

W band MMIC Power Amplifier

W-PA-8993 Previously named TU-W1330306
GaAs PHEMT MMIC Power Amplifier, 89 - 93GHz

Overview

W-PA-8993 is a 3-stage MMIC power amplifier that covers frequencies from 89GHz to 93GHz. This MMIC provides up to 13dB of stable gain, and a power output of more than 18dBm from a 4V supply voltage and 750mA current.

All bond pads and the die backside are gold plated. The 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.

A single or cascaded packaged version of the device is also available with WR10 waveguide input and output.

Features

- 89 – 93GHz.
- 13dB 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.

 Arralis	W band Datasheet	W-PA-8993	Issue date: 30 April 2021	DOC REV 3	Page 1 of 8
---	------------------	-----------	---------------------------	-----------	-------------

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	89		93	GHz
Gain	9	12		dB
Input Return Loss	5	15		dB
Output Return Loss		4		dB
Maximum OP Power		18		dBm
Drain Voltage		4		V
Nominal Gate Voltage*		-0.25		V
Current		750		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	1.1A
RF Input Power	10dBm
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

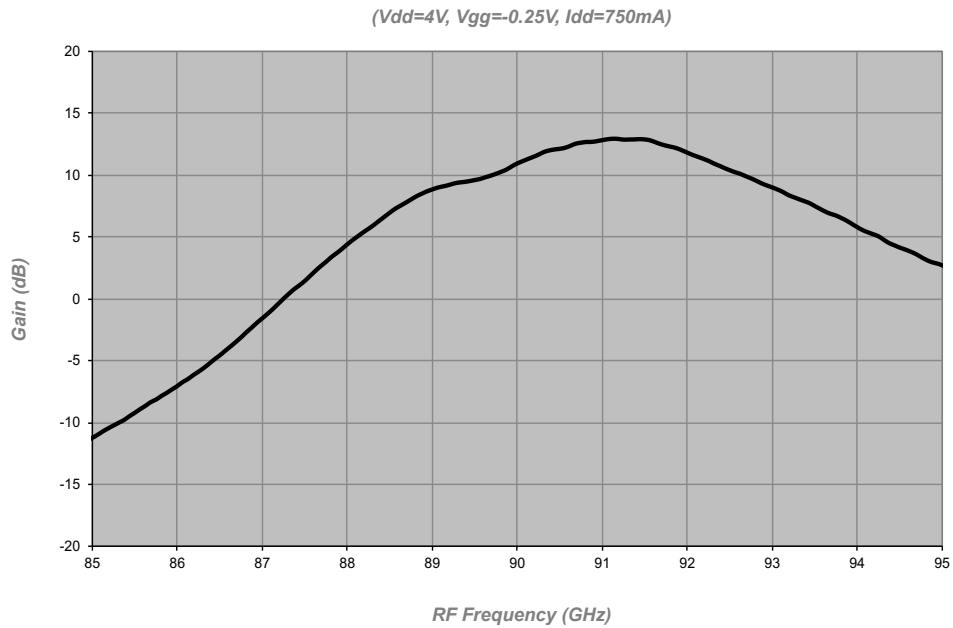


Figure 1
Gain

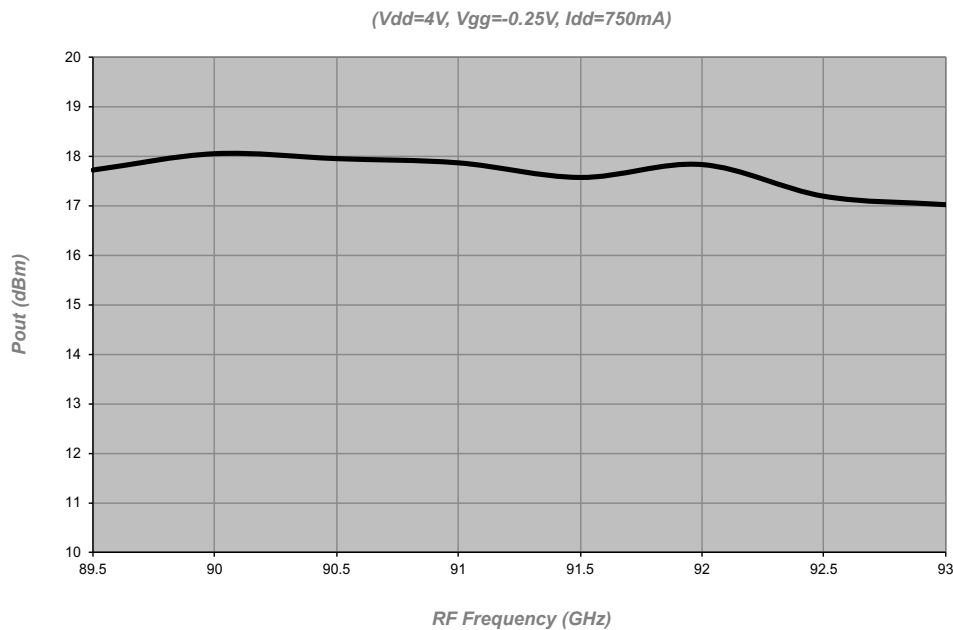


Figure 2
Saturated Output Power

Measured Performance Data

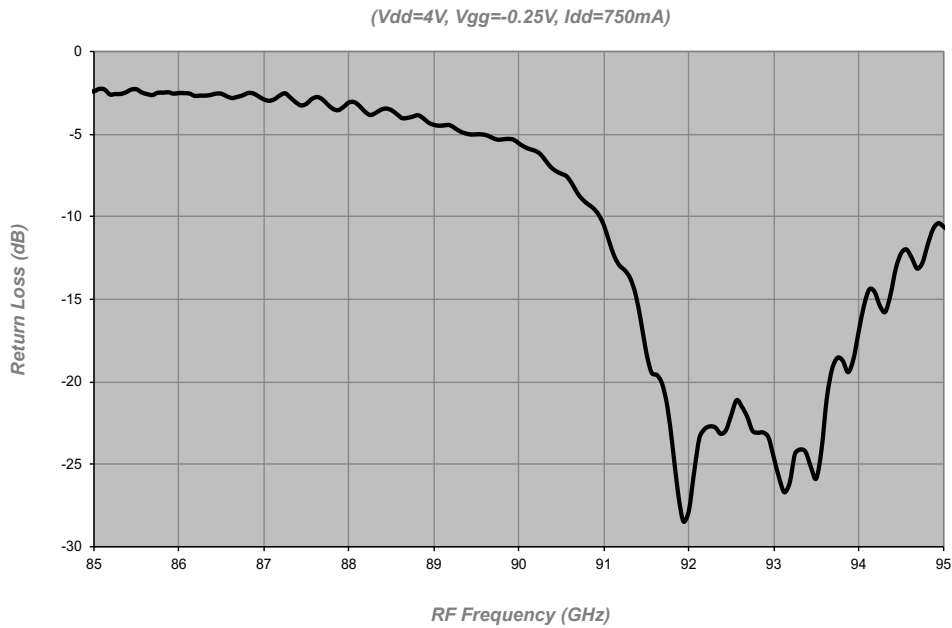


Figure 3
Input Return Loss

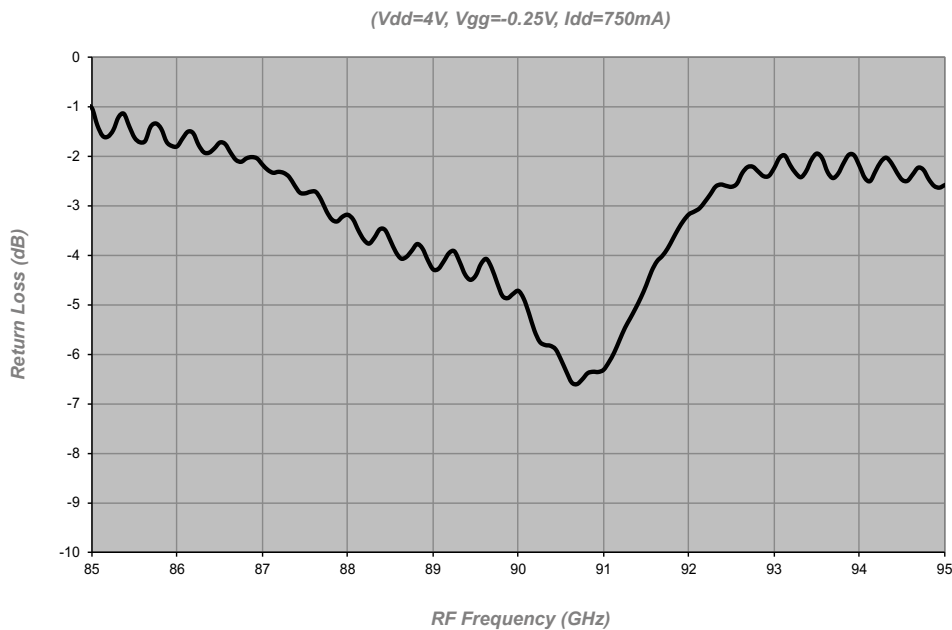
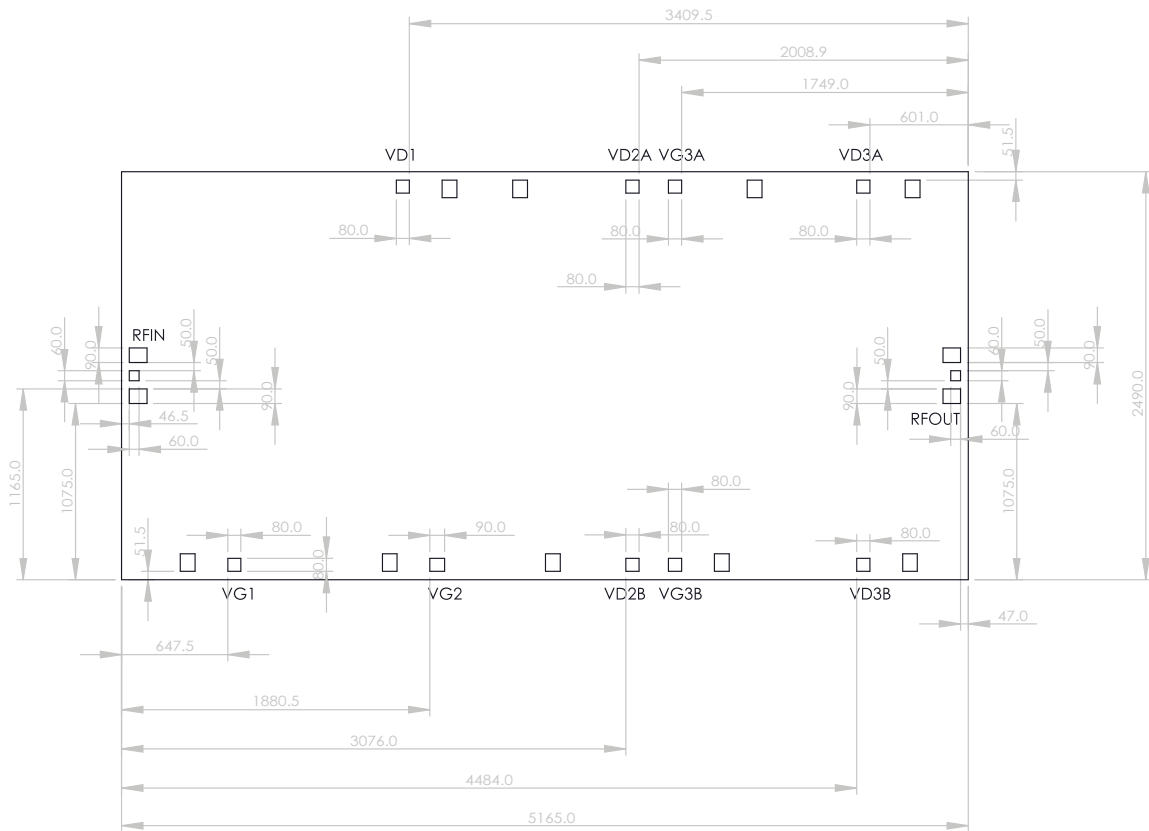


Figure 4
Output Return Loss

Outline Drawing



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. (letters signify part-stage biasing)
VGx	Gate bias pad for stage x. (letters signify part-stage biasing)
BOTTOM	The die backside must be connected to RF/DC ground.

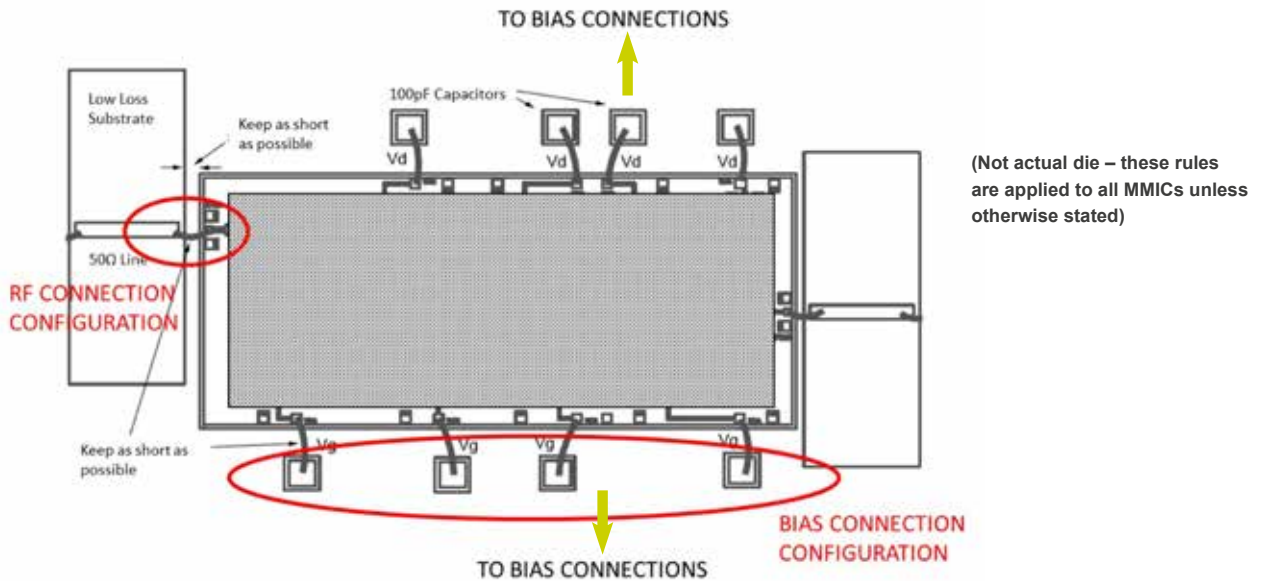
Notes

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

Die Packing Information

All die are delivered using gel-paks unless otherwise requested.

General Notes on Assembly



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.

Disclaimer

The information contained herein is believed to be reliable; however, Arralis makes no warranties regarding the information and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information is subject to change without notice, therefore customers should obtain the latest relevant information before placing orders for Arralis products. The information contained herein does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights.

This information does not constitute a warranty with respect to the product described, and Arralis disclaims any and all warranties either expressed or implied, relating to sale and/or use of Arralis products including liability or warranties relating to fitness for a particular purpose, consequential or incidental damages, merchantability, or infringement of any patent, copyright or other intellectual property right.

Without limiting the generality of the foregoing, Arralis products are not warranted or authorised for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2021 © Arralis

©2021 Arralis Ltd. All rights reserved. Trademarks and registered trademarks are the property of their respective owners.

Arralis European Offices
t: +(44) 1793 239670 (UK)
e: sales@arralis.com

arralis.com

Arralis USA Office
+(1) 386 301 3249 (USA)
e: emilie.wren@arralis.com

	W band Datasheet	W-PA-8993	Issue date: 30 April 2021	DOC REV 3	Page 8 of 8
---	-------------------------	------------------	---------------------------	------------------	-------------