

### Features

- 75 Ohms
- Positive Voltage Control (0 / +5 V)
- Input Terminated
- Low Insertion Loss 0.62 dB at 870 MHz
- High Isolation 54 dB at 870 MHz
- 3 mm FQFP-N 12 Lead Package
- 0.5 micron GaAs pHEMT Process

### Description

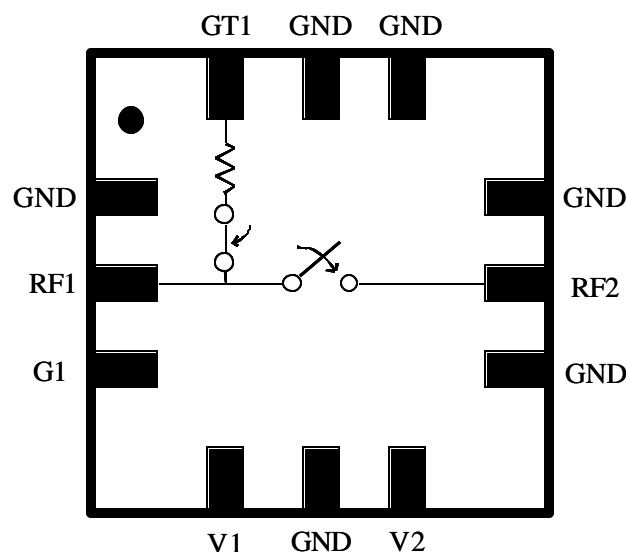
M/A-COM's MASWSS0067 is a GaAs PHEMT MMIC single pole single throw (SPST) switch in a low cost miniature 3 mm FQFP-N 12 lead package. The MASWSS0067 is ideally suited for applications where low control voltage, low insertion loss, high isolation, small size and low cost are required. Typical applications are to replace mechanical relays in CATV systems. This part can be used in all 75 ohm systems operating up to 1 GHz.

The MASWSS0067 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
MASWSS0067	FQFP-N 12-lead Plastic Package
MASWSS0067TR	7 inch, 1000 piece reel
MASWSS0067TR-3000	13 inch, 3000 piece reel
MASWSS0067SMB	Sample Test Board (Includes 5 Samples)

### Functional Schematic



### Pin Configuration

PIN No.	PIN Name	Description
1	GND	Ground
2	RF1	RF In/Out
3	G1	RF Ground
4	V1	Control 1
5	GND	Ground
6	V2	Control 2
7	GND	Ground
8	RF2	RF In/Out
9	GND	Ground
10	GND	Ground
11	GND	Ground
12	GT1	RF Ground

**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 75\ \Omega$** 

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	5 - 50 MHz 50 - 1000 MHz	dB dB		0.45 0.65	
Isolation	5 - 50 MHz 50 - 1000 MHz	dB dB		70 53	
Return Loss (On)	5 - 50 MHz 50 - 1000 MHz	dB dB		30 16	
Return Loss (Off)	5 - 50 MHz 50 - 1000 MHz	dB dB		30 18	
IP3	Two Tone -10 dBm, 6 MHz Spacing, > 50 MHz $V_c = 0\text{V}/3\text{V}$	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	
Gate Leakage	$ V_c  = 2.5\text{V}$	uA		10	100

**Absolute Maximum Ratings <sup>1</sup>**

Parameter	Absolute Maximum
Max Input Power (5 - 1000 MHz, 2.5V Control)	+32 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C

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

**Truth Table <sup>2</sup>**

V1	V2	RF1—RF2
+2.5 to +5V	$0 \pm 0.2\text{V}$	On
$0 \pm 0.2\text{V}$	+2.5 to +5V	Off

2. External DC blocking capacitors are required on all RF ports.

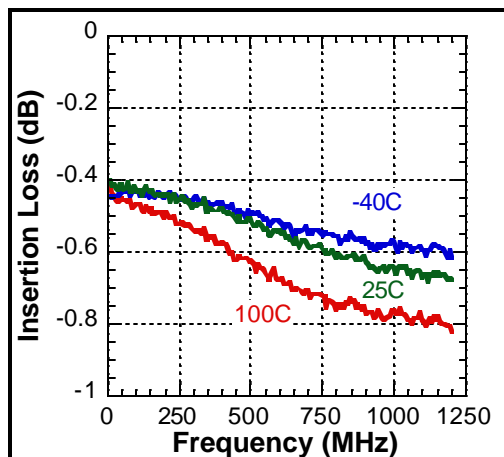
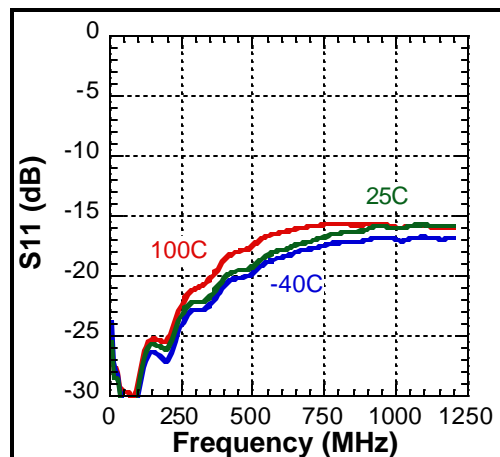
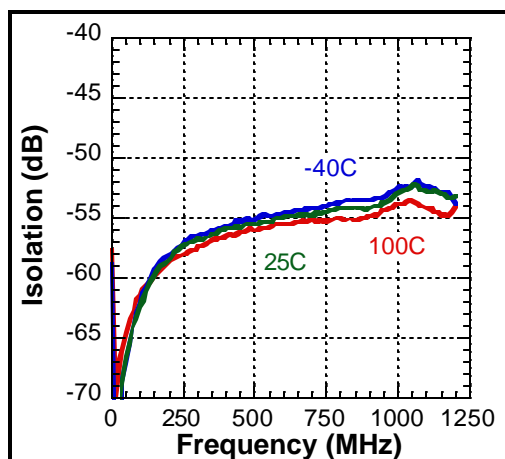
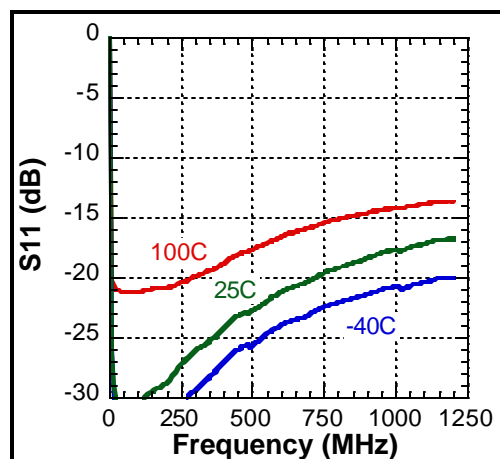
**Handling Procedures**

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

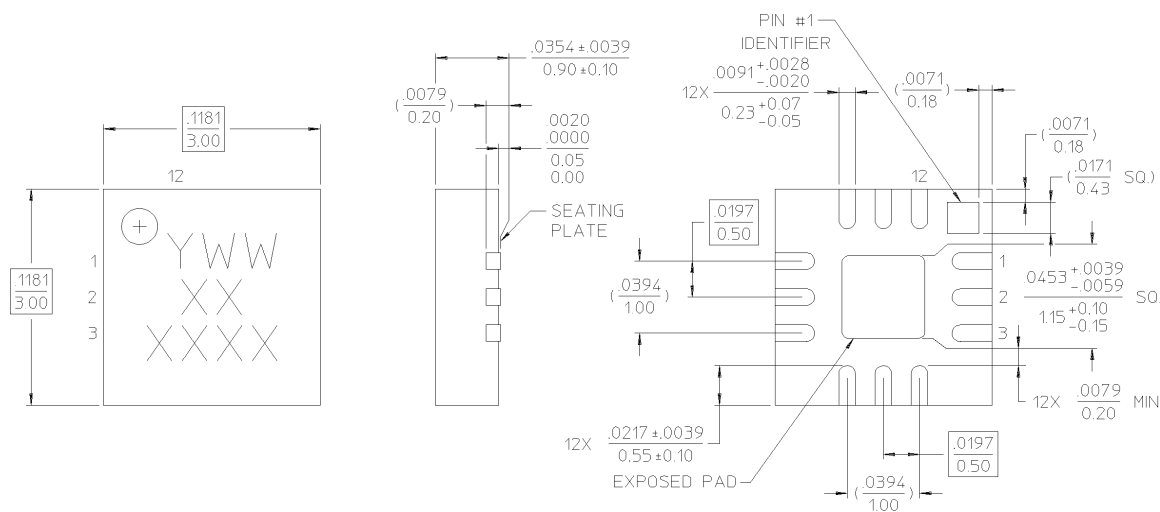
Switch On ( $V_1 = 5V$ ,  $V_2 = 0V$ )Switch On ( $V_1 = 5V$ ,  $V_2 = 0V$ )Switch Off ( $V_1 = 0V$ ,  $V_2 = 5V$ )Switch Off ( $V_1 = 0V$ ,  $V_2 = 5V$ )

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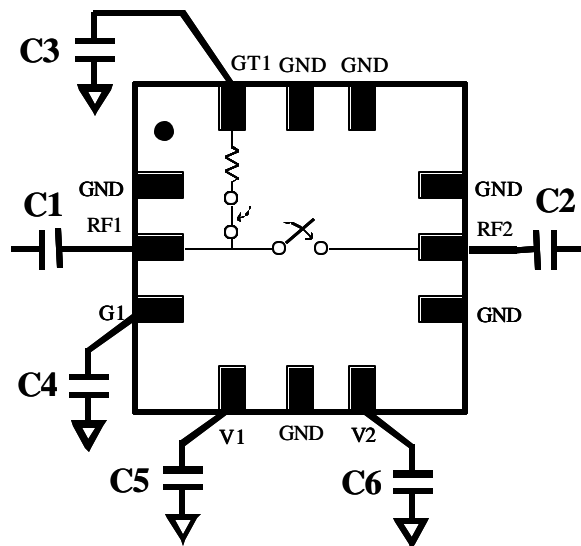
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## 3 mm FQFP-N 12 Lead



## Application Schematic



C1 – C4 = 0.01 uF, RF Bypass Capacitors  
 C5, C6 = 0.01 uF, Logic Control Decoupling Capacitors  
 (All capacitors are Panasonic ECJ-OEF1H1032 or equivalent)

## Insertion Loss State: RF1 to RF2

Freq (MHz)	+25C S11(dB)	+25C S21(dB)	+25C S22(dB)	-40C S11(dB)	-40C S21(dB)	-40C S22(dB)	+85C S11(dB)	+85C S21(dB)	+85C S22(dB)
53	-30.378	-0.429	-29.334	-30.476	-0.438	-29.376	-29.747	-0.485	-28.574
105	-28.510	-0.436	-28.147	-29.201	-0.444	-28.612	-27.916	-0.522	-27.647
158	-25.641	-0.430	-26.960	-26.418	-0.471	-27.691	-25.237	-0.539	-26.767
210	-25.692	-0.436	-24.898	-26.675	-0.475	-25.571	-24.963	-0.574	-24.522
263	-22.737	-0.450	-23.629	-23.492	-0.495	-24.330	-21.860	-0.593	-22.876
315	-22.166	-0.468	-22.503	-22.861	-0.506	-23.147	-20.905	-0.611	-21.303
368	-21.197	-0.486	-21.410	-21.833	-0.526	-22.027	-19.688	-0.664	-19.947
420	-19.812	-0.491	-20.587	-20.365	-0.544	-21.273	-18.252	-0.697	-18.956
473	-19.461	-0.517	-19.776	-20.041	-0.571	-20.443	-17.838	-0.726	-18.110
525	-18.674	-0.516	-19.260	-19.213	-0.580	-19.955	-17.011	-0.748	-17.530
578	-17.973	-0.537	-18.649	-18.569	-0.618	-19.345	-16.449	-0.787	-16.985
630	-17.639	-0.553	-18.108	-18.225	-0.620	-18.820	-16.215	-0.824	-16.606
683	-17.213	-0.565	-17.906	-17.810	-0.640	-18.630	-15.939	-0.832	-16.522
735	-16.838	-0.585	-17.481	-17.548	-0.654	-18.261	-15.807	-0.871	-16.320
788	-16.461	-0.606	-17.087	-17.197	-0.678	-17.937	-15.609	-0.887	-16.178
840	-16.398	-0.611	-17.094	-17.192	-0.707	-18.025	-15.723	-0.898	-16.400
893	-16.103	-0.612	-16.854	-17.007	-0.710	-17.846	-15.660	-0.937	-16.407
945	-15.885	-0.656	-16.692	-16.831	-0.749	-17.718	-15.629	-0.921	-16.456
998	-15.985	-0.645	-16.818	-16.959	-0.734	-17.903	-15.939	-0.927	-16.822
1050	-15.862	-0.664	-16.778	-16.879	-0.723	-17.947	-15.878	-0.927	-16.929

## Isolation State: RF1 to RF2

Freq (MHz)	+25C S11(dB)	+25C S21(dB)	+25C S22(dB)	-40C S11(dB)	-40C S21(dB)	-40C S22(dB)	+85C S11(dB)	+85C S21(dB)	+85C S22(dB)
53	-31.293	-63.858	-0.098	-35.224	-64.636	-0.104	-21.209	-64.005	-0.091
105	-30.397	-60.455	0.003	-34.180	-60.323	0.001	-21.162	-60.680	-0.005
158	-29.375	-59.682	-0.138	-33.433	-58.898	-0.131	-20.916	-59.713	-0.149
210	-28.464	-59.367	-0.165	-31.868	-58.450	-0.157	-20.762	-57.877	-0.178
263	-26.869	-57.062	-0.155	-30.117	-56.968	-0.139	-20.273	-58.547	-0.187
315	-25.821	-57.373	-0.262	-28.999	-56.613	-0.250	-19.697	-58.019	-0.297
368	-24.961	-56.578	-0.230	-27.819	-55.925	-0.206	-19.204	-56.295	-0.266
420	-23.697	-55.791	-0.276	-26.485	-54.992	-0.248	-18.429	-57.247	-0.328
473	-22.871	-54.918	-0.324	-25.665	-53.685	-0.293	-17.879	-55.775	-0.363
525	-22.347	-54.813	-0.317	-25.120	-54.823	-0.283	-17.361	-55.734	-0.367
578	-21.488	-55.402	-0.386	-24.211	-54.472	-0.336	-16.778	-55.855	-0.431
630	-20.809	-54.578	-0.390	-23.648	-54.440	-0.345	-16.261	-55.693	-0.435
683	-20.360	-54.404	-0.388	-23.180	-53.955	-0.349	-15.902	-55.152	-0.469
735	-19.754	-54.540	-0.444	-22.578	-53.624	-0.393	-15.515	-55.378	-0.519
788	-19.209	-53.878	-0.462	-22.121	-53.900	-0.403	-15.143	-54.802	-0.528
840	-18.847	-54.655	-0.489	-21.787	-53.502	-0.423	-14.869	-54.655	-0.568
893	-18.428	-53.933	-0.515	-21.418	-53.785	-0.449	-14.616	-54.085	-0.595
945	-17.957	-53.919	-0.554	-21.007	-54.186	-0.501	-14.327	-54.343	-0.629
998	-17.612	-52.417	-0.571	-20.671	-52.173	-0.493	-14.201	-53.241	-0.653
1050	-17.468	-51.238	-0.627	-20.673	-52.203	-0.537	-14.023	-52.693	-0.684

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