

GaAs SPDT Switch DC - 3.0 GHz

Rev. V5

Features

- Low Cost Plastic SOT-363 Package
- Low Insertion Loss <0.3 dB @900 MHz
- Low Power Consumption <15 μ A @ +2.7V
- Positive or Negative 2.5 to 8 V Control

Description

M/A-COM's SW-437 is a GaAs monolithic switch in a low cost SOT-363 surface mount plastic package. The SW-437 is ideally suited for applications where very low power consumption, low insertion loss, very small size and low cost are required. Typical application is in dual band systems where switching between small signal components is required such as filter banks, single band LNA's, converters etc. The SW-437 can be used in applications up to 0.25 Watts in systems such as cellular, PCS, DCS1800, GSM, CDMA, W-CDMA and other analog/digital wireless communications systems.

The SW-437 is fabricated using a mature 0.5 micron GaAs PHEMT process. The process features full passivation for increased performance and reliability.

Ordering Information ¹

Part Number	Package
SW-437 PIN	Bulk Packaging
SW-437TR-3000	3000 piece reel
SW-437SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.

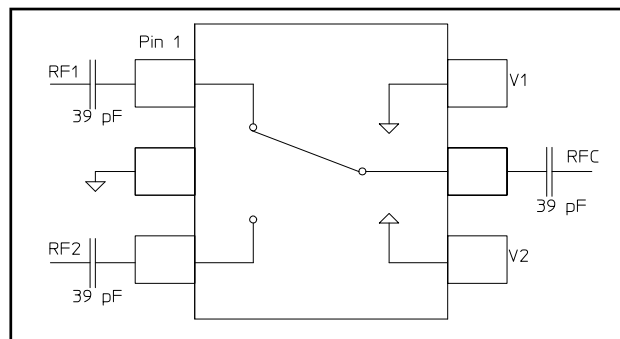
Absolute Maximum Ratings ²

Parameter	Absolute Maximum
Input (0.5-3.0 GHz) 3 V Control 5 V Control	+30 dBm +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.

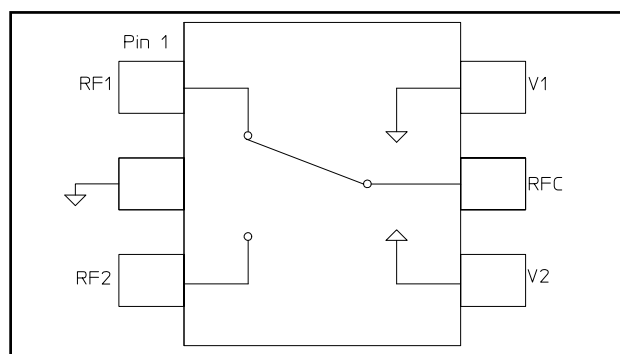
Functional Schematic

Positive Control Voltage



Functional Schematic

Negative Control Voltage



Pin Configuration

Pin No.	Function	Description
1	RF1	RF in/out
2	GND	RF Ground
3	RF2	RF in/out
4	V2	V Control 2
5	RFC	RF COMMON
6	V1	V Control 1

GaAs SPDT Switch

DC - 3.0 GHz

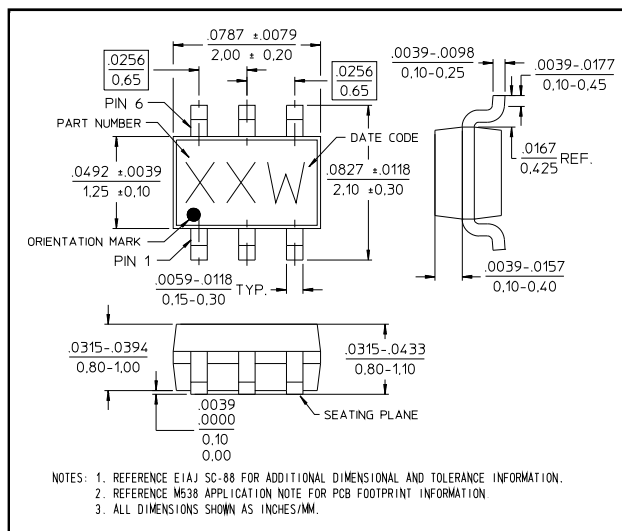
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Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\Omega$ ³

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 1 GHz	dB	—	0.3	0.4
	1 - 2 GHz	dB	—	0.4	0.5
	2 - 3 GHz	dB	—	0.55	0.7
Isolation	DC - 1 GHz	dB	19	21	—
	1 - 2 GHz	dB	13	15	—
	2 - 3 GHz	dB	10	12	—
VSWR	DC - 3 GHz	Ratio	—	1.2:1	1.3:1
P_{1dB} (2.7V Supply)	500 MHz - 3 GHz	dBm	—	24	—
P_{1dB} (5V Supply)	500 MHz - 3 GHz	dBm	—	27	—
Input IP_2	2-Tone 900 MHz, 5 MHz spacing (2.7V)	dBm	—	81	—
Input IP_3	2-Tone 900 MHz, 5 MHz spacing (2.7V)	dBm	—	55	—
Trise, Tfall Ton, Toff Transients	10% to 90% RF, 90% to 10% RF	ns	—	10	—
	50% Control to 90% RF, Control to	ns	—	20	—
	10% RF In-Band	mV	—	10	—
Gate Leakage	$V_{CTRL} = 2.5V$	μA	—	4	15

3. For positive voltage control, external DC blocking capacitors are required on all RF ports.

SOT-363 Plastic Package



Truth Table

Mode (Control)	V1	V2	RFC-RF1	RFC-RF2
Positive ³	0 ± 0.2V +2.5 to +8V	+2.5 to +8V 0 ± 0.2V	On Off	Off On
Negative ⁴	0 ± 0.2V -2.5 to -8V	-2.5 to -8V 0 ± 0.2V	Off On	On Off

- For positive voltage control, external DC blocking capacitors are required on all RF ports (39 pF capacitors are recommended).
- If negative control is used, DC blocking capacitors are not required on RF ports. This switch is not meant to pass or switch a DC voltage.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

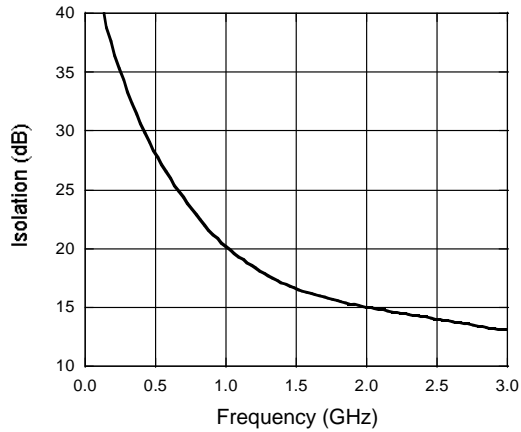
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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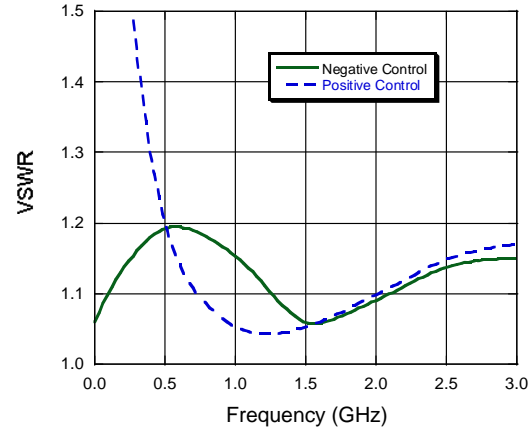
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Typical Performance Curves

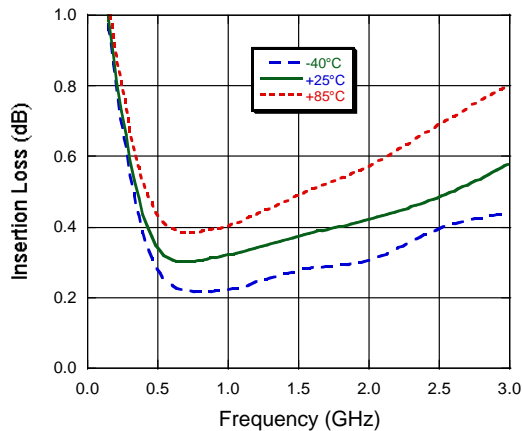
Isolation vs. Frequency over Temperature



VSWR vs. Frequency



Insertion Loss vs. Frequency over Temperature (Positive Control)



Insertion Loss vs. Frequency over Temperature (Negative Control)

