# MASWSS0091

## GaAs SP6T 2.5 V High Power Switch Dual / Tri / Quad-Band GSM Applications

#### Features

- Supplied as Known Good Die •
- Dual/tri/quad-band GSM/GPRS/EDGE
- Low Voltage: 2.5V Operation
- Low Harmonics: -72 dBc at +35 dBm & 1 GHz
- Low Insertion Loss: 0.5 dB at 1 GHz
- High Tx-Rx Isolation: 38 dB at 2 GHz

### Description

M/A-COM's MASWSS0091 is a GaAs PHEMT MMIC single pole six throw (SP6T) high power switch die. The MASWSS0091 is ideally suited for applications where high power, low control voltage, low insertion loss, high isolation, small size and low cost are required. The MASWSS0091 is designed for dual-, tri-, and quad-band GSM and DCS/PCS handset systems that connect separate transmit and receive functions to a common antenna, and can be used in all systems operating up to 2.5 GHz requiring high power at low control voltage.

The MASWSS0091 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

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

Part Number	Package				
MASWSS0091SMB	Sample Test Board				
MASWSS0091-DIE	Separated die on Grip Ring				

1. Die quantity varies.

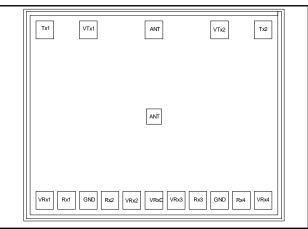
1

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

Parameter	Absolute Maximum				
Input Power (0.5 - 2.5 GHz, 2.5V Control)	+38 dBm				
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 the device.

#### Die Layout



### Pad Layout

PAD Name	Description					
Tx1	Tx1 Port					
VTx1	Tx1 Control					
ANT	Antenna Port Tx2 Control Tx2 Port Rx4 Control Rx4 Port Ground					
VTx2						
Tx2						
VRx4						
Rx4						
GND						
Rx3	Rx3 Port					
VRx3	Rx3 Control Rx Common Control					
VRxC						
VRx2	Rx2 Control					
Rx2	Rx2 Port Ground Rx1 Port					
GND						
Rx1						
VRx1	Rx1 Control					
ANT	Redundant ANT Pad					

- ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions • North America Tel: 800.366.2266 • Europe Tel: +353.21.244.6400 is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed. • India Tel: +91.80.43537383
  - China Tel: +86.21.2407.1588 Visit www.macomtech.com for additional data sheets and product information.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.



Rev. V7

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

## GaAs SP6T 2.5 V High Power Switch Dual / Tri / Quad-Band GSM Applications

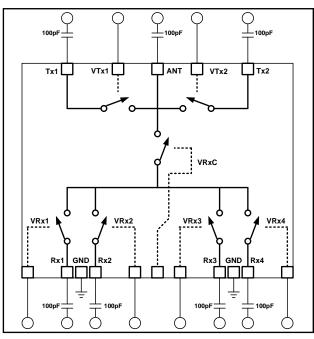
# Electrical Specifications: $T_A = 25^{\circ}C$ , Vc = 0V/2.5V, $Z_0 = 50$ Ohms <sup>3</sup>

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Tx Insertion Loss <sup>4</sup>	0.5 - 1 GHz 1 - 2 GHz	dB dB		0.5 0.65	0.7 0.9
Rx Insertion Loss <sup>3</sup>	0.5 - 1 GHz 1 - 2 GHz	dB dB	_	1.0 1.3	1.2 1.6
Tx to Rx Isolation	0.5 - 1 GHz 1 - 2 GHz	dB dB	40	45 38	
Tx to Tx Isolation	0.5 - 1 GHz 1 - 2 GHz	dB dB	22	26 17	
Return Loss	0.5 - 2.5 GHz	dB	_	20	—
Tx P0.1dB	1 GHz	dBm	_	41	—
Rx P1dB	1 GHz	dBm	_	25	—
2nd Harmonic	1 GHz, P <sub>IN</sub> = +35 dBm, 100% Duty Cycle	dBc	—	-78	-67
3rd Harmonic	1 GHz, P <sub>IN</sub> = +35 dBm, 100% Duty Cycle	dBc	_	-72	-67
Trise, Tfall	10% to 90% RF, 90% to 10% RF	μS	_	0.2	—
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	μS	_	0.2	_
Transients	In Band	mV	_	70	_
Control Current	_	μA	—	20	80

3. 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. 100 pF for 0.5 GHz - 2.0 GHz.

## **Functional Schematic**



#### Qualification

Qualified to M/A-COM specification REL-201, Process Flow –2.

#### 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.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

- North America Tel: 800.366.2266
  Europe Tel: +353.21.244.6400
  India Tel: +91.80.43537383
  China Tel: +86.21.2407.1588
- Visit www.macomtech.com for additional data sheets and product information.

**PRELIMINARY**: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.



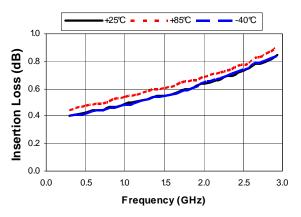
Rev. V7

# MASWSS0091

# GaAs SP6T 2.5 V High Power Switch Dual / Tri / Quad-Band GSM Applications

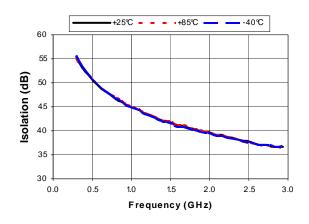


#### TX Insertion Loss

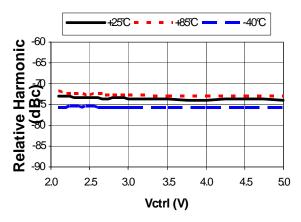


TX - RX Isolation

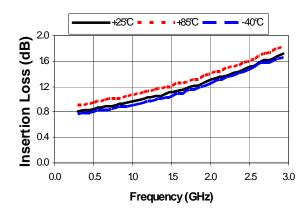
3



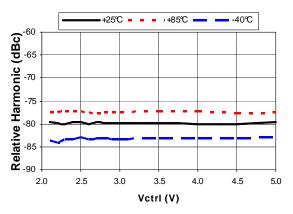
3rd Harmonic vs. Vctrl @ 1 GHz, Pin = +35 dBm, 100% Duty Cycle



RX Insertion Loss



2nd Harmonic vs. Vctrl @ 1 GHz, Pin = +35 dBm, 100% Duty Cycle



North America Tel: 800.366.2266
 Europe Tel: +353.21.244.6400
 India Tel: +91.80.43537383
 China Tel: +86.21.2407.1588

Visit www.macomtech.com for additional data sheets and product information.

is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed. **PRELIMINARY:** Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions



## GaAs SP6T 2.5 V High Power Switch Dual / Tri / Quad-Band GSM Applications

## Truth Table 5,6

VTx1	VTx2	VRxC	VRx1	VRx2	VRx3	VRx4	ANT-Tx1	ANT-Tx2	ANT-Rx1	ANT-Rx2	ANT-Rx3	ANT-Rx4
1	0	0	0	0	0	0	On	Off	Off	Off	Off	Off
0	1	0	0	0	0	0	Off	On	Off	Off	Off	Off
0	0	1	1	0	0	0	Off	Off	On	Off	Off	Off
0	0	1	0	1	0	0	Off	Off	Off	On	Off	Off
0	0	1	0	0	1	0	Off	Off	Off	Off	On	Off
0	0	1	0	0	0	1	Off	Off	Off	Off	Off	On

5. Differential voltage, V (state 1) -V (state 0), must be 2.5 V minimum.

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

4

- North America Tel: 800.366.2266 Europe Tel: +353.21.244.6400 • India Tel: +91.80.43537383 • China Tel: +86.21.2407.1588
- Visit www.macomtech.com for additional data sheets and product information.

changes to the product(s) or information contained herein without notice.

Technology Solutions

Rev. V7