



MASWSS0175 V1

GaAs DPDT Diversity Switch 4.5 - 6.0 GHz

Features

- Low Insertion Loss: 0.8 dB at 5.2 GHz
- Ideal for WLAN IEEE 802.11a
- 0.5 micron GaAs PHEMT Process
- Integrated DC Blocking Capacitors
- Lead-Free 3 mm 12-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of MASWSS0039

Description

M/A-COM's MASWSS0175 is a GaAs PHEMT MMIC DPDT diversity switch in a lead-free 3 mm 12-lead PQFN package. It is designed for low insertion loss and allows for independent control and selection of each switch path. It integrates blocking capacitors on all RF ports and thus eliminates the need for additional off-chip DC blocking capacitors.

The MASWSS0175 is ideally suited for applications where very small size and low cost are required. Typical applications are for WLAN IEEE 802.11a systems that employ two antennas for transmit and receive diversity. This part can be used in all systems operating between 4.5 GHz and 6.0 GHz requiring moderate power and diversity switching.

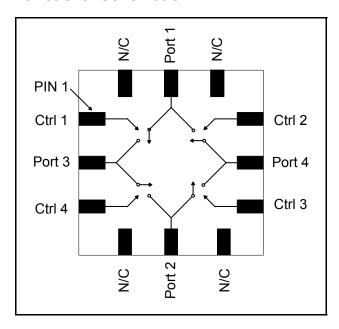
The MASWSS0175 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information

Part Number	Package
MASWSS0175	Bulk Packaging
MASWSS0175TR-3000	3000 Piece Reel
MASWSS0175SMB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration¹

Pin No.	Pin Name	Description	
1	Ctrl 1	Control 1	
2	Port 3	RF Port 3	
3	Ctrl 4	Control 4	
4	N/C	No Connection	
5	Port 2	RF Port 2	
6	N/C	No Connection	
7	Ctrl 3	Control 3	
8	Port 4	RF Port 4	
9	Ctrl 2	Control 2	
10	N/C	No Connection	
11	Port 1	RF Port 1	
12	N/C	No Connection	
13	Paddle ¹	RF and DC Ground	

1. The exposed pad centered on the package bottom must be connected to RF and DC ground.

^{*} Restrictions on Hazardous Substances, European Directive 2002/95/EC.

[•] North America Tel: 800.366.2266 / Fax: 978.366.2266

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298





MASWSS0175 V1

GaAs DPDT Diversity Switch 4.5 - 6.0 GHz

Electrical Specifications: $T_A = 25$ °C, $Z_0 = 50 \Omega$, $V_C = 0 V / 3 V$

Parameter	Test Conditions	Units	Min.	Тур.	Max.	
Insertion Loss	4.9 GHz dB — 5.2 GHz dB — 5.8 GHz dB —				1.3 1.2 1.2	
Isolation	4.9 GHz 5.2 GHz 5.8 GHz	5.2 GHz dB 20				
Return Loss	4.5 - 6.0 GHz	dB	15	25	_	
P1dB	5.2 GHz, $V_C = 2.7 \text{ V}$ 5.2 GHz, $V_C = 3.0 \text{ V}$ 5.2 GHz, $V_C = 5.0 \text{ V}$	dBm — 3 dBm — 3 dBm — 3				
IP2	Two Tone, +15 dBm / tone, 5 MHz Spacing 5.2 GHz			98	_	
IP3	Two Tone, +15 dBm / tone, 5 MHz Spacing 5.2 GHz, V_C = 3 V 5.2 GHz, V_C = 5 V	dBm dBm		52 55		
2 nd Harmonic	5.2 GHz, P _{IN} = 20 dBm	dBc — -85			_	
3 rd Harmonic	5.2 GHz, P _{IN} = 20 dBm	5.2 GHz, P _{IN} = 20 dBm dBc83		-83	_	
Trise, Tfall	10% to 90% RF and 90% to 10% RF nS		_	20	_	
Ton, Toff	50% Control to 90% RF 50% Control to 10% RF	nS nS	_	35 40	_	
Control Current	V _C = 3 V	μА	_	_ 5		

Absolute Maximum Ratings ^{2,3}

Parameter	Absolute Maximum		
Input Power @ 3 V Control	+32 dBm		
Input Power @ 5 V Control	+36 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.
- M/A-COM does not recommend sustained operation near these survivability limits.

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.

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

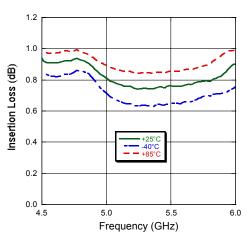


MASWSS0175

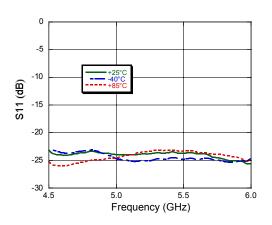
GaAs DPDT Diversity Switch 4.5 - 6.0 GHz

Typical Performance Curves

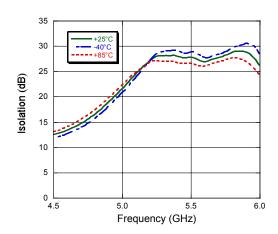
Insertion Loss



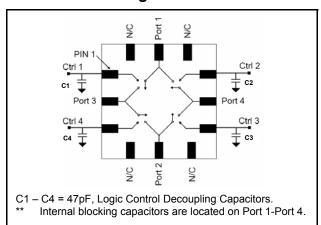
Return Loss



Isolation



Circuit Block Diagram**



Truth Table 4,5

Control V1	Control V2	Control V3	Control V4	Port 1 - Port 3	Port 1 - Port 4	Port 2 - Port 4	Port 2 - Port 3
1	0	0	0	On	Off	Off	Off
0	1	0	0	Off	On	Off	Off
0	0	1	0	Off	Off	On	Off
0	0	0	1	Off	Off	Off	On
1	0	1	0	On	Off	On	Off
0	1	0	1	Off	On	Off	On

- 4. 1 = +2.5 V to +5 V, 0 = 0 V + 0.2 V.
- 5. Differential voltage, V (state 1) V (state 0), must be 2.5 V minimum and must not exceed 8 V.

- North America Tel: 800.366.2266 / Fax: 978.366.2266
- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

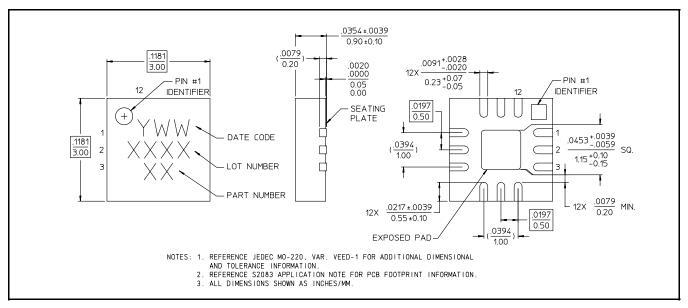




MASWSS0175 V1

GaAs DPDT Diversity Switch 4.5 - 6.0 GHz

Lead-Free 3 mm 12-Lead PQFN[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.

[•] Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300

Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298