# MASWSS0167

## 2.5 V GaAs SPDT Switch
## 0.5 - 3.0 GHz

Rev. V2

### Features

- Low Voltage Operation: 2.5 V
- Low Insertion Loss: 0.3 dB at 1 GHz
- Isolation: 34 dB @ 2.4 GHz
- 0.5 micron GaAs PHEMT Process
- Lead-Free 1.2 x 1.5 mm 6-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS Compliant* and 260°C Reflow Compatible

### Description

M/A-COM's MASWSS0167 is a GaAs PHEMT MMIC single pole double throw (SPDT) switch in a lead-free 1.2 x 1.5 mm 6-lead PQFN package. The MASWSS0167 is ideally suited for applications where low control voltage, low insertion loss, moderate isolation, small size and low cost are required.

Typical applications are for filter and antenna switching in wireless LAN systems that connect separate receive functions to a common antenna, as well as other handset and general purpose switching applications.

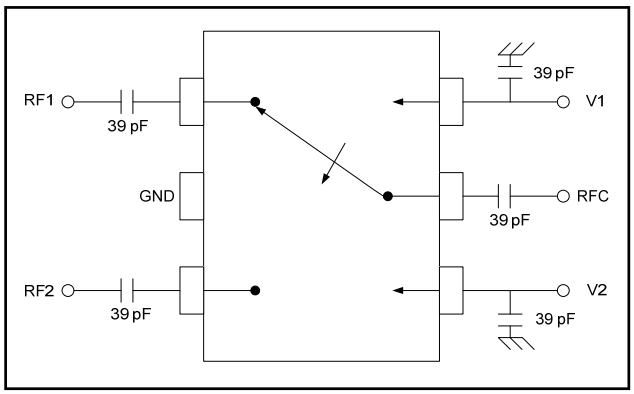
The MASWSS0167 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

### Ordering Information[1]

| Part Number | Package |
|---|---|
| MASWSS0167TR-3000 | 3000 piece reel |
| MASWSS0167SMB | Sample Test Board |

1. Reference Application Note M513 for reel size information.

### Functional Schematic




### Pin Configuration

| Pin No. | Pin Name | Description |
|---|---|---|
| 1 | RF1 | RF In/Out |
| 2 | GND | RF Ground |
| 3 | RF2 | RF In/Out |
| 4 | V2 | Control 2 |
| 5 | RFC | RF Common |
| 6 | V1 | Control 1 |

### Absolute Maximum Ratings [2,3]

| Parameter | Absolute Maximum |
|---|---|
| Input Power (0.5 - 3 GHz, 2.5 V Control) | +32 dBm |
| Operating Voltage | +8.5 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°C, $V_C$ = 0 V / +2.5 V, $Z_0$ = 50 Ω [4]

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Insertion Loss [5] | 1 GHz<br>2 GHz<br>3 GHz | dB<br>dB<br>dB | —<br>—<br>— | 0.30<br>0.40<br>0.50 | 0.50<br>—<br>— |
| Isolation | 1 GHz<br>2 GHz<br>3 GHz | dB<br>dB<br>dB | 23<br>—<br>— | 25<br>27<br>24 | —<br>—<br>— |
| VSWR | 0.5 - 3.0 GHz | Ratio | — | 1.1 | — |
| IP3 | Two Tone, +10 dBm/tone, 5 MHz Spacing, > 50 MHz | dBm | — | 48 | — |
| P1dB | — | dBm | — | 28 | — |
| Linear Pout | 2.5 GHz, OFDM, QAM-64,54Mbps, EVM=2.5%<br>2.5 V<br>3.0 V<br>5.0 V | <br>dBm<br>dBm<br>dBm | <br>—<br>—<br>— | <br>21.0<br>23.5<br>28.5 | <br>—<br>—<br>— |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | nS | — | 30 | — |
| Ton, Toff | 50% control to 90% RF, and 50% control to 10% RF | nS | — | 35 | — |
| Transients | In Band | mV | — | 60 | — |
| Control Current | $\|V_C\|$ = 2.5 V | µA | — | 1 | 5 |

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 - 500 MHz, 39 pF for 0.5 - 3 GHz.

## Truth Table [6]

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

6. 0 = 0 ± 0.2 V, 1 = 2.5 to 5 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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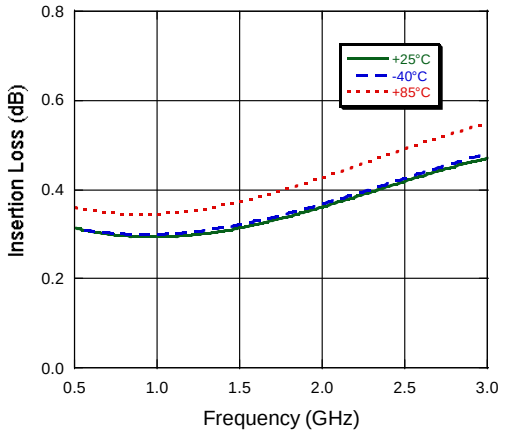
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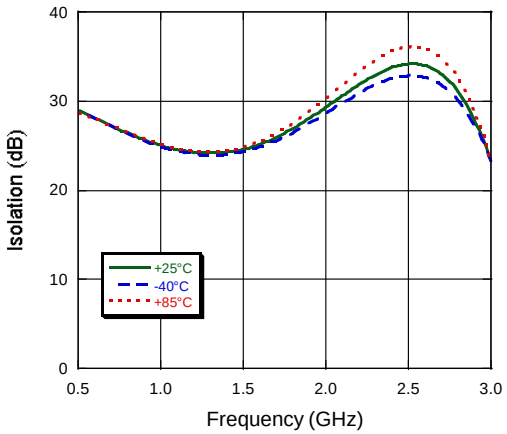
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## Typical Performance Curves

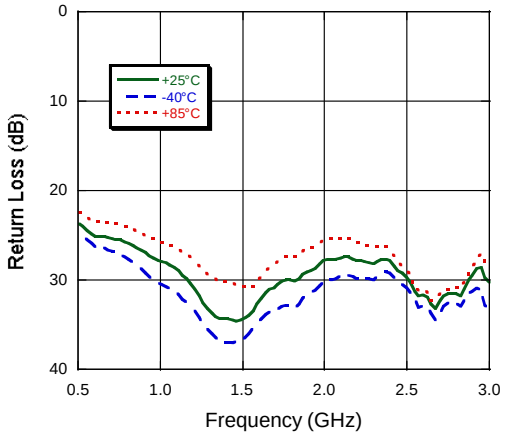
### *Insertion Loss*



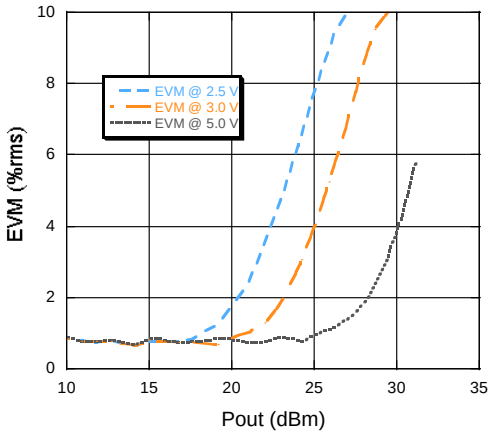

### *Isolation*



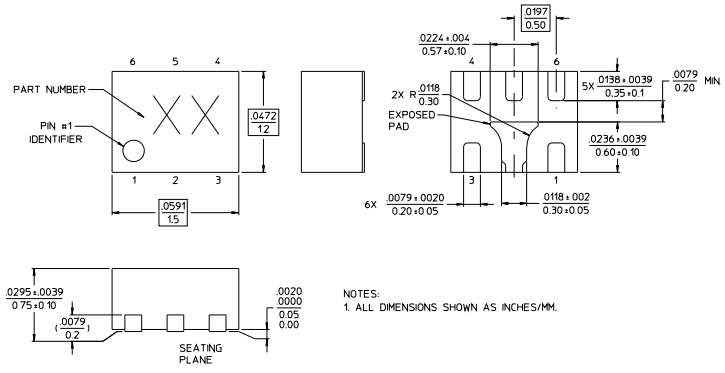

### *Return Loss*




### *EVM vs. Pout @ 2.5 GHz*




## *Lead-Free* 1.2 x 1.5 mm 6-Lead PQFN†




† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.



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