

## GaAs High Isolation Switch DC - 3.0 GHz

Rev. V3

### Features

- Low Power Consumption: < 20  $\mu$ A @ +3 V
- High Isolation: 50 dB Typical @ 2 GHz
- Low Insertion Loss: 0.7 dB @ 2 GHz
- Positive 2.5 to 5 V Control
- Lead-Free MSOP-10 Package
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of SW-439

### Description

The MASWSS0169 is a GaAs MMIC SPDT switch in a lead-free MSOP-10 surface mount plastic package. This part is ideal for high isolation, broadband switching requirements. Typical applications include synthesizer switching, transmit/receive switching, switch matrices and filter banks in systems such as radio and cellular equipment, PCM, GPS, and fiber optic modules.

The MASWSS0169 is fabricated as a monolithic GaAs MMIC using a 0.5 micron pHEMT process. The process features full passivation.

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

Part Number	Package
MASWSS0169	Bulk Packaging
MASWSS0169TR-3000	3000 piece reel
MASWSS0169SMB	Sample Board

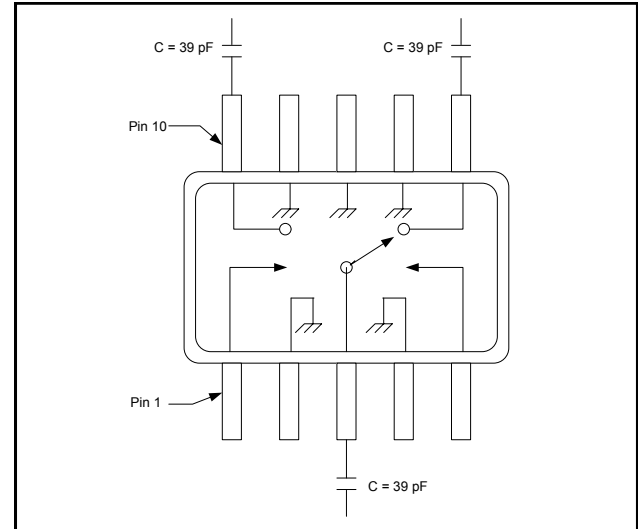
1. Reference Application Note M513 for reel size information.

### Truth Table <sup>2,3</sup>

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

2. External DC blocking capacitors are required on all RF ports.  
3. "0" = 0 + 0.2 Vdc, "1" = +2.5 to +5 Vdc

### Functional Schematic <sup>4</sup>



4. For improved performance at frequencies below 500 MHz, use larger value capacitors.

### Pin Configuration

Pin No.	Function	Pin No.	Function
1	Control 1	6	RF Port 2
2	Ground	7	Ground
3	RF Input	8	Ground
4	Ground	9	Ground
5	Control 2	10	RF Port 1

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

Parameter	Absolute Maximum
Input Power	+30 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 does not recommend sustained operation near these survivability limits.

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

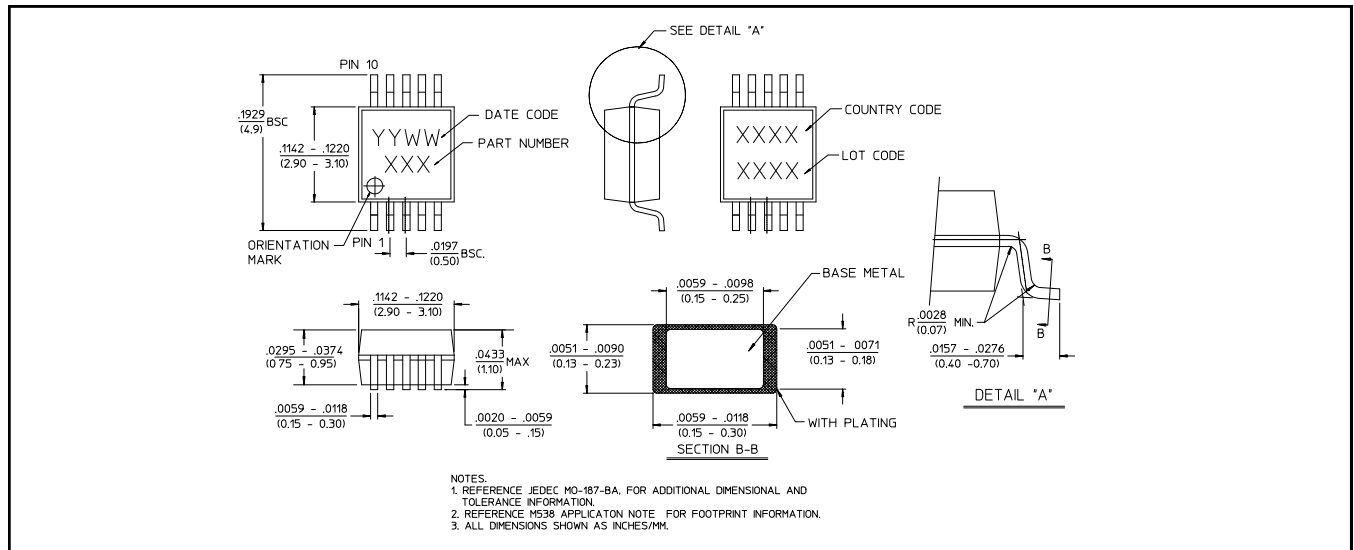
## GaAs High Isolation Switch DC - 3.0 GHz

Rev. V3

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

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	500 MHz - 1.0 GHz	dB	—	0.55	0.65
	1.0 - 2.0 GHz	dB	—	0.65	—
	2.0 - 3.0 GHz	dB	—	0.80	—
Isolation	500 MHz - 2.0 GHz	dB	45	47	—
	2.0 - 3.0 GHz	dB	—	33	—
VSWR	0.25 - 3.0 GHz	Ratio	—	1.2:1	—
P1dB	500 MHz - 2.0 GHz, $V_C = 3 \text{ V}$	dBm	—	20	—
P1dB	500 MHz - 2.0 GHz, $V_C = 5 \text{ V}$	dBm	—	28	—
IP2	2 Tone, 900 MHz, 5 MHz Spacing, $V_C = 3 \text{ V}$	dBm	—	85	—
IP3	2 Tone, 900 MHz, 5 MHz Spacing, $V_C = 3 \text{ V}$	dBm	—	50	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	ns	—	20	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	ns	—	10	—
Transients	In-band	mV	—	15	—
Control Current	$ V_C  = 3.0 \text{ V}$	$\mu\text{A}$	—	5	20

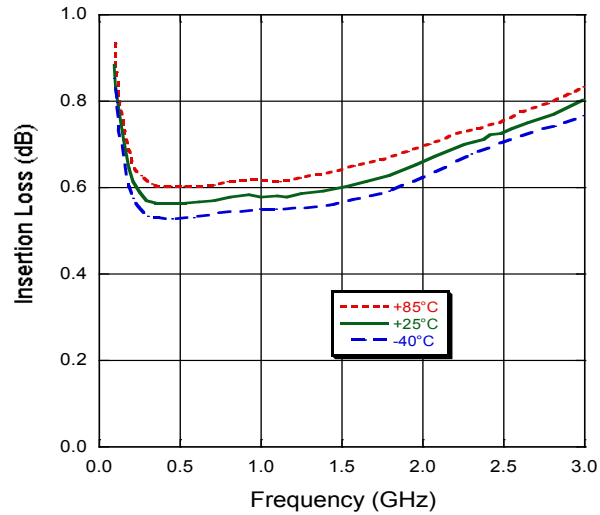
## Lead-Free MSOP-10<sup>†</sup>



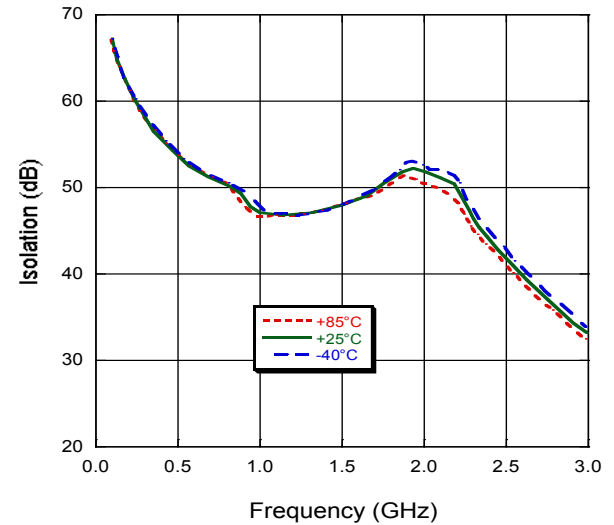
<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.  
Meets JEDEC moisture sensitivity level 1 requirements.  
Plating is 100% matte tin over copper.

## Typical Performance Curves

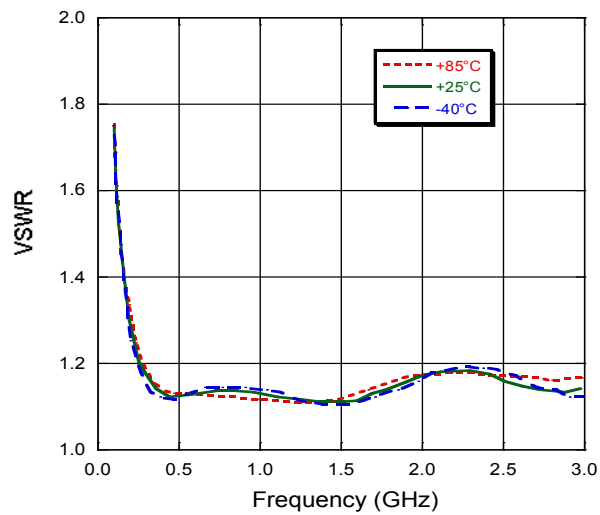
**Insertion Loss**



**Isolation**



**VSWR**



### 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.

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.