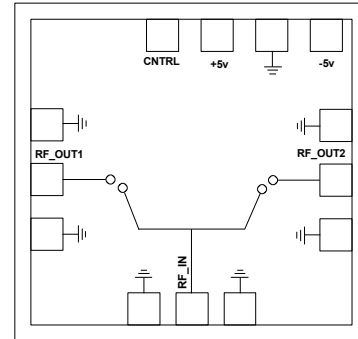


DC-10GHz SPDT Reflective Switch

Features

- ◆ DC-10GHz Wide band operation
- ◆ Low Insertion Loss ~ 1.5 Typ @ 8GHz
- ◆ High Isolation ~ 48dB @ 10GHz
- ◆ I/O VSWR < 1.6: 1
- ◆ P_{1dB} (in) ~ 21dBm
- ◆ Chip Size: 2.2mm X 1.7mm X 0.1mm

Functional Diagram



Typical Applications

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

Description

The ASL8002 is a wideband Reflective single-pole; double throw (SPDT) MMIC chip covering DC to 10GHz. The Switch offers high Isolation and Low Insertion Loss. The Switch features greater than 50 dB Isolation and less than 2.0 dB Insertion Loss up to 10GHz. 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. The die is fabricated using a robust 0.5 μ m 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 @ $T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\ \Omega$

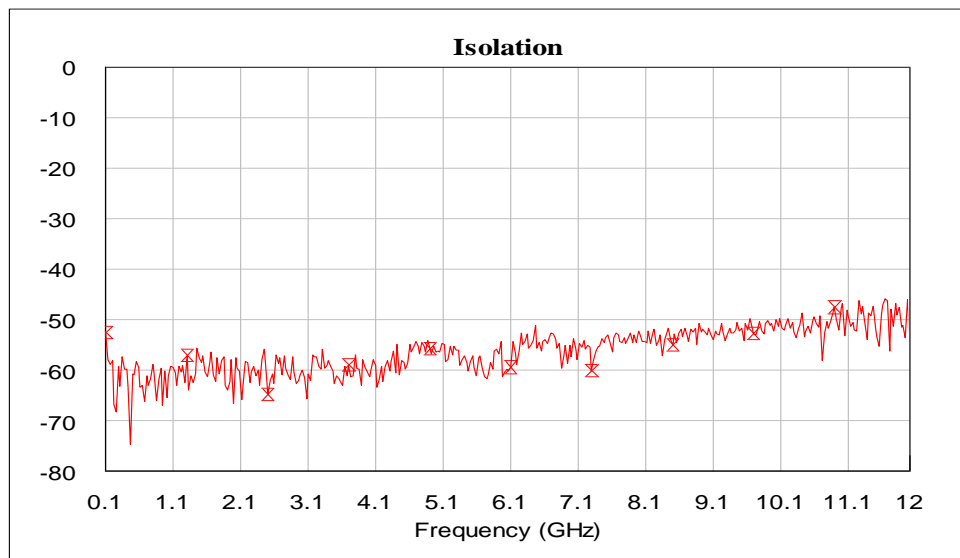
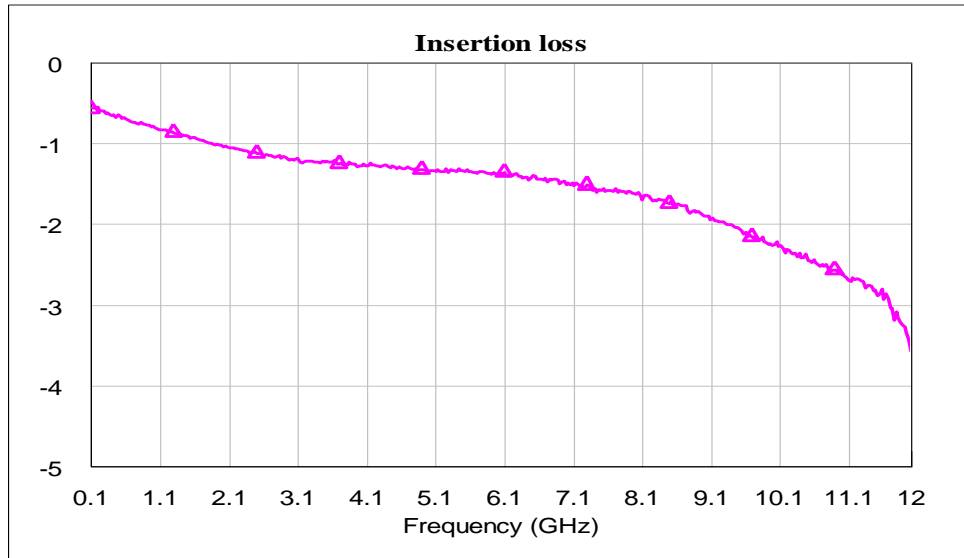
| Parameter | Frequency | Typ. | Units |
|---------------------------------|-----------|--------|-------|
| Insertion Loss (max.) | DC-4 GHz | 1.2 | dB |
| | DC-8 GHz | 1.7 | dB |
| | DC-10 GHz | 2.2 | dB |
| Isolation (min.) | DC-4GHz | 65 | dB |
| | DC-8GHz | 55 | dB |
| | DC-10GHz | 50 | dB |
| Return Loss (On State) | DC-4GHz | 16 | dB |
| | DC-8GHz | 15 | dB |
| | DC-10GHz | 12 | dB |
| Input Power for 1dB Compression | DC-10GHz | 21 | dBm |
| Driver Bias Voltages | | +5, -5 | V |
| Control Voltage | | 0/+5 | V |
| Switching Speed | | 10 | ns |

Note:

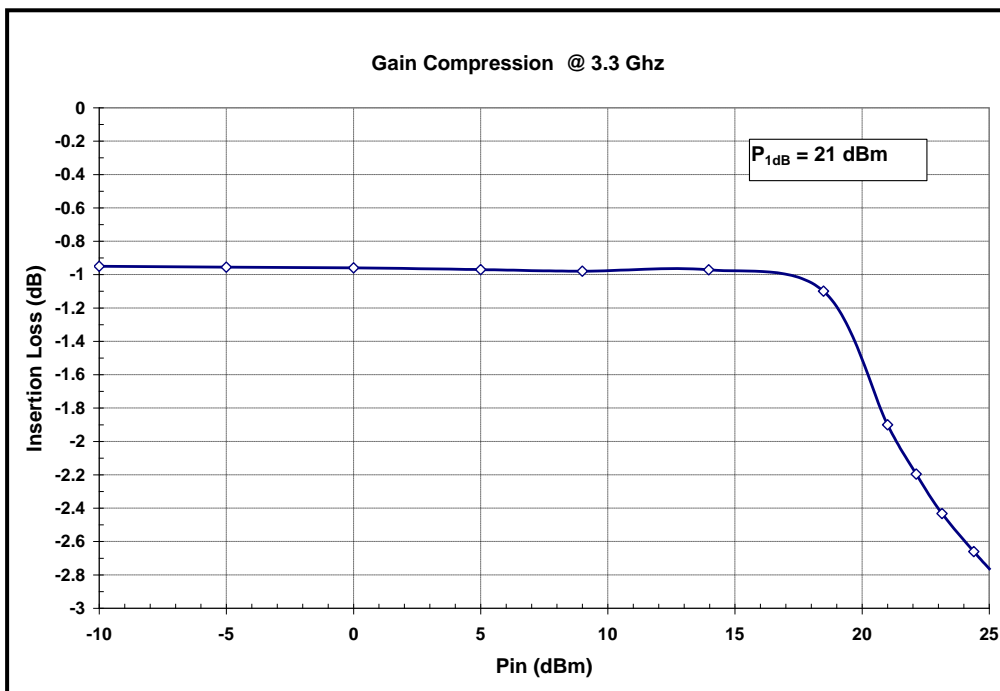
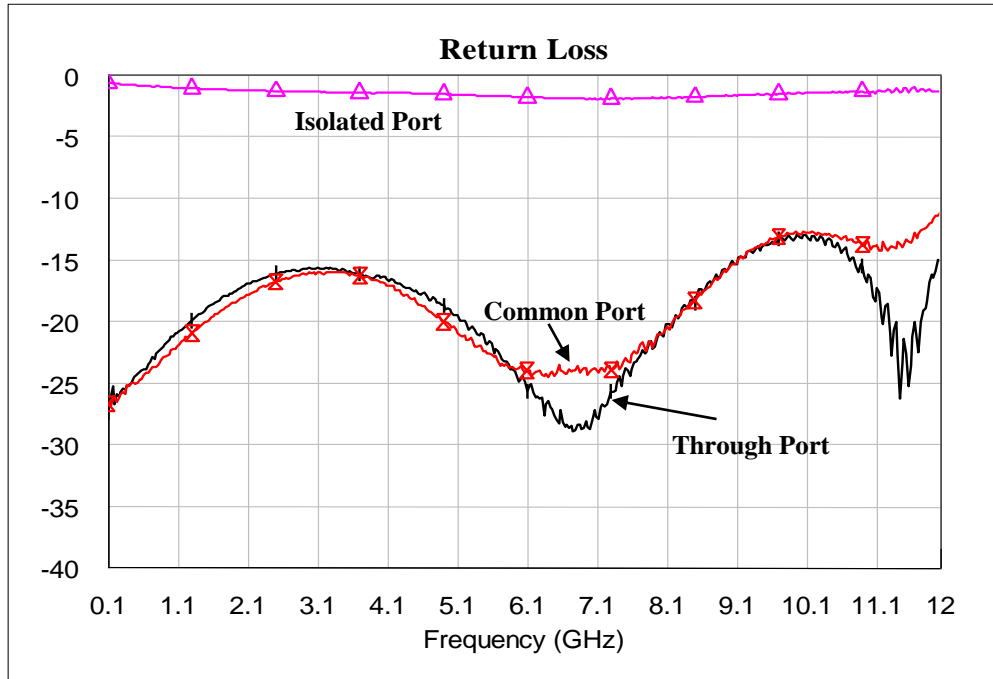
1. The above mentioned electrical specifications are measured in 50ohm line test fixture.
2. The RF input & output ports are DC coupled.
3. For reliable operation external DC blocking capacitors are required at the RF input & output ports.

Test fixture data

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



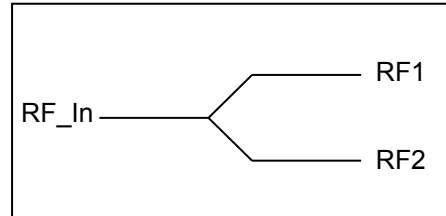
Test fixture data

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


Truth Table

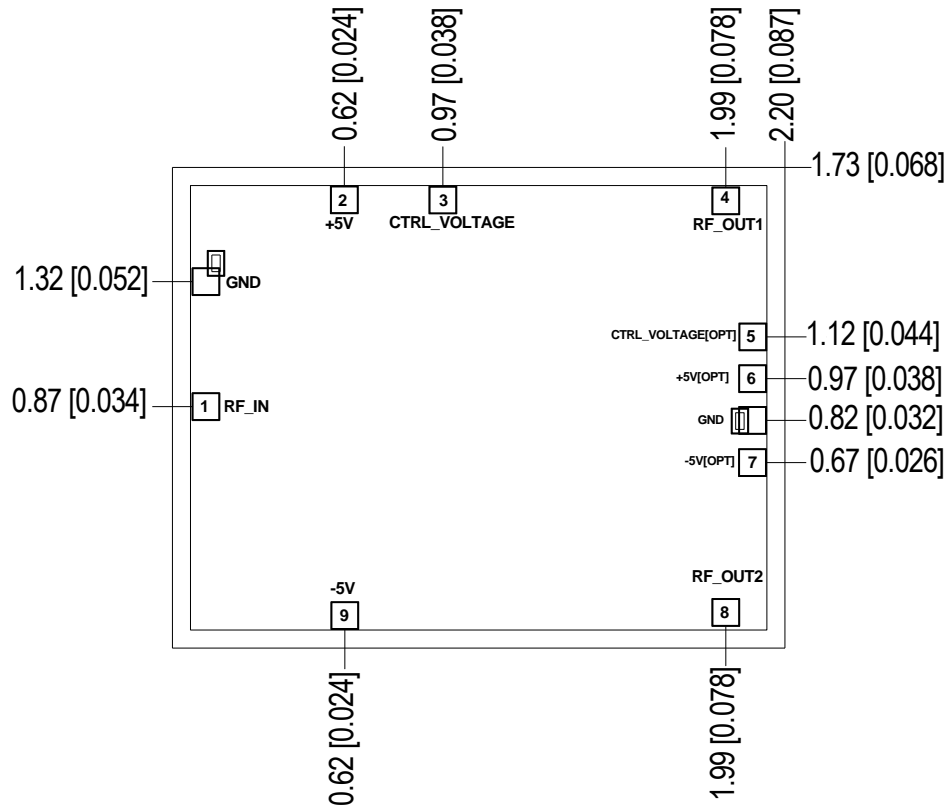
Control Voltage

| 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 |

Mechanical Characteristics

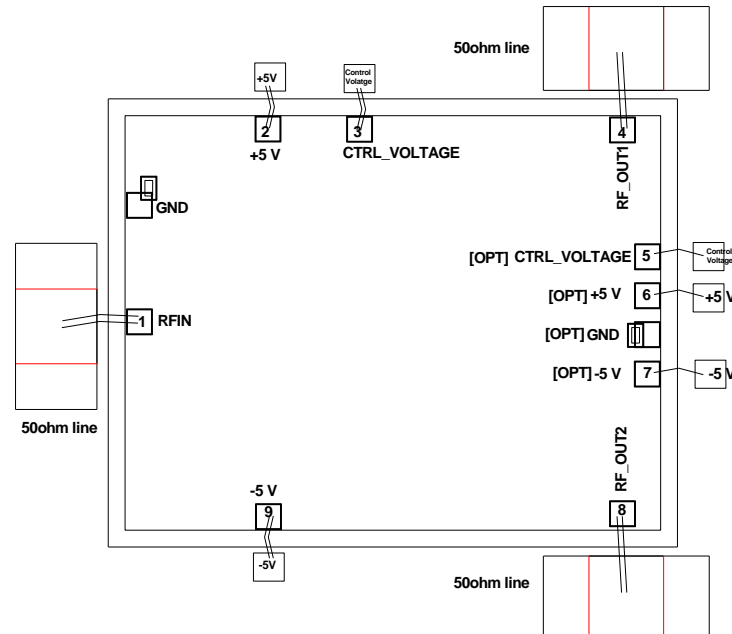


Units: millimeters [inches]

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF_In
3. Pad no. 2, 6 : + 5 V
4. Pad no. 3, 5 : Control Voltage
5. Pad no. 4 : RF_Out 1
6. Pad no. 7,9 :- 5 V
7. Pad no. 8 : RF_Out 2

Recommended Assembly Diagram



Note:

1. Two 1-mil (0.0254mm) bond wires of minimum length ($< 250\mu\text{m}$) should be used for all RF ports.
2. All RF ports are DC Coupled.
3. $0.1\ \mu\text{F}$ 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 - $200\mu\text{m}$ length of wedge bonds is advised. Single Ball bonds of $250\text{-}300\mu\text{m}$ 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