

## GaAs SPDT Switch DC - 3.0 GHz

Rev. V5

### Features

- Low Insertion Loss: 0.65 dB @ 2.4 GHz
- Isolation: 24 dB @ 2.4 GHz
- Low Current Consumption: <10  $\mu$ A @ -3 V
- Lead-Free SOT-363 Plastic Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of the SW-438

### Description

M/A-COM's MASWSS0151 is a GaAs MMIC SPDT switch in a low cost, lead-free SC70 (SOT-363) surface mount plastic package. The MASWSS0151 is ideally suited for applications that include transmit / receive switching for Bluetooth and WLAN equipment.

The MASWSS0151 can also be used in applications up to 500 mW in cellular, PCS, DCS1800, GSM, CDMA, and other analog and digital wireless communications systems.

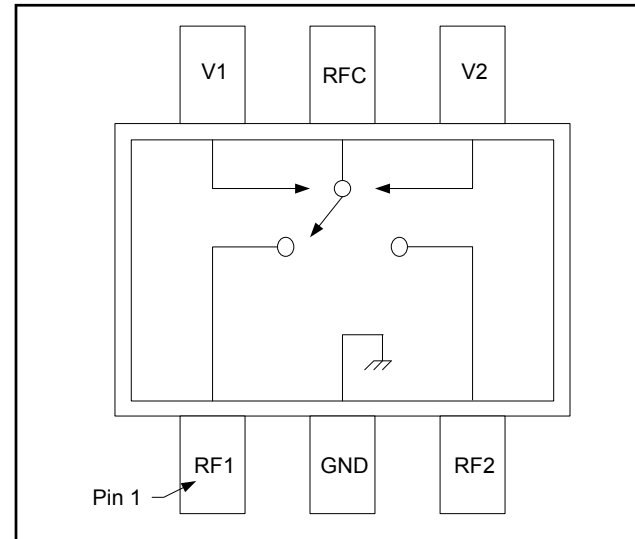
The MASWSS0151 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

### Ordering Information <sup>1</sup>

| Part Number       | Package                              |
|-------------------|--------------------------------------|
| MASWSS0151        | Bulk Packaging                       |
| MASWSS0151TR-3000 | 3000 piece reel                      |
| MASWSS0151SMB     | Sample Board<br>(Includes 5 Samples) |

1. Reference Application Note M513 for reel size information.

### Functional Schematic



### Pin Configuration

| Pin No. | Function | Description       |
|---------|----------|-------------------|
| 1       | RF1      | RF Input / Output |
| 2       | GND      | RF Ground         |
| 3       | RF2      | RF Input / Output |
| 4       | V2       | Control 2 Input   |
| 5       | RFC      | RF Common Input   |
| 6       | V1       | Control 1 Input   |

### Absolute Maximum Ratings <sup>2,3</sup>

| Parameter             | Absolute Maximum |
|-----------------------|------------------|
| Input Power (1 GHz)   | +32 dBm          |
| Operating Voltage     | +8 Volts         |
| Operating Temperature | -40°C to +85°C   |
| Storage Temperature   | -65°C to +150°C  |

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

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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**Electrical Specifications:**  $T_A = 25^\circ\text{C}$ ,  $V_C = 0\text{ V} / -3.0\text{ V}$ ,  $\text{Pin} = 0\text{ dBm}$ ,  $Z_0 = 50\ \Omega$ <sup>4</sup>

| Parameter       | Test Conditions                                 | Units | Min. | Typ. | Max. |
|-----------------|-------------------------------------------------|-------|------|------|------|
| Insertion Loss  | DC - 3.0 GHz                                    | dB    | —    | 0.65 | 0.8  |
| Isolation       | DC - 1.0 GHz                                    | dB    | 29   | 31   | —    |
|                 | 1.0 - 2.0 GHz                                   | dB    | —    | 25   | —    |
|                 | 2.0 - 3.0 GHz                                   | dB    | —    | 21   | —    |
| Return Loss     | DC - 1.5 GHz                                    | dB    | —    | 22   | —    |
|                 | 1.5 - 3.0 GHz                                   | dB    | —    | 20   | —    |
| P1dB            | 1 GHz                                           | dBm   | —    | 31   | —    |
| IP2             | Two Tone, 10 dBm / Tone, 900 MHz, 5 MHz Spacing | dBm   | —    | 81   | —    |
| IP3             | Two Tone, 10 dBm / Tone, 900 MHz, 5 MHz Spacing | dBm   | —    | 55   | —    |
| 2nd Harmonic    | 2.4 GHz, $\text{Pin} = +20\text{ dBm}$          | dBc   | —    | -70  | —    |
| 3rd Harmonic    | 2.4 GHz, $\text{Pin} = +20\text{ dBm}$          | dBc   | —    | -60  | —    |
| Ton, Toff       | 50% control to 90% RF, 50% control to 10% RF    | nS    | —    | 20   | —    |
| Trise, Tfall    | 10% to 90% RF, 90% to 10% RF                    | nS    | —    | 10   | —    |
| Control Current |                                                 | mA    | —    | 5    | 10   |

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

### Truth Table<sup>5,6</sup>

| V1 | V2 | RFC-RF1 | RFC-RF2 |
|----|----|---------|---------|
| 1  | 0  | Off     | On      |
| 0  | 1  | On      | Off     |

5. Differential voltage,  $V(\text{state } 1) - V(\text{state } 0)$ , must be  $+2.1\text{ V}$  minimum and must not exceed  $5\text{ V}$ .

6. 0 =  $-5\text{ V}$  to  $0\text{ V}$ , 1 =  $-2.9\text{ V}$  to  $5\text{ V}$ .

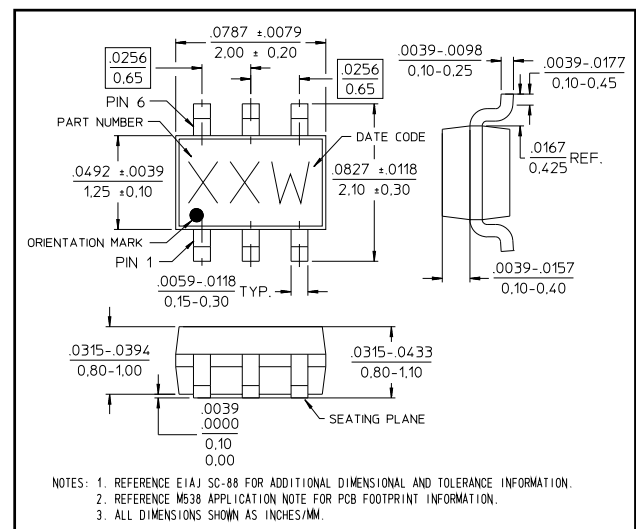
### Handling Procedures

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.

### Lead-Free SC70 (SOT-363)<sup>†</sup>



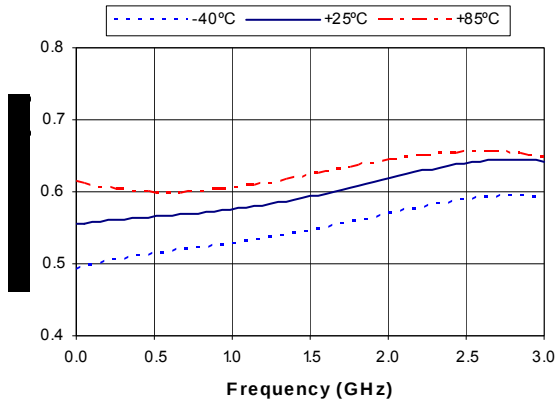
<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.

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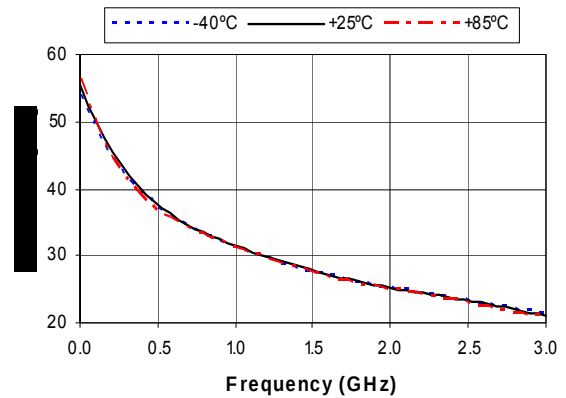
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### Typical Performance Curves vs. Frequency over Temperature

**Insertion Loss**



**Isolation**



**Return Loss**

