

Dual Band Diversity Switch

2.2 - 2.6 GHz & 5.0 - 6.0 GHz

Preliminary

V1P

MASWSS0109

MASWSS0109

Features

- UNII, Hiperlan, 802.11a + 802.11b Applications
- Low Insertion Loss: 1.4 dB @ 2.4GHz and 2.1dB @ 5GHz Typical
- High Isolation: 36 dB Typical at 2.4 GHz
- Low Leakage Current: < 5 μ A
- 4 mm FQFP-N 20 Lead Plastic Surface Mount Package

Description

M/A-COM's MASWSS0109 is a GaAs PHEMT MMIC dual band diversity switch in a 4 mm FQFP-N 20 lead package. The MASWSS0109 is ideally suited for applications where very small size and low cost are required. Typical applications are for 802.11a and 802.11b WLAN systems that employ two antennas for transmit and receive diversity.

The MASWSS0109 is designed for low insertion loss and allows for independent control and selection of each switch path. The MASWSS0109 can be used in all systems operating at 2.4 GHz and 5.0 GHz requiring moderate power and diversity switching.

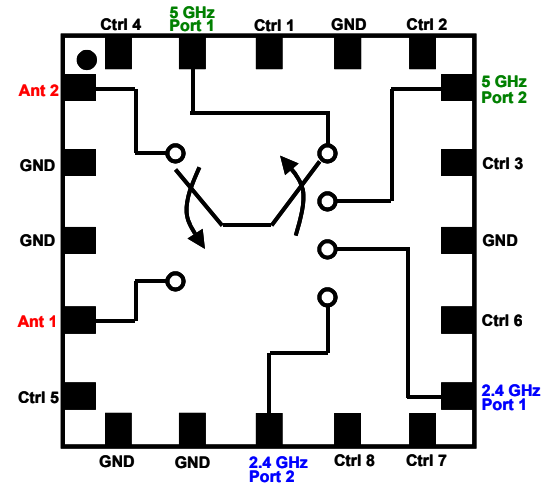
The MASWSS0109 is fabricated using M/A-COM's 0.5 micron PHEMT process to realize low loss and high linearity. This process features full chip passivation for increased performance and reliability.

Ordering Information ¹

Part Number	Description
MASWSS0109	4 mm FQFP-N 20 Lead Package
MASWSS0109TR-3000	3000 Piece Tape and Reel
MASWSS0109SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Function	Description
1	ANT 2	RF Antenna Port 2
2	GND	Ground
3	GND	Ground
4	ANT 1	RF Antenna Port 1
5	Ctrl5	Control 5
6	GND	Ground
7	GND	Ground
8	2.4 GHz Port 2	2.4 GHz RF Port 2
9	Ctrl8	Control 8
10	Ctrl7	Control 7
11	2.4 GHz Port 1	2.4 GHz RF Port 1
12	Ctrl6	Control 6
13	GND	Ground
14	Ctrl3	Control 3
15	5.0 GHz Port 2	5.0 GHz RF Port 2
16	Ctrl2	Control 2
17	GND	Ground
18	Ctrl1	Control 1
19	5.0 GHz Port 1	5.0 GHz RF Port 1
20	Ctrl4	Control 4

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0.0/3.0\text{V}$, $Z_0 = 50\ \Omega$ ²

Parameter	Frequency	Units	Min	Typ	Max
Insertion Loss	2.4 GHz	dB		1.4	2.0
Isolation	2.4 GHz	dB	20	36	
IP3	2.4 GHz	dBm		50	
P1dB	2.4 GHz	dBm		29	
P.1dB	2.4 GHz	dBm		25	
Return Loss (S11)	2.4 GHz	dB		24	
Return Loss (S22)	2.4 GHz	dB		26	
Insertion Loss	5.0 GHz	dB		2.1	3.0
Isolation	5.0 GHz	dB	15	23	
IP3	5.0 GHz	dBm		50	
P1dB	5.0 GHz	dBm		29	
P.1dB	5.0 GHz	dBm		25	
Return Loss (S11)	5.0 GHz	dB		13	
Return Loss (S22)	5.0 GHz	dB		10	
T-rise, T-fall	10% to 90% RF, & 90% to 10% RF	nS		28	
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	nS		62	
Leakage Current	$V_C = 3.0\text{V}$	μA		3	25

2. External DC blocking capacitors are required on all ports. 2.4 GHz = 12 pF, 5.0 GHz = 1.8 pF, ANT Ports = 18 pF.

Absolute Maximum Ratings ⁴

Parameter	Absolute Maximum
Input Power 3 V Control	+32 dBm
Input Power 5 V Control	+34 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.

Qualification

Qualified to M/A-COM Specification Rel 201, Process Flow -2.

Handling Procedures

The following precautions should be observed 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.

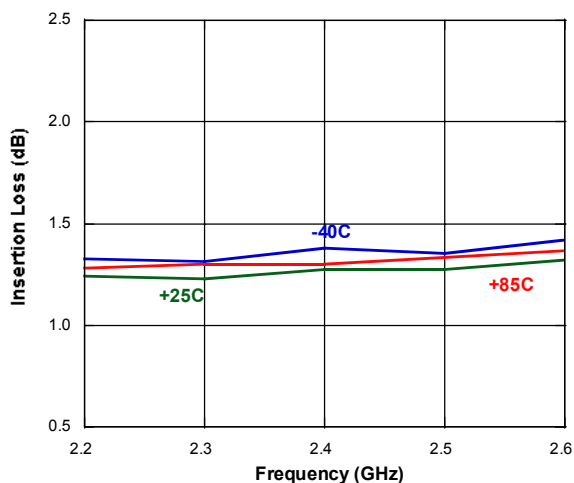
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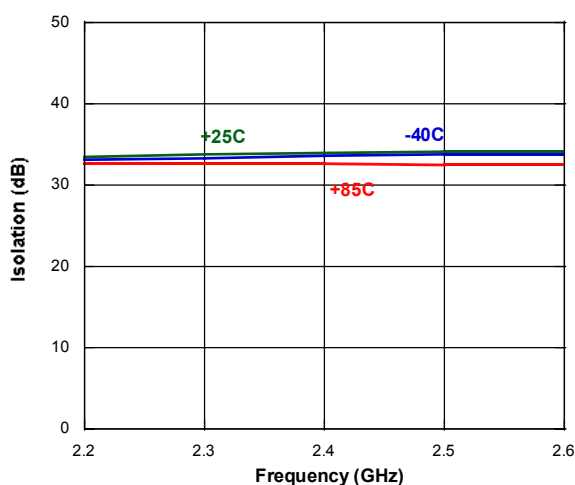
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Typical Performance Curves

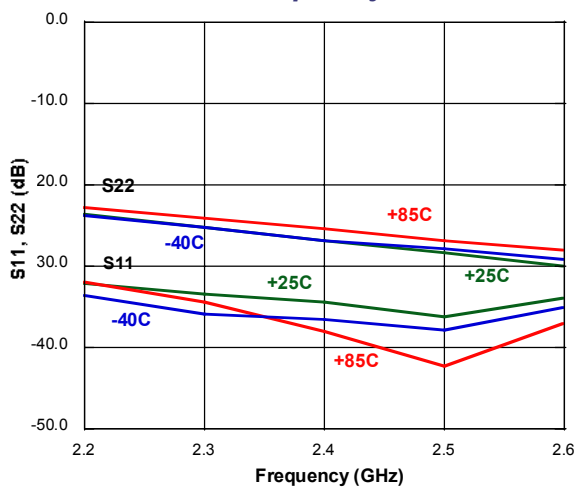
Insertion Loss vs. Frequency



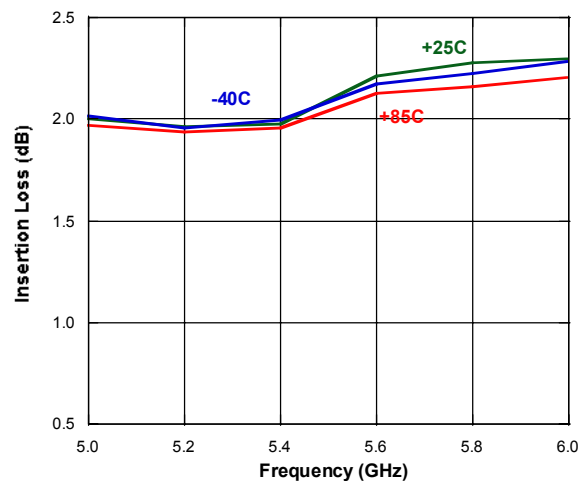
Isolation vs. Frequency



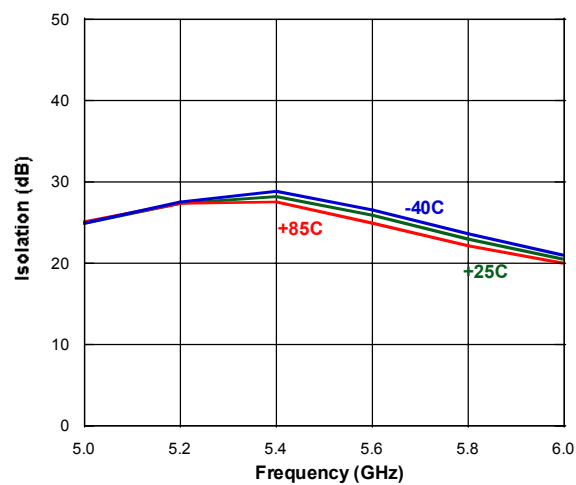
Return Loss vs. Frequency



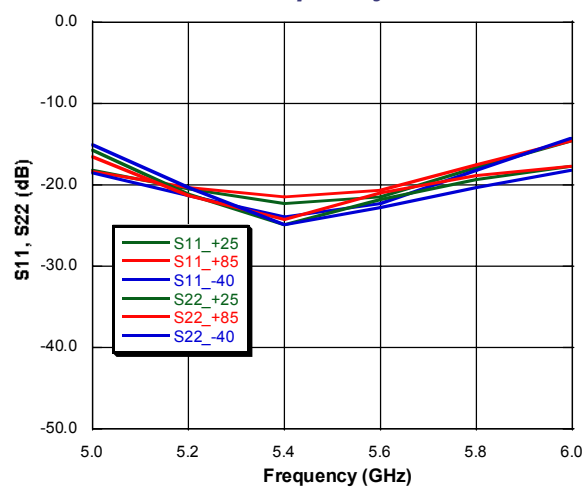
Insertion Loss vs. Frequency



Isolation vs. Frequency



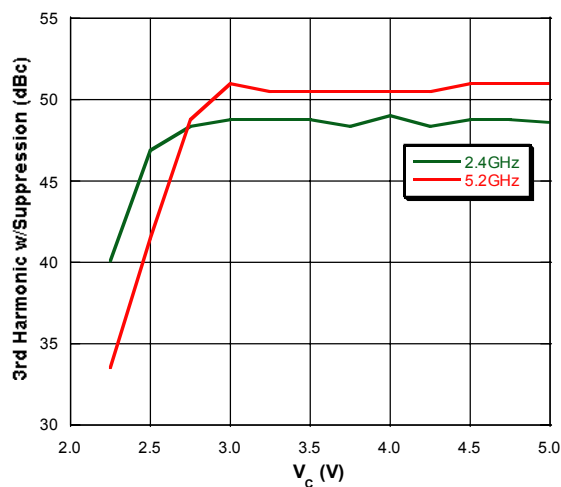
Return Loss vs. Frequency



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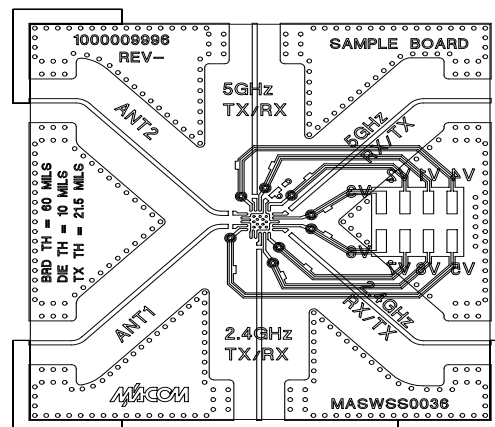
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Typical Performance Curves (continued)

3rd Harmonics vs. V_C @ 2.4 and 5.2 GHz

Application Information

Sample Board

Switch Logic Table ³

State	Ctrl 1	Ctrl 2	Ctrl 3	Ctrl 4	Ctrl 5	Ctrl 6	Ctrl 7	Ctrl 8	ANT1	ANT2
1	1	0	1	0	0	0	0	0	5 GHz Port 1	N/C
2	1	0	0	1	0	0	0	0	N/C	5 GHz Port 1
3	0	1	1	0	0	0	0	0	5 GHz Port 2	N/C
4	0	1	0	1	0	0	0	0	N/C	5 GHz Port 2
5	0	0	0	0	0	1	1	0	2.4 GHz Port 1	N/C
6	0	0	0	0	1	0	1	0	N/C	2.4 GHz Port 1
7	0	0	0	0	0	1	0	1	2.4 GHz Port 2	N/C
8	0	0	0	0	1	0	0	1	N/C	2.4 GHz Port 2

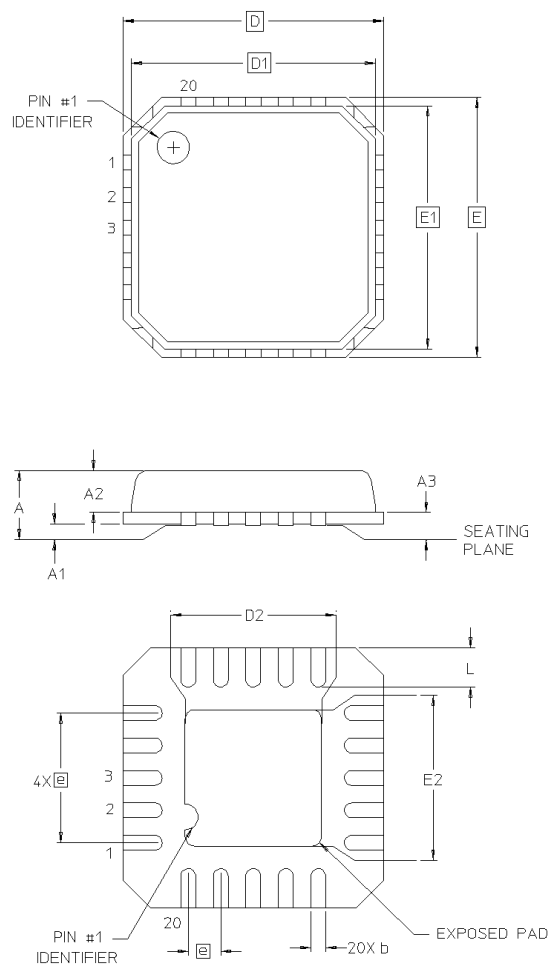
3. Logic State 0 = 0 V \pm 0.2 V; Logic State 1 = 3 V \pm 0.2 V.

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4 mm FQFP-N 20 Lead Anvil Singulated



DIMENSION SYMBOL	MEASUREMENT (mm)		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0	0.02	0.05
A2	0	0.65	1.00
A3	0.25 REF		
b	0.18	0.23	0.30
D		4.00 BSC	
D1		3.75 BSC	
D2	0.75	1.70	2.25
e		0.50 BSC	
E		4.00 BSC	
E1		3.75 BSC	
E2	0.75	1.70	2.25
L	0.35	0.55	0.75

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