GaAs SPDT Switch
DC - 3.0 GHz

Features
- Low Insertion Loss: 0.3 dB @ 900 MHz
- Low Current Consumption: <15 µA @ +2.5 V
- Positive or Negative 2.5 to 8 V Control
- Lead-Free SOT-363 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of SW-437

Description
M/A-COM’s MASWSS0166 is a GaAs monolithic switch in a lead-free SOT-363 surface mount plastic package. The MASWSS0166 is ideally suited for applications where very low power consumption, low insertion loss, very small size and low cost are required.

Typical applications are dual band systems that require switching between small signal components such as filter banks, single band LNA’s and converters. The MASWSS0166 can be used in applications up to 0.25 Watts in systems such as cellular, PCS, DCS1800, GSM, CDMA, W-CDMA and other analog/digital wireless communications systems.

The MASWSS0166 is fabricated using a mature 0.5 micron GaAs PHEMT process. The process features full passivation for increased performance and reliability.

Absolute Maximum Ratings \(^1,2\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power (0.5-3.0 GHz)</td>
<td>+30 dBm</td>
</tr>
<tr>
<td>3 V Control</td>
<td>+30 dBm</td>
</tr>
<tr>
<td>5 V Control</td>
<td>+33 dBm</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>-8.5 Volts</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>

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

Ordering Information \(^3\)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MASWSS0166</td>
<td>Bulk Packaging</td>
</tr>
<tr>
<td>MASWSS0166TR-3000</td>
<td>3000 piece reel</td>
</tr>
<tr>
<td>MASWSS0166SMB</td>
<td>Sample Test Board</td>
</tr>
</tbody>
</table>

3. Reference Application Note M513 for reel size information.

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Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.
Electrical Specifications:  \( T_A = 25^\circ \text{C}, \ V_c = 0 \ \text{V} / -2.5 \ \text{V}, \ Z_0 = 50\Omega \)

<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>DC - 1 GHz</td>
<td>dB</td>
<td>—</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>1 - 2 GHz</td>
<td>dB</td>
<td>—</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>2 - 3 GHz</td>
<td>dB</td>
<td>—</td>
<td>0.55</td>
<td>0.7</td>
</tr>
<tr>
<td>Isolation</td>
<td>DC - 1 GHz</td>
<td>dB</td>
<td>19</td>
<td>21</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1 - 2 GHz</td>
<td>dB</td>
<td>13</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>2 - 3 GHz</td>
<td>dB</td>
<td>10</td>
<td>12</td>
<td>—</td>
</tr>
<tr>
<td>VSWR</td>
<td>DC - 3 GHz</td>
<td>Ratio</td>
<td>—</td>
<td>1:2:1</td>
<td>—</td>
</tr>
<tr>
<td>( P_{\text{1dB}} )</td>
<td>500 MHz - 3 GHz, (</td>
<td>V_c</td>
<td>= 2.7 \ \text{V} )</td>
<td>dBm</td>
<td>—</td>
</tr>
<tr>
<td>( P_{\text{1dB}} )</td>
<td>500 MHz - 3 GHz, (</td>
<td>V_c</td>
<td>= 5 \ \text{V} )</td>
<td>dBm</td>
<td>—</td>
</tr>
<tr>
<td>Input IP (_2)</td>
<td>2-Tone, 900 MHz, 5 MHz spacing, (</td>
<td>V_c</td>
<td>= 2.7 \ \text{V} )</td>
<td>dBm</td>
<td>—</td>
</tr>
<tr>
<td>Input IP (_3)</td>
<td>2-Tone 900 MHz, 5 MHz spacing, (</td>
<td>V_c</td>
<td>= 2.7 \ \text{V} )</td>
<td>dBm</td>
<td>—</td>
</tr>
<tr>
<td>Transients</td>
<td>10% to 90% RF, 90% to 10% RF</td>
<td>nS</td>
<td>—</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>50% Control to 90% RF, 50% Control to 10% RF</td>
<td>nS</td>
<td>—</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>In-Band</td>
<td>mV</td>
<td>—</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>Control Current</td>
<td>(</td>
<td>V_c</td>
<td>= 2.5 \ \text{V} )</td>
<td>( \mu \text{A} )</td>
<td>—</td>
</tr>
</tbody>
</table>

4. For positive voltage control, external DC blocking capacitors are required on all RF ports.

**Lead-Free SOT-363 Plastic Package\(^*\)**

5. Differential voltage, \( V(\text{state 1}) - V(\text{state 0}) \), must be +2.5 V minimum and must not exceed 8 V.

6. \( 0 = -8 \ \text{V} \) to 0 V, \( 1 = -5.5 \ \text{V} \) to 8 V

**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.

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For further information and support please visit: [https://www.macom.com/support](https://www.macom.com/support)
**GaAs SPDT Switch**

**DC - 3.0 GHz**

**Typical Performance Curves**

*Insertion Loss (Negative Voltage Control)*

*Insertion Loss (Positive Voltage Control)*

*Isolation*

*VSWR*

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