

SPDT High Isolation Terminated Switch 0.5 - 3.0 GHz

Rev. V6

Features

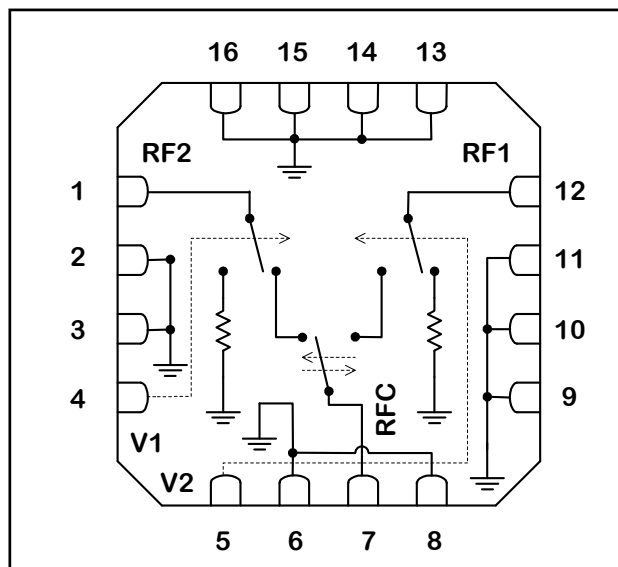
- Positive Voltage Control (0 / +5 V)
- High Isolation (53 dB typ. @ 0.9 GHz,
50 dB typ @ 1.9 GHz)
- 50-Ohm Internal Terminations
- Low Insertion Loss (0.6 dB typ. @ 0.9 GHz,
0.7 dB typ. @ 1.9 GHz)
- 4 mm 16-Lead PQFN Package

Description

The M/A-COM SW-475 GaAs monolithic switch provides high isolation in a low-cost, plastic surface mount package. The SW-475 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 SW-475 using a 1.0-micron gate length MESFET process. The process features full chip passivation for performance and reliability.

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) ³	GND	RF ground

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

Ordering Information ¹

Part Number	Package
SW-475 PIN	Bulk Packaging
SW-475TR	1000 piece reel
SW-475TR-3000	3000 piece reel
SW-475SMB	Sample board

1. Reference Application Note M513 for reel size information.

Absolute Maximum Ratings ²

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

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

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Electrical Specifications ⁴: $T_A = 25\text{ }^{\circ}\text{C}$, $V_{CTL} = 0, 5.0\text{ V}$ (unless otherwise specified)

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	15	20	—
	1.0 - 2.0 GHz	dB	15	20	—
	2.0 - 3.0 GHz	dB	15	20	—
Input IP_2	2-Tone 900 MHz, 5 MHz spacing ($V_C = 5.0\text{ V}$)	dBm	—	83	—
Input IP_3	2-Tone 900 MHz, 5 MHz spacing ($V_C = 5.0\text{ V}$)	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\text{ dBm}$	μA	—	2	13

4. DC blocking capacitors requires on all RF ports.

Truth Table ⁵

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

5. External DC blocking capacitors required on all RF ports.
We recommend 47 pF.

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

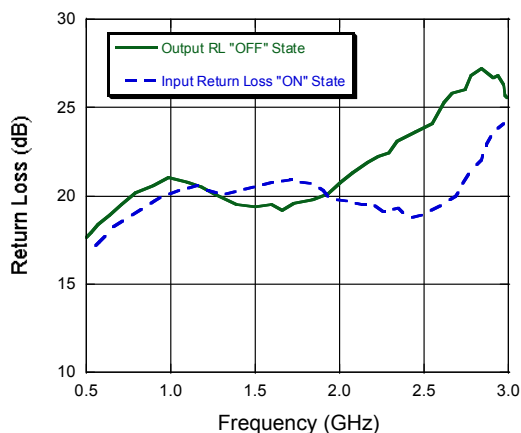
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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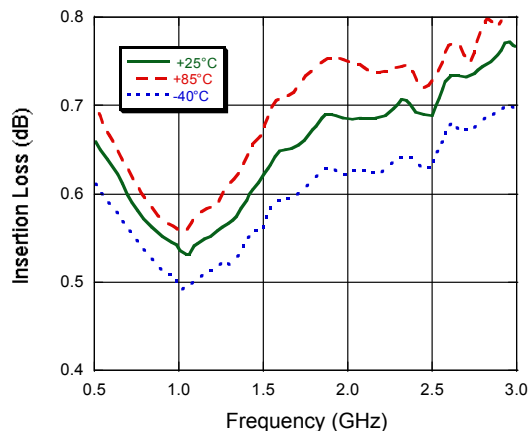
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Typical Performance Curves

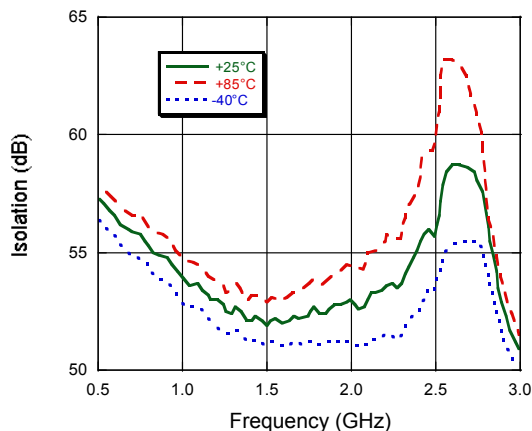
Return Loss Vs. Frequency



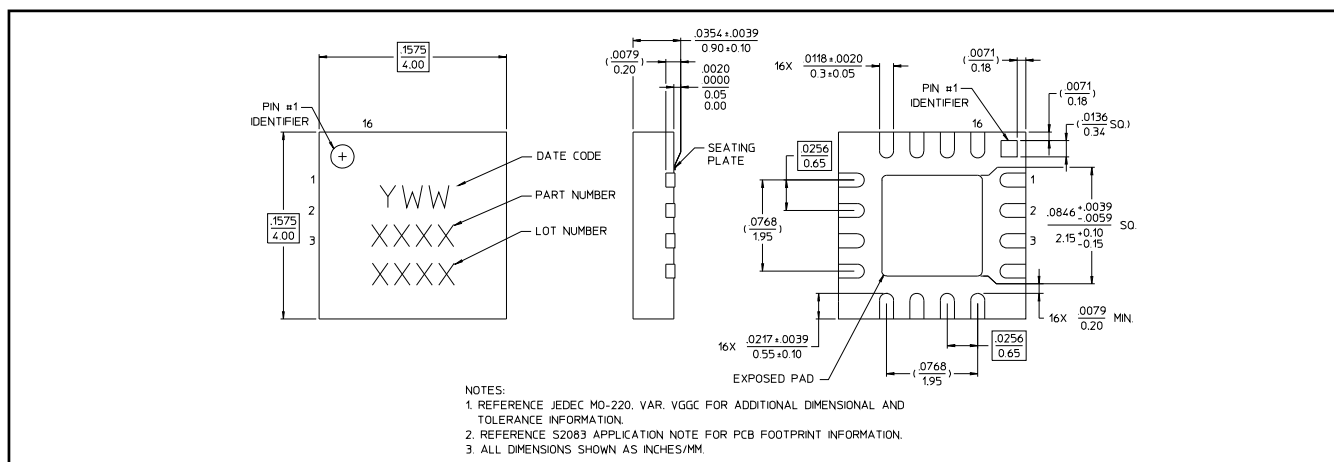
Insertion Loss Vs. Temperature



Isolation Vs. Frequency Over Temperature



4 mm 16-Lead PQFN



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