W band MMIC
Medium Power Amplifier

W-MPA-8691 Previously named TU-W1330304

Medium Power Amplifier, 86-91 GHz

Overview

W-MPA-8691 is a 4-stage MMIC power amplifier that covers frequencies from 86GHz to 91GHz. This MMIC provides greater than 20dB of stable gain, and a power output of more than 16dBm from a 4V supply voltage and <85mA 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 packaged version of the device is also available with WR10 waveguide input and output on request.

Features

- 86 - 91GHz.
- 20dB gain.
- 16dBm 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

(Vdd=4V, Vgg=-0.25V, Idd=750mA)

Parameter	Min.	Typ.	Max.	Units
Frequency	86		91	GHz
Gain	20			dB
Input Return Loss	6	15		dB
Output Return Loss	3		10	dB
Output Power		16		dBm
Drain Voltage		4		V
Gate Voltage*		-0.3		V
Current		85		mA

Notes
*Should be adjusted to ensure the correct 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	200mA
RF Input Power	6dBm
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

(Vdd=4V, Vgg=-0.3V, Idd=85mA)

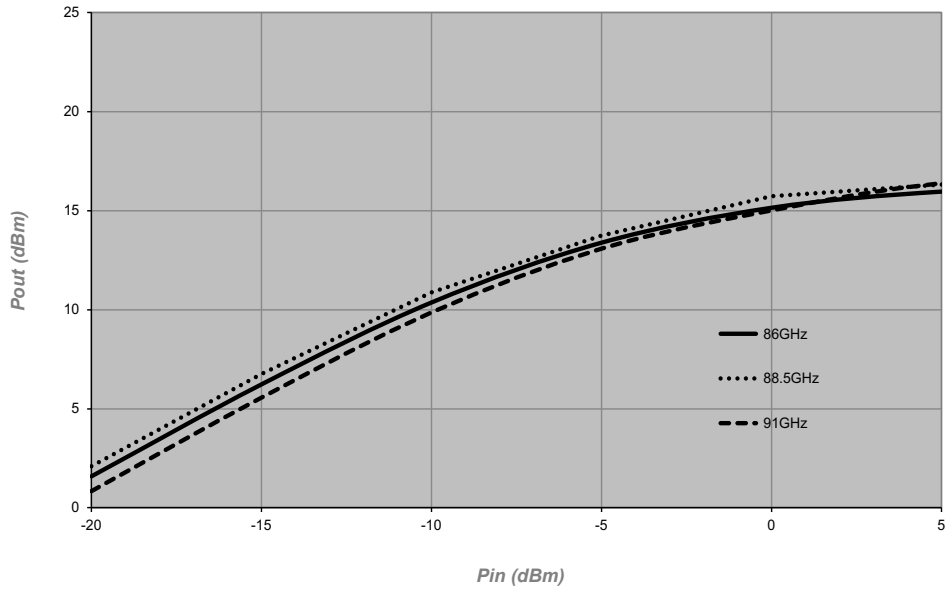


Figure 1
Output Power

(Vdd=4V, Vgg=-0.25V, Idd=750mA)

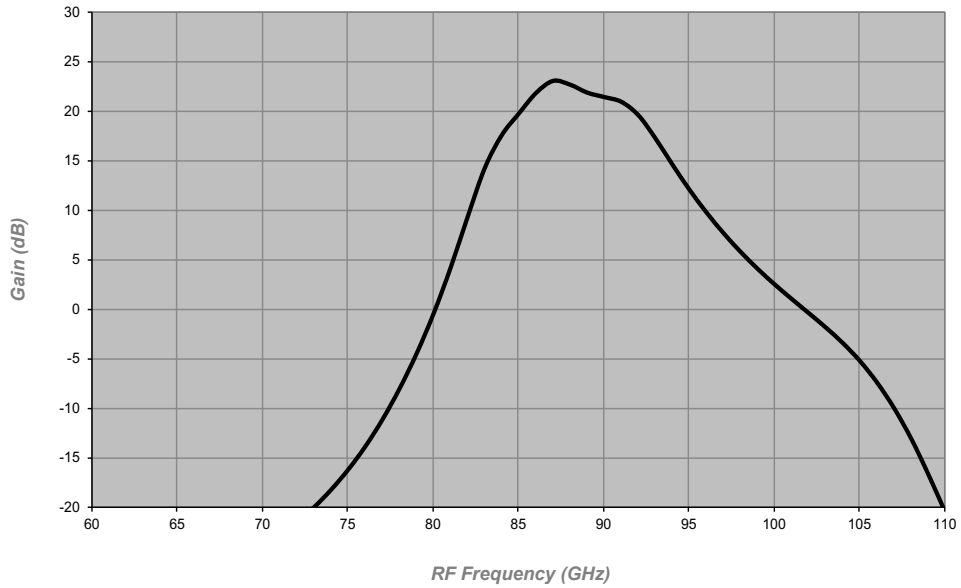


Figure 2
Gain

Performance Data

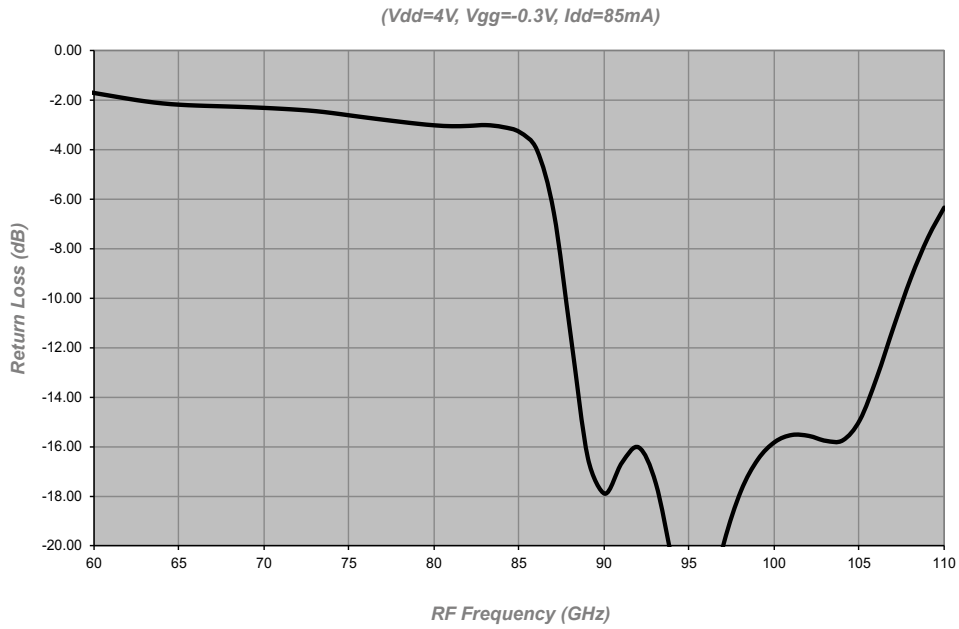


Figure 3
Input Return Loss

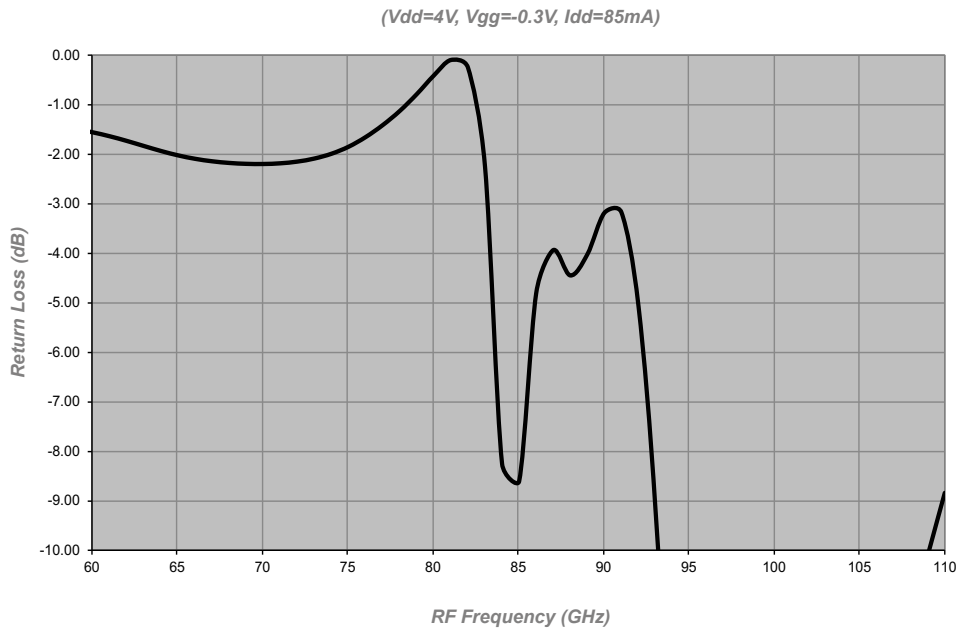
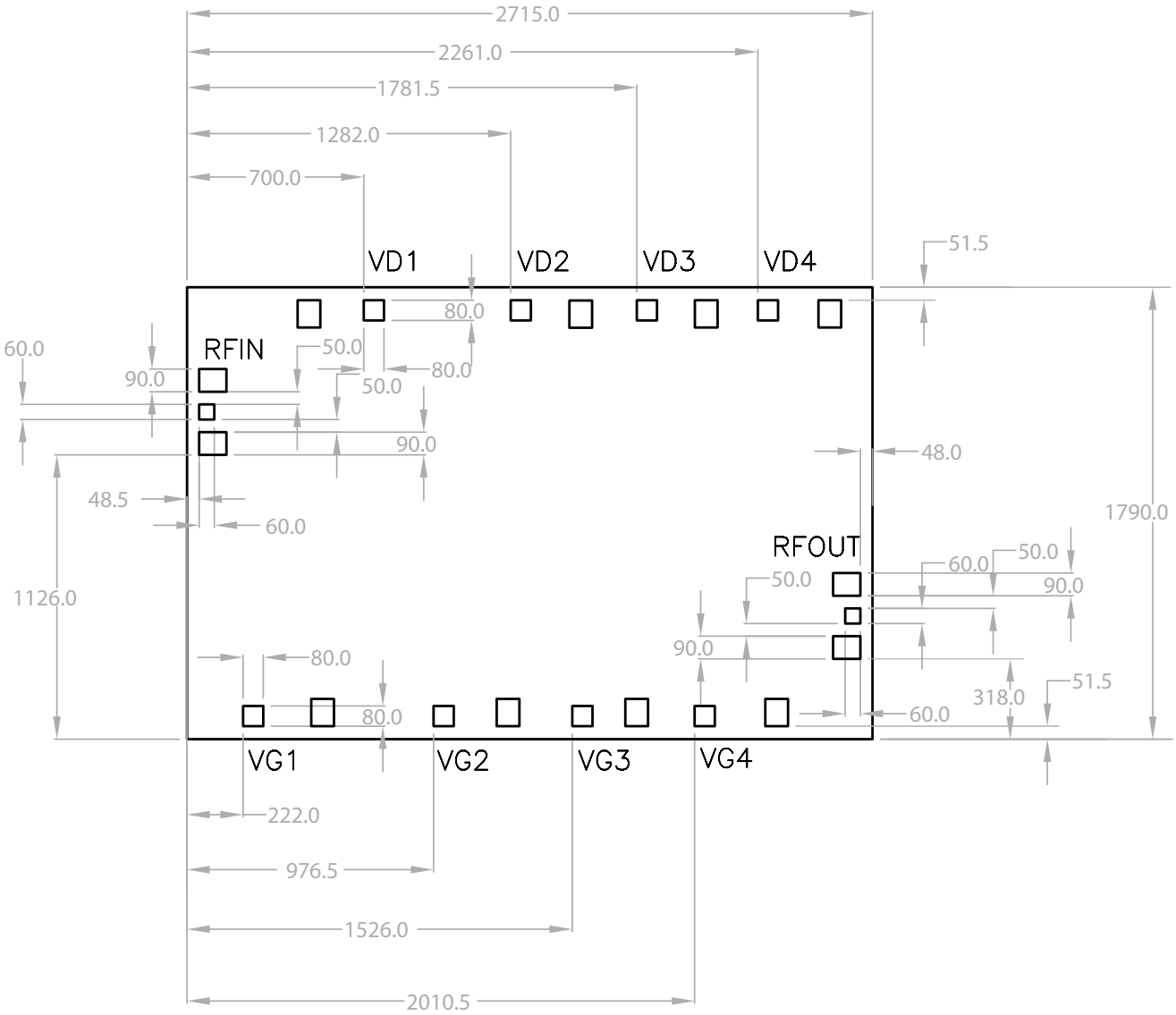


Figure 4
Output Return Loss

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.
VGx	Gate bias pad for stage x.
BOTTOM	The die backside must be connected to RF/DC ground.

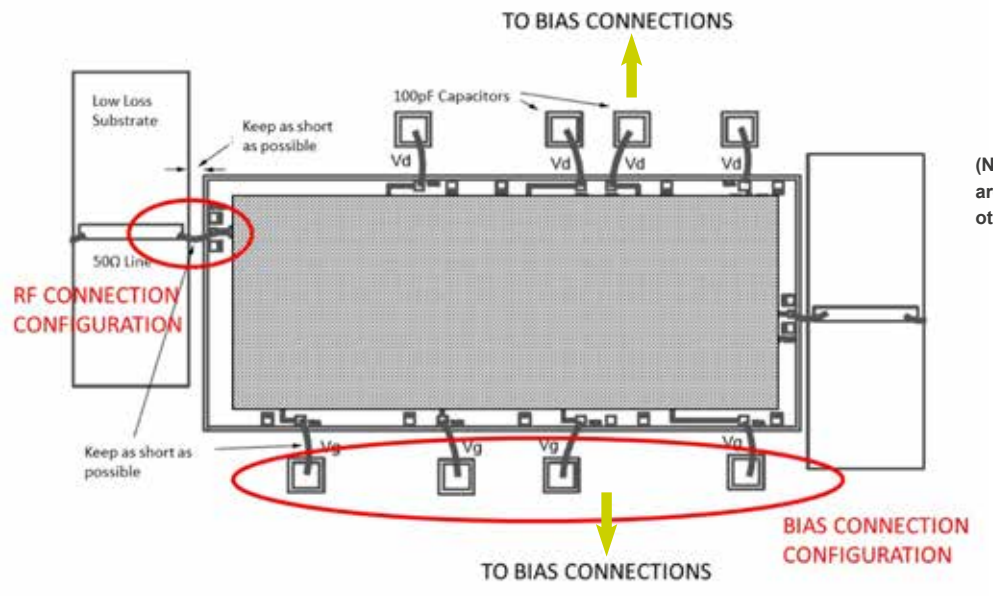
Notes

1. All dimensions are in um.
2. Typical DC bond pads are 80um square.
3. RF bond pads are 60um square.
4. Gold backside metalisation.
5. Backside metal is ground.
6. Die thickness is 50um.

Die Packing Information

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

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. Aluminium wire must not be used.

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