W band MMIC SP3T Switch

W-SP3T-90110 Previously named TU-W1401503

GaAs Diode SP3T MMIC Switch, 90 – 110 GHz

Overview

W-SP3T-90110 is a SP3T diode based switch that covers frequencies from 90 GHz to 110 GHz.

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

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

Features

- 90 – 110GHz.
- 6dB insertion loss.
- 10dB return loss.
- >15dB isolation.

Applications

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

Specification Overview

Parameter	Min.	Typ.	Max.	Units	Notes
Frequency	90		110	GHz	
Insertion Loss Closed		6		dB	Biased at 1.5V, 0mA Open branches Biased at -1.5V, 50mA Closed branch
Isolation (RFIN to RFx)	15			dB	Biased at 1.5V, 0mA Open branches Biased at -1.5V, 50mA Closed branch
Return Loss Closed		10		dB	Biased at 1.5V, 0mA Open branches Biased at -1.5V, 50mA Closed branch
Return Loss Open		8		dB	Biased at 1.5V, 0mA Open branches Biased at -1.5V, 50mA Closed branch
Operating Voltage	-1.5		+1.5	V	
Operating Current	50		0	mA	

Absolute Maximum Ratings

Parameter	Rating
Control Voltage	-2V to +10V dc
RF Power	25dBm
Storage Temperature	−65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	−40°C to +85°C

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

(Vcc=1.5V, Icc=0mA OPEN; Vcc=-1.5V, Icc=50mA Closed)

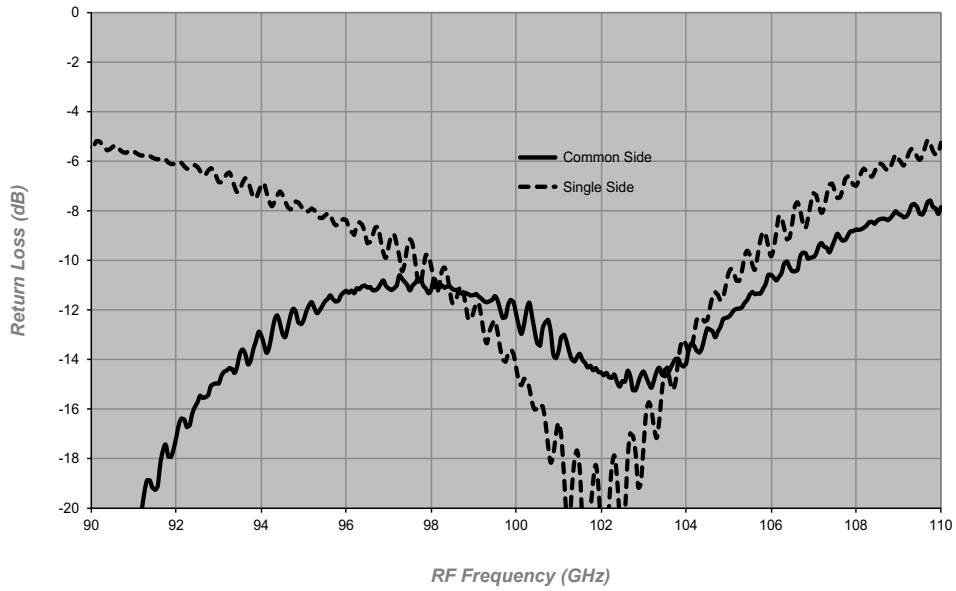


Figure 1
'Closed Path' Return Loss

(Vcc=1.5V, Icc=0mA OPEN; Vcc=-1.5V, Icc=50mA Closed)

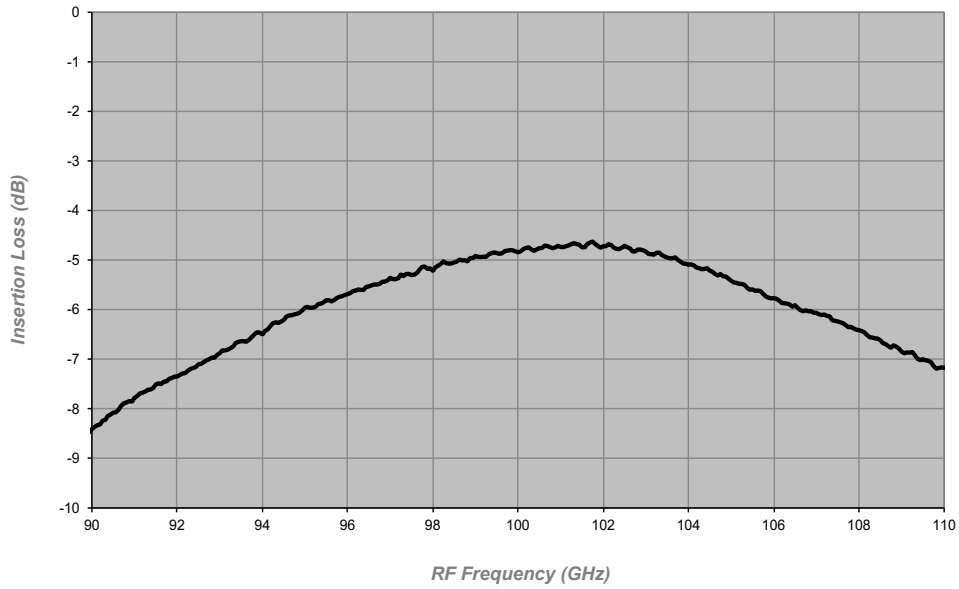


Figure 2
'Closed Path' Insertion Loss

Measured Performance Data

(Vcc=1.5V, Icc=0mA OPEN; Vcc=-1.5V, Icc=50mA Closed)

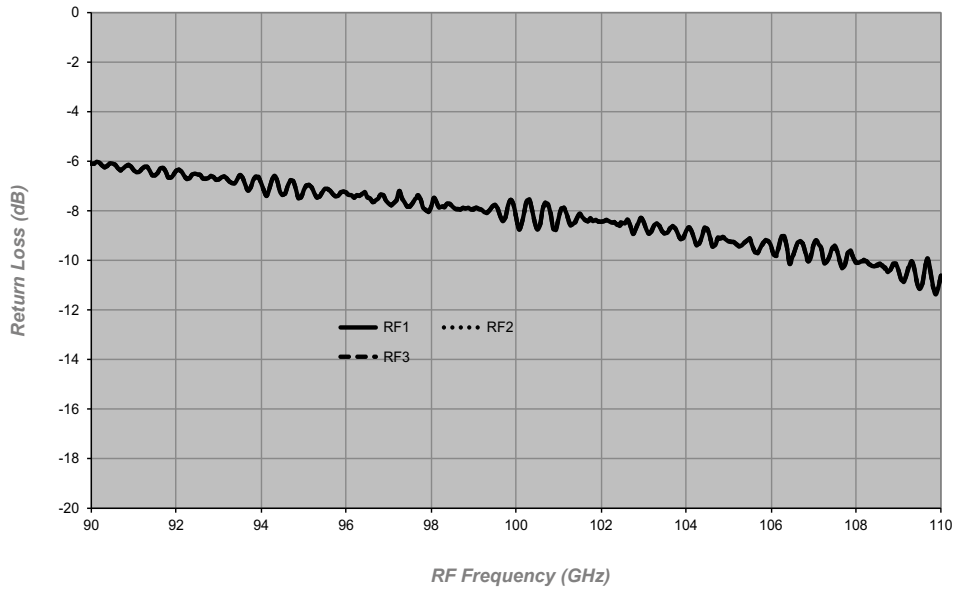


Figure 3
'Open Side' Return Loss

(Vcc=1.5V, Icc=0mA OPEN; Vcc=-1.5V, Icc=50mA Closed)

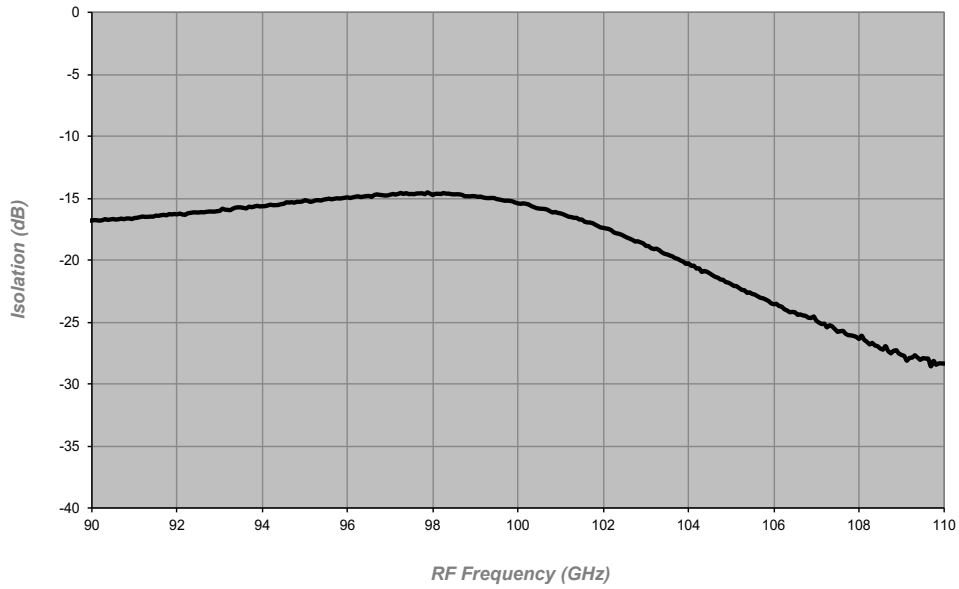
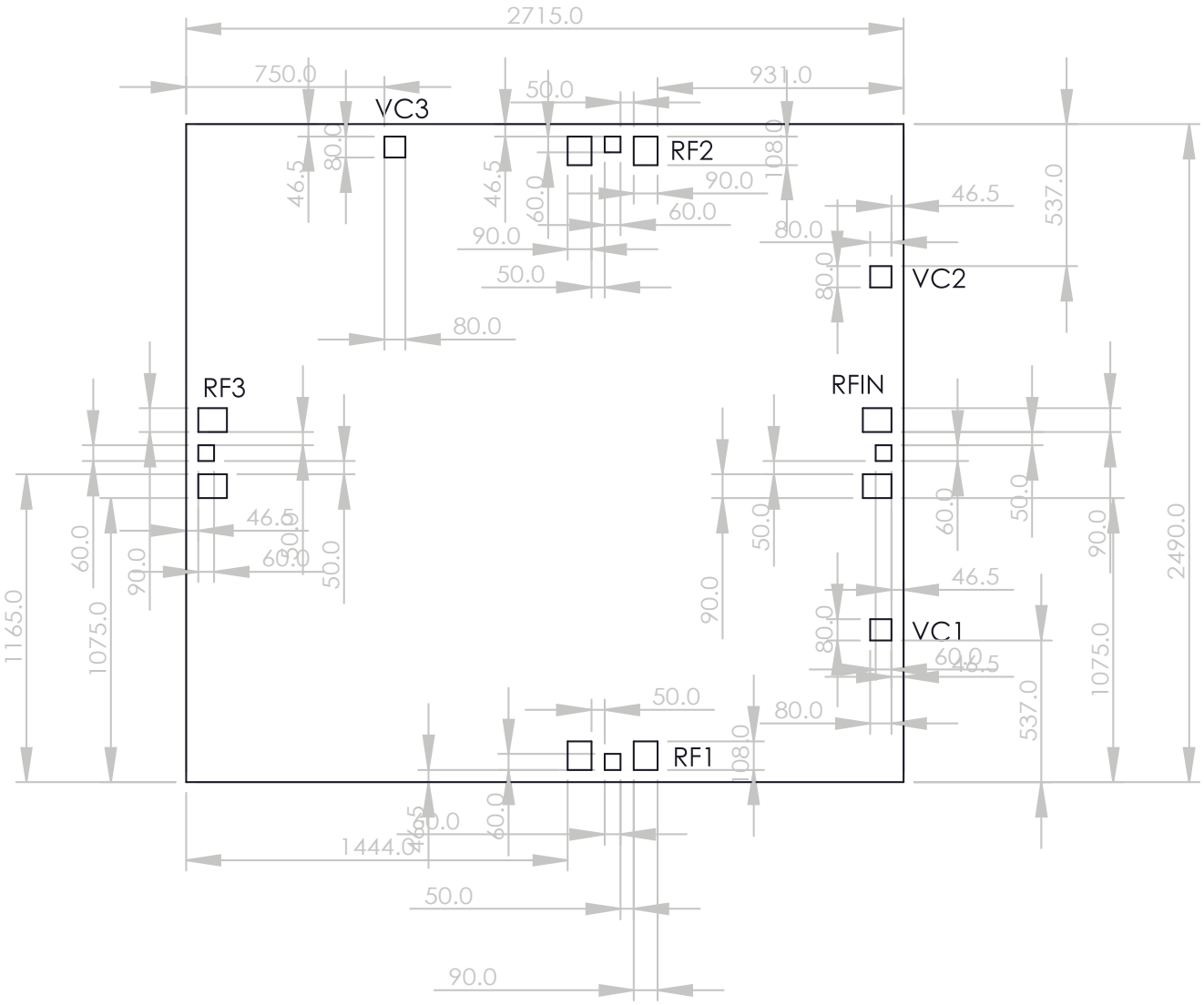


Figure 4
'Open Path' Isolation

Outline Drawing



Pad Descriptions

Name	Description
RFIN	Common RF pad. This pad is AC coupled.
RFx	RF pad for branch x. This pad is AC coupled.
VCx	Control Voltage pad for branch x.
BOTTOM	The die backside must be connected to RF/DC ground.

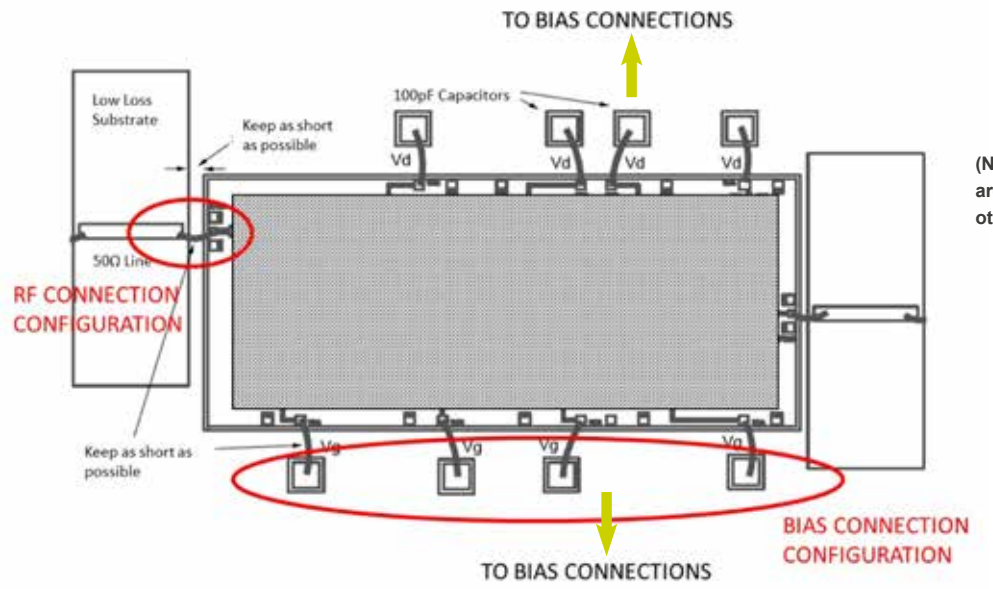
Notes

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.

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. 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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