

SPDT High Isolation Terminated Switch 0.5 - 3.0 GHz

Rev. V3

Features

- Positive Voltage Control (0 / +5 V)
- High Isolation: 54 dB @ 0.9 GHz
52 dB @ 1.9 GHz
- 50-Ohm Internal Terminations
- Low Insertion Loss: 0.6 dB @ 0.9 GHz
0.7 dB @ 1.9 GHz
- Lead-Free Package: 4 mm 16-Lead PQFN
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of SW-475

Description

The M/A-COM MASWSS0121 GaAs monolithic switch provides high isolation in a low-cost, lead-free plastic surface mount package. The MASWSS0121 is ideal for applications across a broad range of frequencies including synthesizer switching, transmit / receive switching, switch matrices and filter banks in systems such as radio and cellular equipment, PCS, GPS, and fiber optic modules.

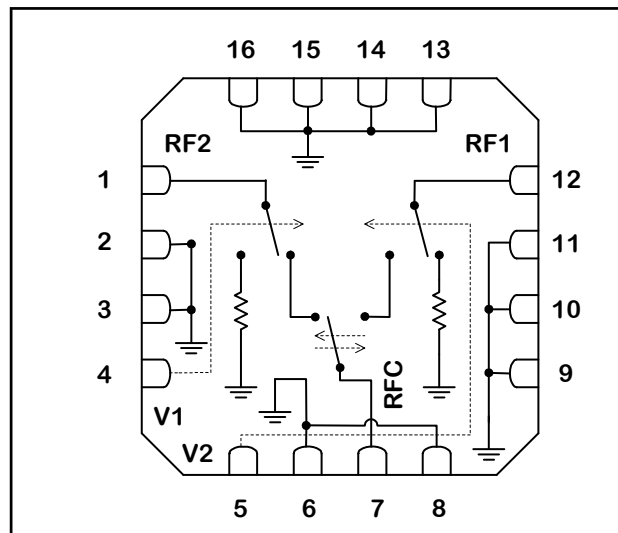
M/A-COM fabricates the MASWSS0121 using a 1.0-micron gate length MESFET process. The process features full chip passivation for performance and reliability.

Ordering Information ¹

Part Number	Package
MASWSS0121	Bulk Packaging
MASWSS0121TR	1000 piece reel
MASWSS0121TR-3000	3000 piece reel
MASWSS0121SMB	Sample board

1. Reference Application Note M513 for reel size information.

Functional Schematic



PIN Configuration

Pin	Function	Description
1	RF2	RF port
2	GND	RF ground
3	GND	RF ground
4	V1	Control 1
5	V2	Control 2
6	GND	RF ground
7	RFC	RF port
8	GND	RF ground
9	GND	RF ground
10	GND	RF ground
11	GND	RF ground
12	RF1	RF port
13	GND	RF ground
14	GND	RF ground
15	GND	RF ground
16	GND	RF ground
17 (pad) ²	GND	RF ground

2. 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: $T_A = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ Ohms}$, $V_C = 0, 5.0\text{ V}^3$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	0.5 - 1 GHz	dB	—	0.6	0.7
	1.0 - 2.0 GHz	dB	—	0.7	0.8
	2.0 - 3.0 GHz	dB	—	0.75	0.9
Isolation	0.5 - 1 GHz	dB	51	54	—
	1.0 - 2.0 GHz	dB	48	52	—
	2.0 - 3.0 GHz	dB	45	50	—
Return Loss	0.5 - 1 GHz	dB	—	20	—
	1.0 - 2.0 GHz	dB	—	20	—
	2.0 - 3.0 GHz	dB	—	20	—
Input IP_2	2-Tone 900 MHz, 5 MHz spacing	dBm	—	83	—
Input IP_3	2-Tone 900 MHz, 5 MHz spacing	dBm	—	46	—
P1dB	1 GHz, 5 V	dBm	—	27	—
	1 GHz, 3 V	dBm	—	18	—
P0.1dB	1 GHz, 5 V	dBm	—	24	—
	1 GHz, 3 V	dBm	—	11	—
T_{RISE} , T_{FALL}	10% to 90% RF & 90% to 10% RF	nS	—	24	—
T_{ON} , T_{OFF}	50% of V_C to 10% / 90% RF	nS	—	15	—
Transients	$V_C = 5.0\text{ V}$ square wave, in-band	mV	—	12	—
Control Current	$ V_C = 4.5\text{ V}$, 0 dBm	μA	—	2	13

3. External DC blocking capacitors are required on all RF ports (47 pF capacitors are recommended).

Absolute Maximum Ratings^{4,5}

Parameter	Absolute Maximum
Input Power (0.5 - 3.0 GHz)	
3 V Control	+30 dBm
5 V Control	+33 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
 5. M/A-COM does not recommend sustained operation near these survivability limits.

Truth Table

V1	V2	RFC - RF1	RFC - RF2
0	1	ON	OFF
1	0	OFF	ON

Logic Level	Voltage Level
0	0 V $\pm$ 0.2 V
1	3.0 V to 8.0 V

Handling Procedures

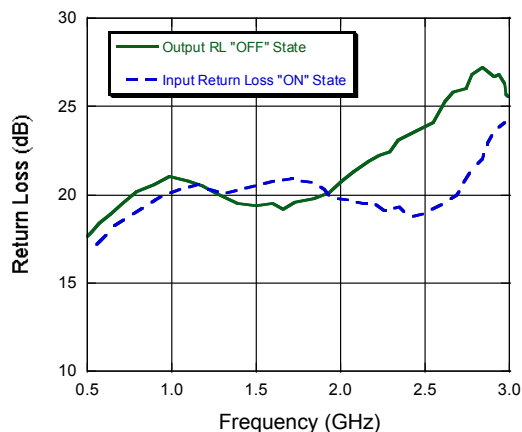
Please observe the following precautions to avoid damage:

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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Return Loss



Frequency (GHz)	+25°C (dB)	+85°C (dB)	-40°C (dB)
0.5	0.65	0.70	0.60
1.0	0.53	0.56	0.49
1.5	0.62	0.68	0.58
2.0	0.68	0.75	0.62
2.5	0.72	0.78	0.65
3.0	0.77	0.80	0.70

Frequency (GHz)	+25°C Isolation (dB)	+85°C Isolation (dB)	-40°C Isolation (dB)
0.5	57.0	57.5	56.0
1.0	54.5	55.0	53.0
1.5	52.0	53.0	51.0
2.0	53.0	54.5	51.0
2.5	56.0	62.0	54.0
2.6	58.5	63.0	55.5
3.0	50.5	51.0	50.5

The drawing illustrates the mechanical specifications of a 16-pin Small Outline Integrated Circuit (SOIC) package. It includes three views: a top view, a side view, and an end view.

- Top View:** Shows the package footprint with a width of 0.1575 ± 0.004 inches and a length of 0.1575 ± 0.004 inches. The pin 1 identifier is located at the top left. The package is marked with "YWW" for the date code, "XXXX" for the part number, and "XXXX" for the lot number. A circular symbol with a "+" sign is also present.
- Side View:** Shows the package height and the seating plate. The total height is 0.0354 ± 0.0039 inches. The seating plate height is 0.0020 ± 0.0005 inches. The pin height is 0.0079 ± 0.0020 inches.
- End View:** Shows the package width and the exposed pad. The width is 0.0256 ± 0.0065 inches. The exposed pad width is 0.0768 ± 0.0039 inches. The pin pitch is 0.0118 ± 0.0020 inches. The pin 1 identifier is located at the top right. The package is marked with "16X" and "16X" on the sides.

NOTES:

- REFERENCE JEDEC MO-220. VAR. VGGC FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
- REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.
- ALL DIMENSIONS SHOWN AS INCHES/MM.

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

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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