

**2.5 V GaAs SPDT Switch
0.5 - 3.0 GHz**

**MASWSS0167
V2**

Features

- Low Voltage Operation: 2.5 V
- Low Insertion Loss: 0.3 dB at 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
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS Compliant* and 260°C Reflow Compatible

Description

M/A-COM's 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. The MASWSS0167 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.

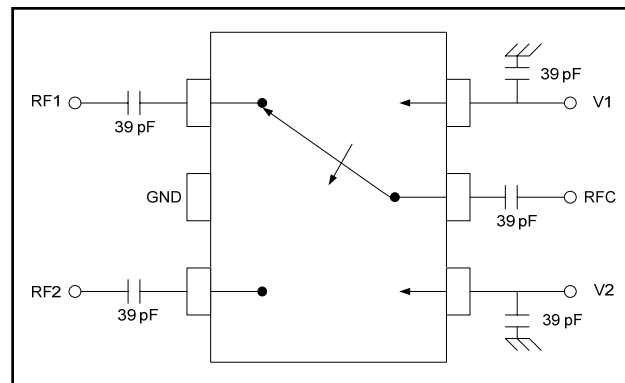
The MASWSS0167 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information¹

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

1. Reference Application Note M513 for reel size information.

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

Absolute Maximum Ratings^{2,3}

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

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.

2.5 V GaAs SPDT Switch
0.5 - 3.0 GHz

MASWSS0167
V2

Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V} / +2.5\text{ V}$, $Z_0 = 50\ \Omega$ ⁴

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss ⁵	1 GHz	dB	—	0.30	0.50
	2 GHz	dB	—	0.40	—
	3 GHz	dB	—	0.50	—
Isolation	1 GHz	dB	23	25	—
	2 GHz	dB	—	27	—
	3 GHz	dB	—	24	—
VSWR	0.5 - 3.0 GHz	Ratio	—	1.1	—
IP3	Two 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	dBm	—	21.0	—
	3.0 V	dBm	—	23.5	—
	5.0 V	dBm	—	28.5	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	—	30	—
Ton, Toff	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}$	μA	—	1	5

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 - 500 MHz, 39 pF for 0.5 GHz - 3 GHz.

Truth Table ⁶

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

6. 0 = $0 \pm 0.2\text{ V}$, 1 = 2.5 to 5 V

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

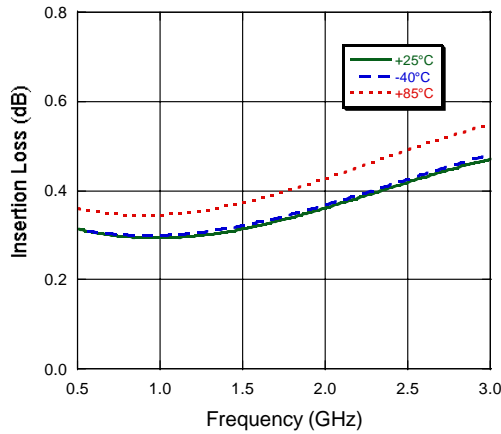
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

**2.5 V GaAs SPDT Switch
0.5 - 3.0 GHz**

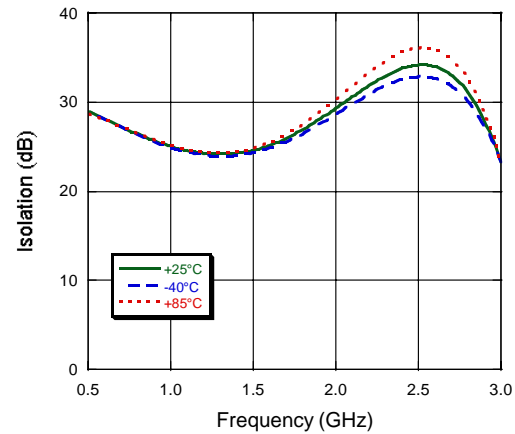
MASWSS0167
V2

Typical Performance Curves

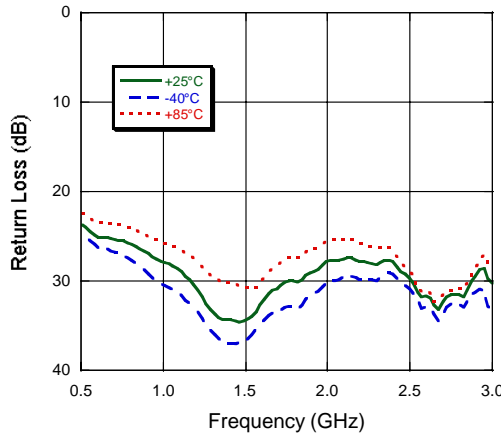
Insertion Loss



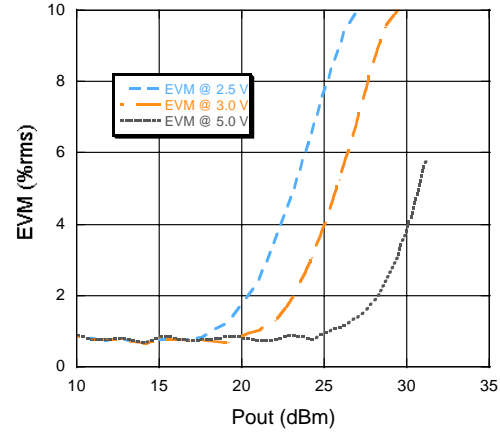
Isolation



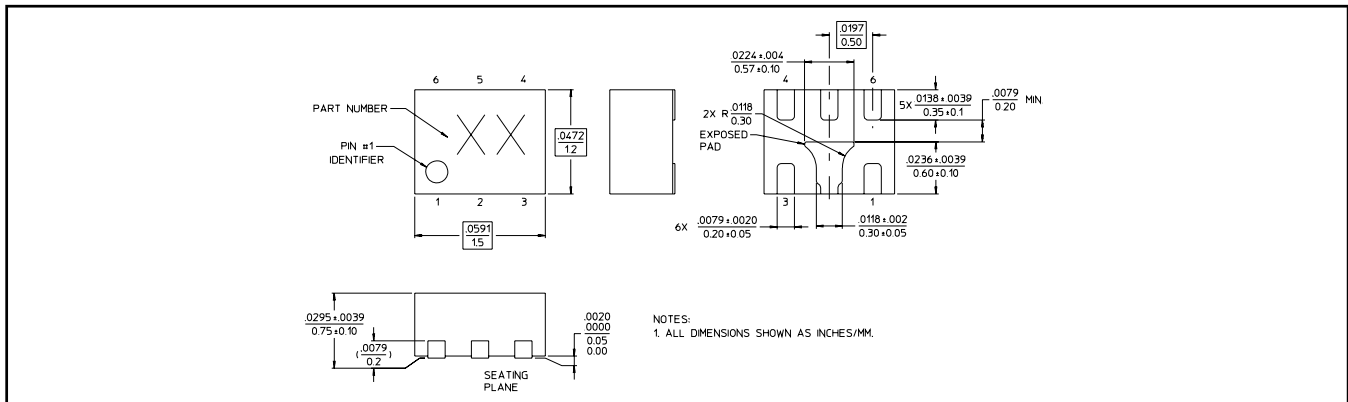
Return Loss



EVM vs. Pout @ 2.5 GHz



Lead-Free 1.2 x 1.5 mm 6-Lead PQFN†



† Reference Application Note M538 for lead-free solder reflow recommendations.
 Meets JEDEC moisture sensitivity level 1 requirements.