

GaAs Broadband DPDT Diversity Switch 2.0 - 6.0 GHz

Features

- 802.11a + b/g Dual Band Applications
- Broadband Performance: 2.0 6.0 GHz
- Low Insertion Loss: 0.75 dB @ 2.4 GHz 0.9 dB @ 4.9 to 6.0 GHz
 - High Isolation: 43 dB @ 2.4 GHz 31 dB @ 4.9 to 6.0 GHz
- Fast Switching Speed: 0.5 µm GaAs PHEMT
- Lead-Free 2 mm 8-Lead UTDFN Package
- Electrolytic Gold Plate over Nickel Plate
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MASWSS0190 is a broadband GaAs PHEMT MMIC diversity switch available in a low cost, lead-free, ultra thin 2 mm 8-lead UTDFN package. The MASWSS0190 is ideally suited for applications where very small size and low cost are required.

Typical applications are for WLAN IEEE 802.11a and 802.11b/g systems that employ two antennas for transmit and receive diversity. Other applications include cordless phones and base stations. Designed for high power, this DPDT switch maintains high linearity up to 6.0 GHz.

The MASWSS0190 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information

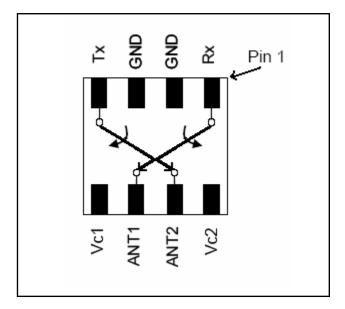
Part Number	Package
MASWSS0190TR-3000	7 inch, 3000 piece reel
MASWSS0190SMB	Sample Test Board

RoHS Compliant



MASWSS0190 V1

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description		
1	Rx	Receive Port		
2	GND	Ground		
3	GND	Ground		
4	Тх	Transmit Port		
5	V _C 1	Control 1		
6	ANT1	Antenna Port 1		
7	ANT2	Antenna Port 2		
8	V _C 2	Control 2		
9	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 Union Directive 2002/95/EC.

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Electrical Specifications: $T_A = 25^{\circ}C$, $V_C = 0 V / 3 V$, 8 pF Capacitor², $Z_0 = 50 \Omega$

Parameter Test Conditions		Units	Min.	Тур.	Max.	
Insertion Loss	2.4 GHz 4.9 - 6 GHz, with 3 pF DC blocking capacitors	dB dB	—	0.75 .9	1.25 1.4	
Isolation (on/off or off/on)	2.4 GHz 4.9 - 6 GHz, with 3 pF DC blocking capacitors	dB dB	39 27	43 31	_	
Isolation (on/on or off/off)	2.4 GHz 4.9 - 6 GHz, with 3 pF DC blocking capacitors	dB dB	5 9	7 11		
Return Loss (on/off or off/on)	2.4 GHz 4.9 - 6 GHz, with 3 pF DC blocking capacitors	dB dB	19 17	22 20		
IP2	Two Tone, 15 dBm/Tone, 5 MHz Spacing 2.4 GHz 5.3 GHz 5.8 GHz	dBm dBm dBm		93 86 84		
IP3	Two Tone, 15 dBm/Tone, 5 MHz SpacingdBm2.4 GHzdBm5.3 GHzdBm5.8 GHzdBm			52 50 50		
Input P-1dB	2.4 GHz 5.3 GHz 5.8 GHz	dBm dBm dBm		33 31 31		
2 nd Harmonic	P _{IN} = 20 dBm 2.4 GHz 5.8 GHz	dBm dBm		-75 -77	_	
3 rd Harmonic	P _{IN} = 20 dBm 2.4 GHz dB 5.8 GHz dB		_	-69 -86	_	
Trise, Tfall	10% to 90% RF 90% to 10% RF	nS nS	_	35 60	_	
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	nS	_	90	_	
Transients	-	mV	_	6	-	
Control Current	V _C = 3 V	μA		3	10	

2. For positive voltage control, external DC blocking capacitors are required on all RF ports. Performance values are valid using 8 pF DC blocking capacitors, except where noted. All scattering parameters can be optimized by varying the DC blocking capacitor value, e.g. 8 pF for 2.4 GHz, 3 pF for 4.9 GHz - 6 GHz.

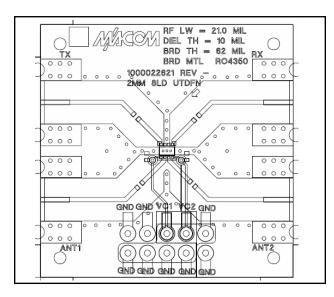
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Evaluation Board for Lead-Free 2 mm 8-lead UTDFN Package



Absolute Maximum Ratings ^{3,4}

Parameter	Absolute Maximum		
Input Power @ 3 V Control	+31 dBm		
Input Power @ 5 V Control	+34 dBm		
Voltage	± 8.5 volts		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

3. 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

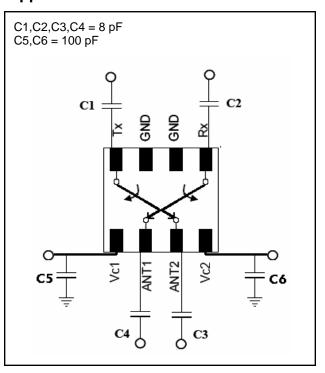
Please observe the following precautions to avoid damage:

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.

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Application Schematic



МАСС

MASWSS0190

V1

Truth Table 5,6

Control V _c 1	Control V _c 2	ANT 1 - Rx	ANT 1 - Tx	ANT 2 - Tx	ANT 2 - Rx
1	0	On	Off	On	Off
0	1	Off	On	Off	On
1	1	Off	Off	Off	Off
0	0	Off	Off	Off	Off

5. 1 = +2.9 V to +5 V, 0 = 0 V ± 0.2 V.

 Differential voltage, V (state 1) - V (state 0), must be 2.7 V minimum and must not exceed 8.5 V.

Qualification

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

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Isolation

60

50

30

20

2

3 pl

3

4

Frequency (GHz)

5

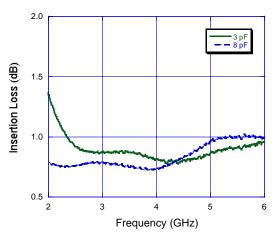
6

Isolation (dB) 40 МАСС

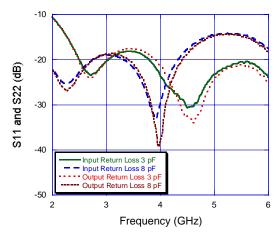
MASWSS0190 V1

Typical Performance Curves (on/off or off/on states)

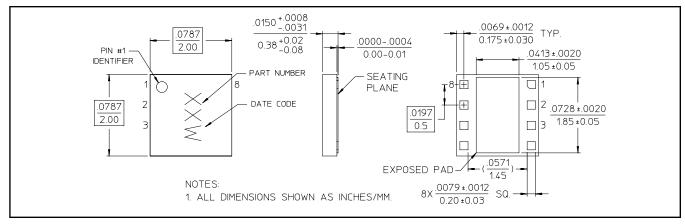
Insertion Loss



Return Loss



Lead-Free 2 mm 8-Lead UTDFN[†]



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

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