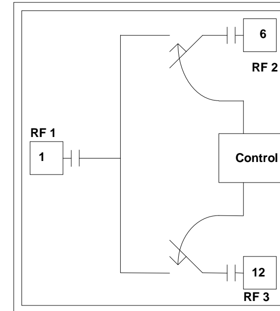
16.0 – 40.0 GHz Reflective SPDT Switch

Features

- Frequency Range: 16.0-40.0 GHz
- Low Insertion Loss of 3.5dB @40GHz
- High Isolation of 37dB @ 40GHz
- I/O VSWR of 1.9:1
- 21 dBm Nominal P1dB
- DC decoupled RF ports
- Integrated TTL Driver
- 0.15-um InGaAs pHEMT Technology
- Chip Size : 2.5 mm x 2.1 mm x 0.1 mm

Functional Diagram



Typical Applications

- Millimetre Wave Point to Point Radio
- Test Equipments
- LMDS
- SATCOM

Description

The AMT2572011 is a wideband Reflective single-pole double throw (SPDT) MMIC chip covering 16 to 40GHz. The Switch features greater than 40 dB Isolation and less than 3.0 dB Insertion Loss up to 35GHz. 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 mid-band. 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 0.15µm InGaAs pHEMT technology.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
Positive Supply Voltage	+6	V
Negative Supply Voltage	-6	V
Control Voltage	-0.5 to +5.5	V
RF Input Power	30	dBm
Operating Temperature	-55 to +85	^{o}C
Storage Temperature	-65 to +150	^{o}C

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

Electrical Specifications [1] @ T_A = 25 °C, Zo =50 Ω

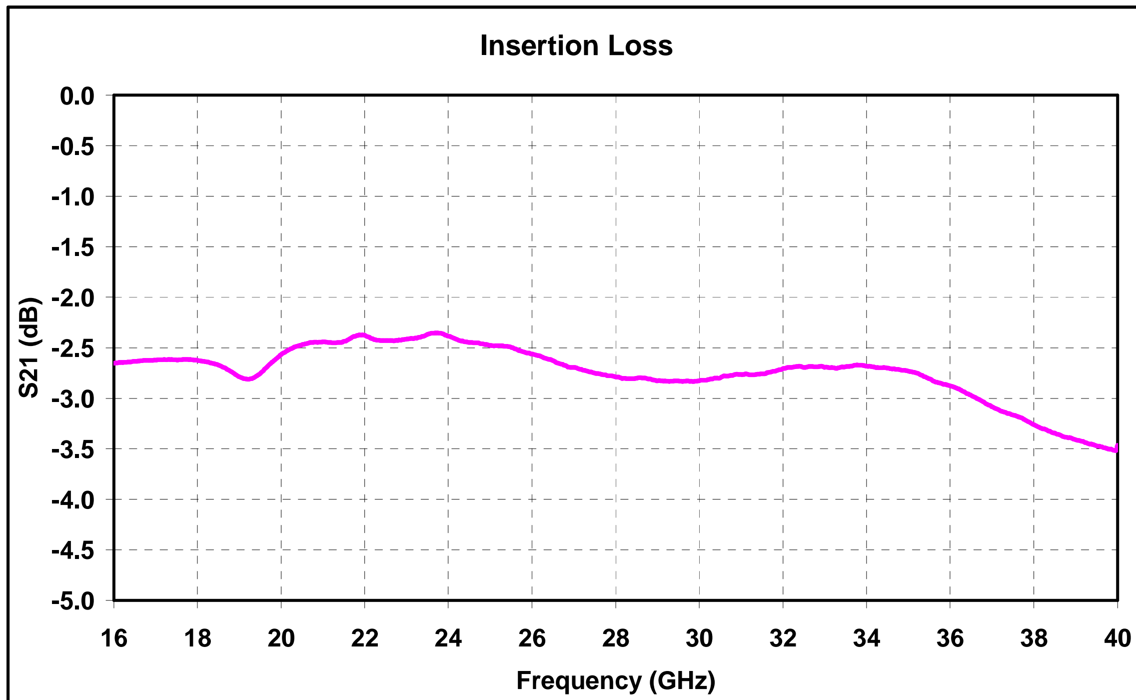
Parameter	Min.	Typ.	Max.	Units
Frequency	16	-	40	GHz
Insertion Loss	-	3.5	-	dB
Isolation	-	37	-	dB
Input Return Loss	-	10	-	dB
Output Return Loss	-	10	-	dB
Input P1dB[2]	-	15	-	dBm
DC Supply	+5/1 , -5/0.5			V/mA
Control Voltage ON OFF	TTL compatible +3.5 to +5 V 0 to +0.5 V			 V V

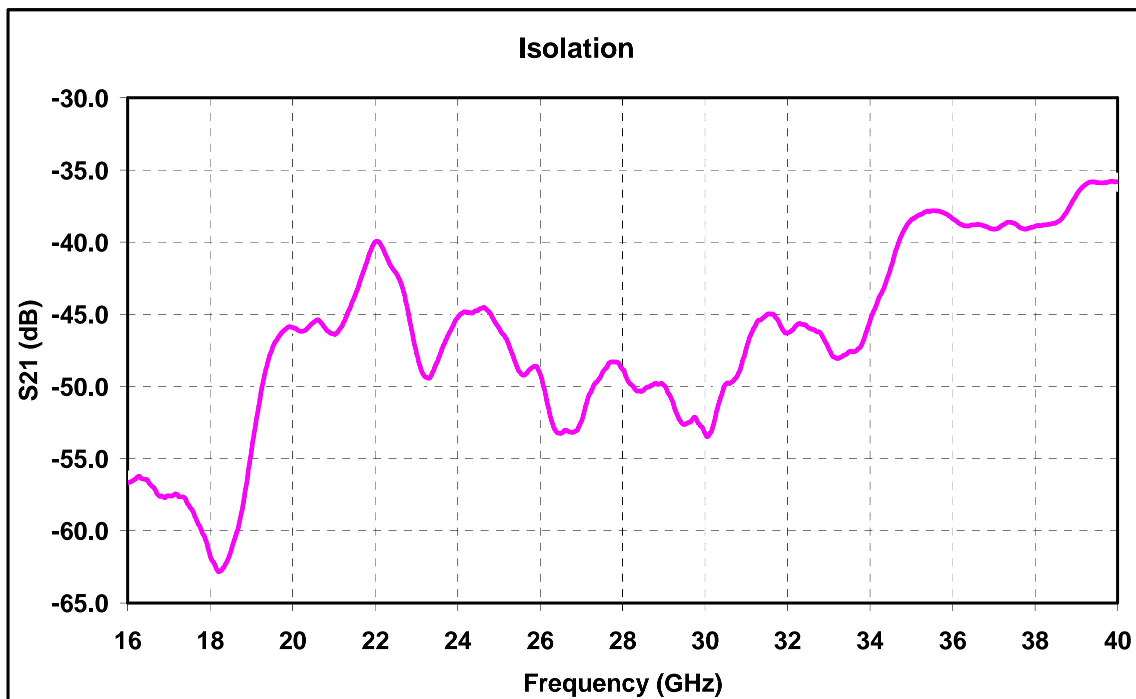
Note:

1. Electrical specifications as measured on wafer.
2. Simulated results.

On Wafer data

Driver Bias: +5,-5 V, $V_{Control} = 0/5V$, $T_A = 25\,^{\circ}C$





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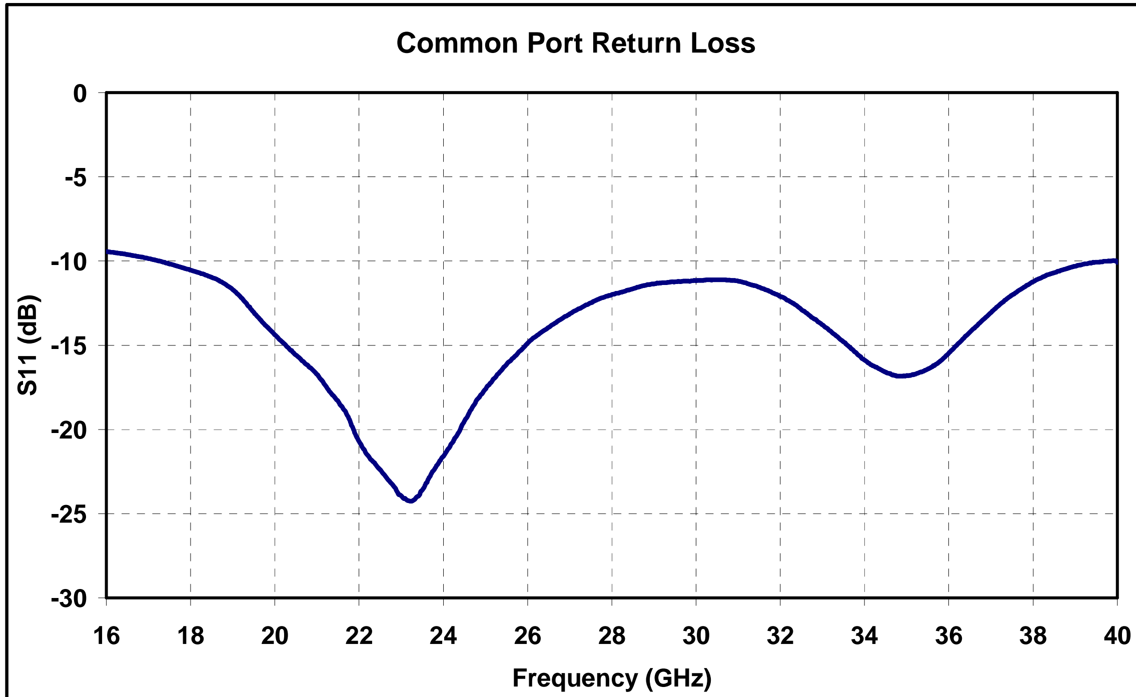
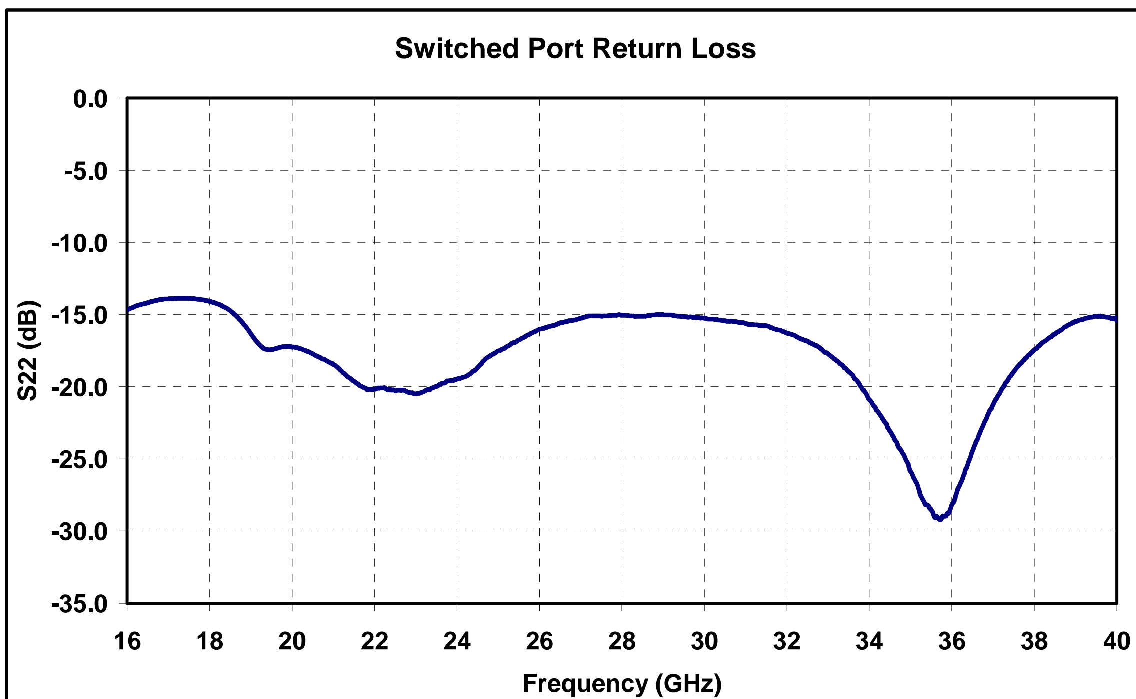
On Wafer data

Driver Bias : +5,-5 V, $V_{Control}$ = 0/5V, T_A = 25 °C

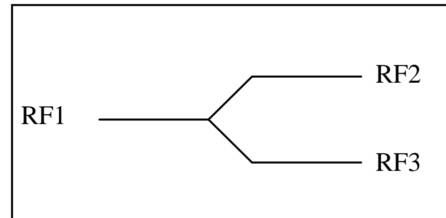




Truth Table

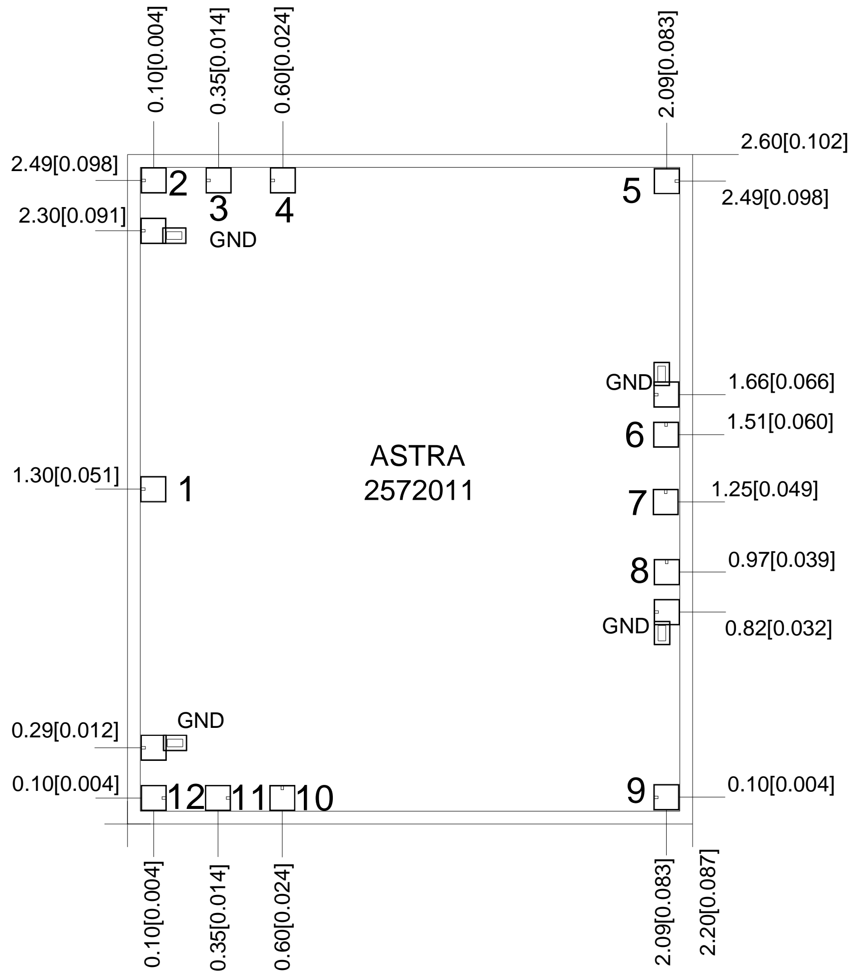
Control Voltage

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



Ctrl vol	RF1 to RF2	RF1 to RF3
0(Low)	Off	On
1(High)	On	Off

Mechanical Characteristics



Units: millimeters (inches)

Note:

1. All RF and DC bond pads are 100μm x 100μm
2. Pad no. 1 : RF Common Port
3. Pad no. 3, 7, 11 : + 5 V (pads 4 and 14 are optional)
4. Pad no. 2, 6, 12 : Control Voltage (pads 3 and 15 are optional)
5. Pad no. 5 : RF Switched Port
6. Pad no. 4, 8, 10 : -5 V (pads 5 and 13 are optional)
7. Pad no. 9 : RF Switched Port

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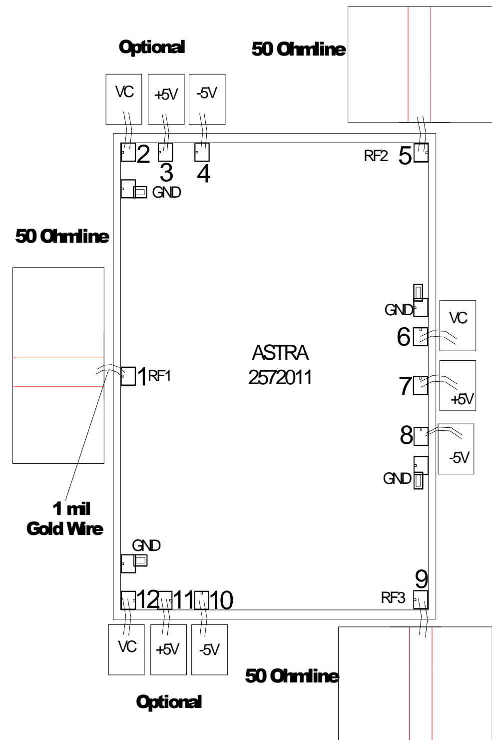
Recommended Assembly Diagram



Note :

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and outputs.
2. Two 1 mil (0.0254mm) bond wires of minimum length should be used from chip bond pad to 100pF capacitor.
3. Input and output 50 ohm lines are on 5 mil RT Duroid substrate
4. 0.1 μF capacitors may be additionally used as a second level of bypass for reliable operation
5. The RF input & output ports are DC decoupled on-chip.

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 - 200μm length of wedge bonds is advised. Single Ball bonds of 250-300μm 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

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