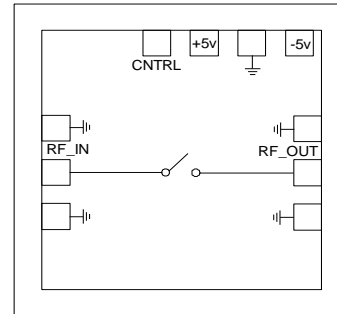


DC–35 GHz SPST Switch

Features

- ◆ Frequency range: DC – 35 GHz
- ◆ Low Insertion loss ~ 1.3dB @ 18 GHz
- ◆ High Isolation of 40 dB
- ◆ I/O Return loss < 15 dB
- ◆ High Input P_{1dB}: 23 dBm
- ◆ On-Chip TTL driver for fast switching
- ◆ 0.5µm InGaAs pHEMT technology
- ◆ Chip Size: 1.73 mm x 1.13 mm x 0.10 mm

Functional Diagram



Typical Applications

- ◆ Military & space
- ◆ Test Equipments
- ◆ Microwave Radio, RADAR
- ◆ Broadband Telecommunications
- ◆ Commercial electronic systems

Description

The ASL8001 is a wideband reflective Single Pole Single Throw (SPST) switch designed over a frequency range of DC–18GHz. This switch offers high isolation and low insertion loss. It has an on-chip TTL driver for high speed switching. The RF ports are DC coupled to ensure low frequency operation. The MMIC operates on +5 V, -5 V supply voltages with very low DC power consumption. This MMIC is fabricated using highly reliable and high performance InGaAs 0.5µm pHEMT Technology.

Absolute Maximum Ratings ⁽¹⁾

Parameter	Absolute Maximum	Units
RF Input Power	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

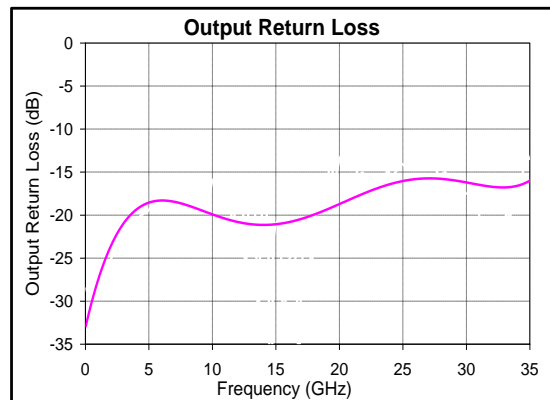
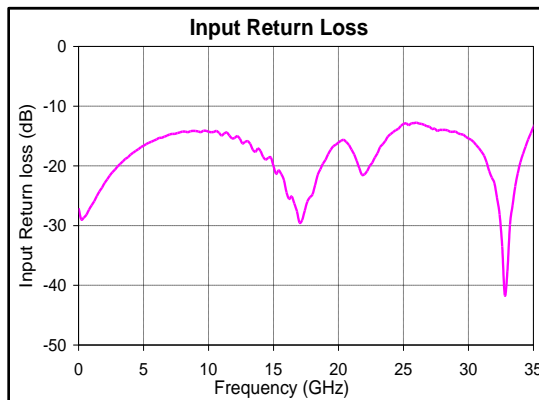
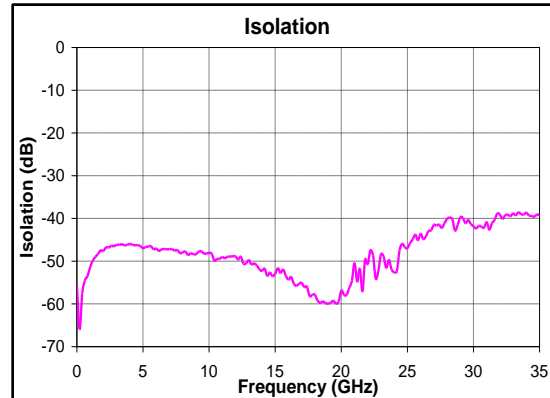
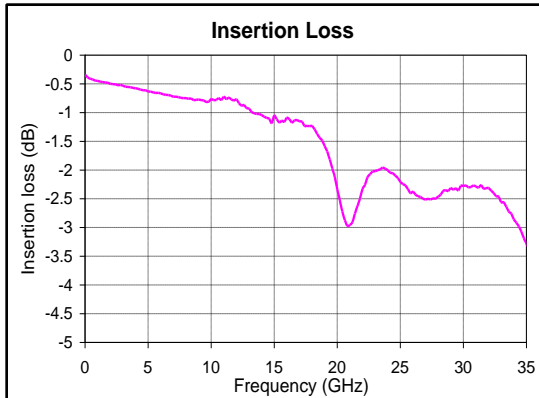
1. Operation beyond these limits may cause permanent damage to the component

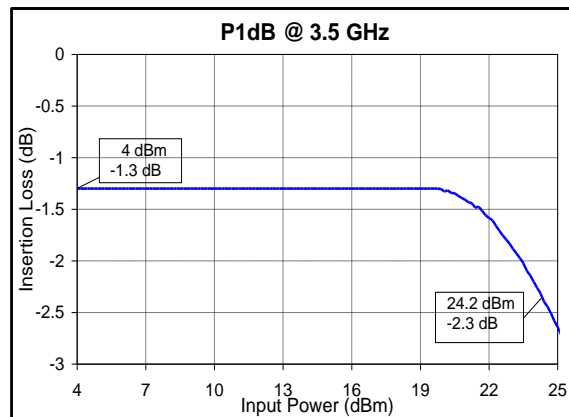
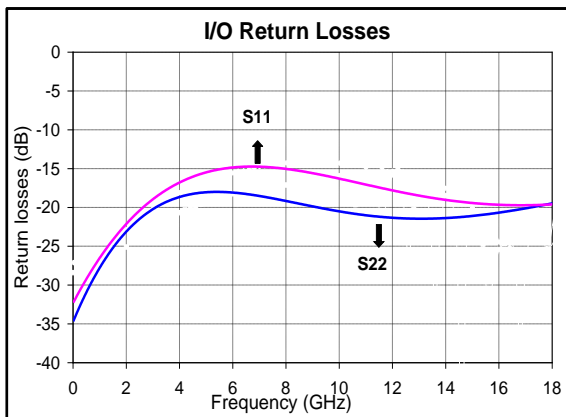
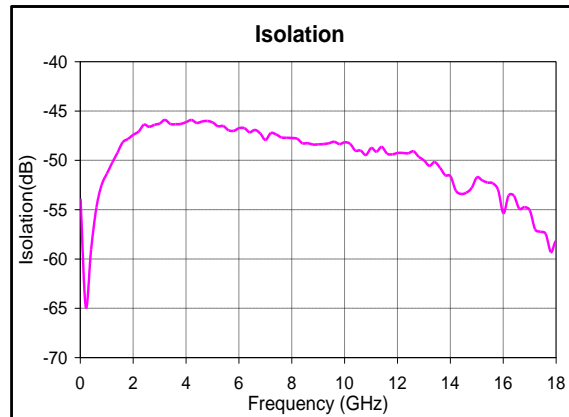
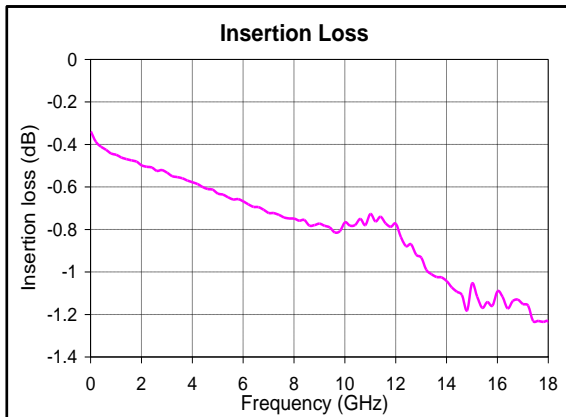
Electrical Specifications⁽¹⁾ @ T_A = 25 °C , Z_o =50 Ω

Parameter	Frequency	Typ. Value	Units
Insertion Loss	5 GHz	0.6	dB
	10 GHz	0.8	dB
	15 GHz	1.0	dB
	18 GHz	1.2	dB
	35GHz ⁽²⁾	3.5 ⁽²⁾	dB
Isolation	5 GHz	46	dB
	10 GHz	48	dB
	15 GHz	52	dB
	18 GHz	57	dB
	35GHz ⁽²⁾	40 ⁽²⁾	dB
Input Return Losses	DC – 18GHz	15	dB
	DC – 35GHz ⁽²⁾	15 ⁽²⁾	dB
Output return Losses	DC – 18GHz	15	dB
	DC – 35GHz ⁽²⁾	15 ⁽²⁾	dB
Input P1dB	DC-18GHz	23	dBm
Switching speed		10	ns
DC Bias Voltages		+5, -5	V
Control Voltage		0/+5	V

Note:

1. Electrical Specifications as measured in a test fixture
2. On-Wafer data

On-Wafer data
 $T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\Omega$


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


Truth Table

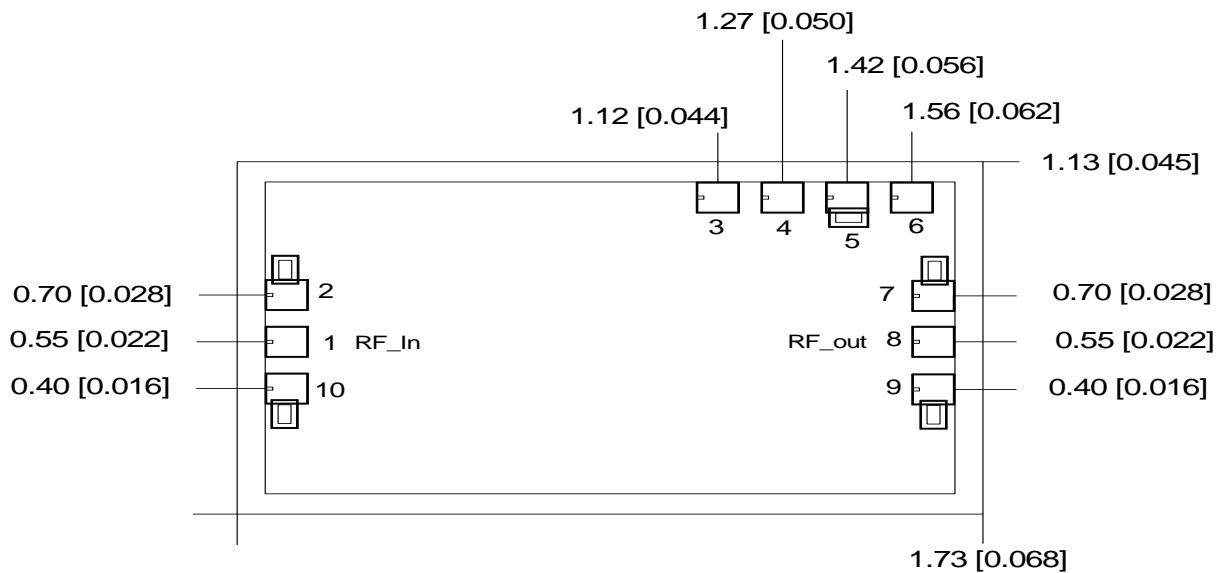
Control Voltage

State	Bias condition
Low "0"	0 - 0.5V
High "1"	3.3 - 5

Truth Table

Ctrl_vol	RF_In to RF_Out
0(Low)	Off (Isolation)
1(High)	On (Low loss)

Mechanical Characteristics



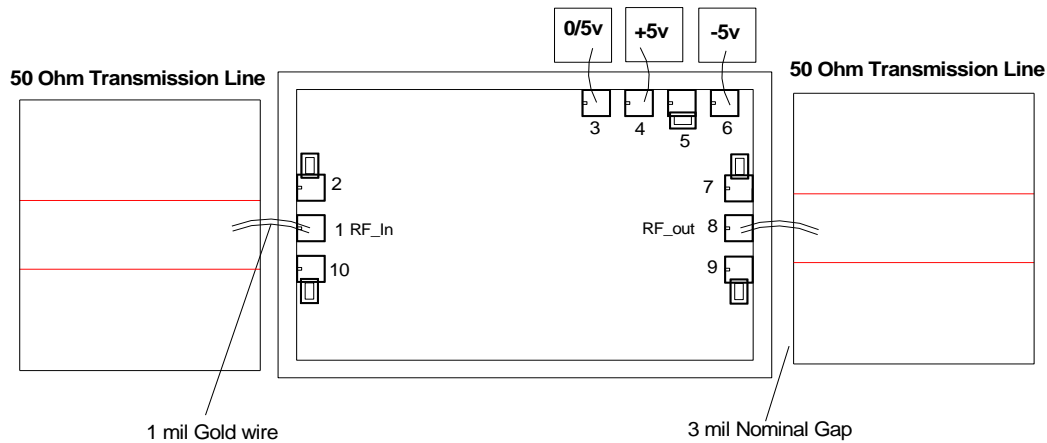
Units: millimeters [inches]

All RF and DC bond pads are 100µm x 100µm

Note:

- 1. Pad no. 1 : RF In
- 2. Pad no. 8 : RF Out
- 3. Pad no. 3 : Control Voltage
- 4. Pad no. 4 : +5V
- 5. Pad no. 5 : -5V

Recommended Assembly Diagram



Note:

1. Both the RF ports are DC Coupled.
2. Two 1 mil (25.4 μ m) bond wires of minimum length should be used for RF input and output.
3. For reliable operation, 0.1 μ F capacitors can be used at the voltage supplies

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