

W band MMIC Low Noise Amplifier

W-LNA-9296 Previously named TU-W1320301
GaAs PHEMT MMIC Low Noise Amplifier, 92 - 96GHz

Overview

W-LNA-9296 is a 4-stage MMIC low noise amplifier that covers from 92GHz to 96GHz. This MMIC provides up to 25dB of stable gain, with a typical noise figure of 5dB from a +2V supply voltage and at less than 70mA.

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

- 92 – 96GHz.
- 25dB gain.
- 5dB noise figure.

Applications

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

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Specification Overview

Parameter	Min.	Typ.	Max.	Units
Frequency	92		96	GHz
Gain	20	23		dB
Input Return Loss		6		dB
Output Return Loss		6		dB
Noise Figure*		5		dB
Drain Voltage		2		V
Nominal Gate Voltage**		-0.25		V
Current		60		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.

*Simulated.

**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	150mA
RF Input Power	0dBm
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

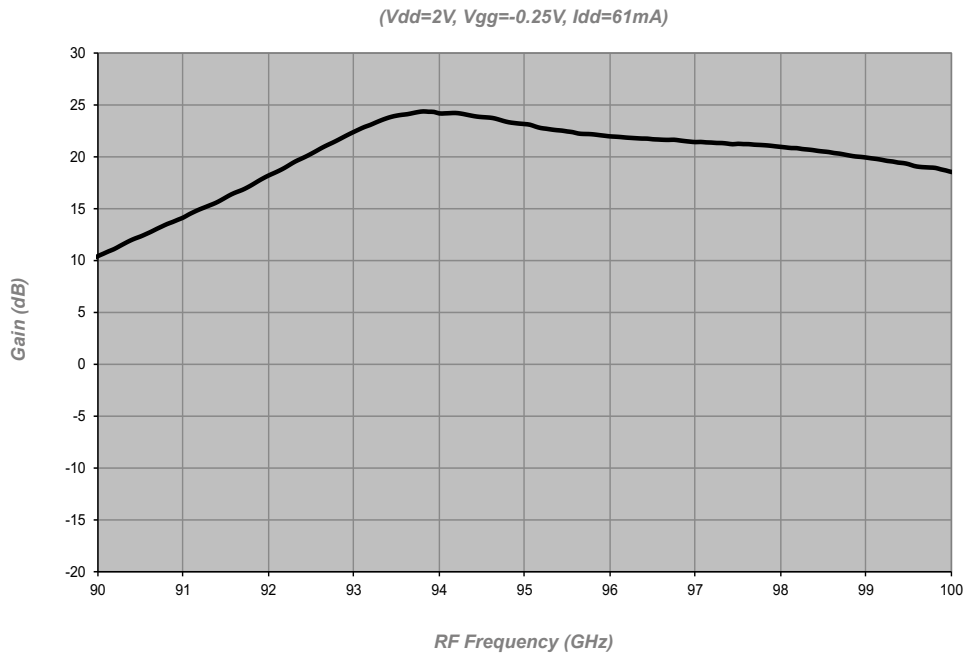


Figure 1
Gain

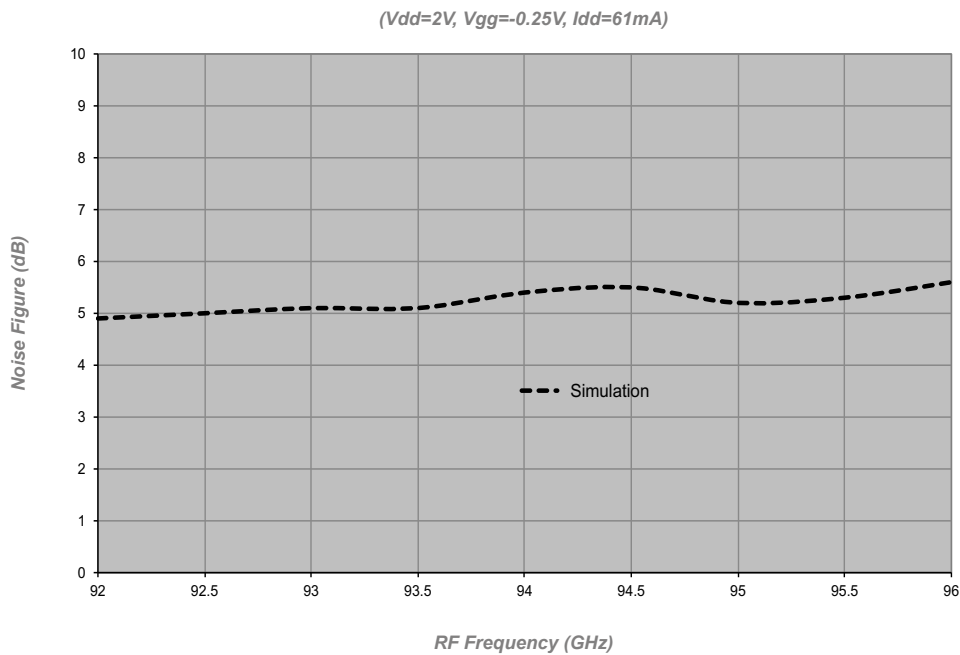


Figure 2
Noise Figure

Measured Performance Data

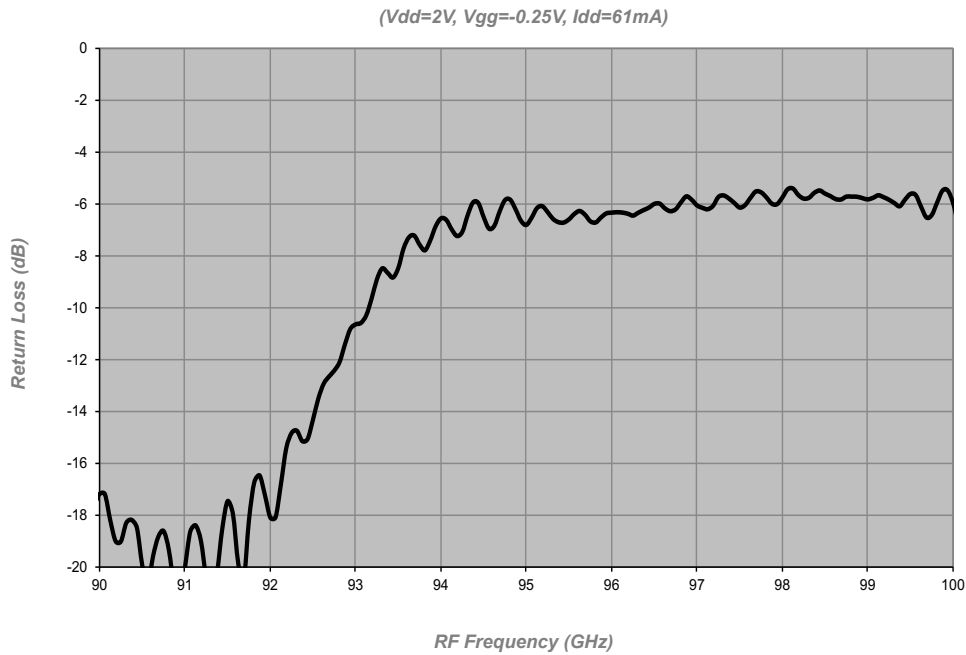


Figure 3
Input Return Loss

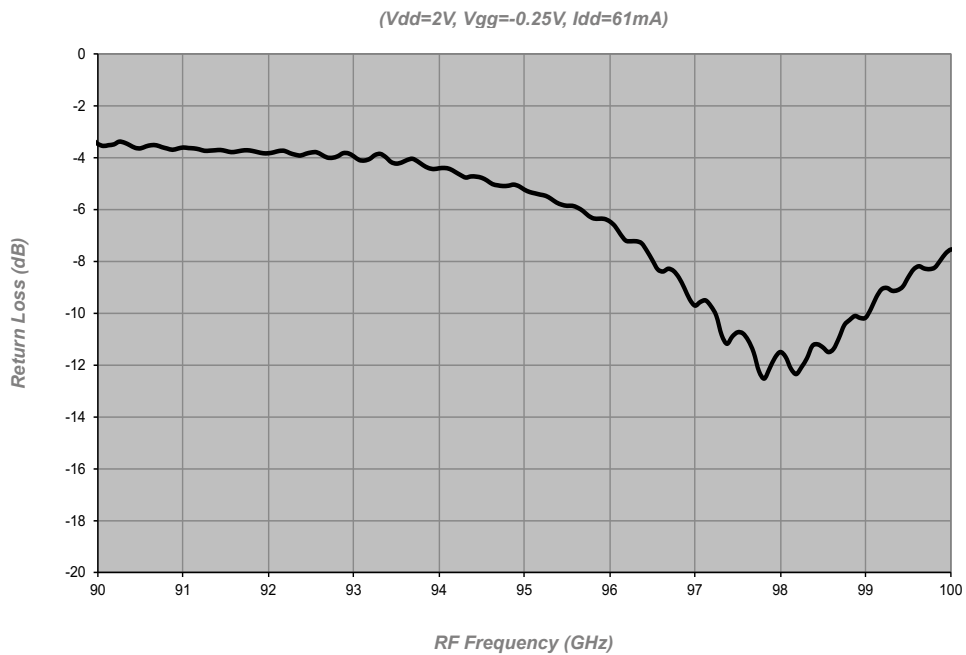


Figure 4
Output Return Loss

Measured Performance Data

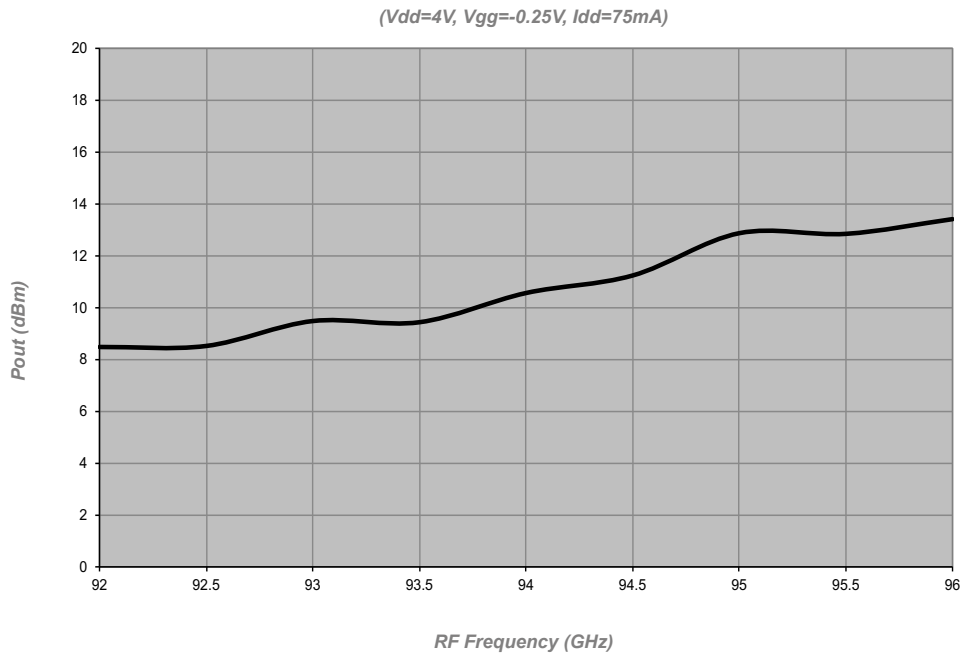
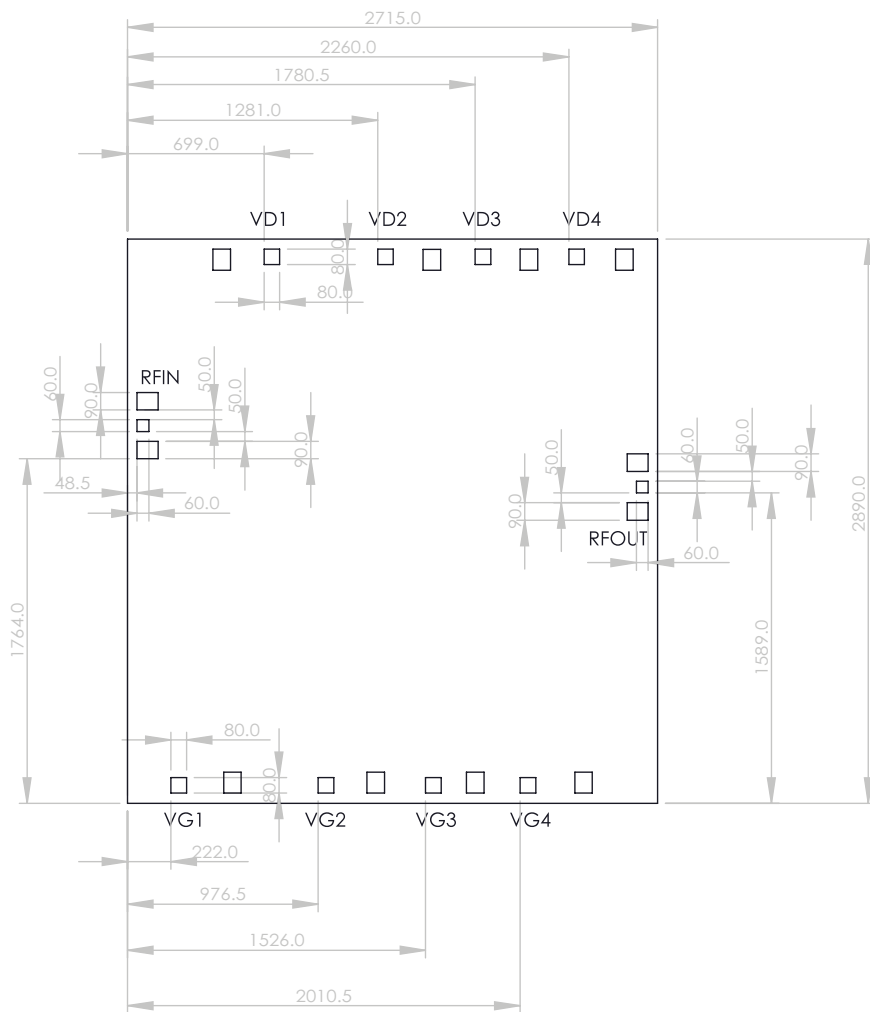


Figure 5
Saturated Output Power

Test Performed under 4V, 75mA bias

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

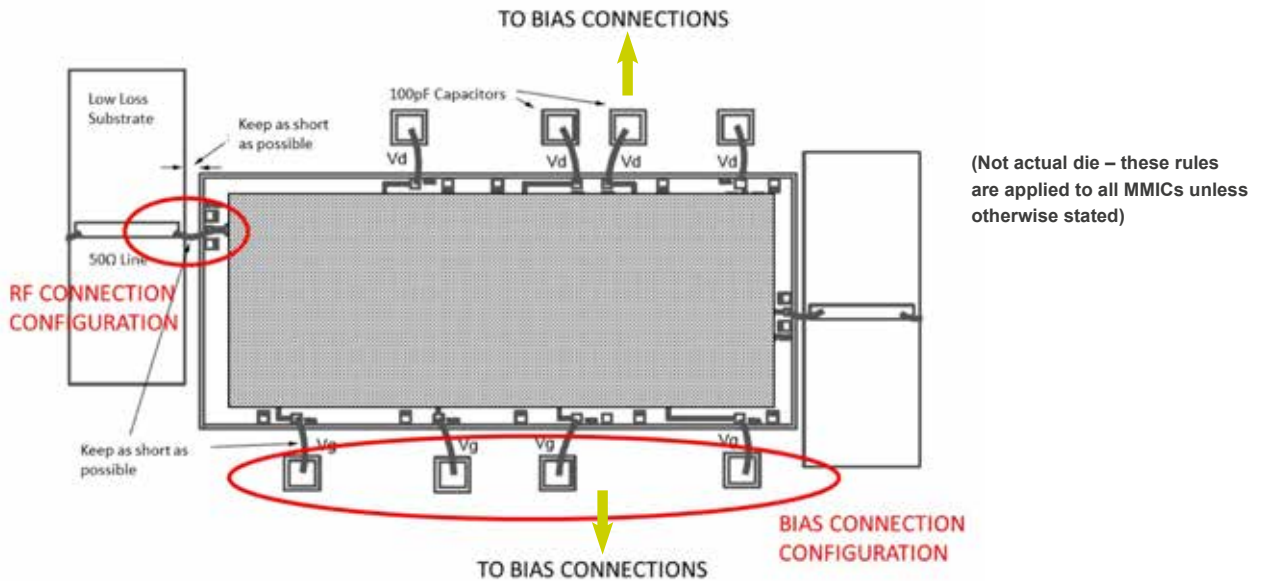
1. All dimensions are in um.
2. Typical DC bond pads are 80um square.
3. RF bond pads are 60um square.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabelled bond pads.
8. Die thickness is 50um

Die Packing Information

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

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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.

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