



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## 2.5 V GaAs SPDT Switch 0.5 - 3.0 GHz

Rev. V3

### Features

- Low Voltage Operation: 2.5 V
- Low Insertion Loss: 0.3 dB @ 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
- Halogen-Free “Green” Mold Compound
- RoHS Compliant\* and 260°C Reflow Compatible

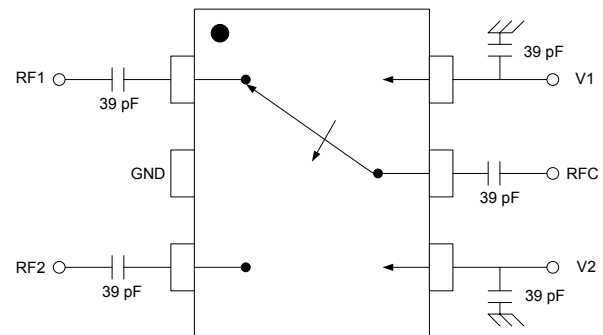
### Description

The 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. This device 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.

### 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

### Ordering Information<sup>1,2</sup>

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

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

### 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.

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

# MASWSS0167

## 2.5 V GaAs SPDT Switch 0.5 - 3.0 GHz

Rev. V3

### Electrical Specifications<sup>3</sup>: $T_A = 25^\circ\text{C}$ , $V_C = 0\text{ V} / +2.5\text{ V}$ , $Z_0 = 50\ \Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss <sup>4</sup>	1 GHz 2 GHz 3 GHz	dB	—	0.30 0.40 0.50	0.50 — —
Isolation	1 GHz 2 GHz 3 GHz	dB	23 — —	25 27 24	—
VSWR	0.5 - 3.0 GHz	Ratio	—	1.1	—
IP3	2-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% 2.5 V 3.0 V 5.0 V	dBm	—	21.0 23.5 28.5	—
$T_{\text{RISE}}, T_{\text{FALL}}$	10% to 90% RF, 90% to 10% RF	ns	—	30	—
$T_{\text{ON}}, T_{\text{OFF}}$	50% control to 90% RF, and 50% control to 10% RF	ns	—	35	—
Transients	In Band	mV	—	60	—
Control Current	$ V_C  = 2.5\text{ V}$	$\mu\text{A}$	—	1	5

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

4. 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.

### Absolute Maximum Ratings<sup>5,6</sup>

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

5. Exceeding any one or combination of these limits may cause permanent damage to this device.

6. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.

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

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

7. 0 =  $0 \pm 0.2\text{ V}$ , 1 = 2.5 to 5 V

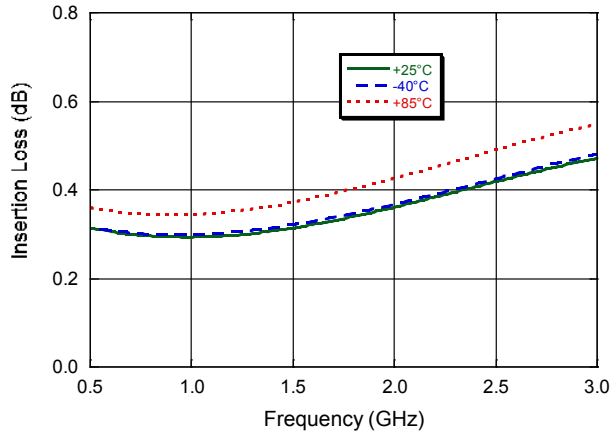
# MASWSS0167

2.5 V GaAs SPDT Switch  
0.5 - 3.0 GHz

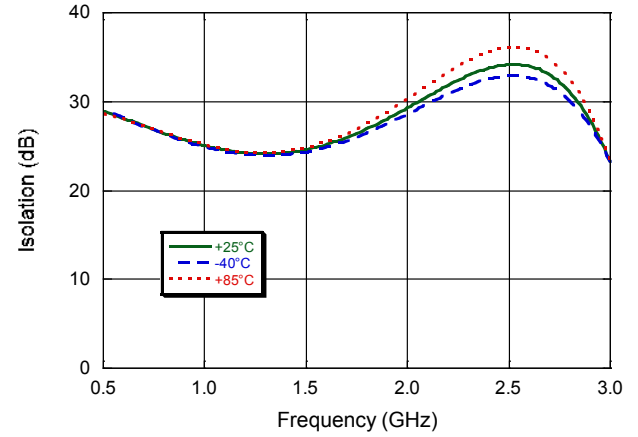
Rev. V3

## Typical Performance Curves

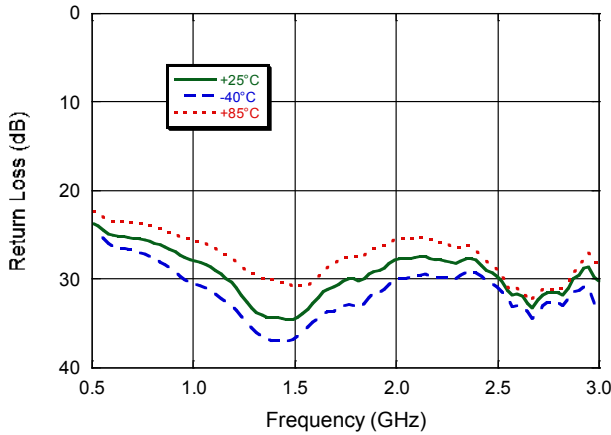
**Insertion Loss**



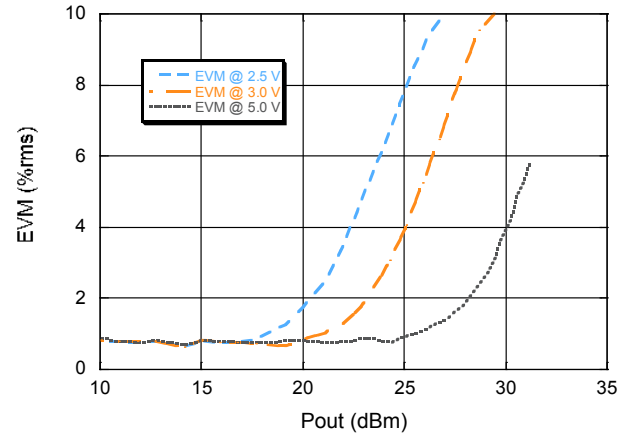
**Isolation**



**Return Loss**



**EVM vs. Pout @ 2.5 GHz**

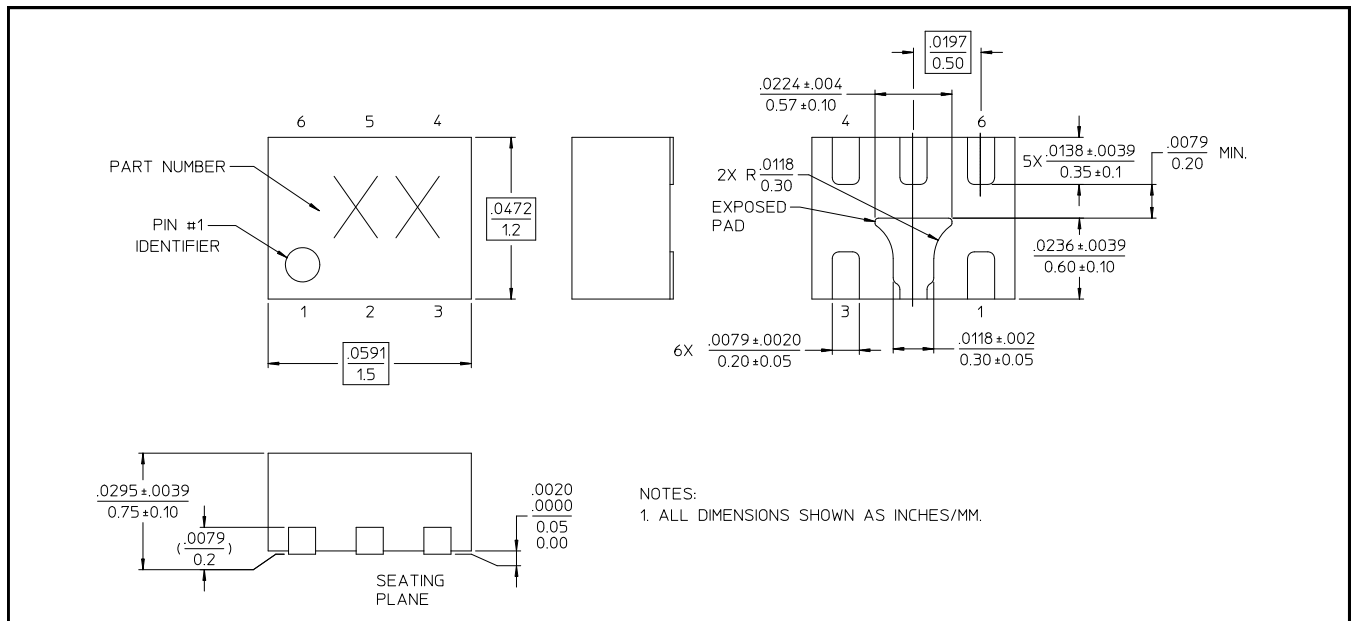


# MASWSS0167

2.5 V GaAs SPDT Switch  
0.5 - 3.0 GHz

Rev. V3

## Lead-Free 1.2 x 1.5 mm 6-Lead PQFN<sup>†</sup>



<sup>†</sup> Reference Application Note S2083 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.  
Plating is 100% matte tin over copper.

# MASWSS0167

2.5 V GaAs SPDT Switch  
0.5 - 3.0 GHz

Rev. V3

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.