

GaAs High Isolation Switch DC - 3.0 GHz

Rev. V4

Features

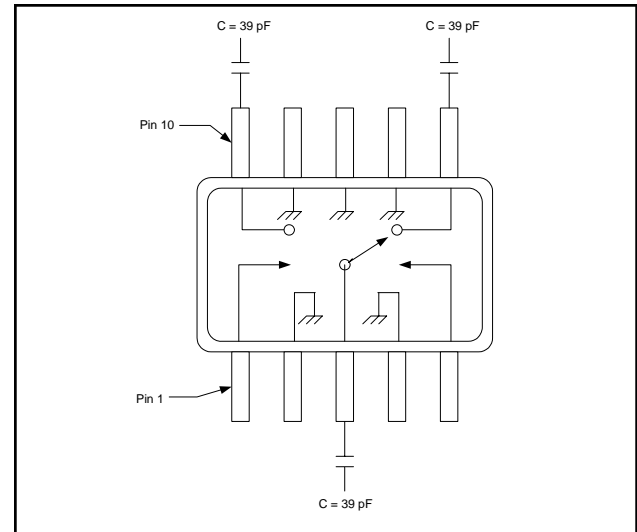
- Low Power Consumption: < 15 μ A @ +2.5V
- High Isolation: 50 dB Typical @ 2 GHz
- Low Insertion Loss: 0.7 dB @ 2 GHz
- Positive 2.5 to 5 V Control
- Low Cost Plastic MSOP-10 Package

Description

The SW-439 is a GaAs MMIC SPDT switch in a low cost MSOP-10 surface mount plastic package. This part is ideal for high isolation, broadband switching requirements. 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-439 is fabricated as a monolithic GaAs MMIC using a 0.5 micron pHEMT process. The process features full passivation.

Functional Schematic ⁴



4. For improved performance at frequencies below 500 MHz, use larger value capacitors.

Ordering Information¹

Part Number	Package
SW-439	Bulk Packaging
SW-439TR	1000 piece reel
SW-439SMB	Sample Board

1. Reference Application Note M513 for reel size information.

Pin Configuration

Pin No.	Function	Pin No.	Function
1	Control 1	6	RF Port 2
2	Ground	7	Ground
3	RF Input	8	Ground
4	Ground	9	Ground
5	Control 2	10	RF Port 1

Absolute Maximum Ratings ^{2,3}

Parameter	Absolute Maximum
Input Power	+30 dBm
Operating Voltage	+8.5 Volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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

Truth Table ^{5,6}

Control V1	Control V2	RFC - RF1	RFC - RF2
0	1	Off	On
1	0	On	Off

- External DC blocking capacitors are required on all RF ports.
- "0" = 0 + 0.2 Vdc, "1" = +2.5 to +5 Vdc

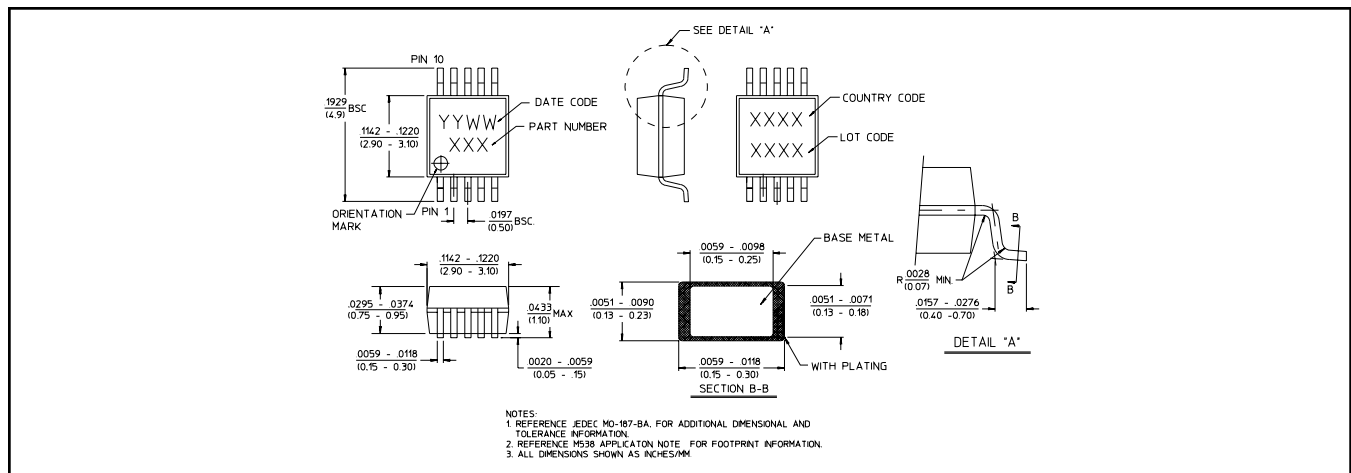
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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0 / 3 \text{ V}$, $Z_0 = 50\Omega$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	DC - 1.0 GHz	dB	—	0.55	0.65
	1.0 - 2.0 GHz	dB	—	0.65	0.75
	2.0 - 3.0 GHz	dB	—	0.80	0.90
Isolation	DC - 2.0 GHz	dB	45	47	—
	2.0 - 3.0 GHz	dB	31	33	—
VSWR	0.25 - 3.0 GHz	Ratio	—	1.2:1	1.3:1
P1dB	500 MHz - 2.0 GHz, $V_C = 2.5 \text{ V}$	dBm	—	20	—
P1dB	500 MHz - 2.0 GHz, $V_C = 5 \text{ V}$	dBm	—	28	—
IP2	2 Tone, 900 MHz, 5 MHz Spacing, $V_C = 3 \text{ V}$	dBm	—	85	—
IP3	2 Tone, 900 MHz, 5 MHz Spacing, $V_C = 3 \text{ V}$	dBm	—	50	—
Ton, Toff	50% Control to 90% RF, 50% Control to 10% RF	nS	—	20	—
Trise, Tfall	10% to 90% RF, 90% to 10% RF	nS	—	10	—
Transients	In-band	mV	—	15	—
Control Current	$ V_C = 2.5 \text{ V}$	μA	—	5	15

MSOP-10[†]



[†] Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

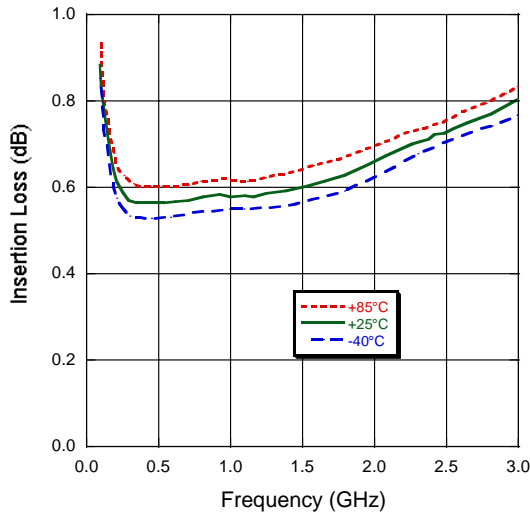
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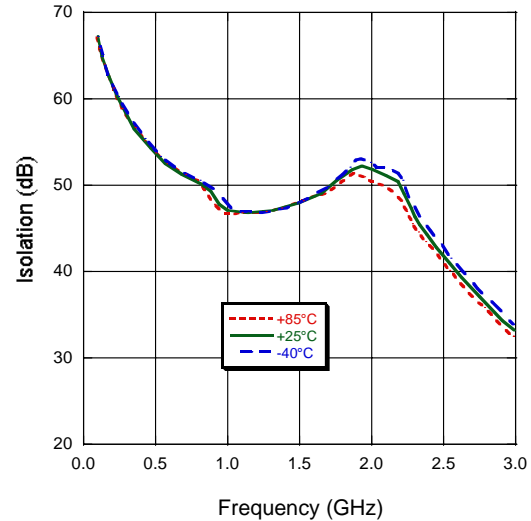
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Typical Performance Curves

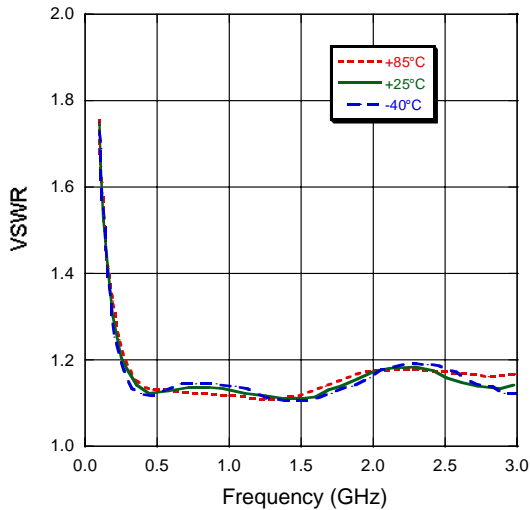
Insertion Loss



Isolation



VSWR



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.