

M/A-COM GaAs Broadband SPDT Switch

DC - 6.0 GHz

Preliminary

V1P

MASWSS0093

MASWSS0093

Features

- UNII, Hiperlan, 802.11a, 802.11b/g, and 802.11a+b/g Applications
- Broadband Performance: DC-6 GHz
- Low Insertion Loss: 0.85 dB at 6 GHz
- High Isolation: 28 dB Typical
- Low Cost 3 mm FQFP-N 12 Lead Package
- Fast Switching Speed: 0.5 um GaAs pHEMT Process
- High Power: 36 dB P1dB

Description

M/A-COM's MASWSS0093 is a broadband GaAs pHEMT MMIC SPDT switch in a low cost miniature 3 mm FQFP-N 12 Lead package (JEDEC). The MASWSS0093 is ideally suited for applications where very small size and low cost are required. Its small size and low height make it ideal for 802.11a and 802.11b/g PC card and access point applications.

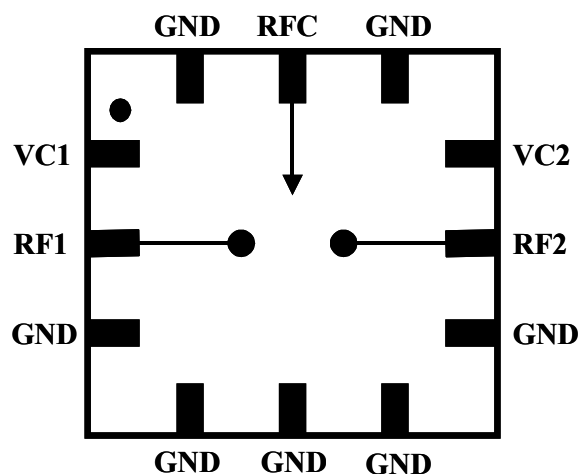
The MASWSS0093 delivers isolation greater than 25 dB and insertion loss less than 0.9 dB. Designed for high power, this SPDT switch maintains high linearity up to 6 GHz.

The MASWSS0093 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
MASWSS0093	FQFP-N 12-lead Plastic Package
MASWSS0093TR	7 inch, 1000 piece reel
MASWSS0093SMB	Sample Test Board (Includes 5 Samples)

Functional Schematic



Pin Configuration

PIN No.	PIN Name	Description
1	VC1	Control 1
2	RF1	RF Port
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	RF2	RF Port
9	VC2	Control 2
10	GND	Ground
11	RFC	RFC Port
12	GND	Ground

Truth Table

Control V1	Control V2	RFC- RF1	RFC-RF2
+2.9 to +5V	0 $\pm$ 0.2V	On	Off
0 $\pm$ 0.2V	+2.9 to +5V	Off	On

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

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

tyco Electronics

M/A-COM

■ **North America:** Tel. (800) 366-2266
 ■ **Asia/Pacific:** Tel. +81-44-844-8296, Fax +81-44-844-8298
 ■ **Europe:** Tel. +44 (1908) 574 200, Fax +44 (1908) 574 300

Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	2 - 3 GHz	dB		0.70	
	3 - 4 GHz	dB		0.80	
	4 - 5 GHz	dB		0.85	
	5 - 6 GHz	dB		0.85	
Isolation	2 - 6 GHz	dB		28	
Return Loss	DC - 6 GHz	dB		17	
IP2	Two Tone +15 dBm, 5 MHz Spacing, > 50 MHz $V_c = 0.0\text{V}/3\text{V}$	dBm		82	
IIP3	Two Tone +5 dBm, 5 MHz Spacing, > 50 MHz; $V_c = 0.0\text{V}/3\text{V}$ 2 - 6 GHz	dBm		53	
Input P-1dB	$V_c = 0.0\text{V}/3.0\text{V}$ @ 2.4 GHz	dBm		36	
	$V_c = 0.0\text{V}/3.0\text{V}$ @ 5.8 GHz	dBm		36	
T-rise, T-fall	10% to 90% RF and 90% to 10% RF	ns		55	
Ton, Toff	50 - 350 MHz	ns		80	
Transients	$V_c = 5\text{V}$, square wave, in band	mV		14	
Gate Leakage	$ V_c = 3\text{V}$	uA		15	

Absolute Maximum Ratings ¹

Parameter	Absolute Maximum
Max Input Power @ 3V Control	+37 dBm
Max Input Power @ 5V Control	+39 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

- Exceeding any one or combination of these limits may cause permanent damage.

Handling Procedures

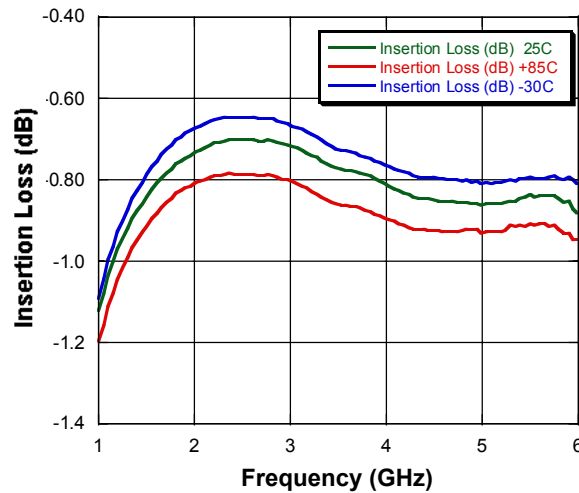
The following precautions should be observed to avoid damage:

Static Sensitivity

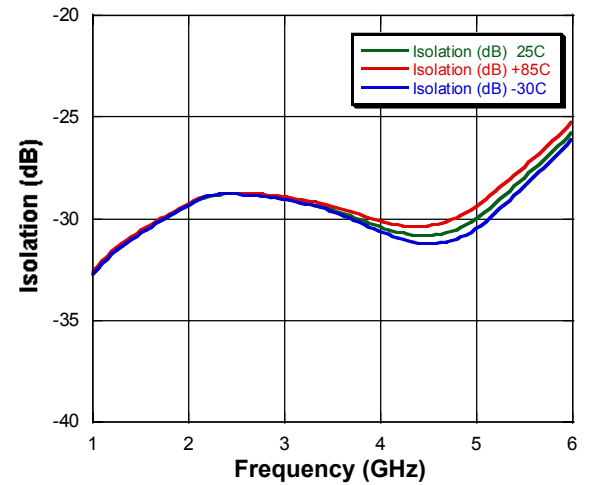
Gallium Arsenide Integrated Circuits are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices.

Typical Performance Curves 0/3V Control, 8 pF

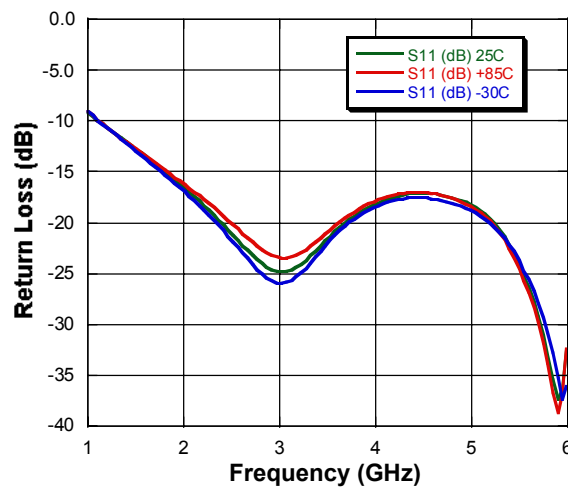
Insertion Loss vs. Frequency



Insertion Loss vs. Frequency



Return Loss vs. Frequency

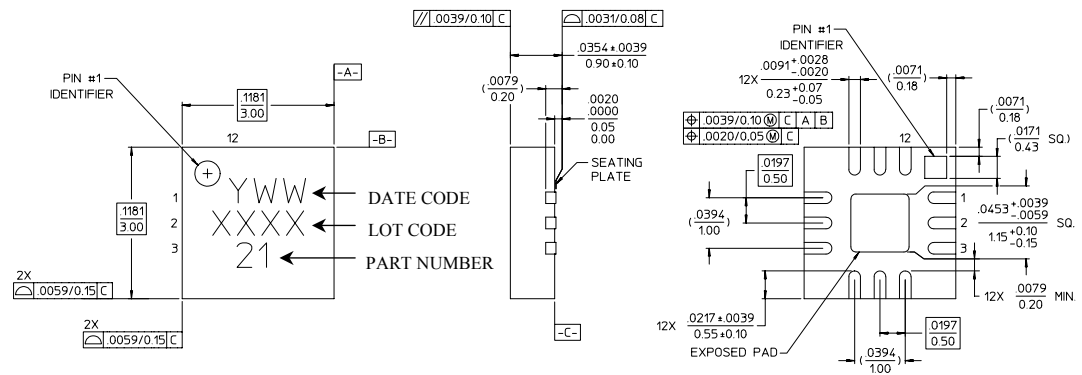


M/A-COM Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

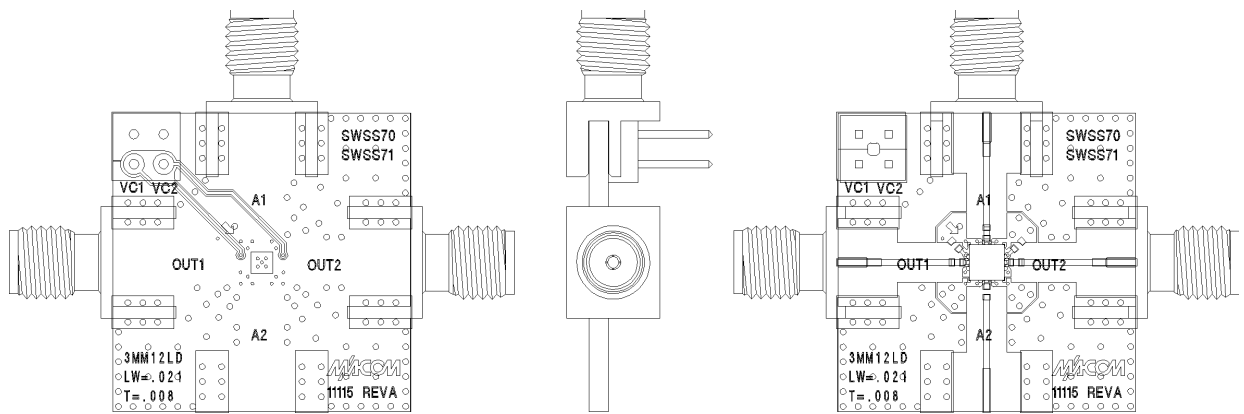
Visit www.macom.com for additional data sheets and product information.

■ **North America:** Tel. (800) 366-2266
 ■ **Asia/Pacific:** Tel. +81-44-844-8296, Fax +81-44-844-8298
 ■ **Europe:** Tel. +44 (1908) 574 200, Fax +44 (1908) 574 300

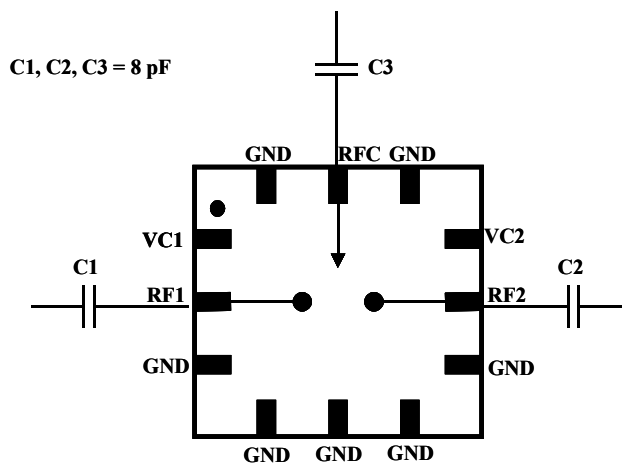
3 mm FQFP-N 12 Lead



Evaluation Board MASWSS0093



Application Schematic



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

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

- North America: Tel. (800) 366-2266
- Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1908) 574 200, Fax +44 (1908) 574 300

S-Parameters

Insertion

Temp:	+25 C	+25 C	+25 C	-30C	-30 C	-30 C	+85 C	+85 C	+85 C
Freq (GHz)	S11 (dB)	S21 (dB)	S22 (dB)	S11 (dB)	S21 (dB)	S22 (dB)	S11 (dB)	S21 (dB)	S22 (dB)
1.00	-9.12	-1.12	-9.14	-9.09	-1.09	-9.11	-9.09	-1.20	-9.14
1.20	-10.61	-0.97	-10.65	-10.66	-0.92	-10.66	-10.64	-1.04	-10.71
1.40	-12.03	-0.86	-12.15	-12.18	-0.81	-12.24	-12.10	-0.92	-12.24
1.60	-13.45	-0.79	-13.66	-13.66	-0.74	-13.83	-13.44	-0.88	-13.71
1.80	-14.95	-0.75	-15.26	-15.20	-0.69	-15.50	-14.78	-0.82	-15.20
2.00	-16.47	-0.73	-16.88	-16.80	-0.68	-17.22	-16.16	-0.80	-16.70
2.20	-18.13	-0.69	-18.78	-18.58	-0.65	-19.13	-17.63	-0.79	-18.39
2.40	-20.01	-0.69	-21.01	-20.43	-0.64	-21.21	-19.13	-0.79	-20.19
2.60	-22.21	-0.69	-24.02	-22.83	-0.64	-24.25	-20.96	-0.78	-22.59
2.80	-24.45	-0.69	-27.31	-25.54	-0.64	-28.12	-22.96	-0.78	-25.15
3.00	-25.53	-0.72	-30.66	-26.98	-0.67	-33.37	-24.07	-0.79	-27.45
3.20	-24.68	-0.73	-29.30	-25.63	-0.67	-31.92	-23.56	-0.82	-27.22
3.40	-22.36	-0.77	-25.55	-22.84	-0.71	-26.58	-21.58	-0.86	-24.52
3.60	-20.48	-0.77	-22.07	-20.69	-0.72	-22.48	-19.99	-0.86	-21.29
3.80	-19.13	-0.78	-19.88	-19.34	-0.74	-20.23	-18.71	-0.87	-19.37
4.00	-17.99	-0.82	-18.29	-18.19	-0.76	-18.69	-17.64	-0.90	-17.93
4.20	-17.26	-0.84	-17.30	-17.45	-0.79	-17.65	-16.97	-0.92	-17.04
4.40	-17.10	-0.85	-16.97	-17.49	-0.79	-17.50	-16.98	-0.93	-16.80
4.60	-17.08	-0.85	-16.67	-17.60	-0.78	-17.32	-17.06	-0.93	-16.69
4.80	-17.42	-0.85	-16.95	-17.96	-0.80	-17.61	-17.49	-0.93	-17.03
5.00	-18.07	-0.89	-17.54	-18.67	-0.84	-18.20	-18.21	-0.96	-17.61
5.20	-19.18	-0.86	-18.57	-19.73	-0.82	-19.16	-19.44	-0.95	-18.72
5.40	-21.33	-0.83	-20.57	-21.63	-0.79	-20.89	-21.62	-0.90	-20.73
5.60	-24.97	-0.83	-24.14	-24.31	-0.80	-23.59	-25.17	-0.90	-23.93
5.80	-33.29	-0.84	-32.96	-30.04	-0.79	-30.47	-34.03	-0.92	-32.14
6.00	-31.28	-0.89	-30.25	-35.50	-0.81	-35.63	-30.84	-0.95	-29.68

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

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

■ North America: Tel. (800) 366-2266

■ Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298

■ Europe: Tel. +44 (1908) 574 200, Fax +44 (1908) 574 300

S-Parameters

Isolation

Temp:	+25 C	+25 C	+25 C	-30C	-30 C	-30 C	+85 C	+85 C	+85 C
Freq (GHz)	S11 (dB)	S21 (dB)	S22 (dB)	S11 (dB)	S21 (dB)	S22 (dB)	S11 (dB)	S21 (dB)	S22 (dB)
1.00	-9.02	-32.70	-0.53	-9.00	-32.71	-0.49	-9.00	-32.60	-0.57
1.20	-10.53	-31.61	-0.67	-10.56	-31.67	-0.60	-10.57	-31.55	-0.73
1.40	-12.02	-30.98	-0.82	-12.14	-31.01	-0.72	-12.06	-30.86	-0.88
1.60	-13.13	-30.36	-0.94	-13.28	-30.41	-0.84	-13.13	-30.18	-1.04
1.80	-15.13	-29.79	-1.08	-15.37	-29.81	-0.97	-15.08	-29.74	-1.21
2.00	-17.02	-29.44	-1.26	-17.37	-29.45	-1.12	-16.65	-29.36	-1.42
2.20	-18.25	-28.67	-1.38	-18.77	-28.60	-1.21	-17.60	-28.68	-1.55
2.40	-20.20	-28.75	-1.48	-20.79	-28.75	-1.29	-19.37	-28.69	-1.70
2.60	-21.52	-28.79	-1.64	-22.17	-28.79	-1.42	-20.56	-28.72	-1.88
2.80	-22.96	-28.83	-1.81	-23.89	-28.85	-1.55	-21.60	-28.76	-2.06
3.00	-24.67	-28.95	-1.97	-25.96	-28.97	-1.70	-22.99	-28.84	-2.28
3.20	-26.71	-29.27	-2.12	-28.04	-29.29	-1.84	-25.06	-29.09	-2.45
3.40	-23.85	-29.38	-2.27	-24.42	-29.44	-1.97	-23.13	-29.24	-2.61
3.60	-20.29	-29.62	-2.38	-20.45	-29.72	-2.06	-20.03	-29.46	-2.74
3.80	-18.98	-30.04	-2.43	-19.18	-30.21	-2.10	-18.51	-29.81	-2.77
4.00	-18.01	-30.51	-2.44	-18.25	-30.71	-2.13	-17.63	-30.19	-2.79
4.20	-15.42	-30.67	-2.41	-15.52	-30.99	-2.11	-15.43	-30.38	-2.71
4.40	-15.86	-30.88	-2.31	-16.15	-31.27	-2.02	-15.82	-30.44	-2.62
4.60	-17.29	-30.86	-2.23	-17.84	-31.32	-1.95	-16.95	-30.32	-2.51
4.80	-15.98	-30.64	-2.14	-16.30	-31.16	-1.87	-16.11	-30.07	-2.38
5.00	-17.64	-30.16	-2.05	-18.05	-30.69	-1.82	-18.01	-29.56	-2.30
5.20	-22.82	-29.20	-1.95	-23.68	-29.66	-1.75	-22.30	-28.67	-2.21
5.40	-23.13	-28.34	-1.90	-23.30	-28.74	-1.70	-22.96	-27.79	-2.13
5.60	-25.19	-27.63	-1.87	-24.52	-28.02	-1.68	-26.67	-27.11	-2.10
5.80	-27.48	-26.70	-1.83	-27.06	-27.08	-1.64	-30.36	-26.14	-2.04
6.00	-27.39	-25.64	-1.83	-29.35	-25.94	-1.62	-28.72	-25.13	-2.04

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

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

■ North America: Tel. (800) 366-2266

■ Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298

■ Europe: Tel. +44 (1908) 574 200, Fax +44 (1908) 574 300