MASWSS0167

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

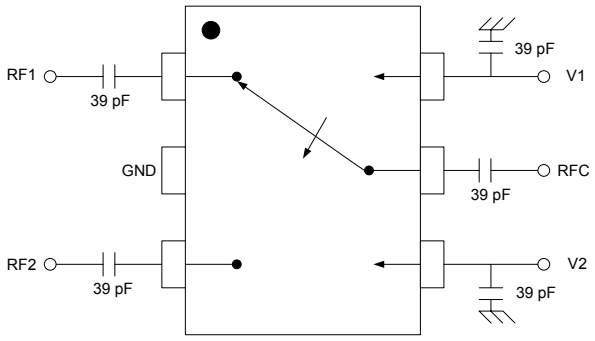
Description

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[1,2]

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.

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Electrical Specifications[3]: T_A = 25°C, V_C = 0 V / +2.5 V, Z_0 = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss[4]	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_{RISE}, T_{FALL}	10% to 90% RF, 90% to 10% RF	ns	—	30	—
T_{ON}, T_{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 V	µA	—	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[5,6]

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.

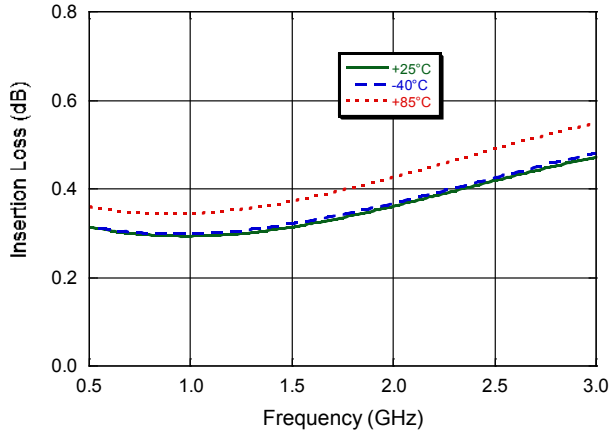
Truth Table[7]

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

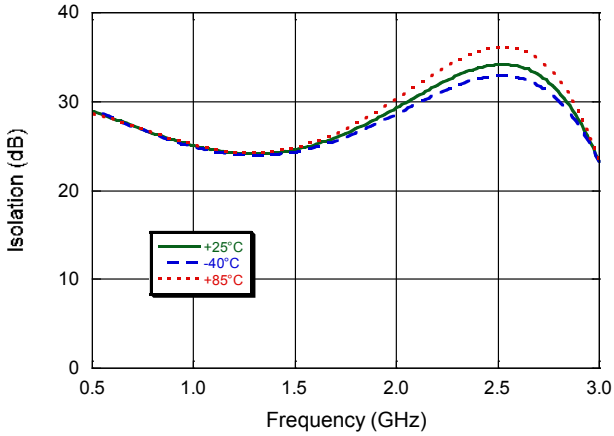
7. 0 = 0 ± 0.2 V, 1 = 2.5 to 5 V

Typical Performance Curves

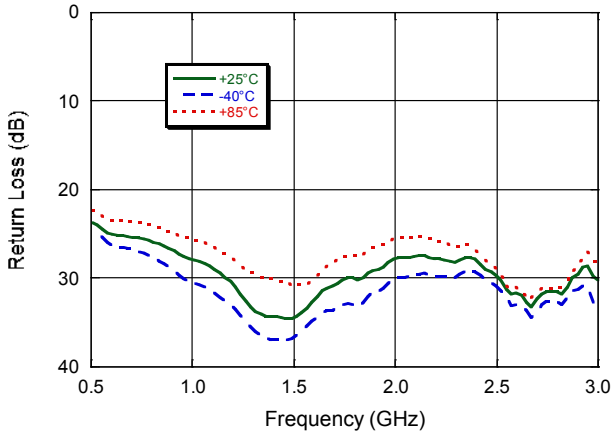
Insertion Loss



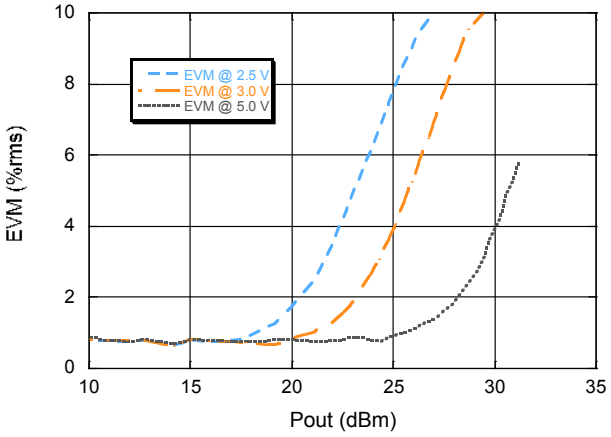
Isolation



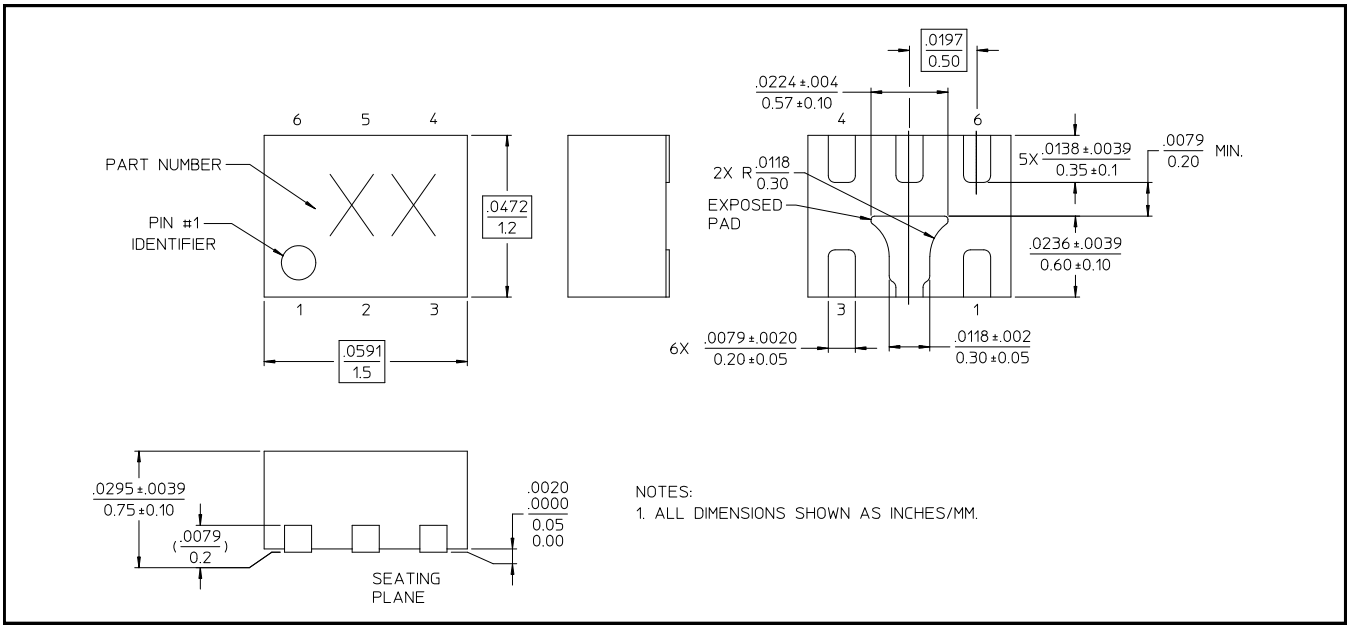
Return Loss



EVM vs. Pout @ 2.5 GHz



Lead-Free 1.2 x 1.5 mm 6-Lead PQFN†



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

Mouser Electronics

Authorized Distributor

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MACOM:

MASWSS0167TR-3000