

TDSW030A2T

Product Specification

June 16, 2022

dc-30GHz Reflective GaAs SPDT Switch

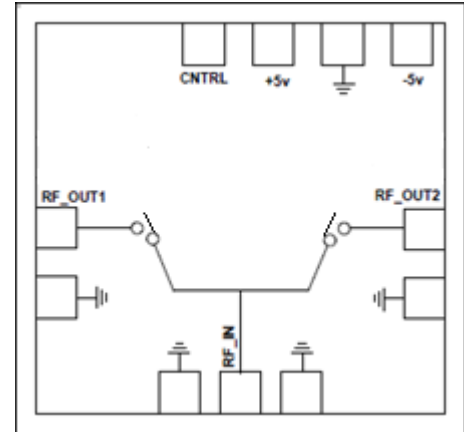
Features

- Frequency Range: dc-30 GHz
- Low Insertion Loss: 3 dB(Max)
- Isolation: >35 dB
- Input & Output Return Loss: 15 dB
- Input P1dB: +25 dBm
- Die Size: 1.28 mm x 1.15 mm x 0.1 mm

Typical Applications

- Radar
- Military & Space Communication Systems
- Instrumentation

Figure 1 TDSW030A2T Functional Diagram



Description

The Teledyne TDSW030A2T is a wide band, reflective, single pole, double throw (SPDT) Switch covering dc to 30 GHz. The switch features insertion loss of 3dB(max) and greater than 35 dB Isolation up to 30 GHz. The input power for 1dB compression is 25 dBm typical. The switch operates on +5V/-5V supplies with minimal dc power consumption and is controlled using TTL-compatible voltage levels. The die is fabricated using a robust 0.15 μm InGaAs pHEMT technology. The switch will be available in both space screened die form and an alternative 4 mm x 4 mm hermetic sealed QFN package with space level screening.

Absolute Maximum Ratings¹

Parameter	Absolute Maximum	Units
RF Input Power	32	dBm
Control Voltage	-0.5 to +5.5	V
ON State	+6	V
OFF State	-6	V
Operating temperature	-50 to +85	°C
Storage Temperature	-65 to +150	°C

1. Operation beyond these limits may cause permanent damage to the component

Electrical Specifications @ $T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\ \Omega$,

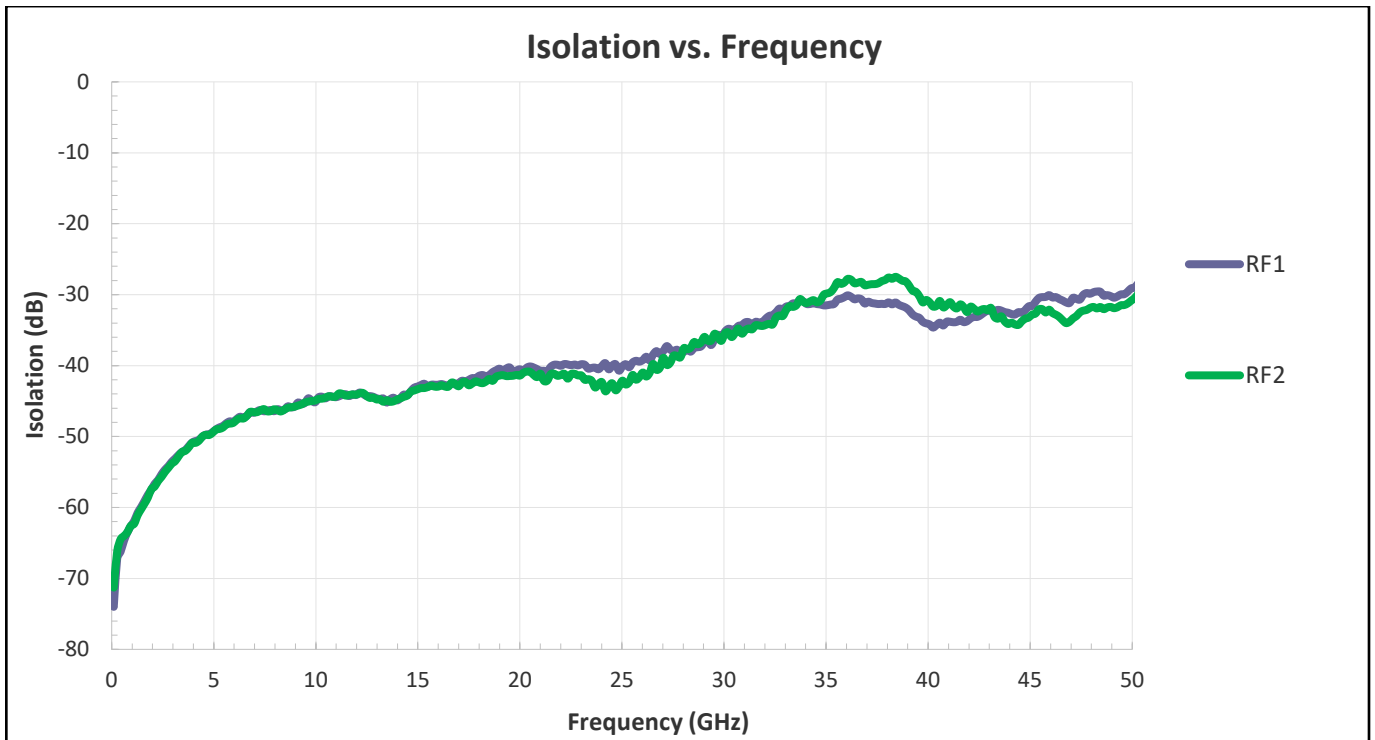
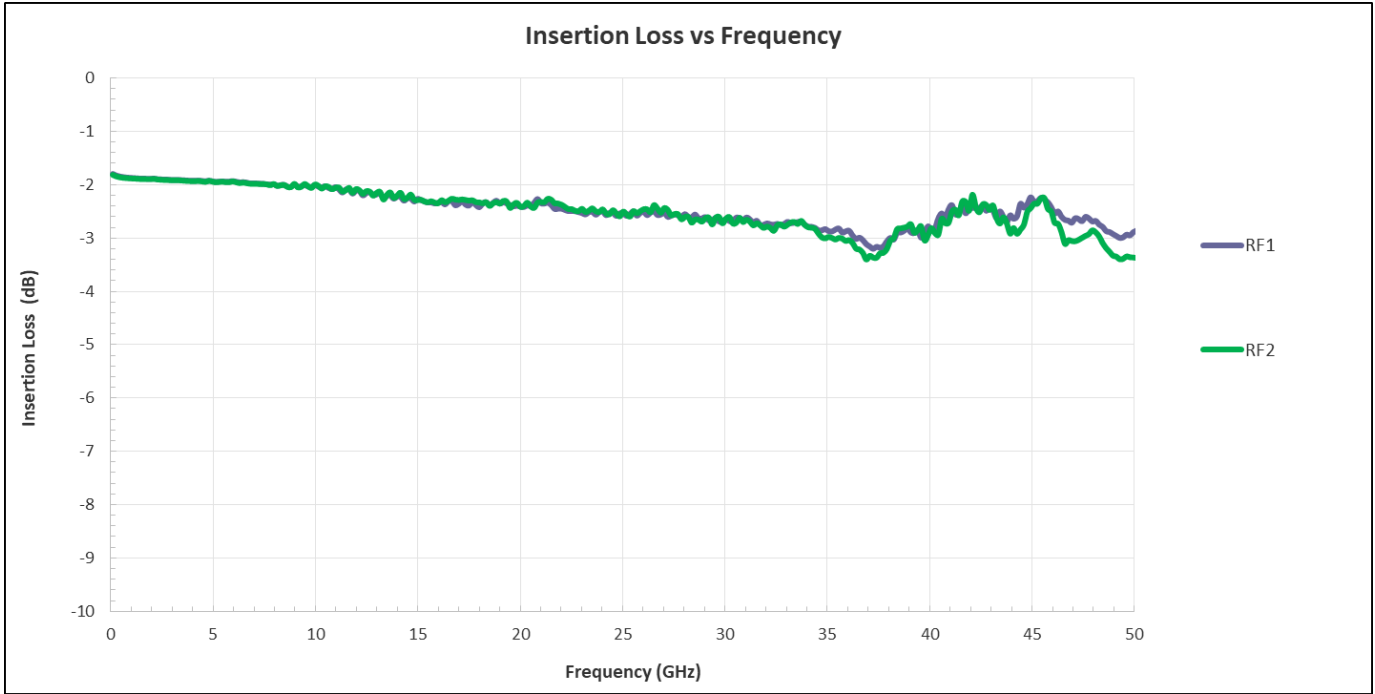
Parameter	Typical Values	Units
Frequency Range	dc - 30.0	GHz
Insertion Loss	3	dB
Input Return Loss	15	dB
Output Return Loss	11	dB
Off State Output Return Loss	2.6	dB
Isolation	35	dB
Input P1dB	25	dBm
Driver Bias voltages	+5,-5	V
Control Voltage	0/+5	V

Note:

1. The RF input & output ports are dc coupled.
2. For reliable operation external dc blocking capacitors are required at the RF input & output ports.

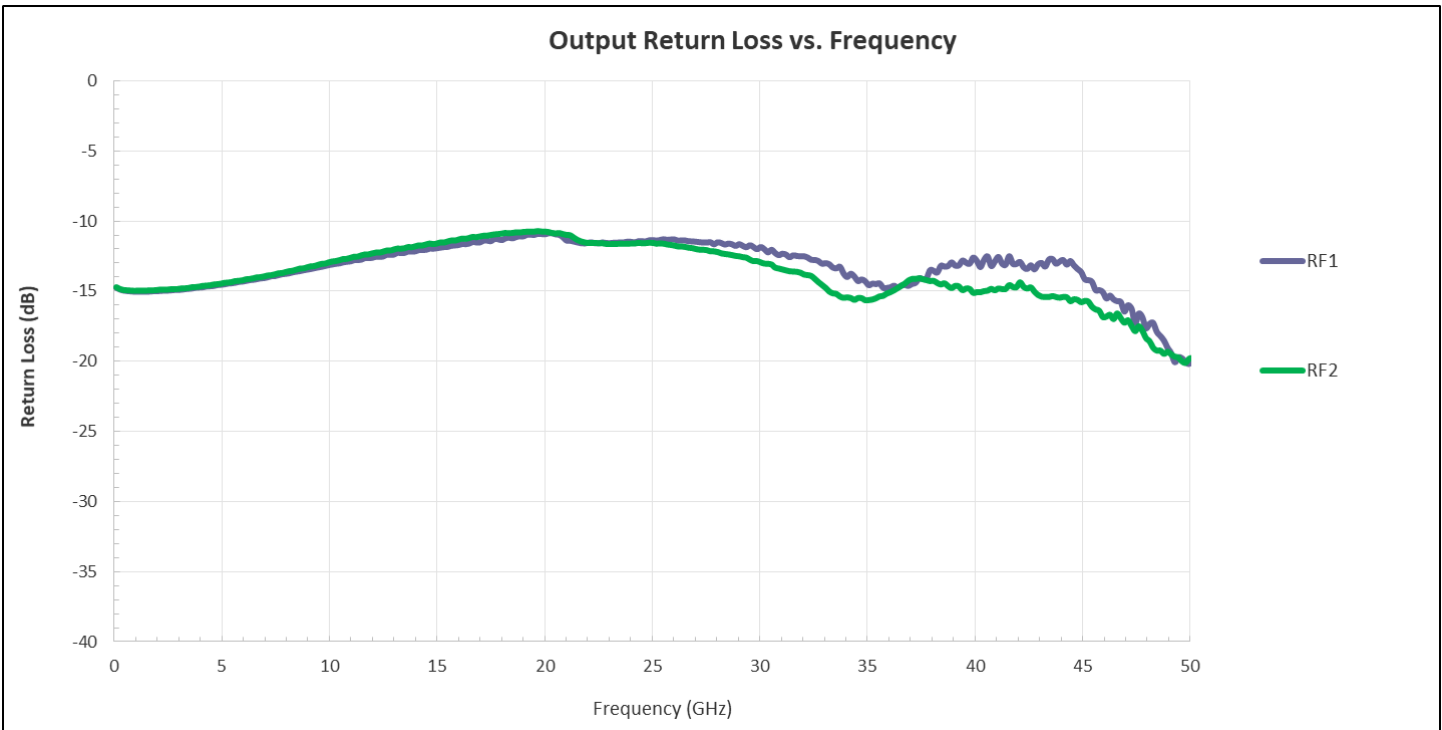
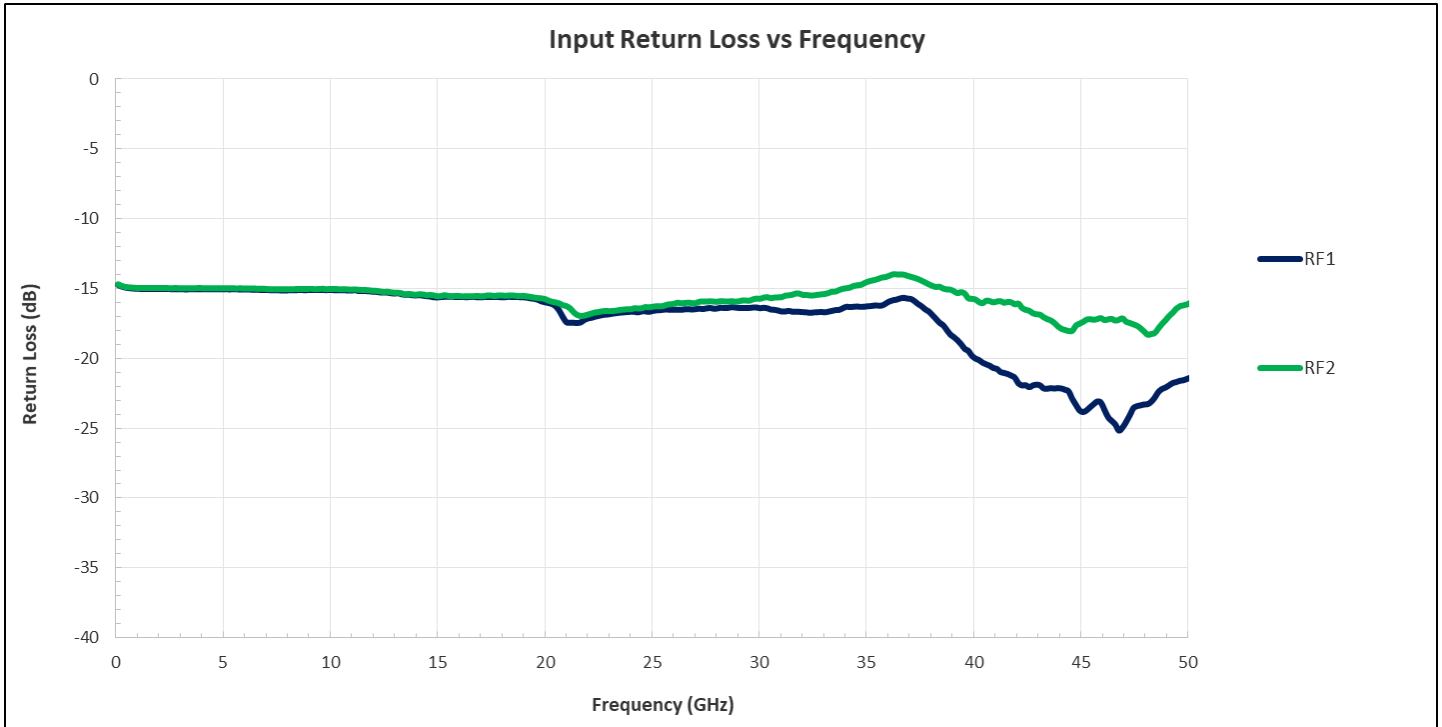
On Wafer Probed Data

$T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\ \Omega$



On Wafer Probed Data

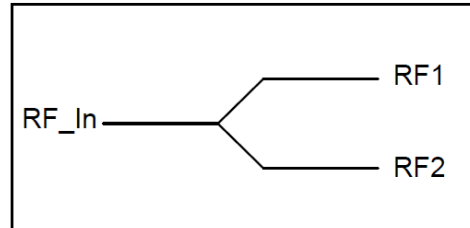
$T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\ \Omega$



Truth Table

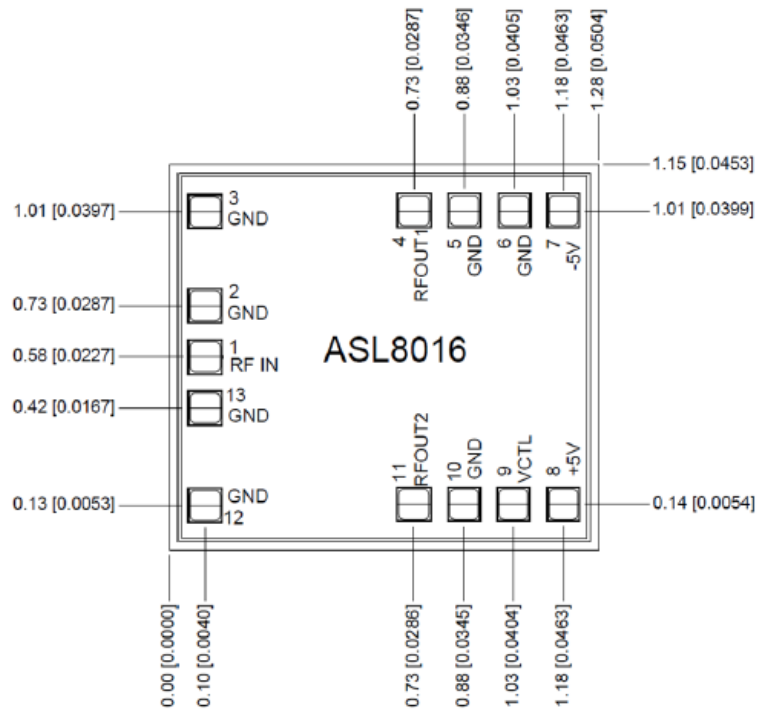
Control Voltage

State	Bias condition
Low "0"	0 to 0.5 V
High "1"	3.3 V to 5.0 V



Ctrl_vol	RF_In to RF1	RF_In to RF2
0(Low)	Off	On
1(High)	On	Off

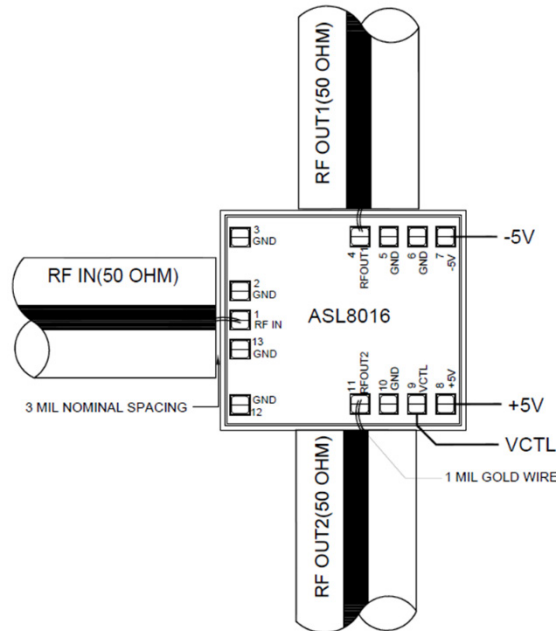
Die Bond Pad Coordinates and Details



Note

Dimensions are in mm
 All RF and dc pads are 100 μm × 100 μm

Recommended Die Assembly Diagram



Note:

1. Two 1 mil (0.0254 mm) bond wires of minimum length should be used for RF input, RF output.
2. Input and output 50-ohm lines are preferably on 5 mil or 10 mil RT Duroid substrate.
3. The RF input & output ports are dc decoupled on-chip.
4. Coefficient of thermal expansion matching is recommended for reliability purpose.
5. Use high thermal conductive material for die mounting for long term reliability.
6. Maintain base plate temperature less than 70 °C under RF operation for optimum performance.

Die attach: For Epoxy attachment, use of a two-component conductive epoxy is recommended. An epoxy fillet should be visible around the total die periphery. If Eutectic attachment is preferred, use of flux less AuSn (80/20) 1-2 mil thick preform solder is recommended. Use of AuGe preform should be strictly avoided.

Wire bonding: For dc pad connections use either ball or wedge bonds. For best RF performance, use of 150 - 200 µm length of wedge bonds is advised. Single Ball bonds of 250- 300 µm though acceptable, may cause a deviation in RF performance.



GaAs MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing

All information and Specifications are subject to change without prior notice. Before using the product, please download and refer to latest datasheet from website.

Part Number Ordering Details

The TDSW030A2T RF Switch is available in the following die and 4 mm x 4 mm configurations.

Part Number	Description	Packaging	Notes
TDSW030A2T-98	EM DIE	Gel-Pack	
TDSW030A2T-99	FM DIE	Gel-Pack	w/ Method 2010 space visual
TDSW030A2T-00	EVK	Module	EVK for QFN pkg device
TDSW030A2T-01	EM Flight Unit	QFN	25 °C testing only
TDSW030A2T-11	FM Flight Unit	QFN	Contact factory for space screening options

Contact Information:

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