SW-243

Reflective GaAs SP4T Switch
DC - 4 GHz

Rev. V3

Features

- Low Insertion Loss: 0.7 dB Typical
- Fast Switching Speed: 4 nS Typical
- Ultra Low DC Power Consumption
- Small Package Size: 0.250" Square

Description

M/A-COM's SW-243 GaAs MMIC SP4T switch is packaged in a CR-4 surface mount ceramic style package. The SW-243 is a reflective switch, optimized for low insertion loss. The CR-4 package is hermetically sealed, making these switches ideal for space, military radios, or other environmentally harsh applications.

Typical applications include synthesizer switching, switch matrices and filter banks in systems such as military radios, and space equipment.

The SW-243 is fabricated as a monolithic GaAs MMIC using a 1.0 micron MESFET process.

Ordering Information

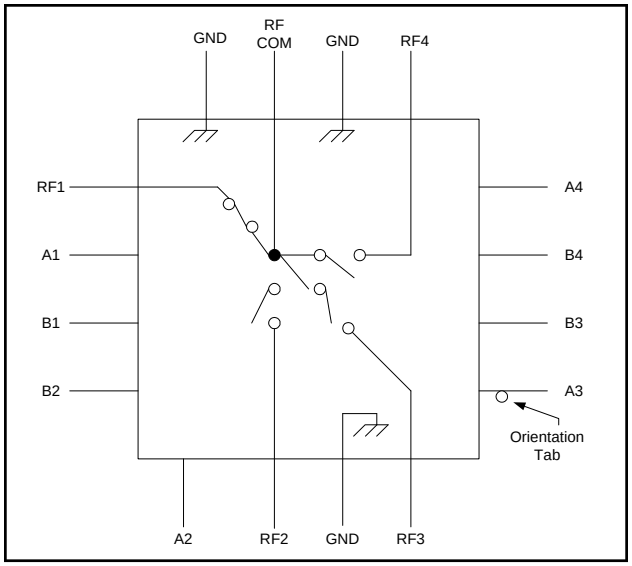
Part Number	Package
SW-243	Ceramic (CR-4)

Absolute Maximum Ratings [1,2]

Parameter	Absolute Maximum
Input Power 0.05 GHz 0.5 - 4.0 GHz	 +26 dBm +33 dBm
Control Voltage	-8.5 V $\leq$ Vc $\leq$ +5 V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

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

Functional Schematic



Pin Configuration[3]

Pin No.	Function	Pin No.	Function
1	RF Port 1	9	Control A3
2	Control A1	10	Control B3
3	Control B1	11	Control B4
4	Control B2	12	Control A4
5	Control A2	13	RF Port 4
6	RF Port 2	14	Ground
7	Ground	15	RF Common
8	RF Port 3	16	Ground

3. Bottom of case is RF ground.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
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Electrical Specifications: T_A = -55 to +85°C, Vc = 0 V / -5 V, Z_0 = 50 Ω [4,5]

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	DC - 0.5 GHz DC - 1 GHz DC - 2 GHz DC - 4 GHz	dB dB dB dB	— — — —	— — — —	0.8 0.9 1.0 1.3
Isolation	DC - 0.5 GHz DC - 1 GHz DC - 2 GHz DC - 4 GHz	dB dB dB dB	35 30 25 20	— — — —	— — — —
VSWR	DC - 0.5 GHz DC - 1 GHz DC - 2 GHz DC - 4 GHz	Ratio Ratio Ratio Ratio	— — — —	— — — —	1.25:1 1.25:1 1.5:1 1.9:1
Trise, Tfall [5]	10% to 90% RF, 90% to 10% RF	nS	—	2	—
Ton, Toff [5]	50% control to 90% RF, 50% control to 10% RF	nS	—	4	—
Transients [5]	In-Band	mV	—	25	—
Input P1dB	0.5 - 4 GHz, 0 / -5 VDC 0.05 GHz, 0 / -5 VDC 0.5 - 4 GHz, 0 / -8 VDC 0.05 GHz, 0 / -8 VDC	dBm dBm dBm dBm	— — — —	26 20 32 23	— — — —
IP2	For two-tone input power up to +13 dBm 0.5 - 4 GHz 0.05 GHz	 dBm dBm	 — —	 68 55	 — —
IP3	For two-tone input power up to +13 dBm 0.5 - 4 GHz 0.05 GHz	 dBm dBm	 — —	 46 37	 — —
Control Current	|Vc| = 0 to 0.2 V |Vc| = 5 V |Vc| = 8 V	µA µA µA	— — —	— 10 —	5 — 100

4. See MIL-STD-883 for environmental screening options.
5. Faster switching speed can be achieved with enhanced driver waveform.

Truth Table[6,7]

Control Input								Condition of Switch, RF Common to each RF Port			
A1	B1	A2	B2	A3	B3	A4	B4	RF1	RF2	RF3	RF4
1	0	0	1	0	1	0	1	On	Off	Off	Off
0	1	1	0	0	1	0	1	Off	On	Off	Off
0	1	0	1	1	0	0	1	Off	Off	On	Off
0	1	0	1	0	1	1	0	Off	Off	Off	On

6. 0 = 0 V to -0.2 V, 1 = -5 V to -8 V
7. When an RF output port is “off” it is shorted to ground through an “on” shunt MESFET.

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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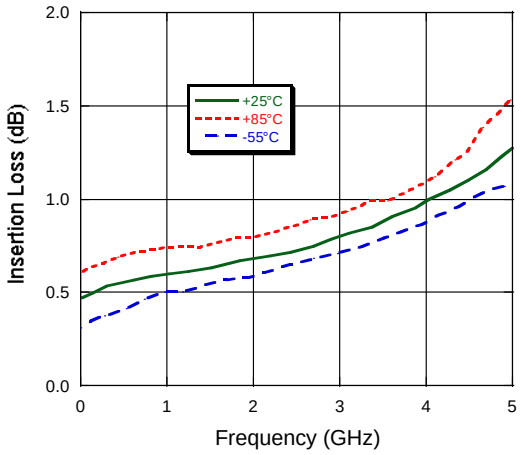
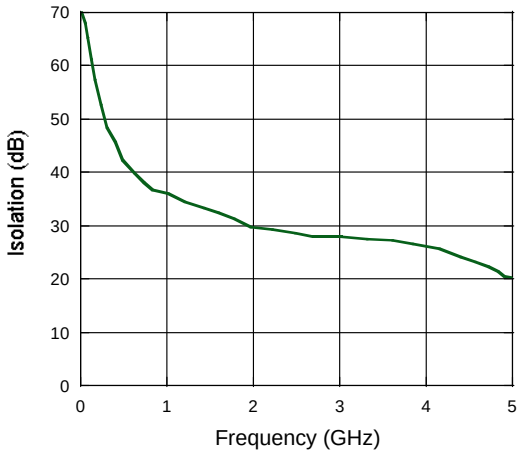
Typical Performance Curves

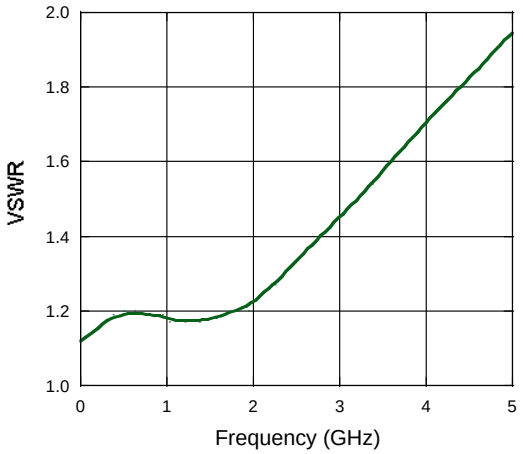
Insertion Loss



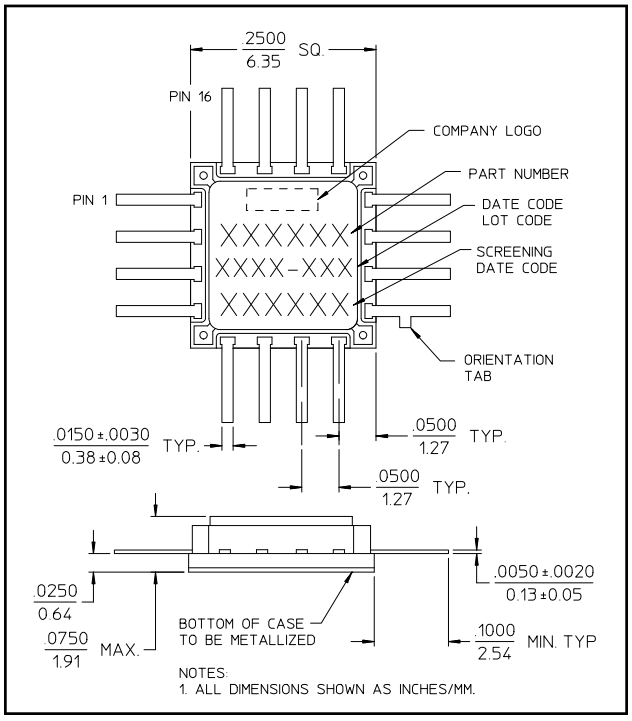
Isolation



VSWR



CR-4



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