

SPDT High Isolation CATV Switch

5 - 1000 MHz

V1

MASWSS0068

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Features

- 75 Ohm Impedance
- Positive Voltage Control (0 / +5 V)
- Low Insertion Loss: 0.60 dB at 870 MHz
- High Isolation: 51 dB at 870 MHz
- 4 mm FQFP-N 20 Lead Package
- 0.5 micron GaAs PHEMT Process

Description

M/A-COM's MASWSS0068 is a GaAs PHEMT MMIC single pole double throw (SPDT) switch in a low cost 4 mm FQFP-N 20 lead package. The MASWSS0068 is ideally suited for applications where low control voltage, low insertion loss, high isolation, small size and low cost are required. Typical applications are to replace mechanical relays in CATV systems. This part can be used in all 75 ohm systems operating up to 1.0 GHz.

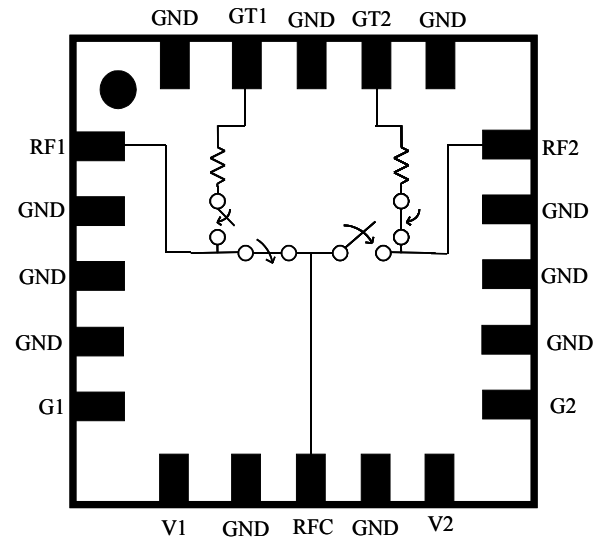
The MASWSS0068 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information ¹

Part Number	Package
MASWSS0068	FQFP-N 20 Lead Plastic Package
MASWSS0068TR	7 inch, 1000 piece reel
MASWSS0068TR-3000	13 inch, 3000 piece reel
MASWSS0068SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

Functional Schematic



Absolute Maximum Ratings ²

Parameter	Absolute Maximum
Max Input Power (5 - 1000 MHz, 5 V Control)	+32 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.

Truth Table ^{3,4}

V1	V2	RFC - RF1	RFC - RF2
1	0	On	Off
0	1	Off	On

3. External 0.01 μ F DC blocking capacitors are required on all RF In/Out and RF Ground ports.

4. 0 = 0 V \pm 0.2 V; 1 = +2.5 V to +5 V.

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Pin Configuration ⁵

PIN No.	PIN Name	Description
1	RF1	RF In/Out
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	G1	RF Ground
6	V1	Control 1
7	GND	Ground
8	RFC	RF In/Out
9	GND	Ground
10	V2	Control 2
11	G2	RF Ground
12	GND	Ground
13	GND	Ground
14	GND	Ground
15	RF2	RF In/Out
16	GND	Ground
17	GT2	RF Ground
18	GND	Ground
19	GT1	RF Ground
20	GND	Ground

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

Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V} / 5\text{ V}$, $Z_0 = 75\ \Omega$ ⁶

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	5 - 50 MHz	dB		0.40	
	50 - 1000 MHz	dB		0.65	1.0
Isolation	5 - 50 MHz	dB		68	
	50 - 1000 MHz	dB	48	50	
Return Loss (On)	5 - 50 MHz	dB		38	
	50 - 1000 MHz	dB		17	
Return Loss (Off)	5 - 50 MHz	dB		35	
	50 - 1000 MHz	dB		22	
IP3	Two Tone, 6 MHz Spacing, 10 dBm / tone, > 50 MHz	dBm		52	
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS		20	
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF	nS		40	
Transients	In Band	mV		30	
Control Current	$ V_C = 5\text{ V}$	μA		12	20

6. External 0.01 μF DC blocking capacitors are required on all RF ports.

Qualification

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

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

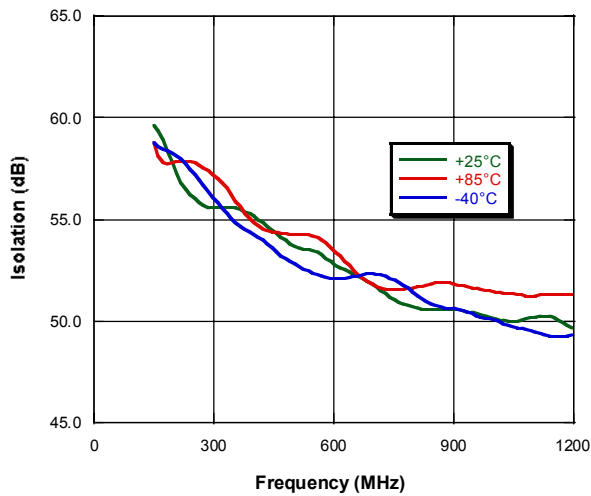
Gallium arsenide integrated circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Use proper ESD control precautions when handling these devices.

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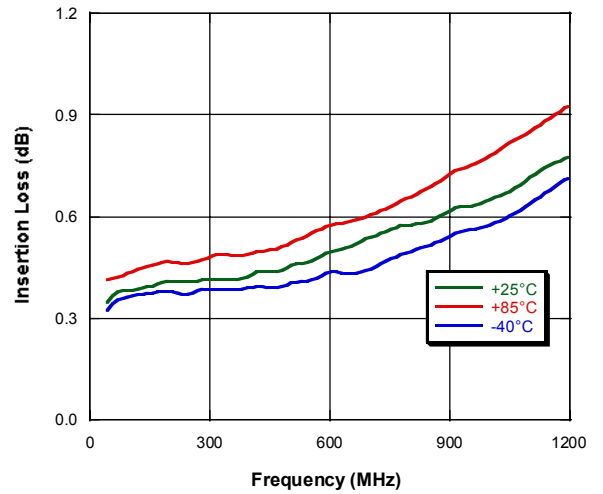
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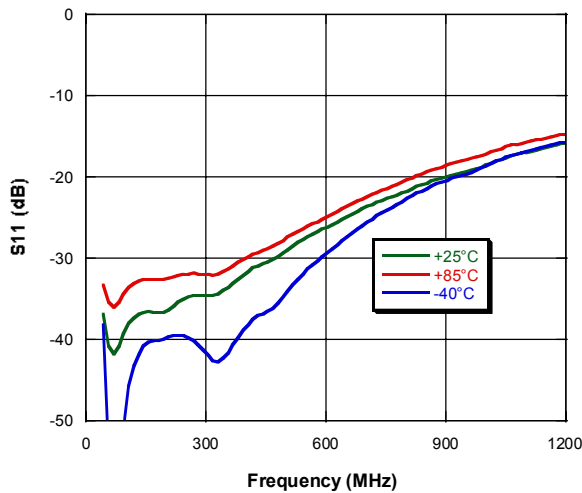
RFC to RF1, RF2 Isolation



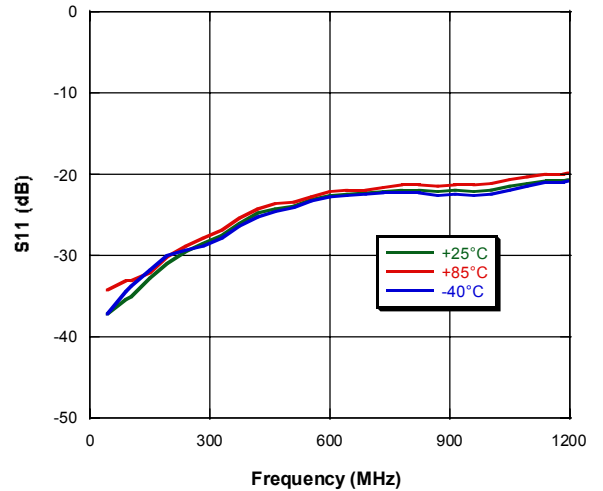
RFC to RF1, RF2 Insertion Loss



On Return Loss



Off Return Loss

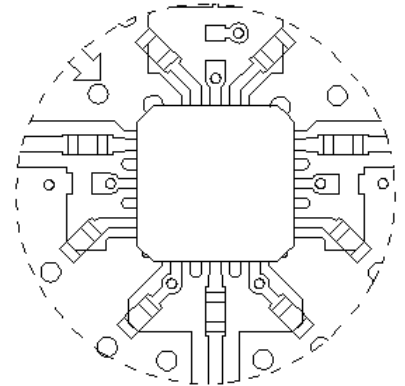
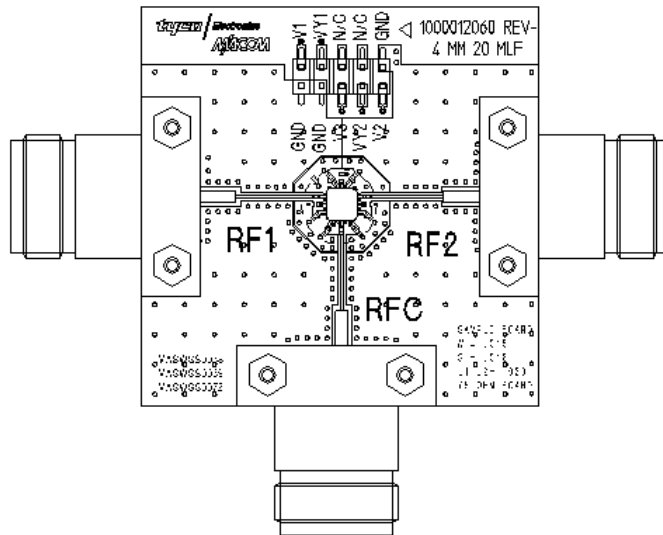


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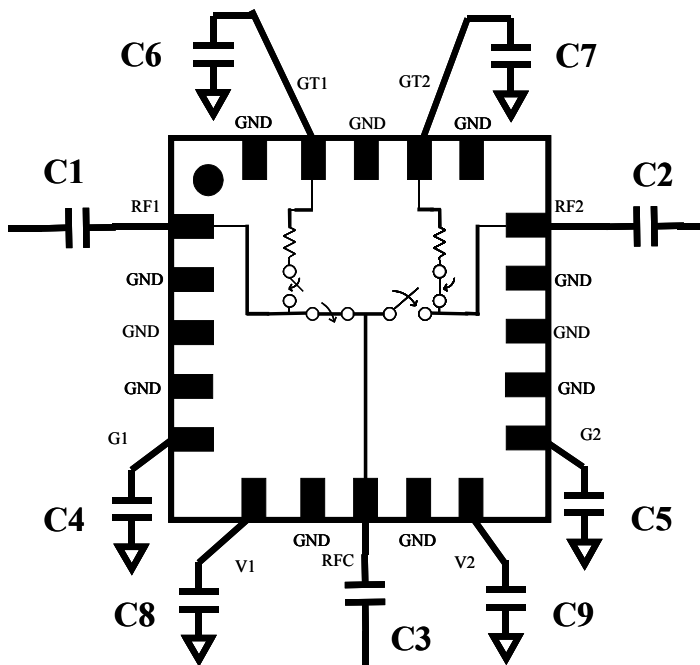
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Evaluation Board



Application Schematic



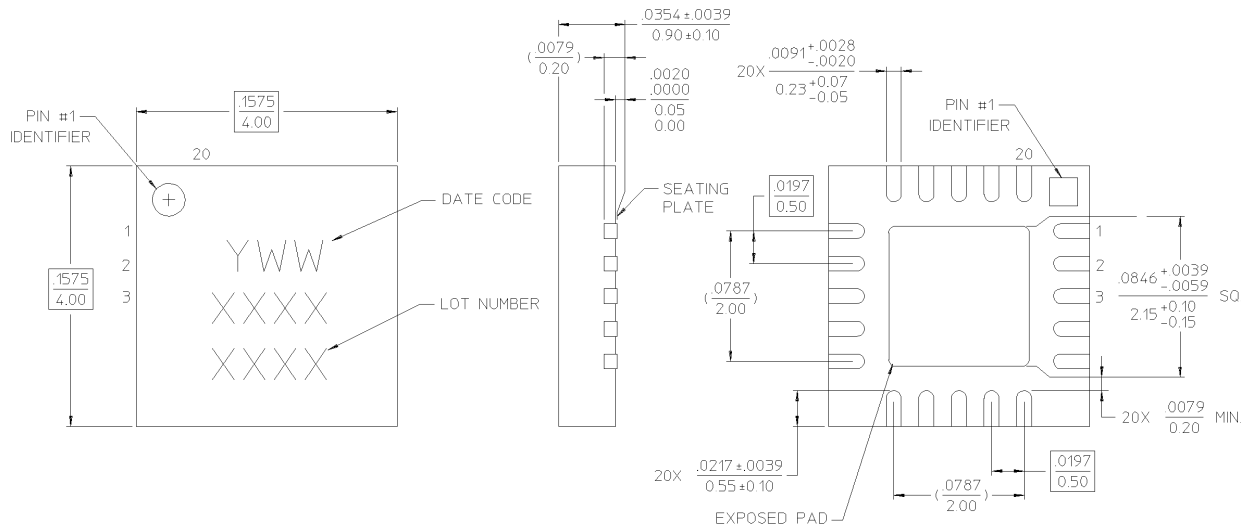
C1 – C3 = 0.01 uF, RF Bypass Capacitors
 C4 – C9 = 0.01 uF, Logic Control Decoupling Capacitors
 (All capacitors are Panasonic ECJ-OEF1H1032 or equivalent)

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4 mm FQFP-N 20 Lead



- NOTES: 1. REFERENCE JEDEC MO-220, VAR. VGGD-1 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
 2. REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.
 3. ALL DIMENSIONS SHOWN AS INCHES/MM.

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