WINSOURCE ELECTRONICS

THE DATASHEET OF

TGS2302

TGS2302

4 – 20 GHz VPIN SPDT Switch

Product Description

Qorvo's TGS2302 is a 4-20 GHz Single Pole Double Throw (SPDT) switch. This part is designed using Qorvo's proven standard VPIN production process.

The TGS2302 provides a nominal 0.9 dB insertion loss, 12 dB return loss, and 35 dB isolation.

The TGS2302 integrated DC blocking capacitors on all ports and includes decoupled DC bias pads to reduce the number of off-chip components.

The part is ideally suited for EW receivers, radar, and communication systems.

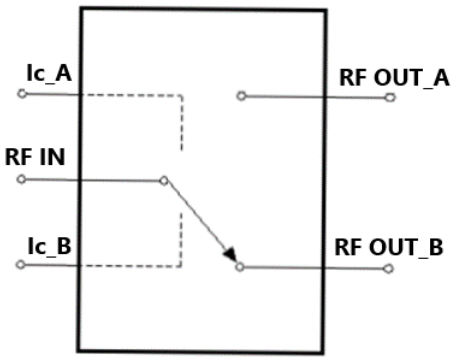


Product Features

- Frequency Range: 4 - 20 GHz
- Insertion Loss: < 0.9 dB
- Isolation: 35 dB Nominal
- Return Loss: 12dB typical.
- On-Chip Bias Network
- DC Blocked at RF ports
- Die Dimensions: 2.24 x 1.63 x 0.10 mm

Performance is typical across frequency. Please reference electrical specification table and data plots for more details.

Block Diagram



Applications

- EW Receivers
- Radar
- Communications Systems

Ordering Information

Part No.	Description
TGS2302	4 - 20 GHz High Isolation Switch

Absolute Maximum Ratings

Parameter	Value
Positive Supply Voltage (V^+)	+3 V
Negative Supply Voltage (V^-)	-3 V
Positive Supply Current (I^+)	22 mA
Power Dissipation, (P_{DISS}), CW, T = 25ºC	0.38 W
RF Input Power, CW, 50 Ω, T = 25ºC	24 dBm
Mounting Temperature (30 sec)	320 °C
Storage Temperature	-65 to 150

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Frequency	4		20	GHz
Input Power Handling (CW)		24		dBm
Control Current ($I_{CONTROL}$)		±20		mA

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

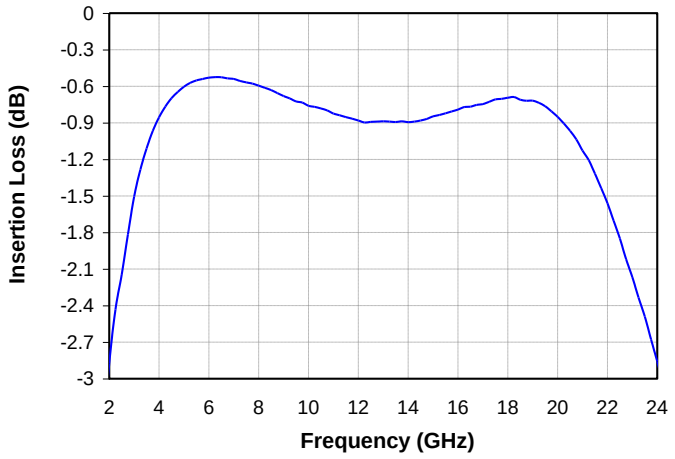
Electrical Specifications

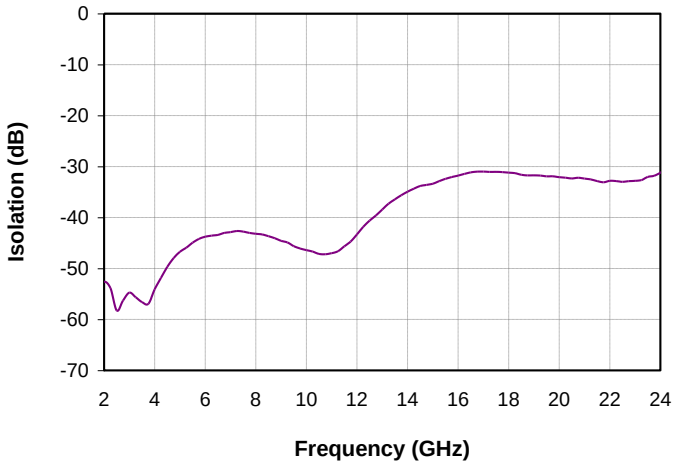
Test conditions unless otherwise noted: CW RF Input, Temp= +25 °C, Bias Conditions: $I_{CONTROL}$ = ±20 mA. See Function Table on page 4

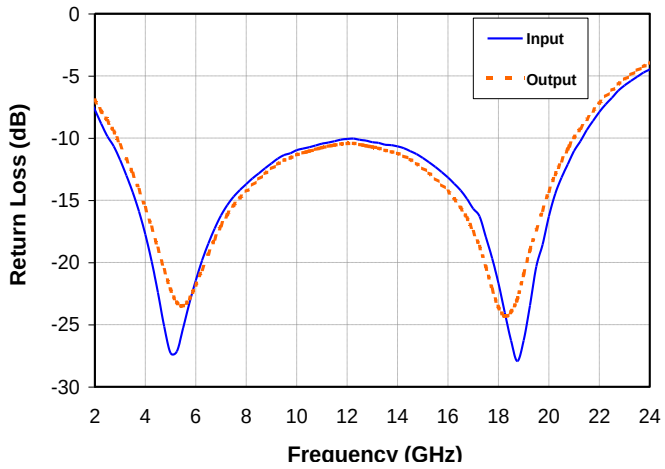
Parameter	Conditions	Min	Typical	Max	Units
Operational Frequency Range		4		20	GHz
Insertion Loss	On-State		0.9		dB
Input Return Loss – Common Port RL	On-State		12		dB
Output Return Loss – Switched Port RL	On-State		12		dB
Isolation	Off-State		35		dB
Input Power			24		dBm

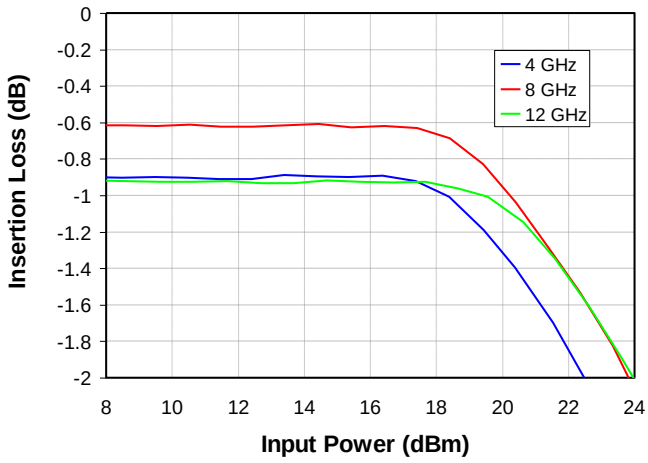
Performance Plots –

Test conditions unless otherwise noted: CW RF Input, Temp= +25 °C, Bias Conditions: $I_{CONTROL}$ = ±20 mA

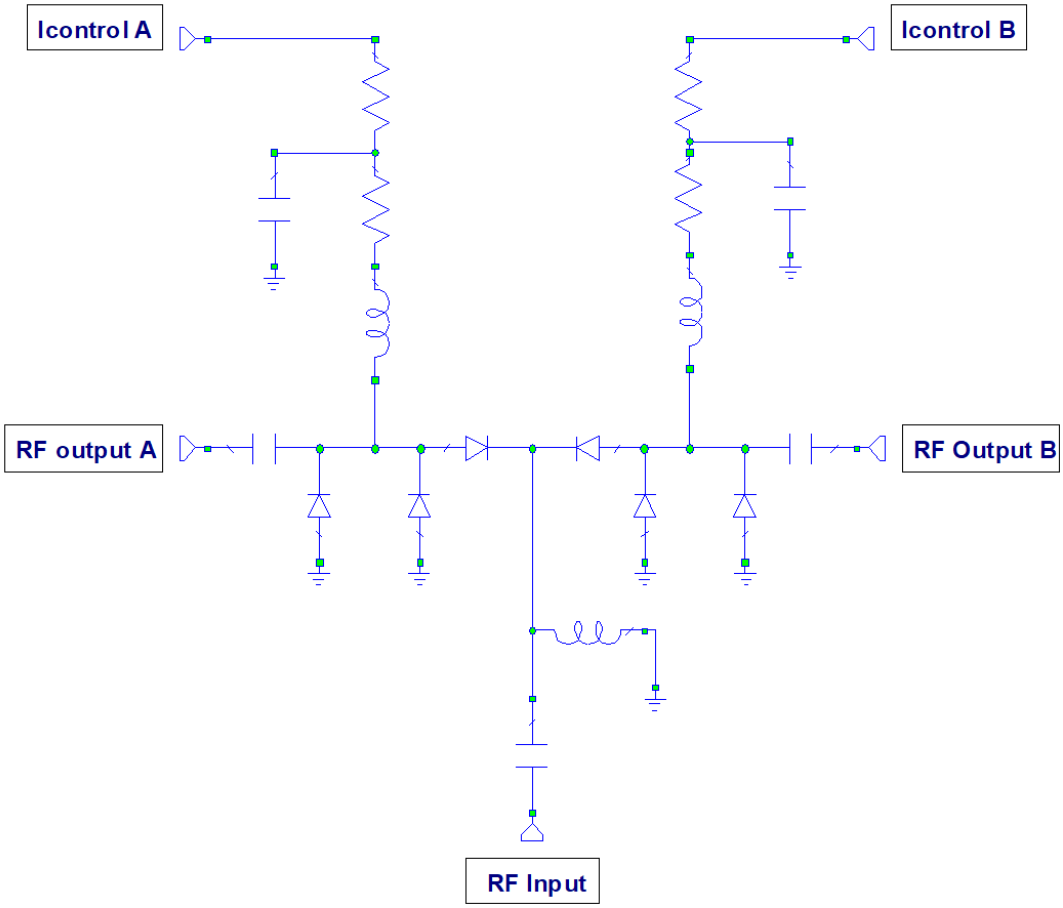








Applications Circuit



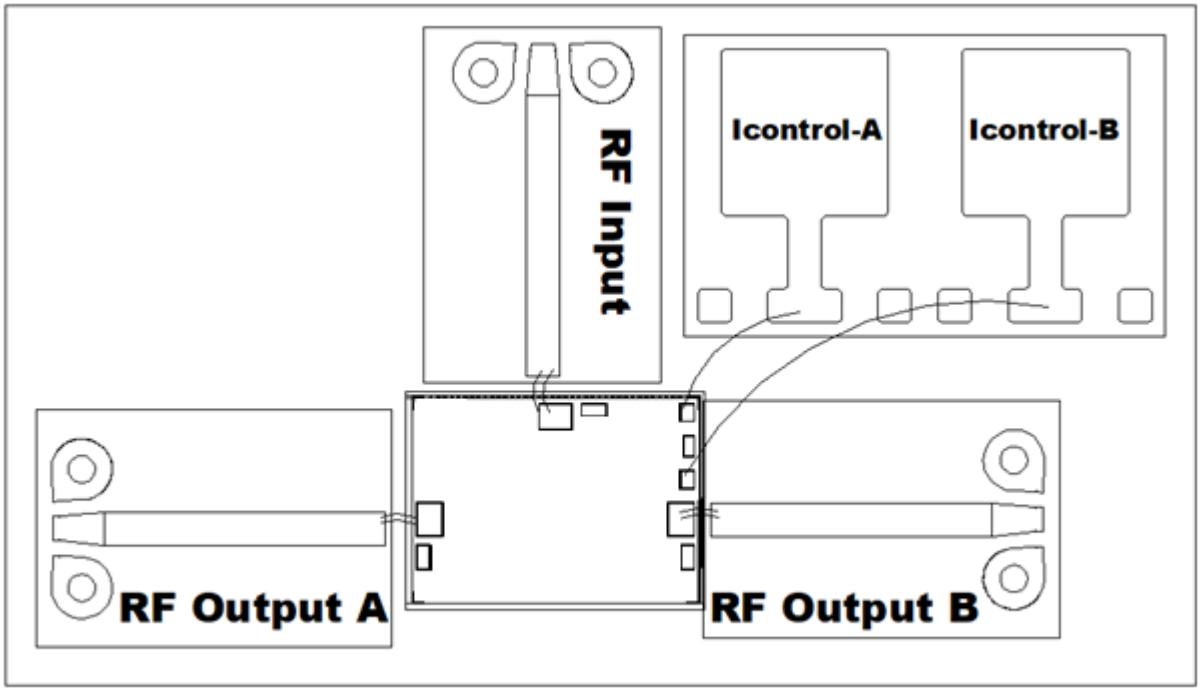
Function Table

State	RF-A	RF-B	$I_{CONTROL}$ A	$I_{CONTROL}$ B
1	Low-Loss	Isolated	+20 mA	-20 mA
2	Isolated	Low-Loss	-20 mA	+20 mA

Notes: Typical DC voltage to achieve ±20 mA at $I_{CONTROL}$ node is ±2.6 - ±2.7 V

Assembly Drawing

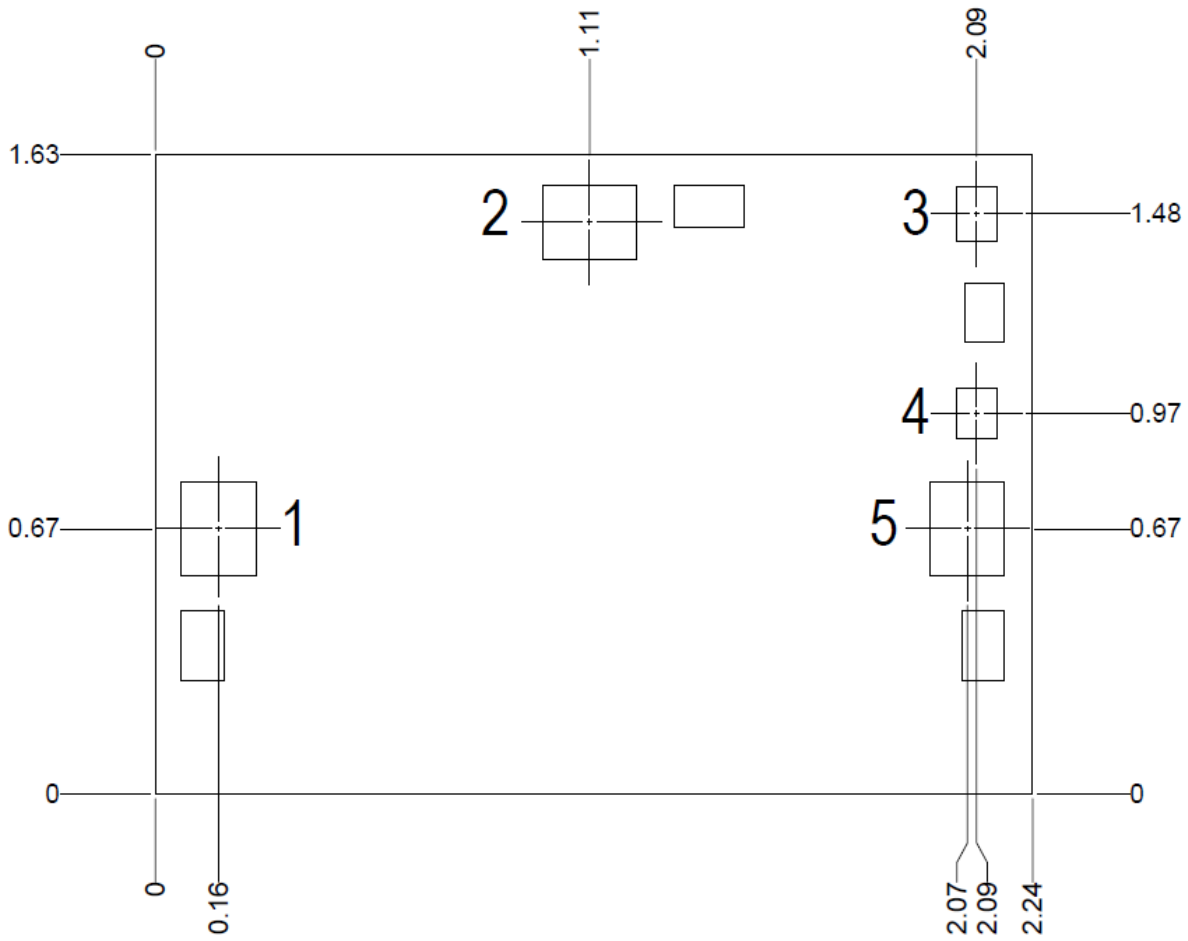
.



Note:

± 20mA control lines ($I_{CONTROL}$ A, $I_{CONTROL}$ B) use on-chip resistors for diode current control.

Mechanical Drawing and Bond Pad Description



Pin No.	Symbol	Description	Pad Size (mm)
1	RF Output A	Output A, RF switched port A; matched to 50 Ω; DC coupled	0.189 x 0.238
2,	RF Input	Input, RF common port; matched to 50 Ω; DC coupled	0.238 x 0.189
3	$I_{CONTROL-A}$	Control Current A.	0.104 x 0.140
4	$I_{CONTROL-B}$	Control Current B	0.104 x 0.131
5	RF Output B	Output B, RF switched port B; matched to 50 Ω; DC coupled	0.189 x 0.238

Thickness: 0.100 mm
Chip edge to bond pad dimensions is shown to center of bond pad
Chip size tolerance: ± 0.050 mm
GND is backside of MMIC

Assembly Notes

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.
- Organic attachment (i.e., conductive epoxy) can be used in low-power applications.
- Curing should be done in a convection oven; proper exhaust is a safety concern.

Reflow process assembly notes:

- Use AuSn (80/20) solder and limit exposure to temperatures above 300 °C to 3 – 4 minutes, maximum.
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- Do not use any kind of flux.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- Devices must be stored in a dry nitrogen atmosphere.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonic are critical parameters.
- Aluminum wire should not be used.
- Devices with small pad sizes should be bonded with 0.0007-inch wire.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	N/A	ESDA / JEDEC JS-001



Caution!
ESD-Sensitive Device

Solderability

Use only AuSn (80/20) solder and limit exposure to temperatures above 300 °C to 3-4 minutes, maximum.

RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU. This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

The information contained herein is believed to be reliable; however, Qorvo makes no warranties regarding the information contained herein and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for Qorvo products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information. **THIS INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Without limiting the generality of the foregoing, Qorvo products are not warranted or authorized 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 © Qorvo, Inc. | Qorvo is a registered trademark of Qorvo, Inc.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View TGS2302 on WIN SOURCE
- Qorvo US Inc. Information

Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management