DC-20GHz High Power GaN SPDT Switch

Features
- Frequency Range: DC-20 GHz
- Low Insertion Loss: 1.8 dB
- Isolation: 35 dB
- Input & Output Return Loss: > 10 dB
- Input P1dB: 10Watt
- Die Size: 2.2mm×1.2mm×0.1mm

Typical Applications
- Radar
- Military & Space
- Instrumentation

Description
The GaN based ASL 8010 is a high power wide band Reflective single pole double through (SPDT) switch covering DC-20GHz. The Switch offers low insertion loss, high isolation. The Switch features 35dB Isolation and 1.8dB insertion loss up to 20GHz. The input power for 1dB compression is 10watt. The Switch operates on 0V & -40V for ON & OFF states.

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Input Power</td>
<td>+42</td>
<td>dBm</td>
</tr>
<tr>
<td>Control Voltage ON State</td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>Control Voltage OFF State</td>
<td>-60</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-50 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

1. Operation beyond these limits may cause permanent damage to the component
### Electrical Specifications @ $T_A = 25 \, ^\circ C$, $Z_o=50\Omega$,

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Typical Values</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>DC – 20.0</td>
<td>GHz</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>1.8</td>
<td>dB</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>10</td>
<td>dB</td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>10</td>
<td>dB</td>
</tr>
<tr>
<td>Isolation</td>
<td>35</td>
<td>dB</td>
</tr>
<tr>
<td>Input P1dB</td>
<td>10</td>
<td>Watt</td>
</tr>
<tr>
<td>Control Voltages ON State</td>
<td>0</td>
<td>V</td>
</tr>
<tr>
<td>Control Voltages OFF State</td>
<td>-40</td>
<td>V</td>
</tr>
</tbody>
</table>

**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.

### Truth Table

<table>
<thead>
<tr>
<th>Control Input</th>
<th>Signal Path</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RF IN to RF OUT1</td>
</tr>
<tr>
<td>V1</td>
<td>V2</td>
</tr>
<tr>
<td>0</td>
<td>-40</td>
</tr>
<tr>
<td>-40</td>
<td>0</td>
</tr>
</tbody>
</table>
On Wafer Probed Results

**INSERTION LOSS**

![Insertion Loss Graph](image)

**RETURN LOSS**

![Return Loss Graph](image)
On Wafer Probed Results

Test Fixture Data

$T_A = 25 \degree C$, $Z_0 = 50 \, \Omega$

Input P1dB

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Email: info@aeliussemi.com
URL: www.aeliussemi.com
Mechanical Characteristics

Units: millimeters (inches)

RF and DC Pad Details

Note:
1. All RF and DC bond pads are 100μm x 100μm
2. Pad no. 1: RF IN
3. Pad no. 2,3,5,7,9,11,12: GND
4. Pad no. 4: RF OUT1
5. Pad no. 6: V1
6. Pad no. 8: V2
7. Pad no. 10: RFOUT2
Recommended Assembly Diagram

Note:
1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input, RF output.
2. Input and output 50 ohm lines are preferably on 5mil or 10mil RT Duroid substrate.
3. The RF input & output ports are DC coupled on-chip.
4. 100pf and 0.1 µF capacitors may be additionally used as a bypass for reliable operation at the power 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 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 - 200µm length of wedge bonds is advised. Single Ball bonds of 250-300µm though acceptable, may cause a deviation in RF performance.

GaN 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.