

## 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

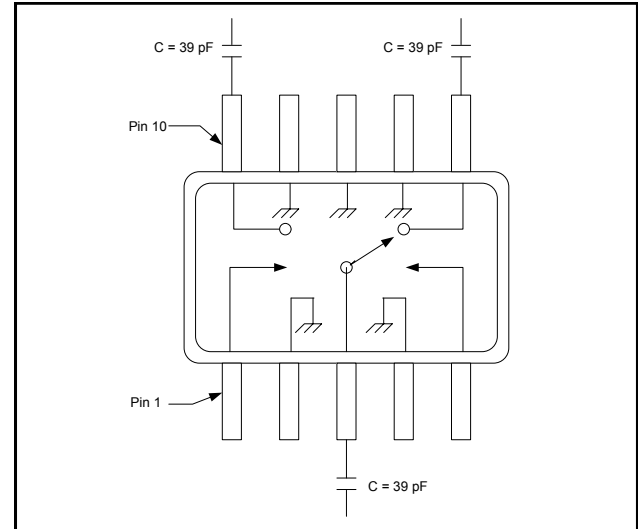
1. Reference Application Note M513 for reel size information.

### 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.

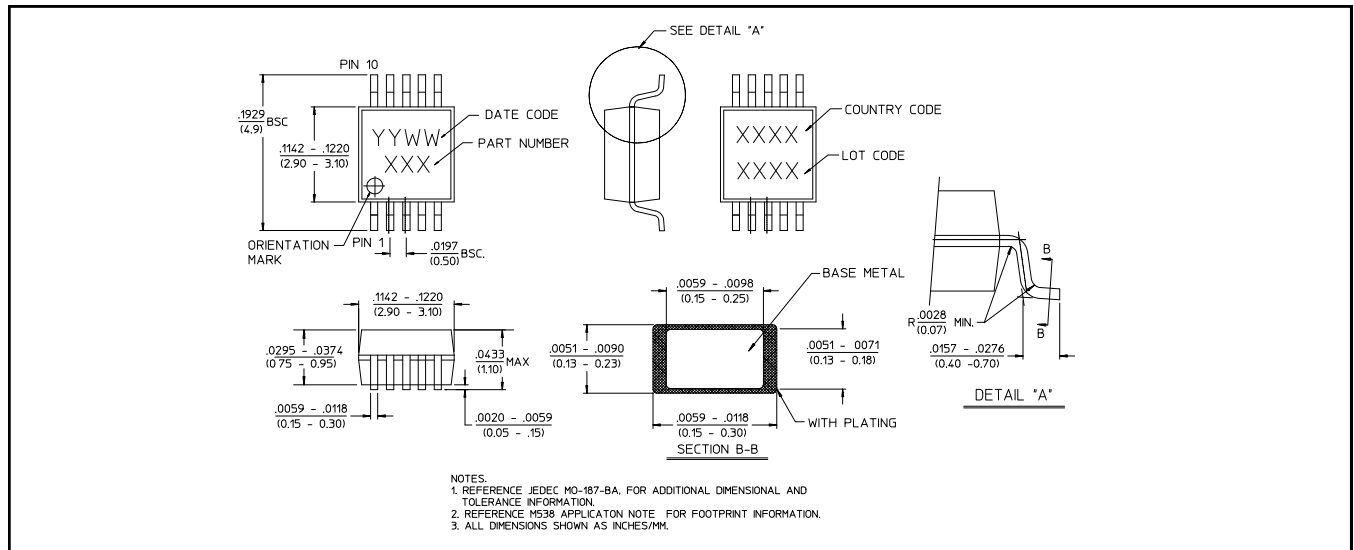
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Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $V_C = 0 / 3 \text{ V}$ ,  $Z_0 = 50\Omega$

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

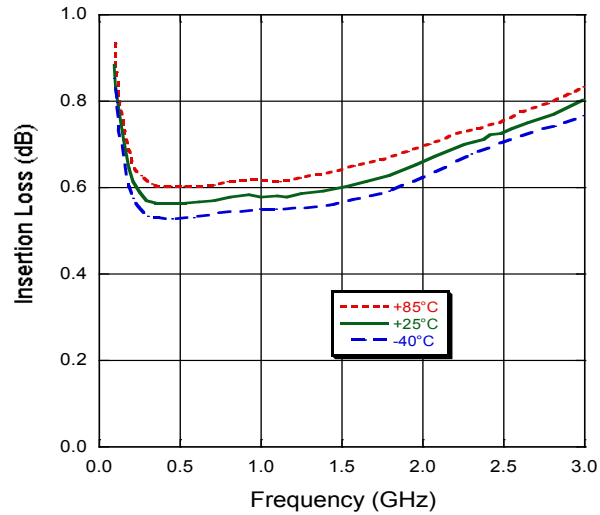
## Lead-Free MSOP-10<sup>†</sup>



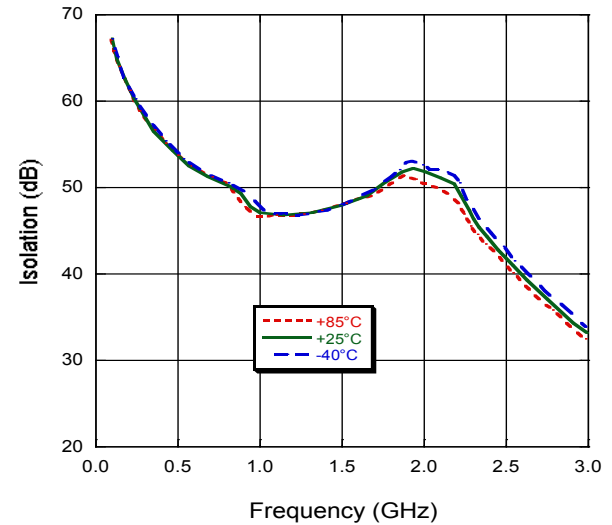
<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.  
 Meets JEDEC moisture sensitivity level 1 requirements.  
 Plating is 100% matte tin over copper.

## Typical Performance Curves

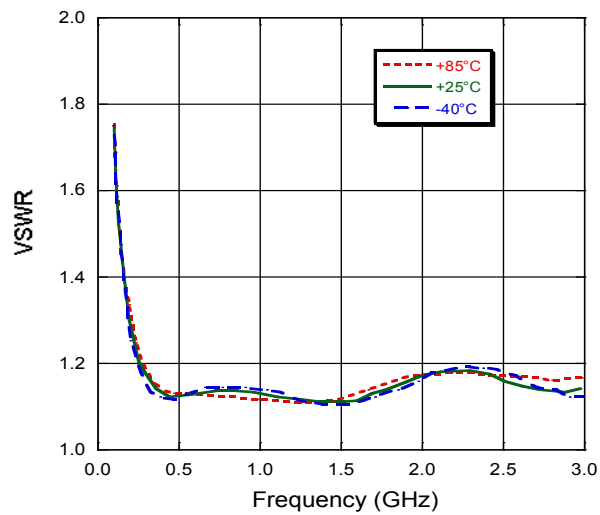
**Insertion Loss**



**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.

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