

## Features

- Low Insertion Loss: 0.4 dB @ 2.4 GHz
- Moderate Isolation: 27 dB @ 2.4 GHz
- Low Power Consumption: 5  $\mu$ A @ +3.0 V
- Lead-Free SC-70 (SOT-363) Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible

## Description

M/A-COM's MASWSS0136 is a GaAs PHEMT MMIC SPDT switch in a lead-free SC-70 (SOT-363) surface mount plastic package. The MASWSS0136 is ideally suited for applications where very small size and low cost are required.

Typical applications are transmit / receive (Tx / Rx) switching in linear systems such as WLAN 802.11b/g. Other applications include 1.9 GHz and 2.4 GHz DECT and linear systems operating up to 3.0 GHz.

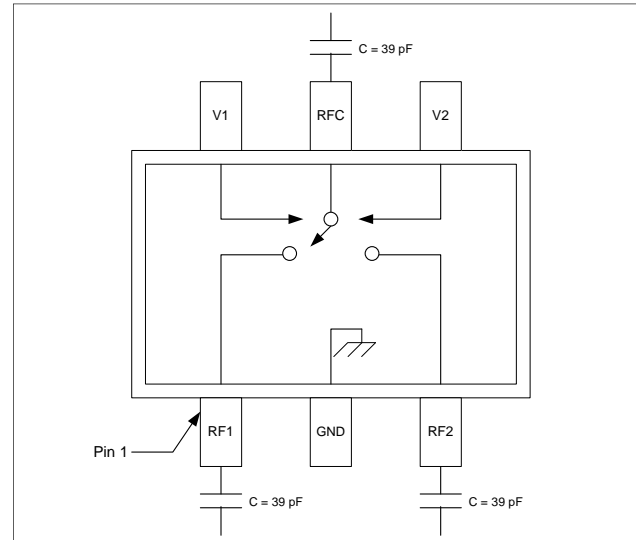
The MASWSS0136 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

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

| Part Number       | Package         |
|-------------------|-----------------|
| MASWSS0136        | Bulk packaging  |
| MASWSS0136TR-3000 | 3000 piece reel |
| MASWSS0136SMB     | Sample Board    |

1. Reference Application Note M513 for reel size information.

## Functional Schematic



## Pin Configuration

| Pin No. | Pin Name | Description |
|---------|----------|-------------|
| 1       | RF1      | RF Port 1   |
| 2       | GND      | Ground      |
| 3       | RF2      | RF Port 2   |
| 4       | V2       | Control 2   |
| 5       | RFC      | RF Input    |
| 6       | V1       | Control 1   |

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

| Parameter                                  | Absolute Maximum               |
|--|--------------------------------|
| Input Power (0.5 - 3.0 GHz)<br>3 V Control | +30 dBm                        |
| Voltage                                    | -8.5 V $\leq$ Vc $\leq$ +8.5 V |
| 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.

## GaAs SPDT Switch DC - 3.0 GHz

Rev. V2

### Electrical Specifications: $T_A = 25^\circ\text{C}$ , $V_C = 0\text{ V} / 3\text{ V}$ , $Z_0 = 50\ \Omega$ <sup>4</sup>

| Parameter                   | Test Conditions                                   | Units         | Min. | Typ.  | Max. |   |
|-----------------------------|---|---------------|------|-------|------|---|
| Insertion Loss <sup>5</sup> | 1.0 GHz   | dB            | —    | 0.3   | —    |   |
|                             | 2.4 GHz   | dB            | —    | 0.4   | 0.5  |   |
| Isolation                   | 1.0 GHz   | dB            | —    | 24    | —    |   |
|                             | 2.4 GHz   | dB            | 25   | 27    | —    |   |
| VSWR                        | 0.05 - 3.0 GHz                                    | Ratio         | —    | 1.2:1 | —    |   |
| IP2                         | Two Tone, +5 dBm / Tone, 5 MHz Spacing<br>2.4 GHz | dBm           | —    | 80    | —    |   |
| IP3                         | Two Tone, +5 dBm / Tone, 5 MHz Spacing<br>2.4 GHz | dBm           | —    | 48    | —    |   |
| Linear Pout                 | 2.5 GHz, OFDM, QAM-64, 54Mbps, EVM=2.5%           | 3.0 V         | dBm  | —     | 22.5 | — |
|                             |   | 3.3 V         | dBm  | —     | 24.0 | — |
|                             |   | 5.0 V         | dBm  | —     | 28.5 | — |
| P1dB                        | —   | dBm           | —    | 28    | —    |   |
| Trise, Tfall                | 10% to 90% RF and 90% to 10% RF                   | nS            | —    | 35    | —    |   |
| Ton, Toff                   | 50% control to 90% RF, 50% control to 10% RF      | nS            | —    | 40    | —    |   |
| Transients                  | —   | mV            | —    | 10    | —    |   |
| Current                     | $V_C = 3.0\text{ V}$                              | $\mu\text{A}$ | —    | 5     | 10   |   |

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

5. Insertion Loss can be optimized by varying the DC blocking capacitor value, e.g. 1000 pF for 100 MHz – 1.0 GHz, 39 pF for 0.5 - 3.0 GHz.

### Truth Table<sup>6,7</sup>

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

6. Differential voltage,  $V(\text{state } 1) - V(\text{state } 0)$ , must be +2.3 V minimum and must not exceed 8.5 V.

7. 0 = 0 V  $\pm$  0.2 V, 1 = +2.5 V to 5.0 V

### Qualification

Qualified to M/A-COM specification REL-201, Process Flow -2.

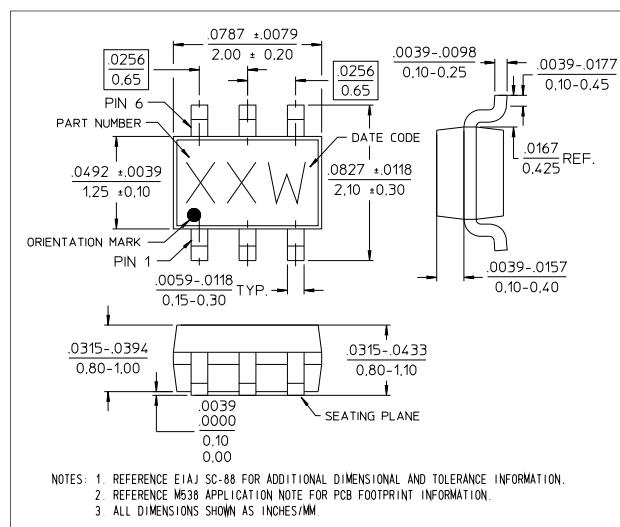
### Handling Procedures

The following precautions should be observed 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 SC-70 (SOT-363)<sup>†</sup>



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

Meets JEDEC moisture sensitivity level 1 requirements.

**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.

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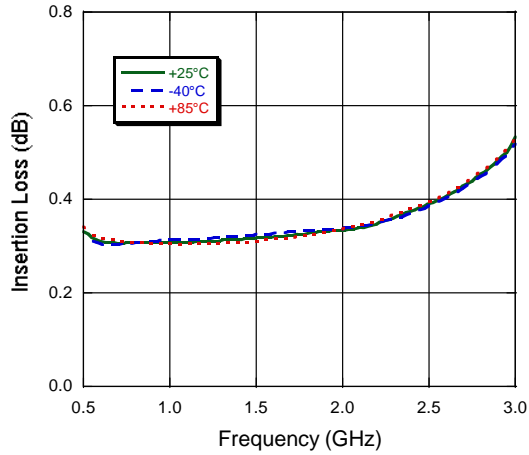
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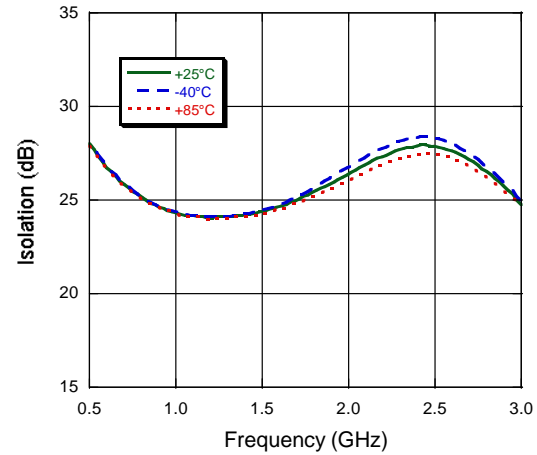
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## Typical Performance Curves

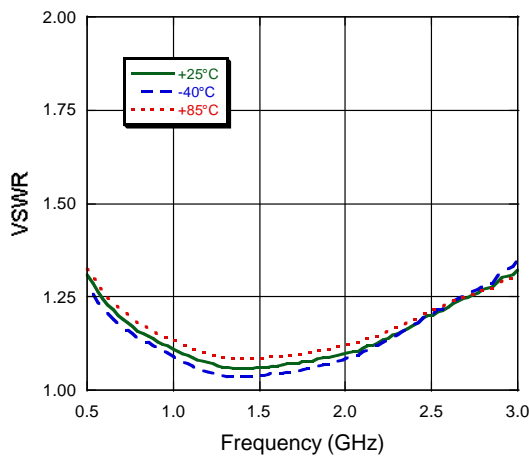
**Insertion Loss**



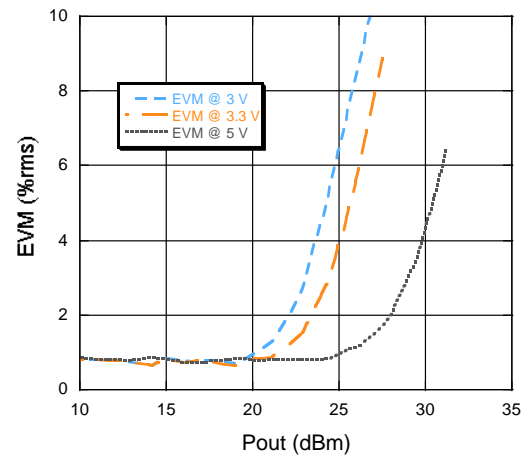
**Isolation**



**VSWR**



**EVM vs. Pout @ 2.5 GHz**



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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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