SPDT Switch with Integral CMOS Driver
800 - 2000 MHz
Rev. V5

Features
- Low Cost Plastic SOIC-8 Package
- Integral TTL / CMOS Compatible Driver
- Matched Input and Output
- Low Distortion: > 40 dBm IP₃ @ 900 MHz and > 62 dBm IP₂ @ 900 MHz
- Low DC Current: < 1.5 mA Typical Per Supply

Description
M/A-COM’s SW-335 is a terminated GaAs MMIC SPDT with an on-chip TTL / CMOS driver in a low-cost, SOIC 8-lead plastic package. The SW-335 is ideally suited for use in applications where low power consumption and small size are required.

Typical applications include switch matrices, filter banks, and general switching applications, in systems such as cellular, PCN / PCS, GPS and 900 MHz ISM band applications.

The SW-335 is fabricated using a monolithic GaAs MMIC using a mature 1 micron process. The process features full passivation for increased performance and reliability.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW-335-PIN</td>
<td>SOIC-8 Lead Package</td>
</tr>
<tr>
<td>SW-335TR</td>
<td>Forward Tape and Reel</td>
</tr>
<tr>
<td>SW-335SMB</td>
<td>Sample Test Board</td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Truth Table

<table>
<thead>
<tr>
<th>Control Inputs</th>
<th>TTL/CMOS</th>
<th>RFC-RF1</th>
<th>RFC-RF2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Off</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>0</td>
<td>On</td>
<td>On</td>
<td>Off</td>
</tr>
</tbody>
</table>

3. Logic 0 = 0 to 1 V
4. Logic 1 = 3.5 to 5 V, 10 μA typical.
5. \( V_{DD} = 5 \pm 0.5 \) V @ <1.5 mA typical.
6. \( V_{GG} = -5 \pm 0.25 \) V @ < 1.5 mA

Pin Configuration

Functional Schematic

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Input Power</td>
<td>+31 dBm</td>
</tr>
<tr>
<td>Max. Control Voltages</td>
<td></td>
</tr>
<tr>
<td>( V_{DD} )</td>
<td>+6 VDC</td>
</tr>
<tr>
<td>( V_{GG} )</td>
<td>-6 VDC</td>
</tr>
<tr>
<td>( V_{CTL} ) Maximum</td>
<td>+6 VDC</td>
</tr>
<tr>
<td>( V_{CTL} ) Minimum</td>
<td>-1 VDC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +150°C</td>
</tr>
</tbody>
</table>

7. Exceeding any one or combination of these limits may cause permanent damage to this device.
8. M/A-COM does not recommend sustained operation near these survivability limits.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.
Electrical Specifications: $T_A = +25^\circ C$, $V_{DD} = 5.0\, V$, $V_{GG} = -5.0\, V$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>800-2000 MHz</td>
<td>dB</td>
<td>—</td>
<td>0.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Isolation</td>
<td>800-1000 MHz</td>
<td>dB</td>
<td>35</td>
<td>45</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1000-1500 MHz</td>
<td>dB</td>
<td>35</td>
<td>38</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1500-2000 MHz</td>
<td>dB</td>
<td>30</td>
<td>32</td>
<td>—</td>
</tr>
<tr>
<td>VSWR</td>
<td>800-1000 MHz</td>
<td>Ratio</td>
<td>—</td>
<td>1.2:1</td>
<td>1.3:1</td>
</tr>
<tr>
<td></td>
<td>1000-2000 MHz</td>
<td>Ratio</td>
<td>—</td>
<td>1.2:1</td>
<td>1.3:1</td>
</tr>
<tr>
<td>1 dB Compression</td>
<td>900 MHz</td>
<td>dBm</td>
<td>—</td>
<td>29</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_{RISE, TFALL}$</td>
<td>10% to 90% RF, 90% to 10% RF</td>
<td>ns</td>
<td>—</td>
<td>75</td>
<td>—</td>
</tr>
<tr>
<td>$T_{ON, TOFF}$</td>
<td>50% Control to 90% RF, Control to 10% RF</td>
<td>mV</td>
<td>—</td>
<td>200</td>
<td>—</td>
</tr>
<tr>
<td>Transients</td>
<td>In-Band</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input IP$_2$</td>
<td>2-tone, 10 dBm (13 dBm total)</td>
<td>900 MHz</td>
<td>dBm</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Input IP$_3$</td>
<td>2-tone, 10 dBm (13 dBm total)</td>
<td>900 MHz</td>
<td>dBm</td>
<td>62</td>
<td>70</td>
</tr>
<tr>
<td>Current</td>
<td>$V_{DD} @ 5.0, V$</td>
<td>mA</td>
<td>—</td>
<td>1.1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>$V_{GG} @ -5.0, V$</td>
<td>mA</td>
<td>—</td>
<td>-0.8</td>
<td>-1.5</td>
</tr>
<tr>
<td></td>
<td>$V_{CTL} @ 0, V$</td>
<td>µA</td>
<td>—</td>
<td>-5</td>
<td>-10</td>
</tr>
<tr>
<td></td>
<td>$V_{CTL} @ 5.0, V$</td>
<td>µA</td>
<td>—</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

9. All measurements are in a 50 $\Omega$ system.
10. DC Blocks required on RF ports.

SOIC-8$^\dagger$

$^\dagger$Meets JEDEC moisture sensitivity level 1 requirements.
Typical Performance Curves

**Insertion Loss**

- 70°C
- 25°C
- 0°C

**Isolation**

- 70°C
- 25°C
- 0°C

**Output VSWR (“ON” State) vs. Frequency**

- 70°C
- 25°C
- 0°C

**Input VSWR vs. Frequency**

- 70°C
- 25°C
- 0°C

**Handling Procedures**

Please observe the following precautions to avoid damage:

**Static Sensitivity**

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.