# MASWSS0136



# GaAs SPDT Switch DC - 3.0 GHz

Rev. V2

#### **Features**

- Low Insertion Loss: 0.4 dB @ 2.4 GHz
- Moderate Isolation: 27 dB @ 2.4 GHz
- Low Power Consumption: 5 μA @ +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.

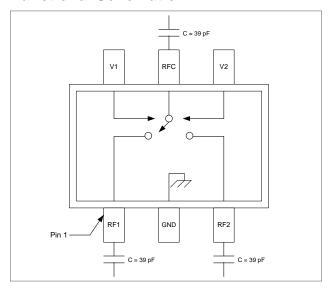
The MASWSS0136 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

## 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 Descripti	
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) 3 V Control	+30 dBm		
Voltage	-8.5 V <u>&lt;</u> Vc <u>&lt;</u> +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.
- M/A-COM does not recommend sustained operation near these survivability limits.

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

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

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss <sup>5</sup>	1.0 GHz 2.4 GHz	dB dB	_	0.3 0.4	— 0.5
Isolation	1.0 GHz 2.4 GHz	dB dB	 25	24 27	
VSWR	0.05 - 3.0 GHz	Ratio	_	1.2:1	_
IP2	Two Tone, +5 dBm / Tone, 5 MHz Spacing 2.4 GHz	dBm	_	80	_
IP3	Two Tone, +5 dBm / Tone, 5 MHz Spacing 2.4 GHz	dBm	_	48	_
Linear Pout	2.5 GHz, OFDM, QAM-64,54Mbps, EVM=2.5% 3.0 V 3.3 V 5.0 V	dBm dBm dBm	_	22.5 24.0 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 <sub>C</sub> = 3.0 V	μA	_	5	10

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

### Truth Table 6,7

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

Differential voltage, V (state 1) - V (state 0), must be +2.3 V minimum and must not exceed 8.5 V.

#### Qualification

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

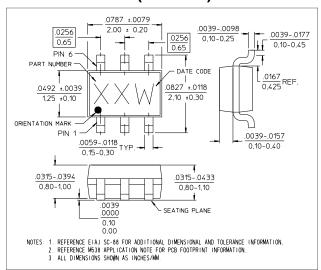
#### **Handling Procedures**

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.

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<sup>5.</sup> 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.

<sup>7.</sup>  $0 = 0 \text{ V} \pm 0.2 \text{ V}$ , 1 = +2.5 V to 5.0 V

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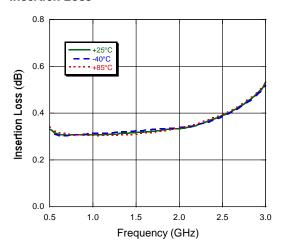


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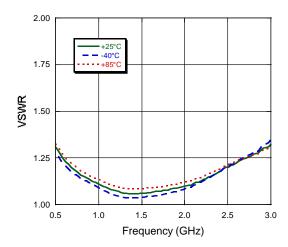
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### **Typical Performance Curves**

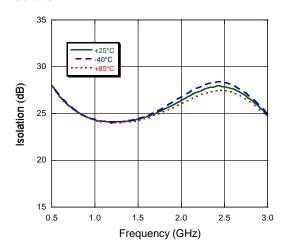
#### Insertion Loss



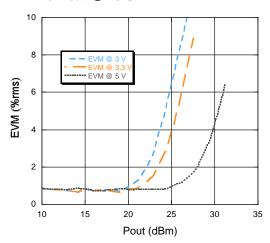
#### **VSWR**



#### Isolation



#### EVM vs. Pout @ 2.5 GHz



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