

DC-20GHz SPDT Reflective Switch

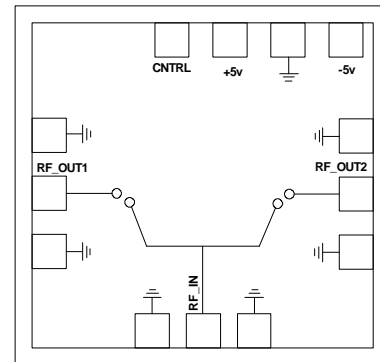
Features

- ◆ Frequency Range: DC- 20GHz
- ◆ Low Insertion Loss < 3.0dB @ 20GHz
- ◆ High Isolation > 45dB @ 20GHz
- ◆ I/O VSWR < 1.6 : 1
- ◆ P_{1dB} (in):21dBm @ 10GHz
- ◆ Chip Size:2.2 mm X 1.8 mm X 0.1mm

Typical Applications

- ◆ Military & Space
- ◆ Test Equipments
- ◆ Microwave Radio, RADAR
- ◆ Broadband Telecom

Functional Diagram



Description

The AMT2562012 is a wideband Reflective single-pole; double throw (SPDT) MMIC chip covering DC to 20GHz. The Switch offers high Isolation and Low Insertion Loss. The Switch features greater than 45dB Isolation and < 3.0 dB Insertion Loss up to 20GHz. The Switch offers a high speed switching due to the presence of an on-chip TTL Driver. The input power for 1dB gain compression is 21dBm at midband. The switch operates on +5V/-5V supplies with minimal DC power consumption and is controlled using TTL compatible voltage levels. Optional bond pads are provided for DC and Control voltages on three sides of die for flexibility of operation. The die is fabricated using a robust 0.5µm InGaAs pHEMT technology.

Absolute Maximum Ratings ⁽¹⁾

Parameter	Absolute Maximum	Units
RF input Power (common Port)	25	dBm
RF input Power (Toggle ports)	25	dBm
Positive supply Voltage	+6	V
Negative supply voltage	-6	V
Control voltage	-0.5 to +5.5	V
Operating Temperature	-55 to +85	°C
Storage Temperature	-65 to +150	°C

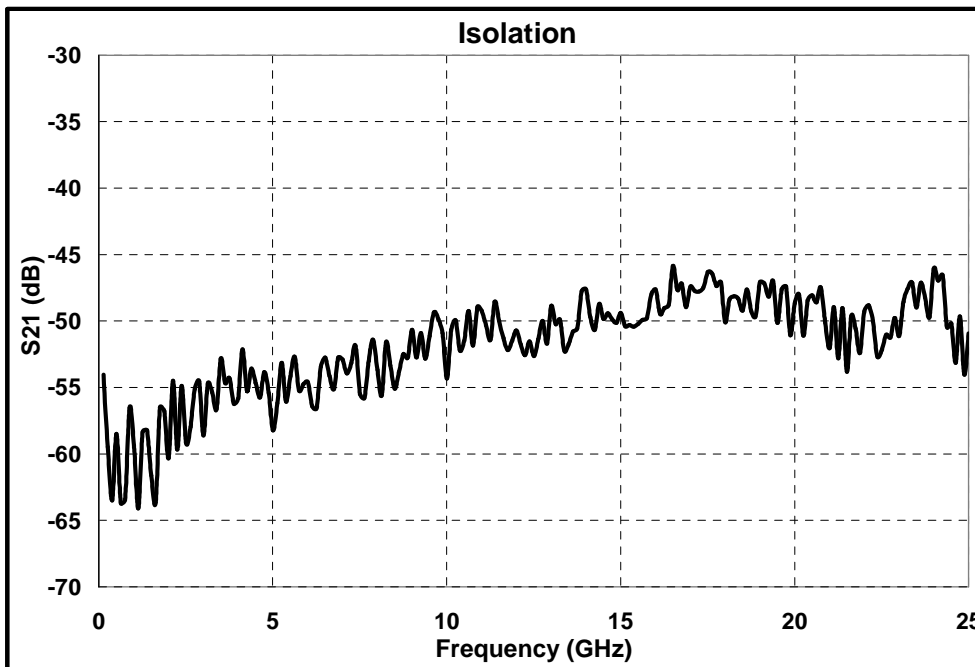
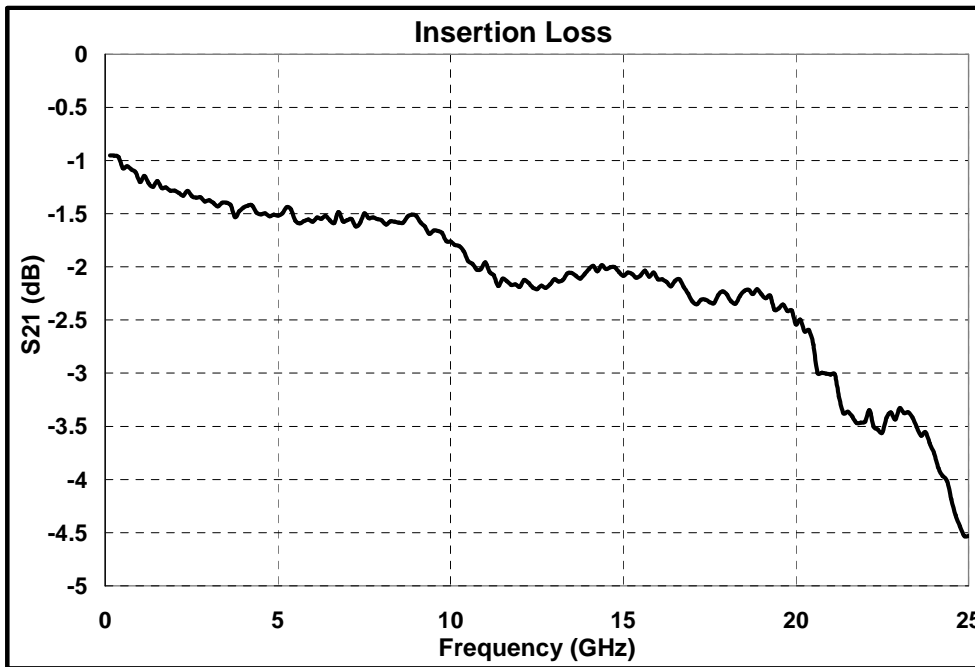
1. Operation beyond these limits may cause permanent damage to the component

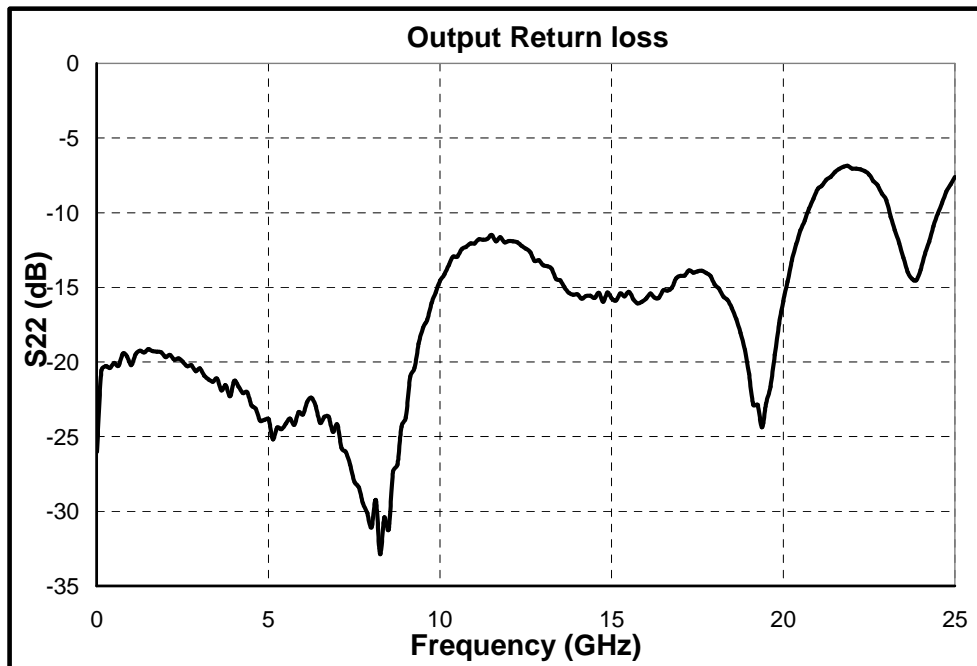
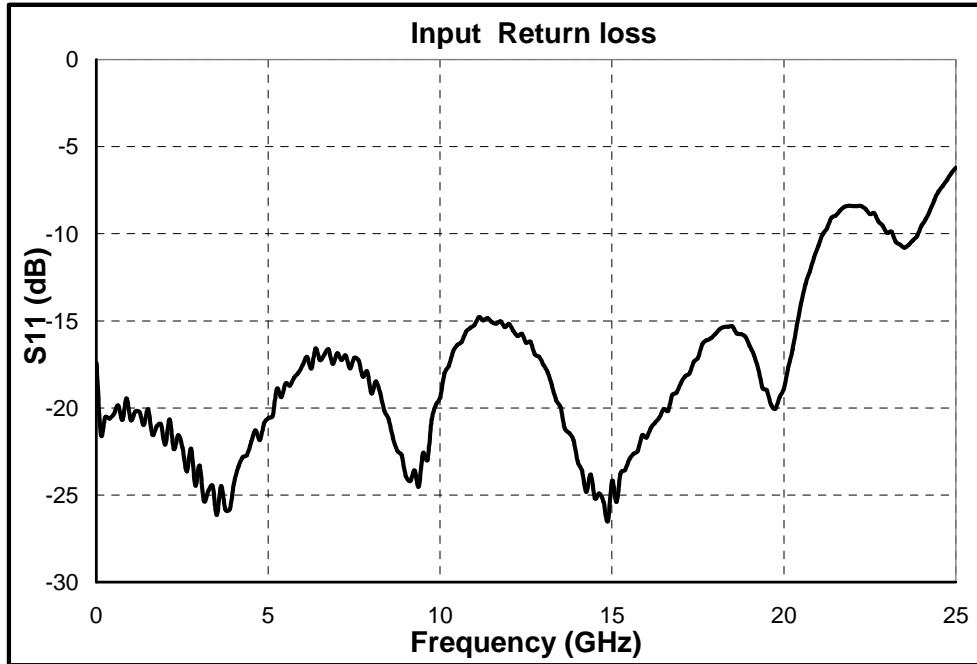
Electrical Specifications @ $T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\text{ }\Omega$

Parameter	Frequency	Typ.	Units
Insertion Loss (max.)	DC-10GHz	1.5	dB
	10-15 GHz	2.0	dB
	15-20 GHz	3.0	dB
Isolation(min.)	DC-10GHz	55	dB
	10-15GHz	50	dB
	15-20GHz	45	dB
Return Loss (On State)	DC-10GHz	15	dB
	10-15GHz	13	dB
	15-20GHz	13	dB
Input Power for 1dB Compression		21	dBm
Driver Bias Voltages		+5, -5	V
Control Voltage		0/+5	V
Switching Speed		10	ns

Note:

1. The above mentioned electrical specifications are measured in 50ohm line test fixture.
2. The RF input & output ports are DC coupled.
3. For reliable operation, external DC blocking capacitors are required at the RF input & output ports.

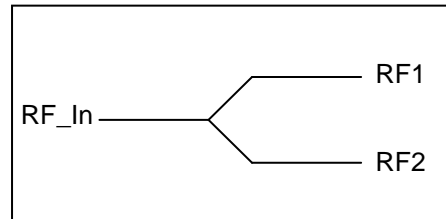
Test fixture data*Driver Bias +5V,-5V; Control : 0/+5V; $T_A = 25^\circ\text{C}$* 

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Truth Table

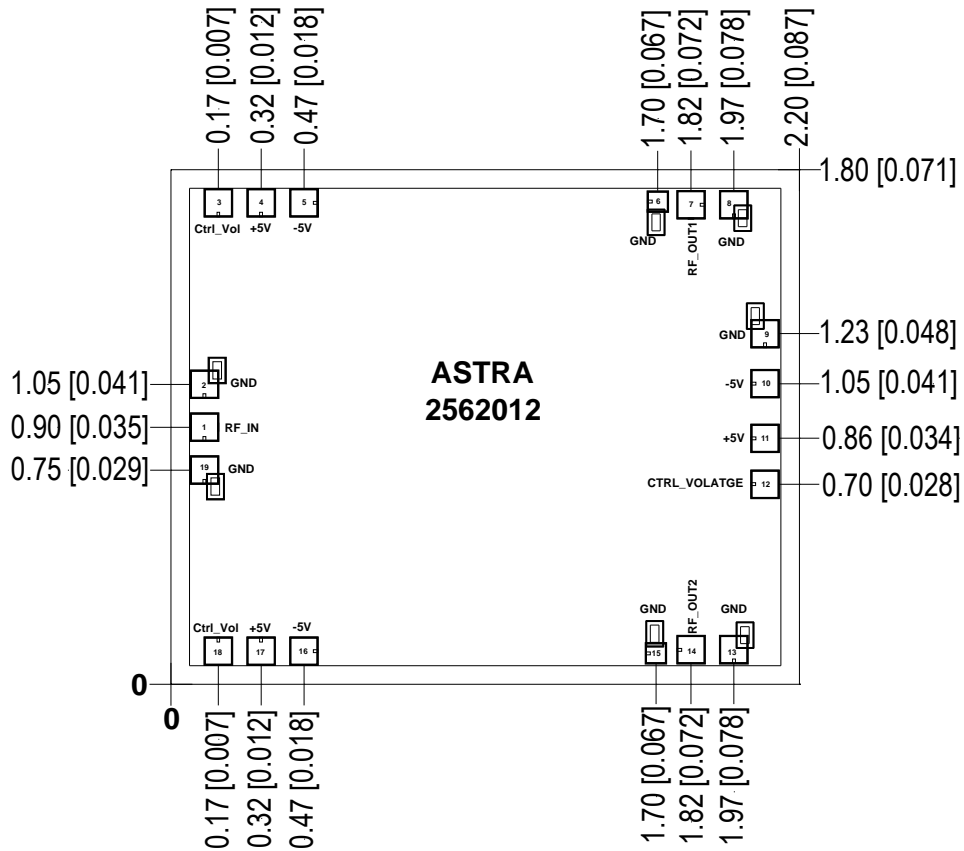
Control Voltage

State	Bias condition
Low "0"	0 to 0.5 V
High "1"	3.5 V to 5.0 V



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

Mechanical Characteristics

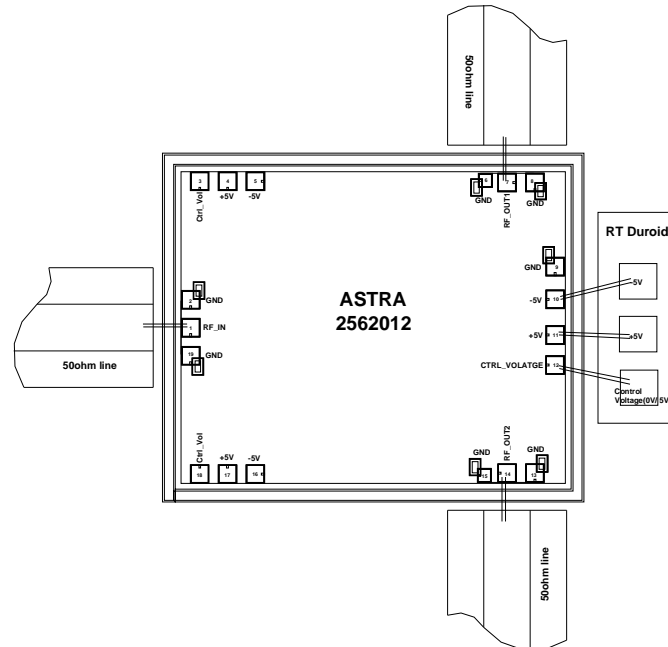


Units: millimeters (inches)

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF_In
3. Pad no. 7 : RF_Out 1
4. Pad no. 3,12,18 : Control Voltage
5. Pad no. 4,11,17 : +5 V
6. Pad no. 5,10,16 : - 5 V
7. Pad no. 14 : RF_Out 2

Recommended Assembly Diagram



Note:

1. Two one mil (0.0254mm) bond wires of maximum length of 250microns should be used for all RF ports.
2. All RF ports are DC Coupled.
3. 0.1 μ F capacitors may be additionally used as a bypass for reliable operation at the power supplies.
4. Input and output 50 ohm lines are on either 5mil or 10mil Alumina or RT Duroid substrate.

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 fluxless 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 μ m length of wedge bonds is advised. Single Ball bonds of 250-300 μ m 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