

SPDT High Isolation Terminated Switch 0.5 - 3.0 GHz

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.

Ordering Information 1Part NumberPackageSW-475 PINBulk PackagingSW-475TR1000 piece reelSW-475TR-30003000 piece reelSW-475SMBSample board

1. Reference Application Note M513 for reel size information.

Absolute Maximum Ratings²

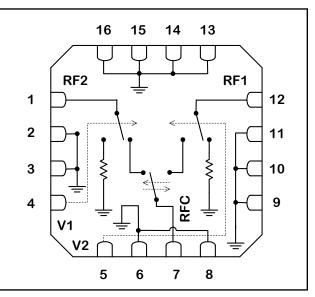
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Parameter	Absolute Maximum		
Input Power (0.5 - 3.0 GHz)			
3 V Control	+30 dBm		
5 V Control	+33 dBm		
Operating Voltage	+8.5 volts		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +150°C		

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

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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.

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

Parameter	Test Conditions	Units	Min.	Тур.	Max.
Insertion Loss	0.5- 1 GHz 1.0 - 2.0 GHz 2.0 - 3.0 GHz	dB dB dB		0.6 0.7 0.75	0.7 0.8 0.9
Isolation	0.5 - 1 GHz 1.0 - 2.0 GHz 2.0 - 3.0 GHz	dB dB dB	51 48 45	54 52 50	
Return Loss	0.5 - 1 GHz 1.0 - 2.0 GHz 2.0 - 3.0 GHz	dB dB dB	15 15 15	20 20 20	
Input IP ₂	2-Tone 900 MHz, 5 MHz spacing (V _c = 5.0 V)	dBm	—	83	_
Input IP ₃	2-Tone 900 MHz, 5 MHz spacing (V _c = 5.0 V)	dBm	—	46	_
P1dB	1 GHz, 5 V 1 GHz, 3 V	dBm dBm	_	27 18	_
P0.1dB	1 GHz, 5 V 1 GHz, 3 V	dBm dBm	—	24 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	$V_{\rm C}$ = 5.0 V square wave, in-band	mV	—	12	_
Control Current	Vc = 4.5 V, 0 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 ± 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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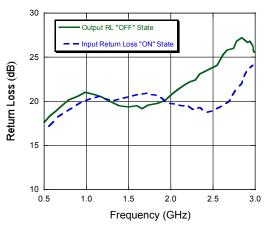


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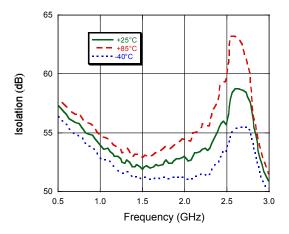
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Typical Performance Curves

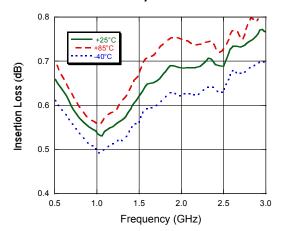
Return Loss Vs. Frequency



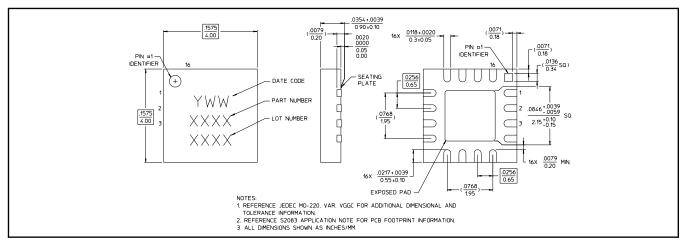
Isolation Vs. Frequency Over Temperature



Insertion Loss Vs. Temperature



4 mm 16-Lead PQFN



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