W band MMIC
Upconverter Core Chip

W-UC-9396 Previously named TU-W1360302

GaAs PHEMT Upconverter Core Chip, 92 – 96GHz

Overview

W-UC-9396 is an integrated mixer and medium power amplifier MMIC that upconverts frequencies from 2 – 6GHz into the 92 - 96GHz frequency band. This MMIC provides very low conversion loss with a maximum output power of 10dBm running from a +4V supply voltage and at less than 80mA.

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

The MMIC is available in die form.

Features

- 92 – 96GHz output.
- 2 – 6GHz input.
- <4dB conversion loss.
- >10dBm P3 output power.

Applications

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

Specification Overview

Parameter	Min.	Typ.	Max.	Units
Output Frequency	92		96	GHz
IF Frequency	2		6	GHz
Conversion Loss		0	4	dB
LO Frequency	86.6		90.6	GHz
LO Power		13		dBm
Power Output		10	13	dBm
Drain Voltage		4		V
Current		75		mA

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

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

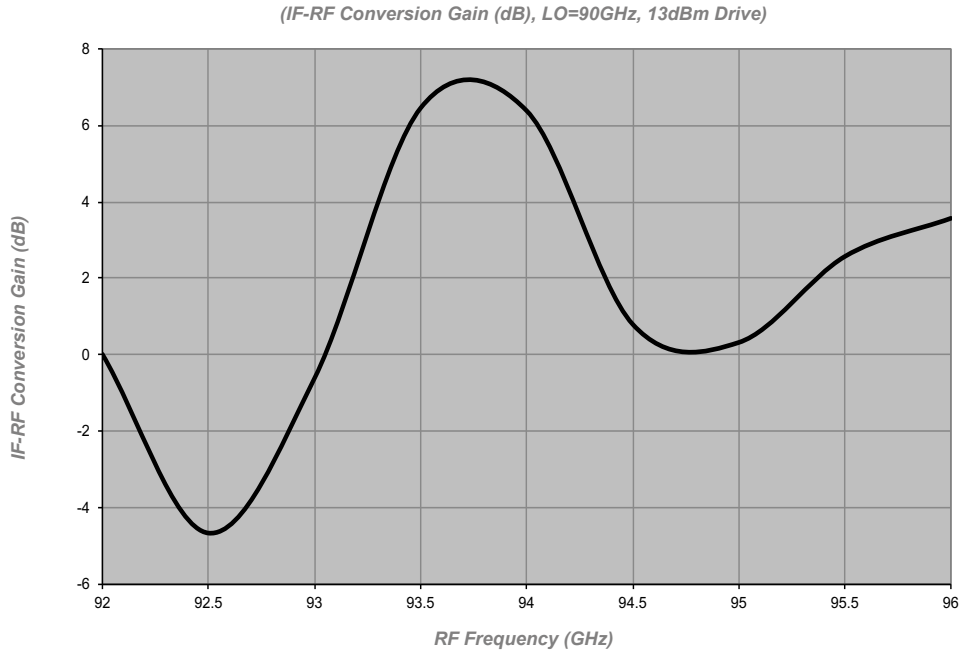


Figure 1
Conversion Gain

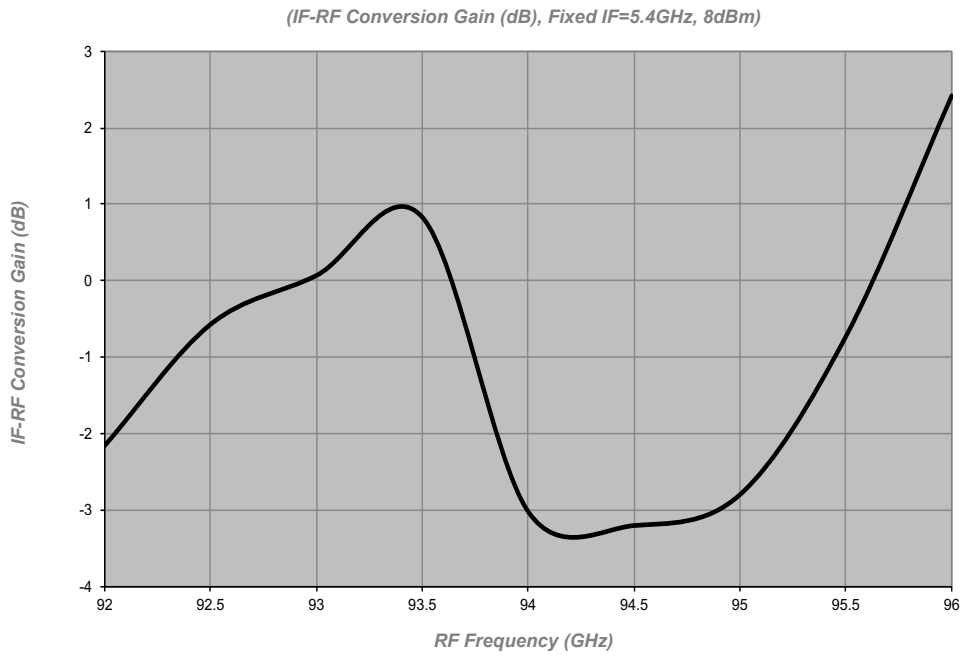


Figure 2
Conversion Gain

Measured Performance Data

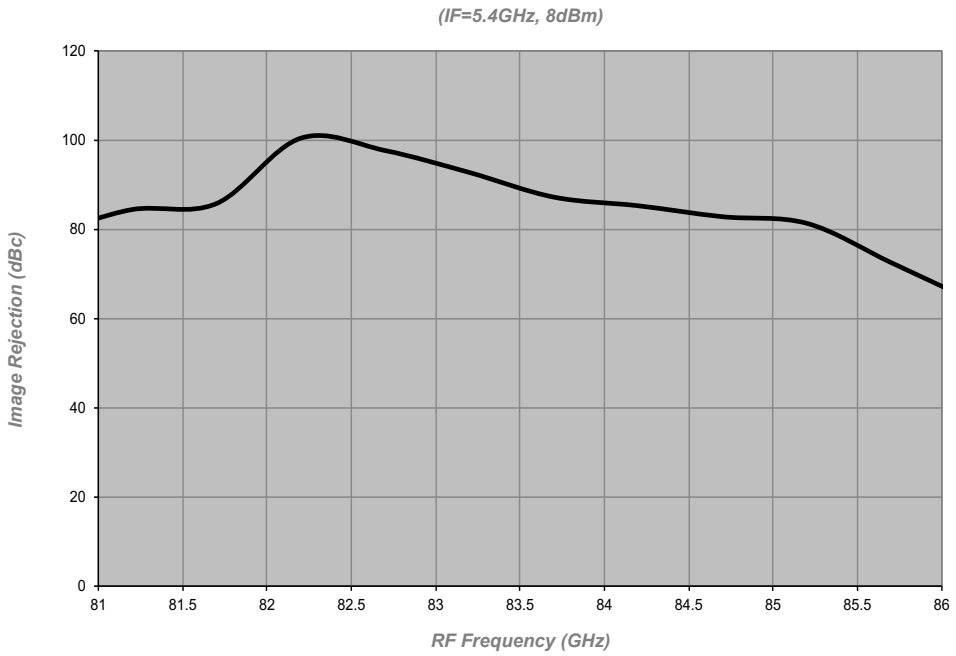
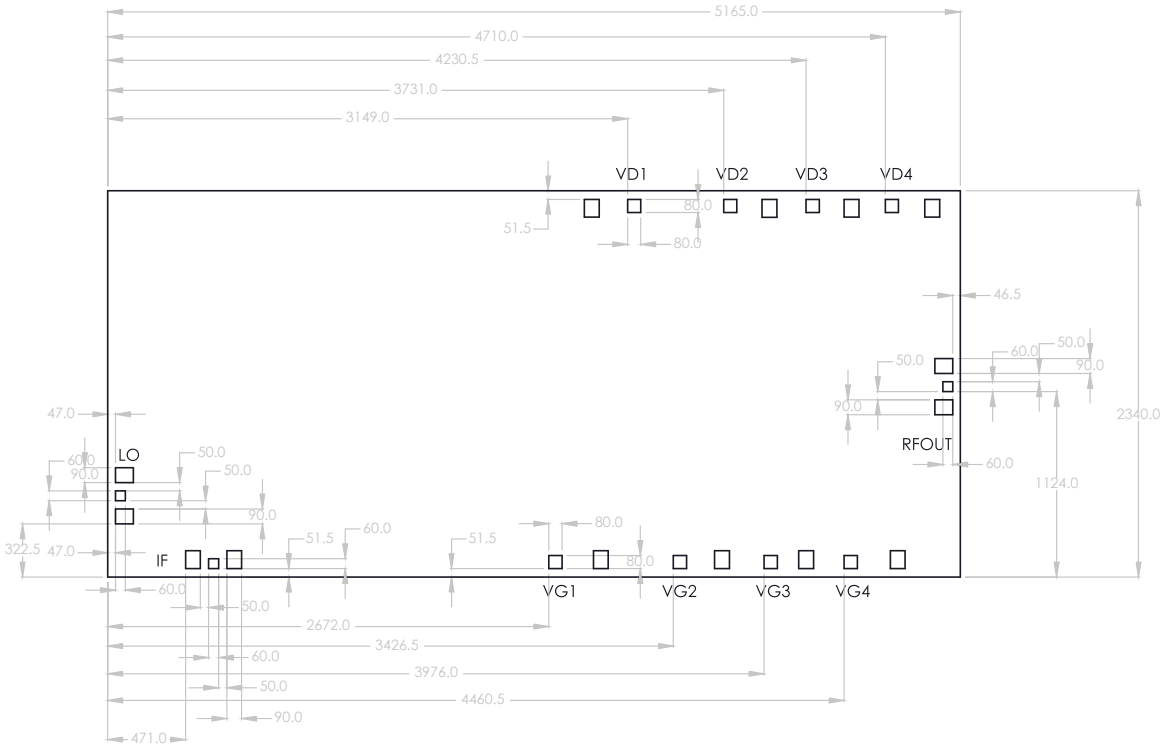


Figure 3
Image Rejection

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

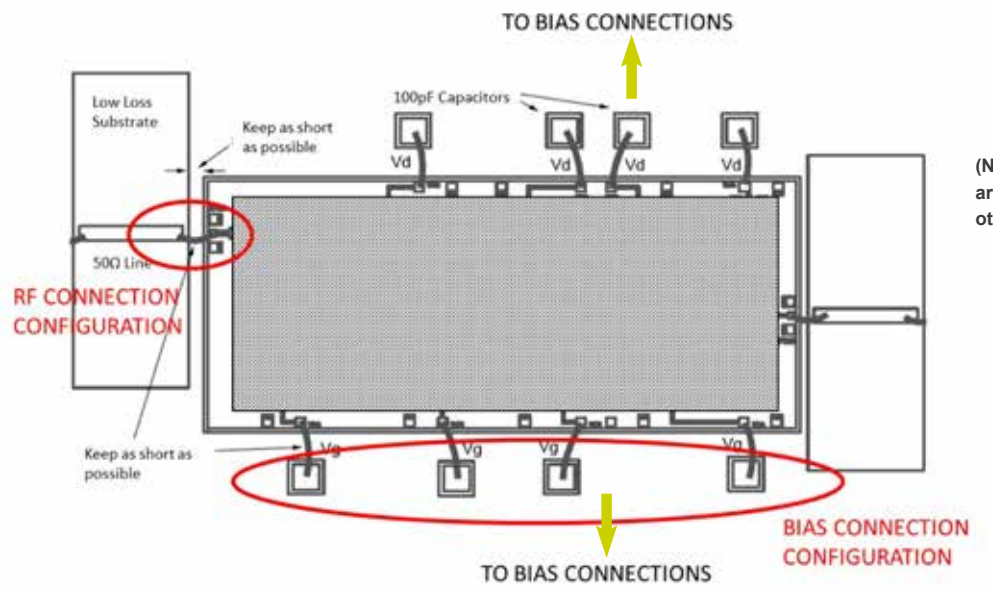
Die Packing Information

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

Pad Descriptions

Name	Description
LO	Input for LO signal. Requires AC coupling.
IF	Output for IF signal. Requires AC coupling.
RFOUT	Output pad for RF signal. 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)

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.

Recommended Bias Conditions for Optimum Performance

Name	Description
Vd	4V
Id	75mA
Storage Temperature	-65oC to 150oC Dry
Maximum Operating Temperature	85oC

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