

## GaAs SPDT Switch 0.05 - 3 GHz

Rev. V1

### Features

- Low Insertion Loss: 0.35 dB @ 2.4 GHz
- Moderate Isolation: 21 dB @ 2.4 GHz
- Low Current Consumption: 5  $\mu$ A @ 2.5 V
- Lead-Free SOT-26 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of MASWSS0005

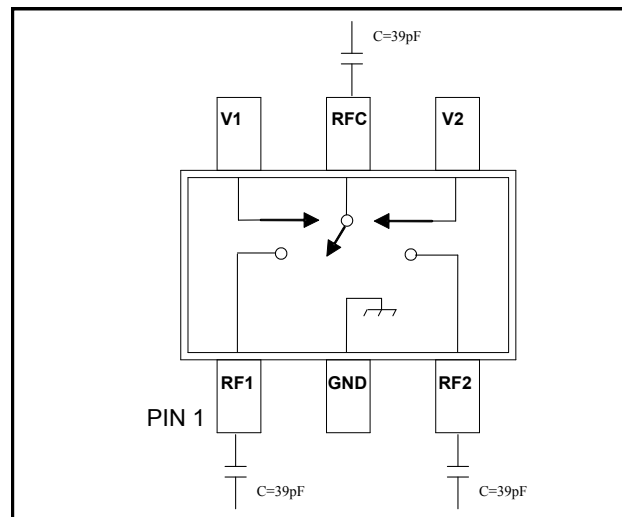
### Description

M/A-COM’s MASWSS0176 is a GaAs PHEMT MMIC single pole, double throw (SPDT) switch in a low cost, lead-free SOT-26 surface mount plastic package. The MASWSS0176 is ideally suited for applications where small size and low cost are required.

Typical applications are dual band systems which require switching between small signal components such as filter banks, single-band LNAs, converters, etc. This part can be used for low power, low loss requirements in all systems operating up to 3 GHz, including PCS, GSM, DCS, Satellite Radio, Blue Tooth, and other receive chain applications.

The MASWSS0176 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.	Function	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

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

Part Number	Package
MASWSS0176	Bulk Packaging
MASWSS0176TR-3000	3000 piece reel
MASWSS0176SMB	Sample Board

1. Reference Application Note M513 for reel size information.

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

Parameter	Absolute Maximum
Input Power @ 2.5 V Control	+26 dBm
Operating Voltage	+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 0.05 - 3 GHz

Rev. V1

**Electrical Specifications:**  $T_A = 25^\circ\text{C}$ ,  $V_c = 0\text{ V} / +2.5\text{ V}$ ,  $Z_0 = 50\text{ Ohms}$  <sup>4,5</sup>

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	0.05 - 1.0 GHz	dB	—	0.3	0.4
	1.0 - 3.0 GHz	dB	—	0.35	0.55
Isolation	0.05 - 1.0 GHz	dB	20	24	—
	1.0 - 3.0 GHz	dB	—	21	—
Return Loss	0.05 - 3.0 GHz	dB	—	20	—
IP2	Two Tone +5 dBm, 5 MHz Spacing	dBm	—	62	—
IP3	Two Tone +5 dBm, 5 MHz Spacing	dBm	—	45	—
P1dB	—	dBm	—	21	—
Trise, Tfall	10% to 90% RF and 90% to 10% RF	nS	—	35	—
Ton, Toff	50% Vc to 10% RF, 50% Vc to 90% RF	nS	—	40	—
Transients	In-Band	mV	—	10	—
Control Current	$ V_c  = 2.5\text{ V}$	$\mu\text{A}$	—	5	20

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 GHz, 39 pF for 0.5 GHz - 3 GHz.

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

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

6. 0 = 0 V to 0.2 V, 1 = +2.5 V to 5 V

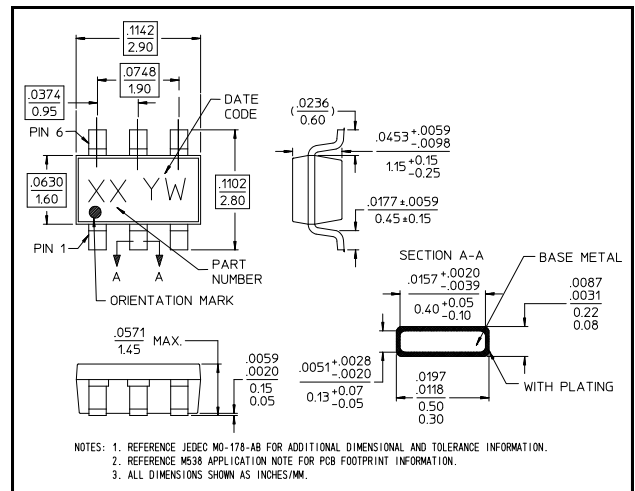
### Handling Procedures

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.

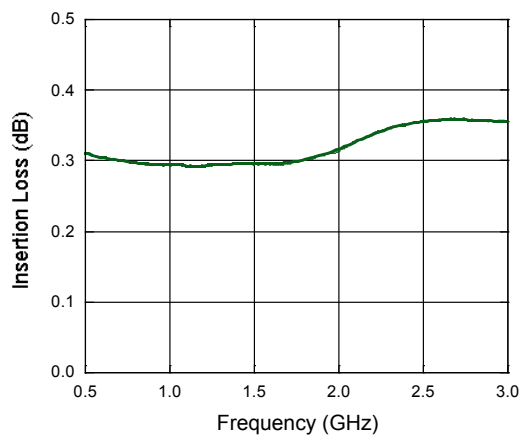
### Lead-Free SOT-26<sup>†</sup>



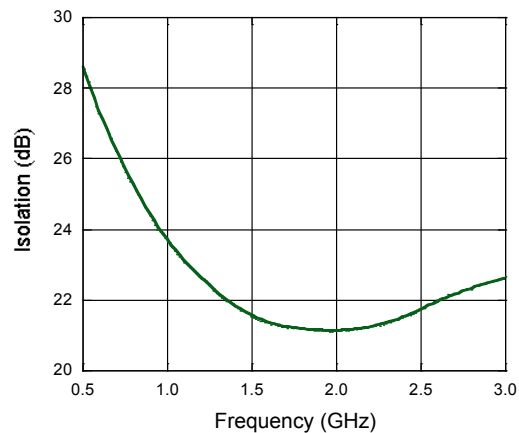
<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.

## Typical Performance Curves

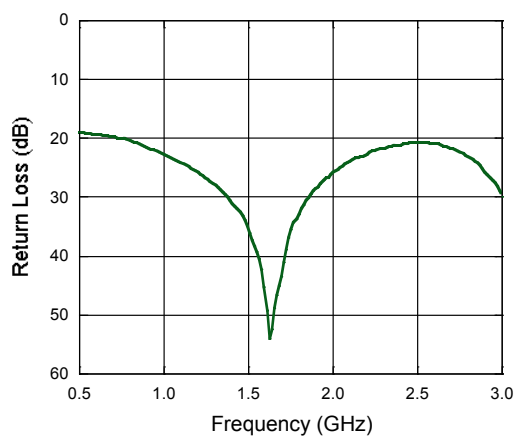
**Insertion Loss**



**Isolation**



**Return Loss**



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.

4

---

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.  
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.