W band MMIC
Medium Power Amplifier

W-MPA-8690 Previously named TU-W1330307

GaAs PHEMT MMIC Medium Power Amplifier, 86-90 GHz

Overview

W-MPA-8690 is a 4-stage MMIC power amplifier that covers frequencies from 86GHz to 90GHz. This MMIC provides greater than 23dB of stable gain, and a power output of more than 14dBm from a 2.5V supply voltage and 90mA current at the high output powers.

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.

Features

- 86 - 90GHz.
- >23dB gain.
- >14dBm Psat.
- Unconditionally stable.

Applications

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

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	86		90	GHz
Gain	20	23		dB
Input Return Loss	12	15		dB
Output Return Loss	10			dB
Output Power	14	15		dBm
Drain Voltage		2.5		V
Quiescent Current		80		mA

Notes
*Gate voltages should be adjusted to ensure the correct quiescent current is drawn.

All results are stated for temperatures at 25°C.

Assumes 100pF de-coupling capacitors on all bias pads.

Absolute Maximum Ratings

Parameter	Rating
Gate Voltage	-5V to 0.2V dc
Drain Voltage	5V
Drain Current	150mA
RF Input Power	0dBm
Storage Temperature	−65°C to +175°C
Channel Temperature	+175°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.

Performance Data

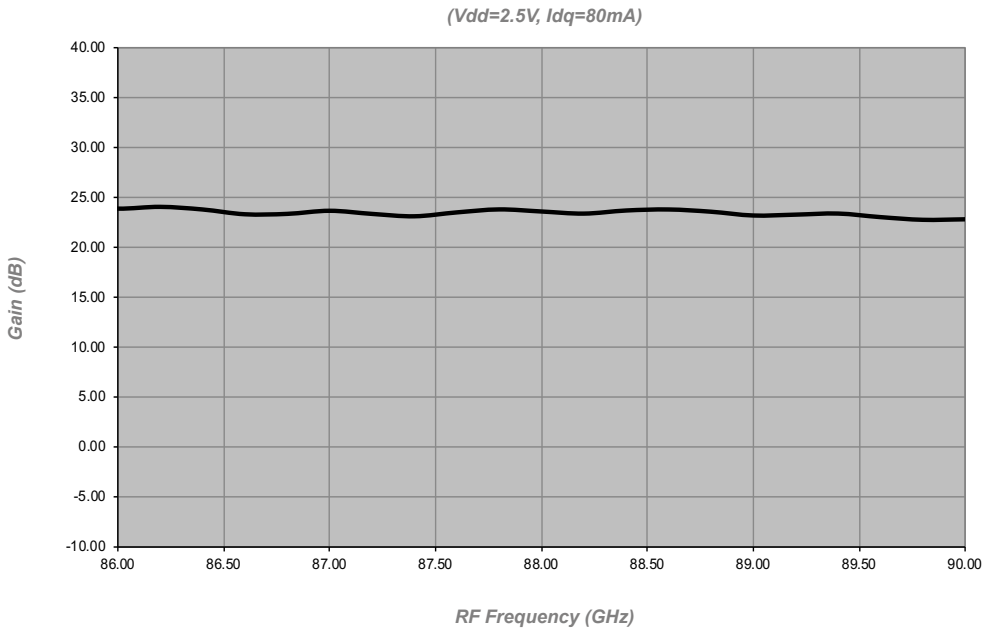


Figure 1
Gain

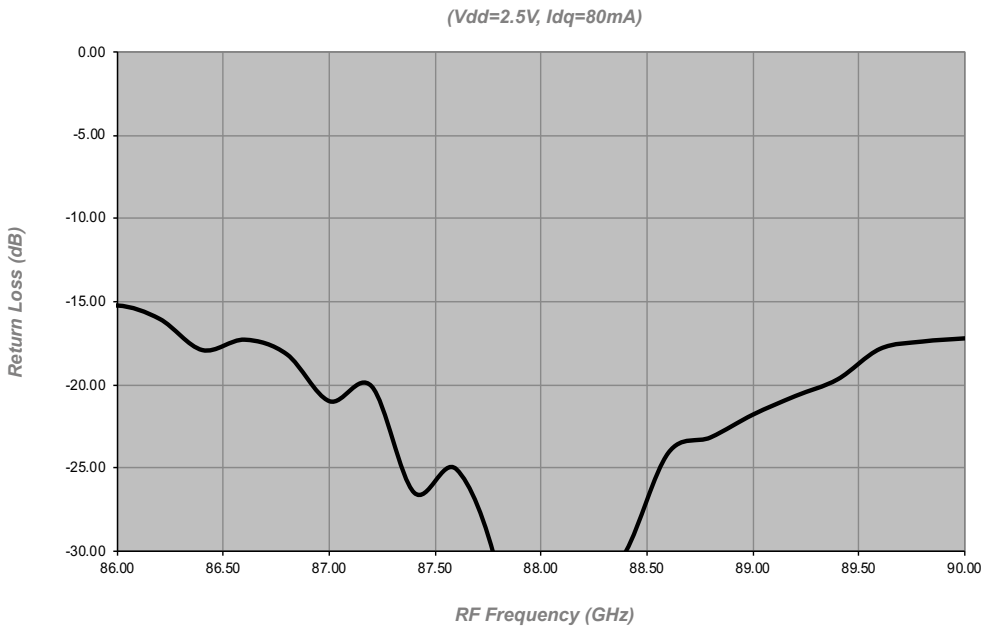


Figure 2
Input Return Loss

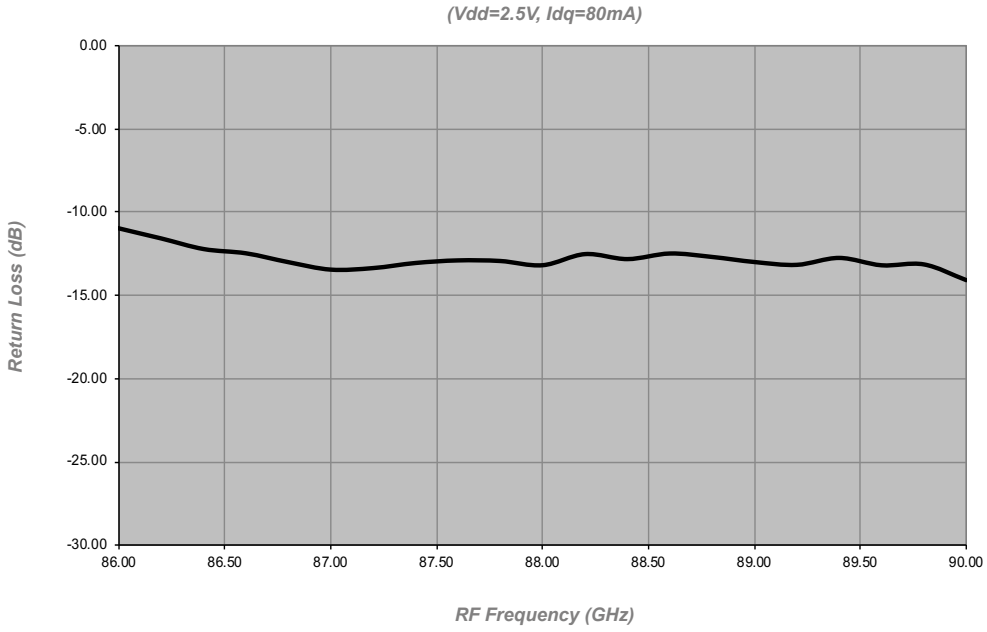


Figure 3
Output Return Loss

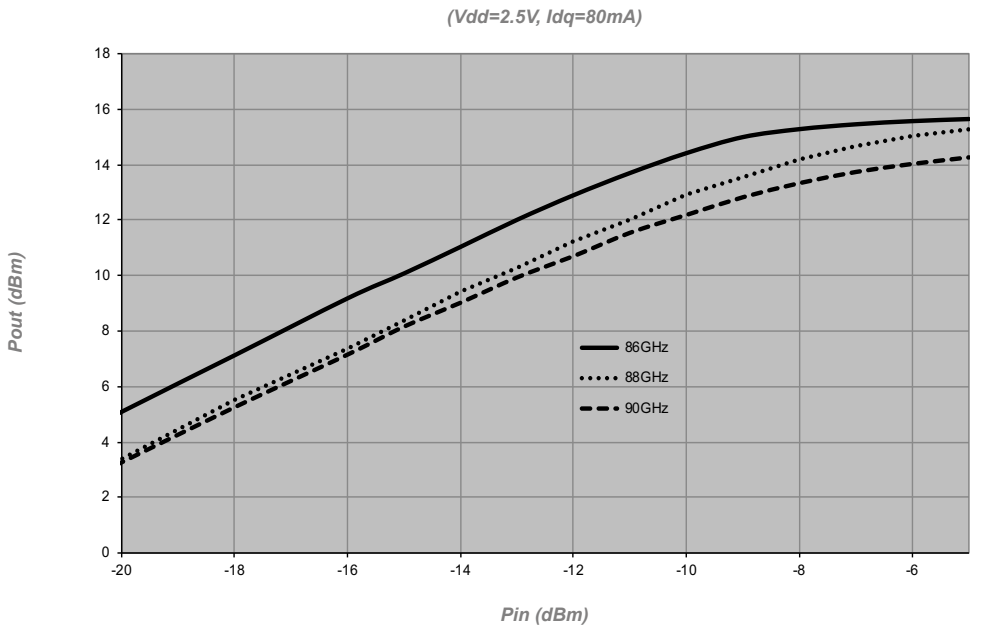


Figure 4
Power Characteristic

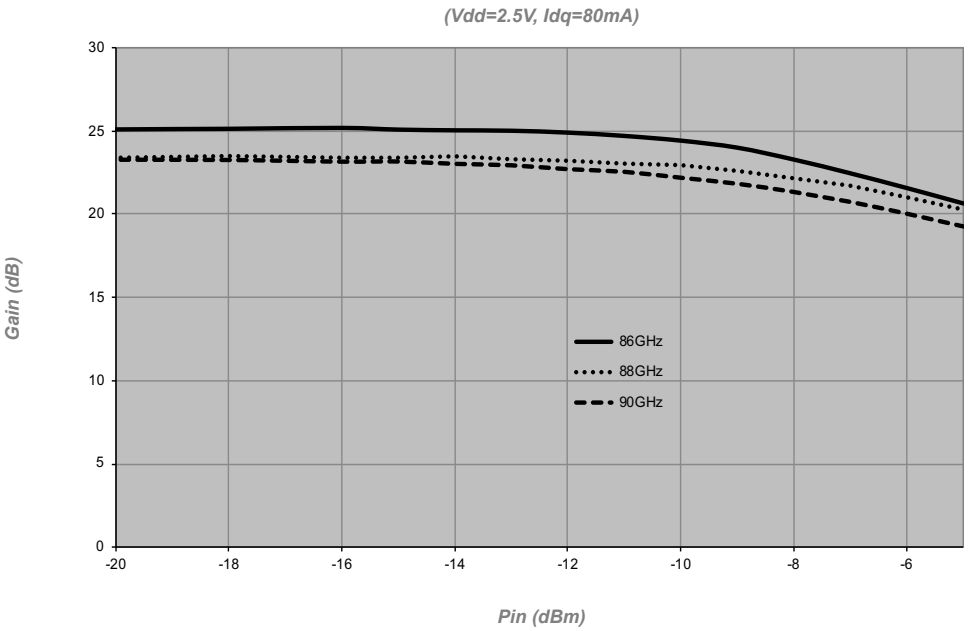


Figure 5
Gain Compression

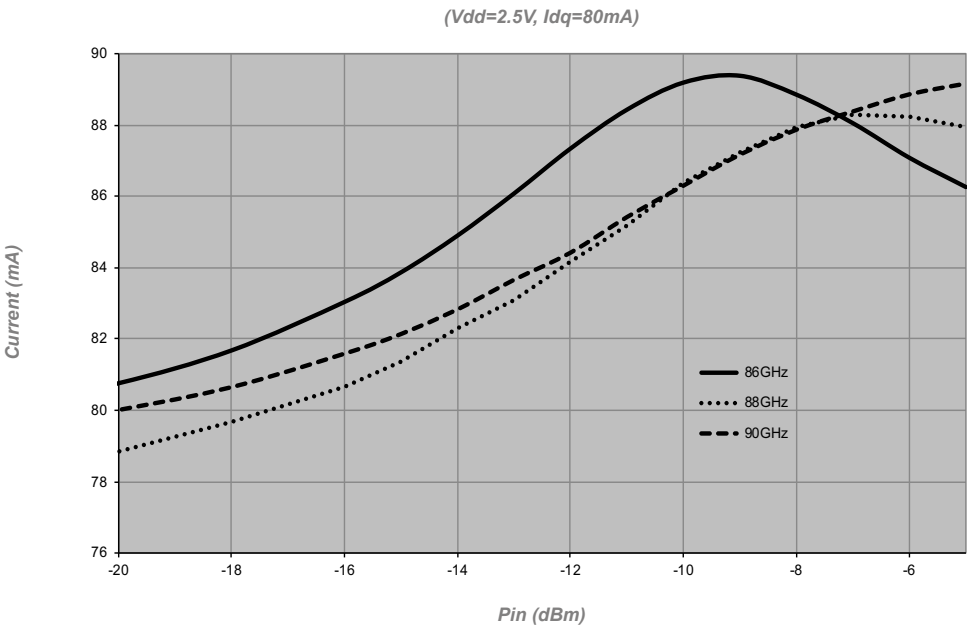
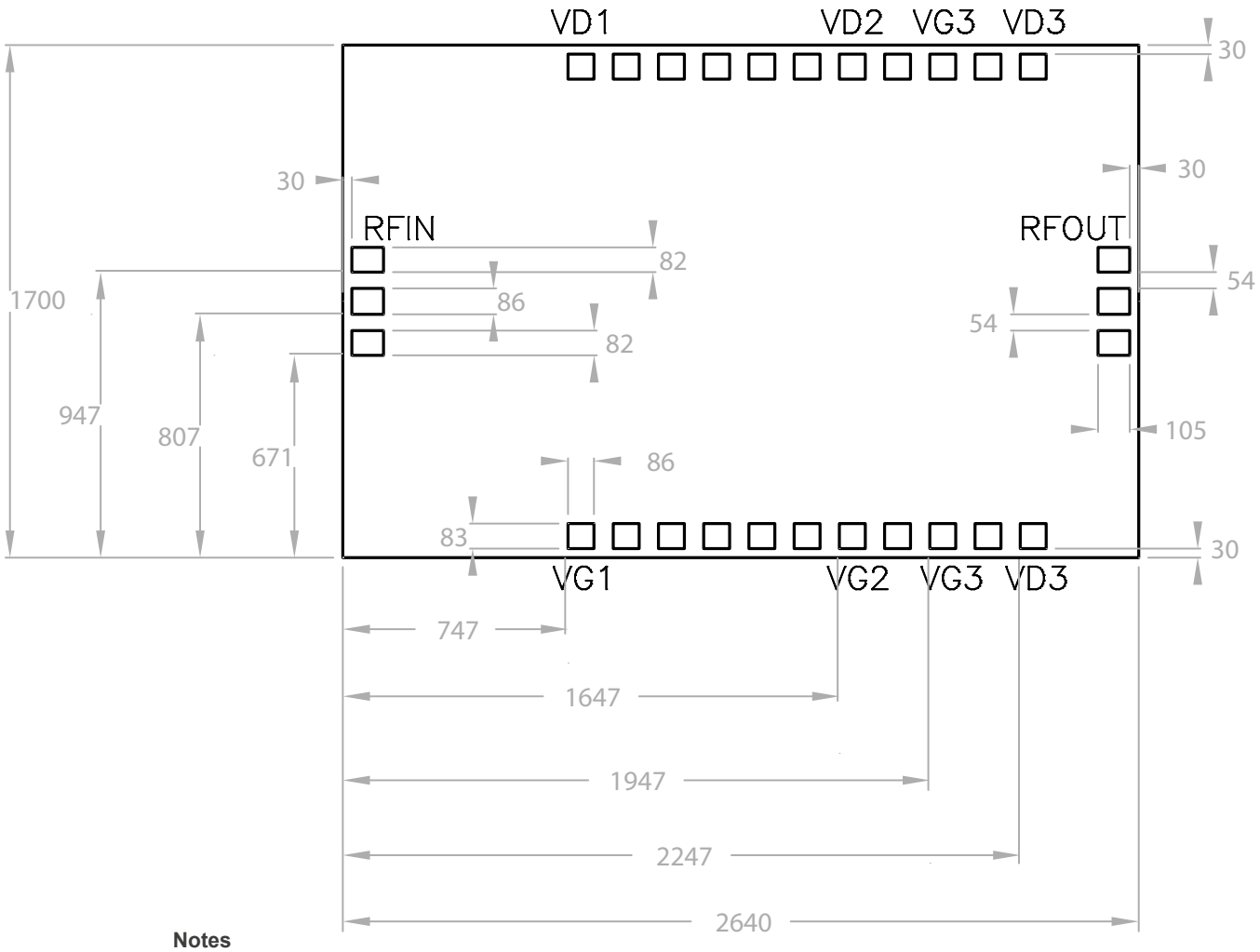


Figure 6
Current Draw

Outline Drawing

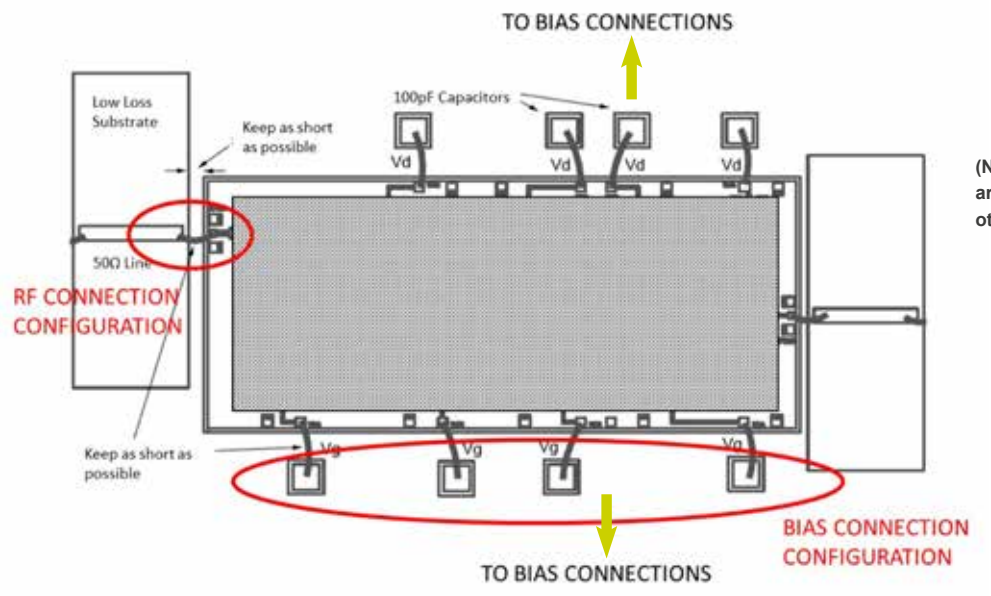


Notes

1. All dimensions are in um.
2. Typical DC bond pads are 83um x 86um.
3. RF bond pads are 105um x 86um.
4. Gold backside metalisation.
5. Backside metal is ground.
6. Die thickness is 70um.

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. VD3 can be biased either from the top side or bottom side (or both).
VGx	Gate bias pad for stage x. VG3 can be biased either from the top side or bottom side (or both).
BOTTOM	The die backside must be connected to RF/DC ground.



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

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. 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.

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