

W band MMIC SPST / Attenuator Switch

W-SPST-90100

Previously named TU-W1401601

GaAs PHEMT MMIC Attenuator / SPST Switch, 90 – 100 GHz

Overview

The W-SPST-90100 is a GaAs PHEMT diode based SPST switch and variable attenuator with a single input and output. The attenuation value may be adjusted to any value within the specified attenuation range. The chip is manufactured on a 50um substrate with 100nm gate length. All bond pads and the die underside are gold plated. The control voltage ranges from +1.5V to -1.5V, the latter giving maximum attenuation.


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 devices is also available with WR10 waveguide input and output

Features

- 90 – 100GHz.
- 2 - 25 dB attenuation range.
- Low operating current.
- >15dBm power handling.
- High speed operation.
- Small chip size.

Applications

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

	W band Datasheet	W-SP3T-90100	Issue date: 30 April 2021	DOC REV 3	Page 1 of 9
-------------------------------------------------------------------------------------	------------------	--------------	---------------------------	-----------	-------------

Specification Overview

Parameter	Min.	Typ.	Max.	Units	Notes
Frequency	90		100	GHz	
Insertion Loss Closed	1.5	1.75	2.0	dB	Biased at 1.5V, 0mA
Isolation (RF1 to RF2)	20	23	25	dB	Biased at -1.5V, 25mA
Return Loss Closed	10	12		dB	Biased at 1.5V, 0mA
Return Loss Open	6		12	dB	Biased at -1.5V, 25mA
Attenuation	2		25	dB	
Maximum OP Power		15		dBm	at P1dB
Operating Voltage	-1.5		+1.5	V	
Operating Current	25		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

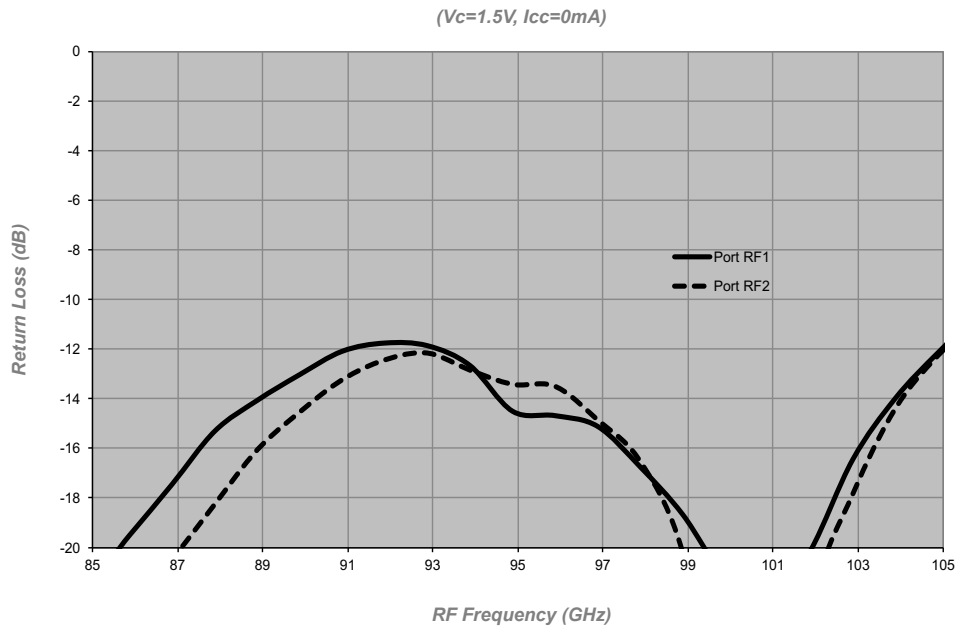


Figure 1
'Closed' Return Loss

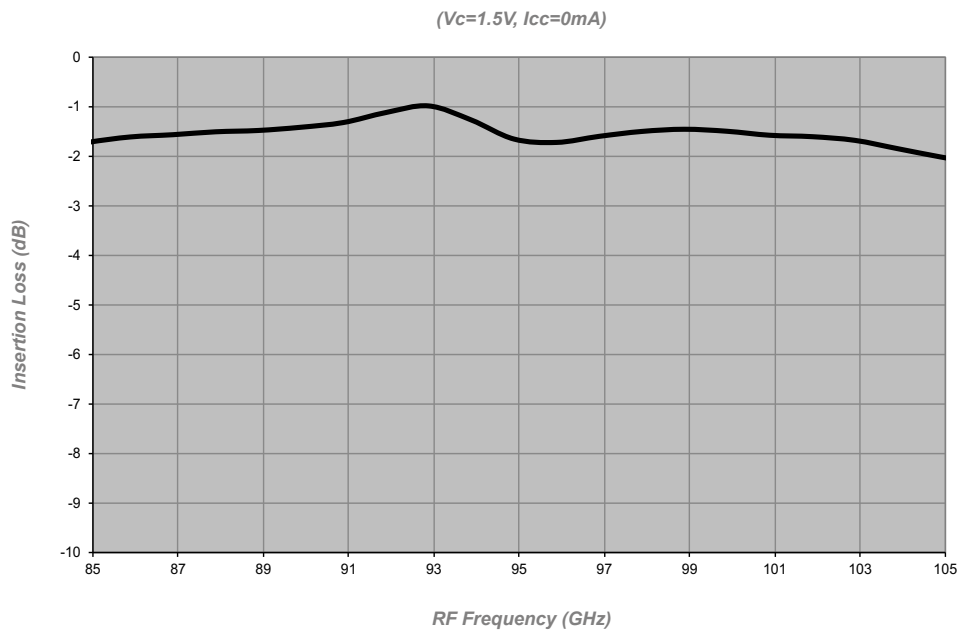


Figure 2
'Insertion Loss

Measured Performance Data

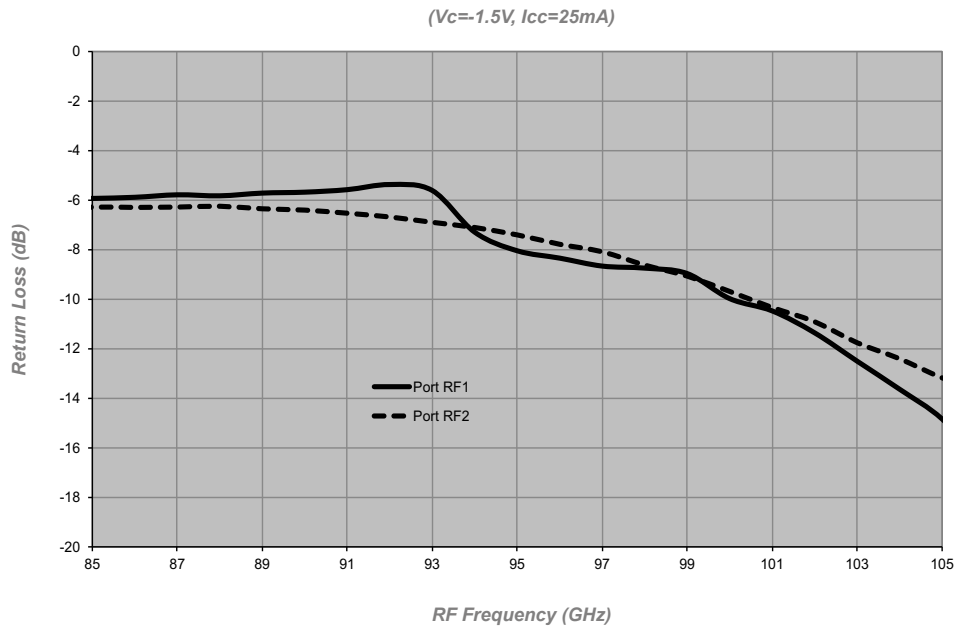


Figure 3
'Open' Return Loss

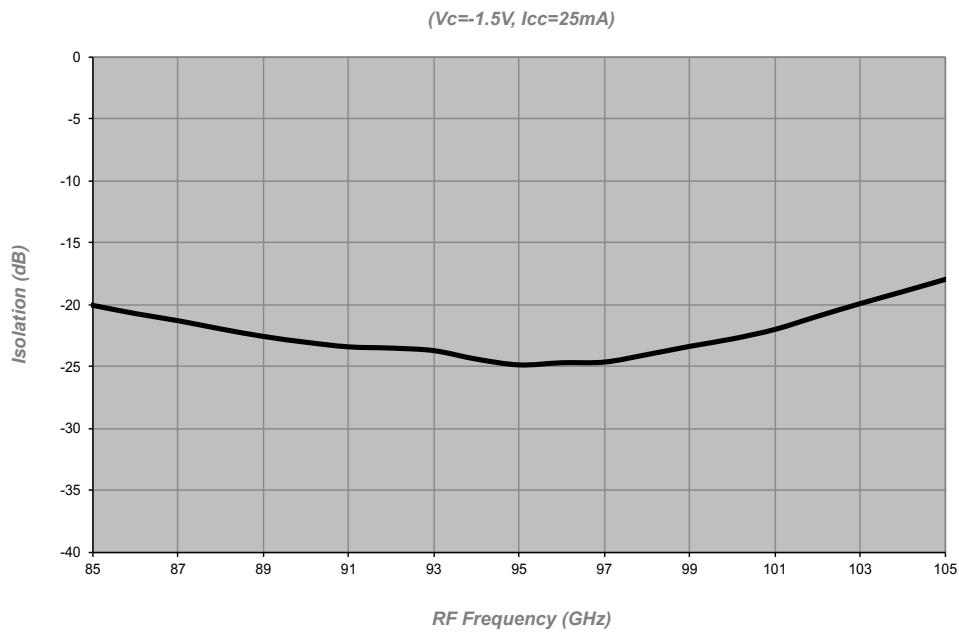
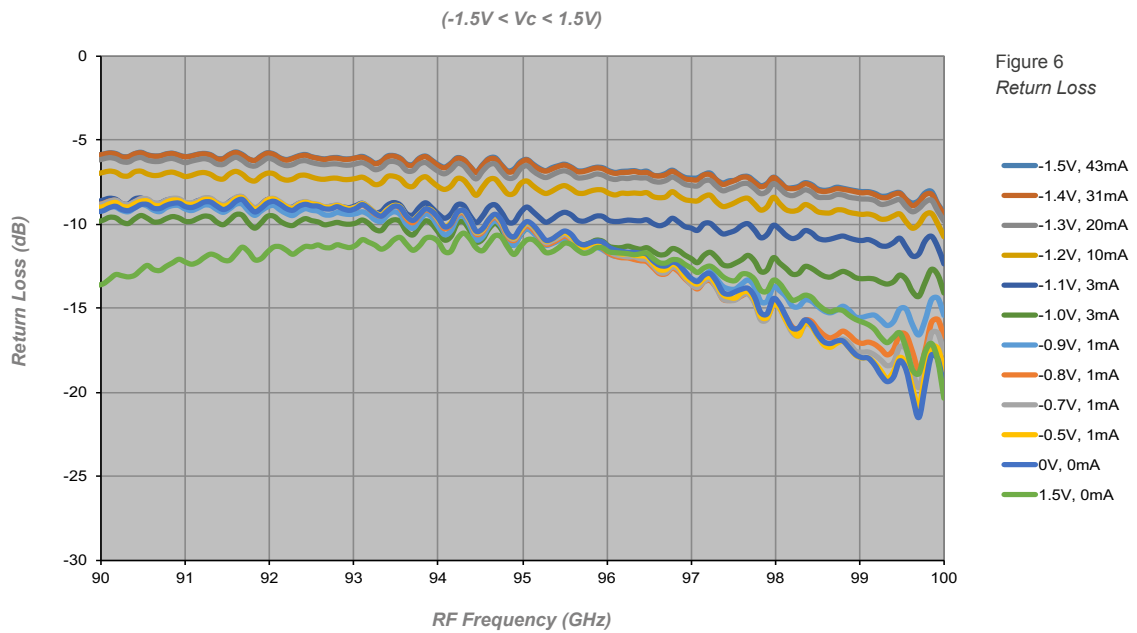
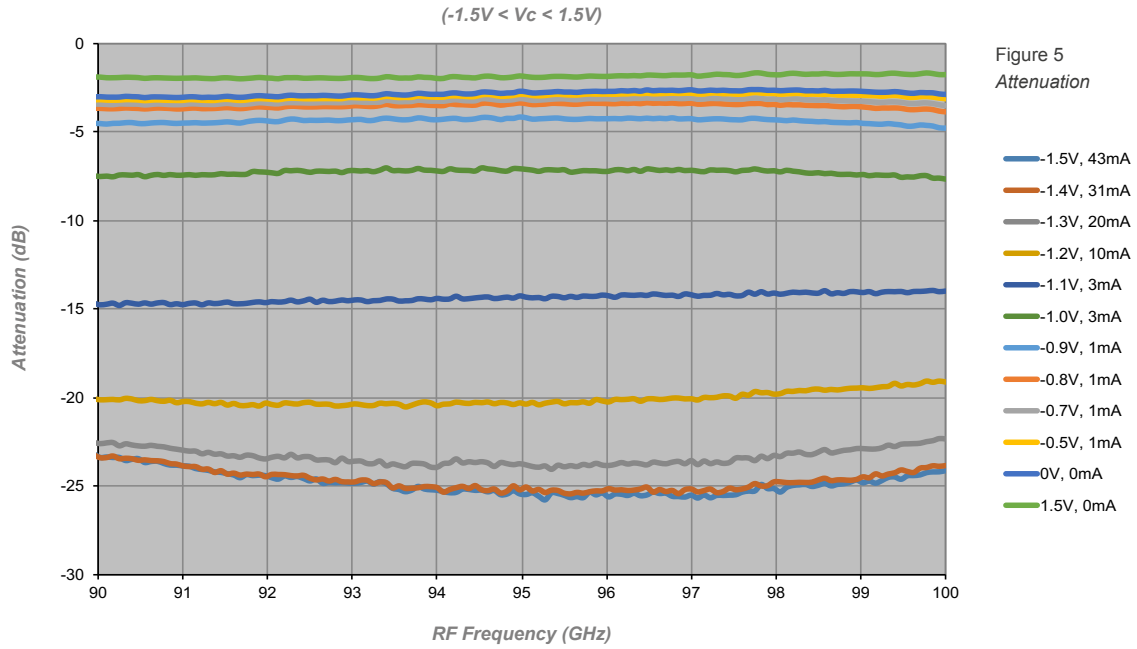
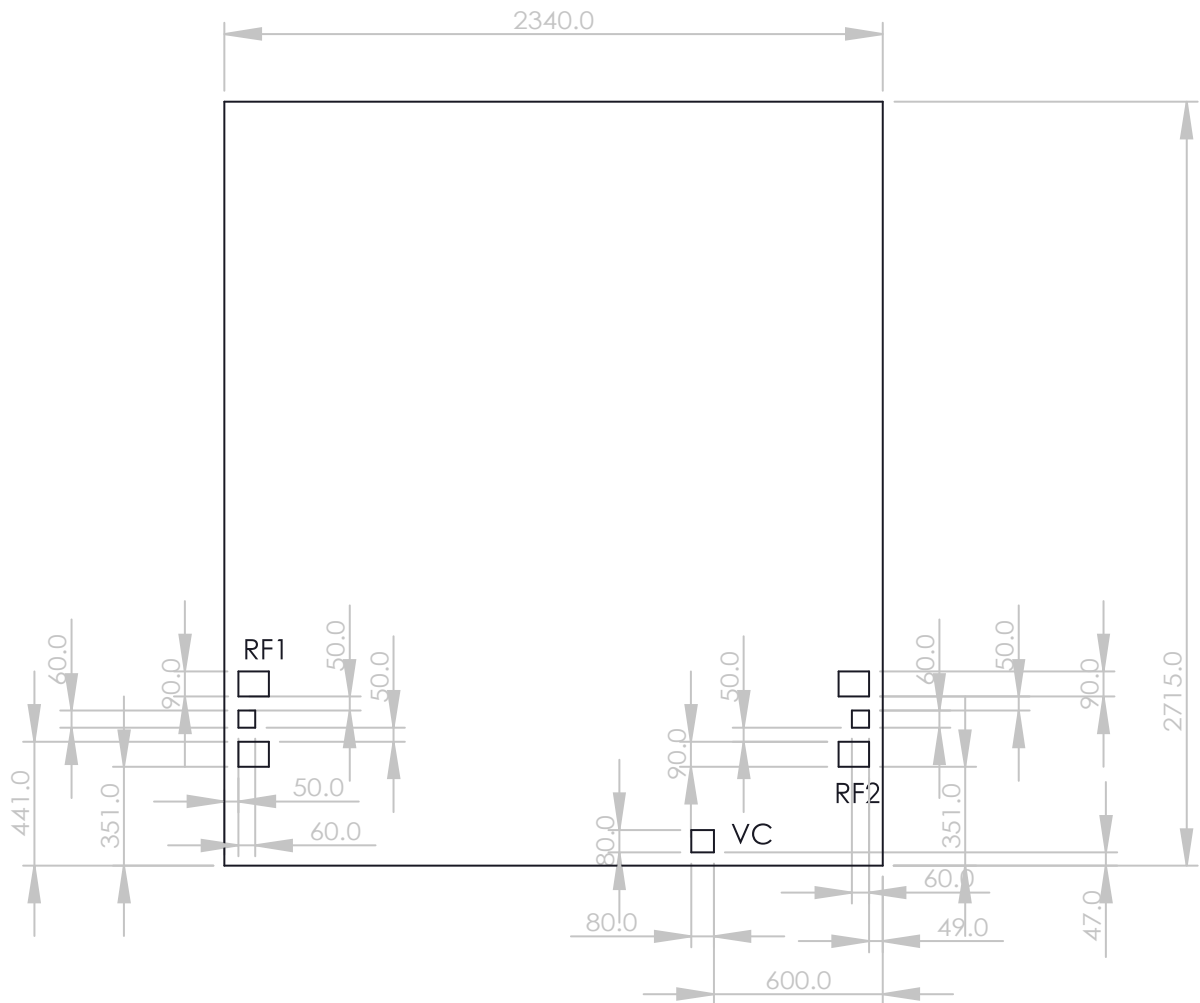


Figure 4
Isolation

Measured Performance Data



Outline Drawing



Pad Descriptions

Name	Description
RF1	Input RF pad. This pad is AC coupled. (RF1 & RF2 are interchangeable).
RF2	Output RF pad. This pad is AC coupled. (RF1 & RF2 are interchangeable).
VC	Control Voltage pad.
BOTTOM	The die backside must be connected to RF/DC ground.

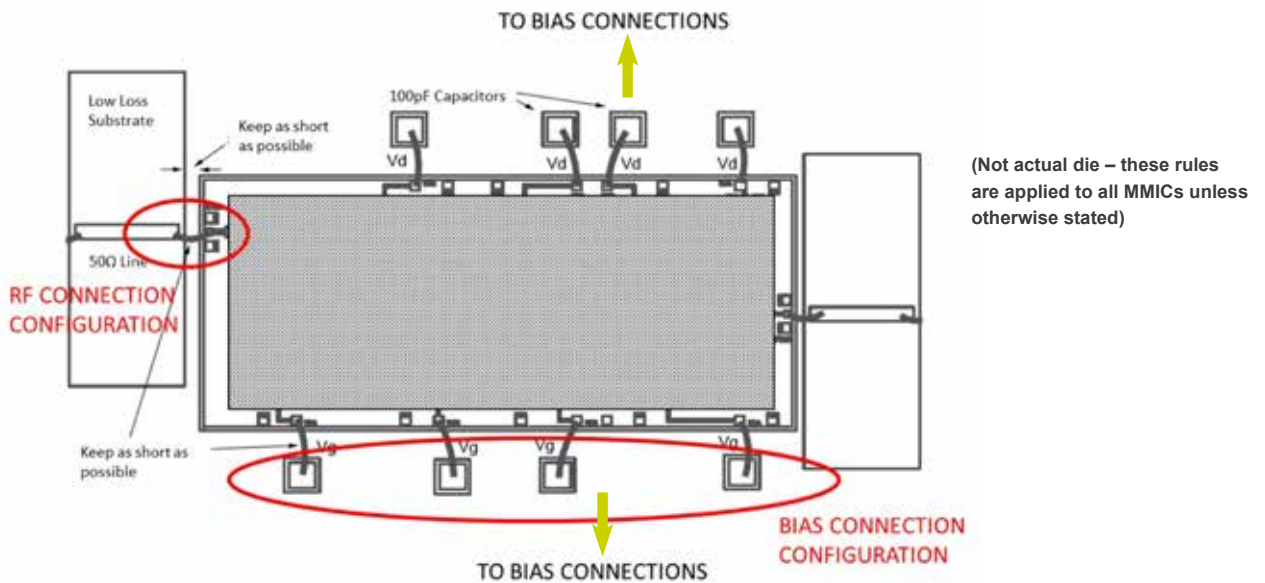
Notes

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



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.

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.

Copyright 2021 © Arralis

©2021 Arralis Ltd. All rights reserved. Trademarks and registered trademarks are the property of their respective owners.

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

	W band Datasheet	W-SP3T-90100	Issue date: 30 April 2021	DOC REV 3	Page 9 of 9
-------------------------------------------------------------------------------------	-------------------------	---------------------	---------------------------	------------------	-------------