

**GaAs SPDT RF Switch
DC - 3 GHz**

**SW-219
V3**

Features

- Fast Switching Speed: 6 nS Typical
- Ultra Low DC Power Consumption
- Small Package Size: 0.180" (4.6 mm) Sq.

Description

M/A-COM's SW-219 is a GaAs MMIC SPDT switch packaged in a surface mount CR-3 or a CR-10 ceramic style package. The SW-219 is a low loss, high isolation SPDT that has broadband application from DC to 3 GHz. The CR-3 and CR-10 packages are hermetically sealed, making these switches ideal for space, military radios, or other environmentally harsh applications.

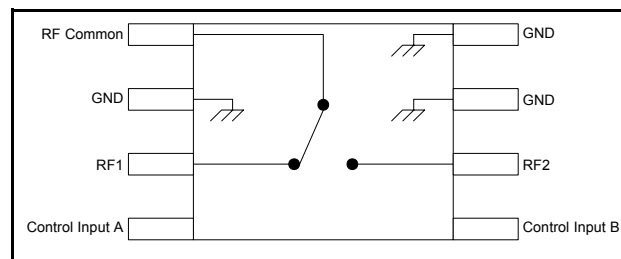
Typical applications include synthesizer switching, transmit/receive switching, switch matrices and filter banks in systems such as radio and cellular equipment, PCM, GPS, and fiber optic modules.

The SW-219 is fabricated as a monolithic GaAs MMIC using a 1.0 micron MESFET process.

Ordering Information

Part Number	Package
SW-219	Ceramic (CR-3)
SW-219G	Ceramic with Gull Wing (CR-10)
SW-219B	Screened to MIL-STD-883C, Method 5008.4, Table VII, Class B Hybrid

Functional Schematic ¹



1. Bottom of case is AC Ground.

Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF Common	5	Control Input B
2	Ground	6	RF Port 2
3	RF Port 1	7	Ground
4	Control Input A	8	Ground

Absolute Maximum Ratings ^{2,3}

Parameter	Absolute Maximum
Input Power 0.05 GHz 0.5 - 2.0 GHz	+27 dBm +34 dBm
Control Voltage	-8.5 V ≤ Vc ≤ +5 V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

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

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Electrical Specifications: $T_A = -55$ to $+85^\circ\text{C}$, $V_c = 0\text{ V} / -5\text{ V}$, $Z_0 = 50\ \Omega$ ⁴

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 0.5 GHz	dB	—	—	0.7
	DC - 1 GHz	dB	—	—	0.8
	DC - 2 GHz	dB	—	—	0.8
	DC - 3 GHz	dB	—	—	0.9
Isolation	DC - 0.5 GHz	dB	43	—	—
	DC - 1 GHz	dB	38	—	—
	DC - 2 GHz	dB	28	—	—
	DC - 3 GHz	dB	23	—	—
VSWR	DC - 0.5 GHz	Ratio	—	—	1.2:1
	DC - 1 GHz	Ratio	—	—	1.2:1
	DC - 2 GHz	Ratio	—	—	1.3:1
	DC - 3 GHz	Ratio	—	—	1.6:1
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	—	3	—
Ton, Toff	50% control to 90% RF, 50% control to 10% RF	nS	—	6	—
Transients	In-Band	mV	—	10	—
Input P1dB	0.5 - 3 GHz, 0 / -5 VDC	dBm	—	27	—
	0.05 GHz, 0 / -5 VDC	dBm	—	21	—
	0.5 - 3 GHz, 0 / -8 VDC	dBm	—	33	—
	0.05 GHz, 0 / -8 VDC	dBm	—	26	—
IP2	For two-tone input power up to +13 dBm 0.5 - 3 GHz	dBm	—	62	—
	0.05 GHz	dBm	—	68	—
IP3	For two-tone input power up to +13 dBm 0.5 - 3 GHz	dBm	—	40	—
	0.05 GHz	dBm	—	46	—
Control Current	$ V_c = 0$ to 0.2 V	μA	—	—	20
	$ V_c = 5\text{ V}$	μA	—	50	—
	$ V_c = 8\text{ V}$	μA	—	—	300

4. See MIL-STD-883 for environmental screening options.

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.

Truth Table^{5,6}

Control Input		Condition of Switch, RF Common to each RF Port	
A	B	RF1	RF2
1	0	On	Off
0	1	Off	On

5. 0 = 0 V to -0.2 V, 1 = -5 V to -8 V

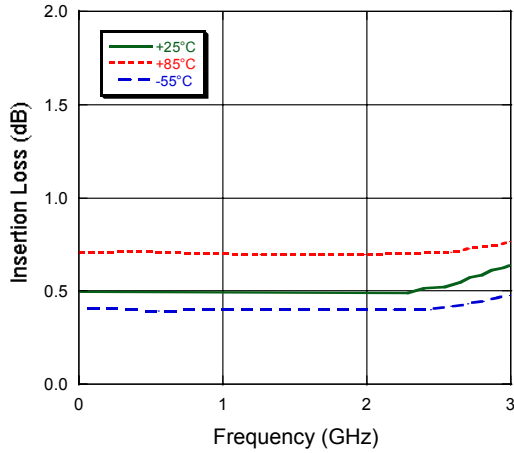
6. When an RF output is off, it is shorted to ground.

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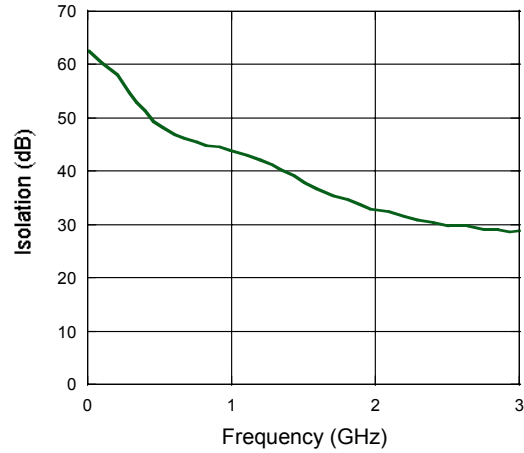
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Typical Performance Curves

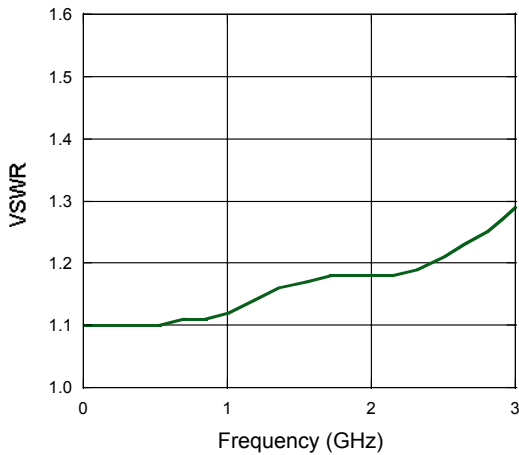
Insertion Loss



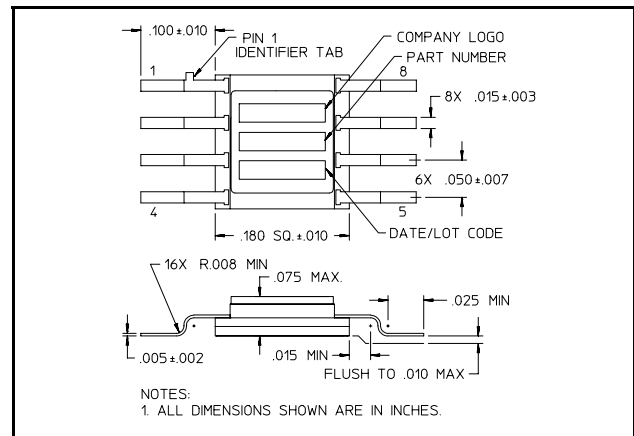
Isolation



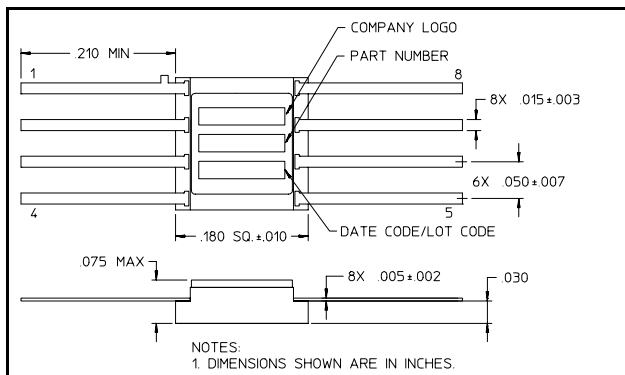
VSWR



CR-10 (SW-219G)



CR-3 (SW-219, SW-219B)



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