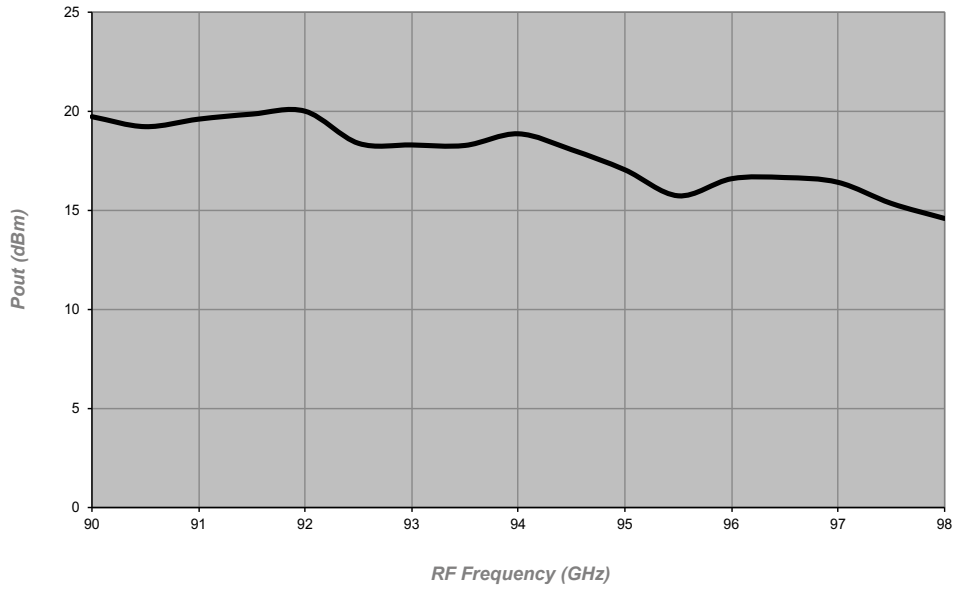
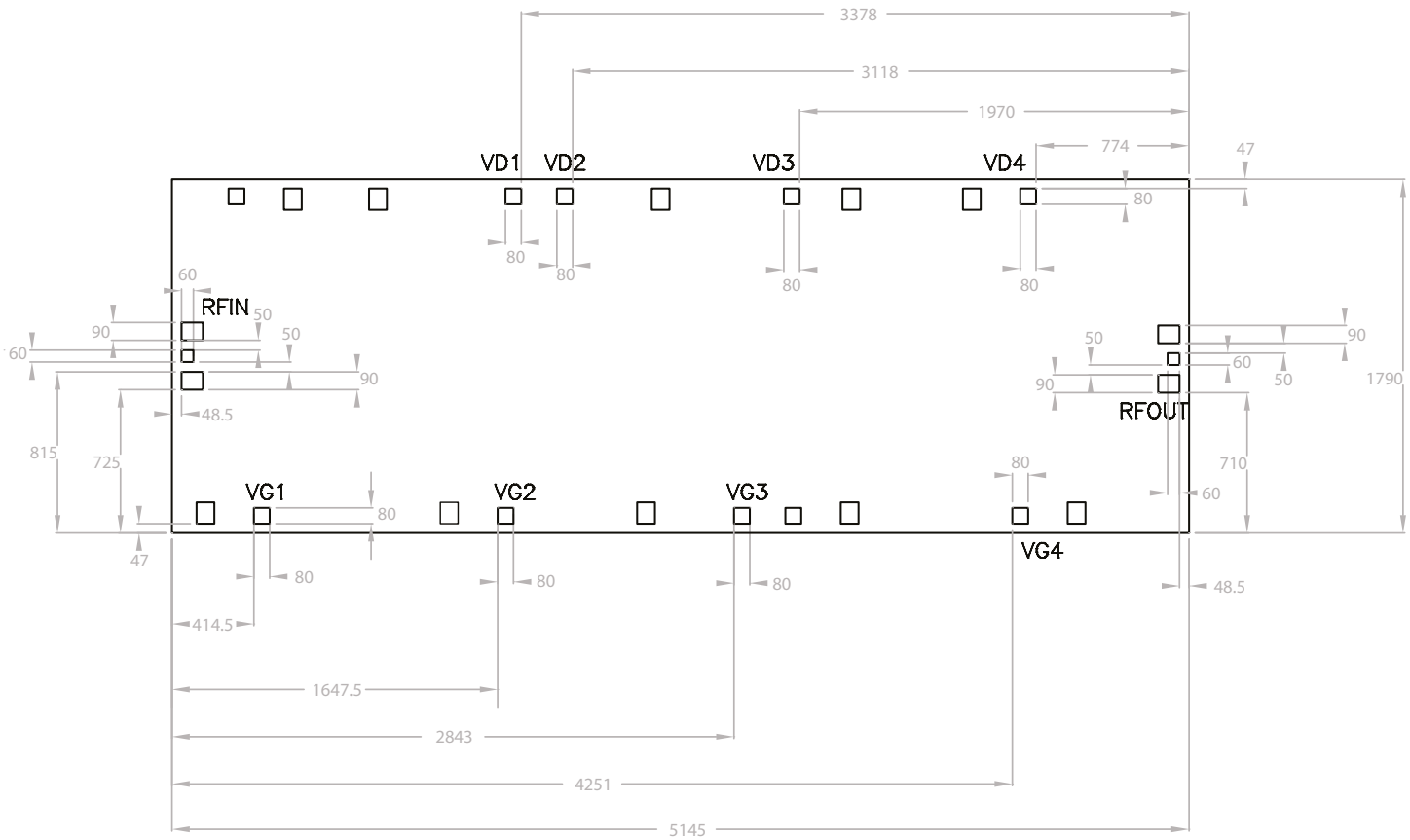


Figure 4
Saturated Output Power (Calibrated @ 96GHz)

Outline Drawing



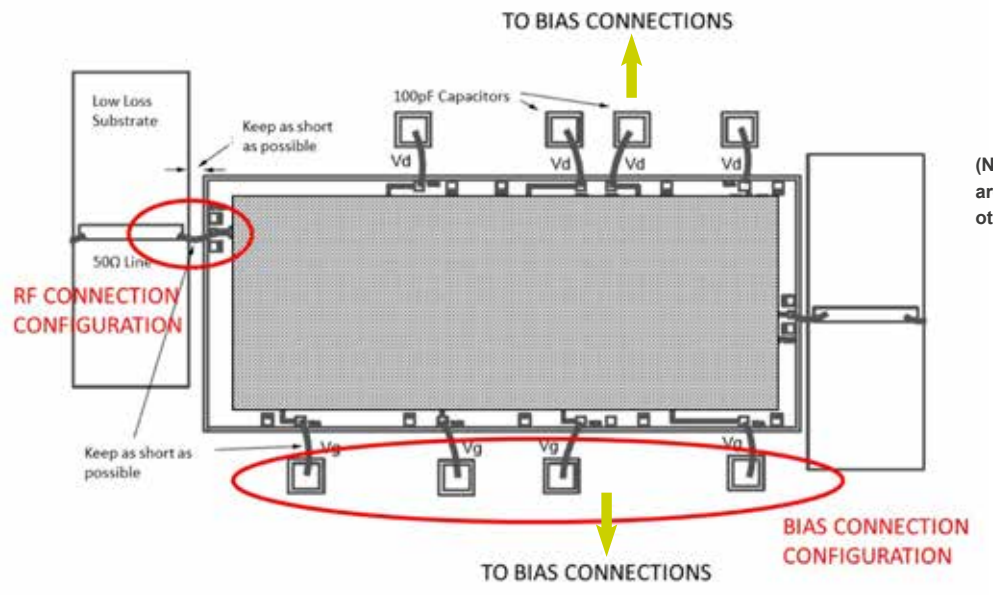
Notes

1. All dimensions are in um.
2. Typical DC bond pads are 80um square.
3. RF bond pads are 60um square.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabelled bond pads.
8. Die thickness is 50um

Pad Descriptions

Name	Description
RFIN	Input RF pad. This pad is AC coupled.
RFOUT	Output RF pad. This pad is AC coupled.
VDx	Drain bias pad for stage x
VGx	Gate bias pad for stage x.
BOTTOM	The die backside must be connected to RF/DC ground.

General Notes on Assembly



(Not actual die – these rules are applied to all MMICs unless otherwise stated)

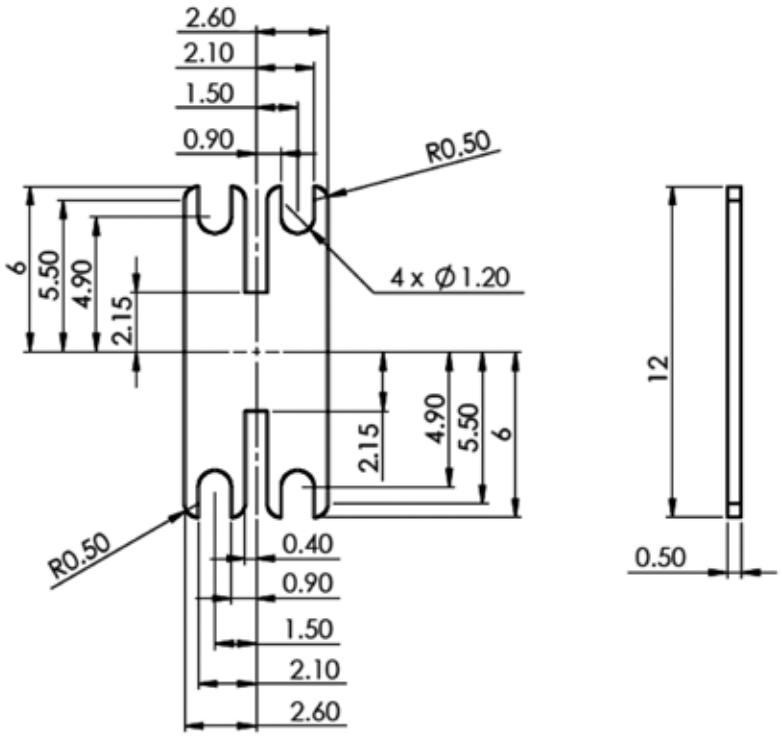
Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/Sn occurs at approximately 280°C so the die (plus mount and preform) is initially heated up to 180°C and then it is heated for approximately 10 seconds to 280°C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330°C.
2. Pure, dry nitrogen should be used as the heat source
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Supply lines should be decoupled with 100pF capacitors. Larger planar capacitors could be used if available.
5. Aluminium wire must not be used.

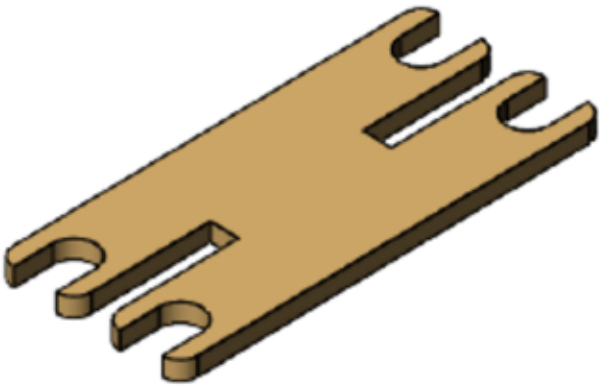
Die Packing Information

All die are normally delivered using gel-paks, Arralis also offer the W-PA-9296 die already eutectically die-attached on a gold plated carrier.

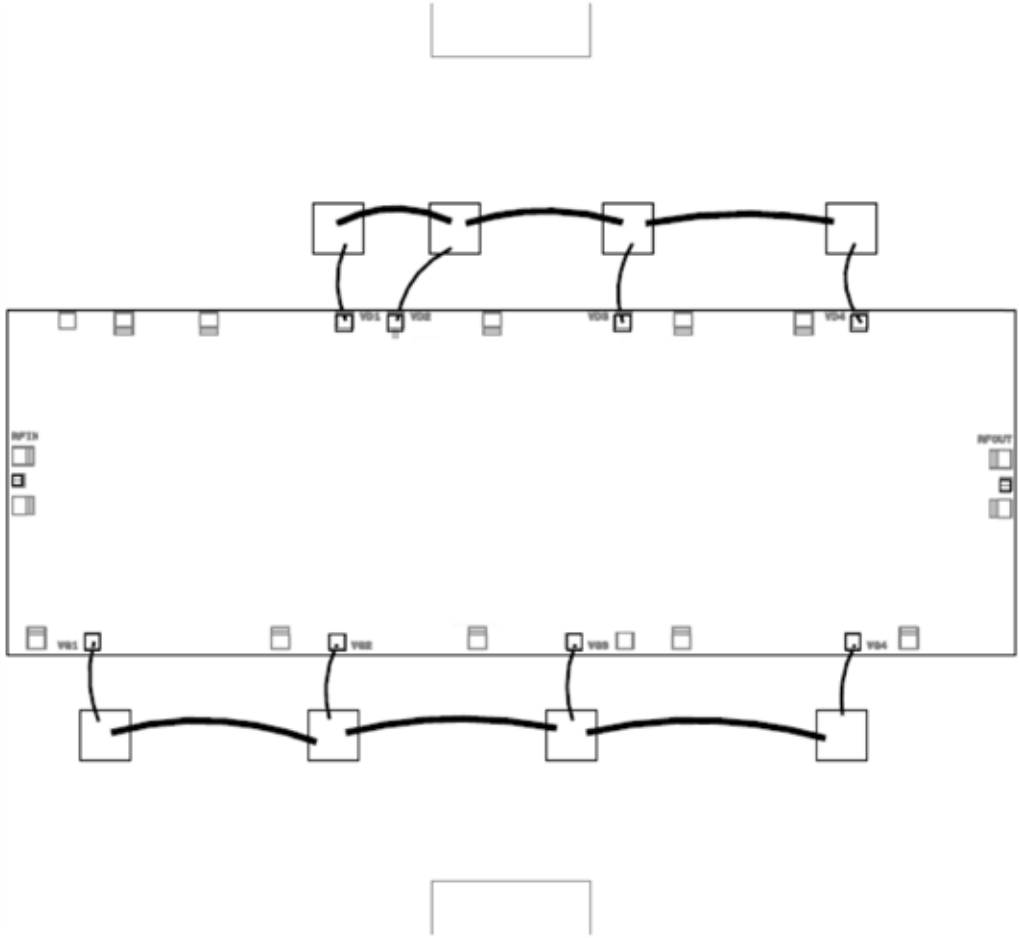
Carrier Outline Drawing



Note:
Fabricated using 0.5mm gold plated brass CZ108



Carrier Bonding Diagram



Note:
0.0007 99.99% Au wire

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