

# GaAs SPDT Terminated Switch

## DC - 2.5 GHz

**SW-337, SW-338, SW-339**

V2.00

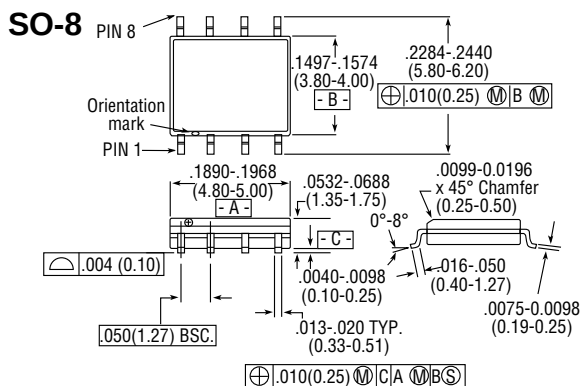
### Features

- Very Low Power Consumption: 75  $\mu$ W
- Low Insertion Loss: 0.5 dB
- High Isolation: 33 dB up to 2 GHz (SW-337, SW-338)  
28 dB up to 2 GHz (SW-339)
- Very High Intercept Point: 46 dBm  $IP_3$
- Nanosecond Switching Speed
- Temperature Range: -40°C to +85°C
- Low Cost SOIC8 Plastic Package
- Tape and Reel Packaging Available<sup>1</sup>

### Description

M/A-COM's SW-337, SW-338 and SW-339 are GaAs MMIC SPDT terminated switches in a low cost SOIC 8-lead surface mount plastic package. They are ideally suited for use where very low power consumption is required. Typical applications include transmit/receive switching, switch matrices, and filter banks in systems such as: radio and cellular equipment, PCM, GPS, fiber optic modules, and other battery powered radio equipment. The difference between the switches is in the pin configuration.

The SW-337, SW-338 and SW-339 are fabricated with monolithic GaAs MMICs using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.



8-Lead SOP outline dimensions

Narrow body .150

(All dimensions per JEDEC No. MS-012-AA, Issue C)

Dimensions in ( ) are in mm.

Unless otherwise noted: .xxx =  $\pm 0.010$  (.xx =  $\pm 0.25$ )

.xx =  $\pm 0.02$  (.x =  $\pm 0.5$ )

### Ordering Information

| Part Number | Package             |
|-------------|---------------------|
| SW-337 PIN  | SOIC 8 Lead         |
| SW-337 TR   | Forward Tape & Reel |
| SW-337 RTR  | Reverse Tape & Reel |
| SW-338 PIN  | SOIC 8 Lead         |
| SW-338 TR   | Forward Tape & Reel |
| SW-338 RTR  | Reverse Tape & Reel |
| SW-339 PIN  | SOIC 8 Lead         |
| SW-339 TR   | Forward Tape & Reel |
| SW-339 RTR  | Reverse Tape & Reel |

### Electrical Specifications, $T_A = \pm 25^\circ\text{C}$

| Parameter                               | Test Conditions <sup>2</sup>                 | Unit | SW-337, SW-338 |       |      | SW-339 |       |      |
|-----------------------------------------|----------------------------------------------|------|----------------|-------|------|--------|-------|------|
|                                         |                                              |      | Min.           | Typ.  | Max. | Min.   | Typ.  | Max. |
| Insertion Loss                          | DC – 0.1 GHz                                 | dB   |                | 0.4   | 0.6  |        | 0.4   | 0.6  |
|                                         | DC – 0.5 GHz                                 | dB   |                | 0.5   | 0.7  |        | 0.5   | 0.7  |
|                                         | DC – 1.0 GHz                                 | dB   |                | 0.5   | 0.7  |        | 0.5   | 0.7  |
|                                         | DC – 2.0 GHz                                 | dB   |                | 0.7   | 0.9  |        | 0.7   | 0.9  |
| Isolation                               | DC – 0.1 GHz                                 | dB   | 50             | 53    |      | 50     | 53    |      |
|                                         | DC – 0.5 GHz                                 | dB   | 43             | 46    |      | 43     | 46    |      |
|                                         | DC – 1.0 GHz                                 | dB   | 36             | 39    |      | 35     | 38    |      |
|                                         | DC – 2.0 GHz                                 | dB   | 30             | 33    |      | 25     | 28    |      |
| VSWR                                    | On                                           |      |                | 1.2:1 |      |        | 1.2:1 |      |
|                                         | Off                                          |      |                | 1.2:1 |      |        | 1.2:1 |      |
| Trise, Tfall<br>Ton, Toff<br>Transients | 10% to 90% RF, 90% to 10% RF                 | nS   |                | 7     |      |        | 7     |      |
|                                         | 50% Control to 90% RF, 50% Control to 10% RF | nS   |                | 10    |      |        | 10    |      |
|                                         | In Band                                      | mV   |                | 25    |      |        | 25    |      |
| One dB<br>Compression Point             | Input Power                                  | dBm  |                | 25    |      |        | 25    |      |
|                                         | Input Power                                  | dBm  |                | 30    |      |        | 30    |      |
| 2nd Order<br>Intercept                  | Measured Relative                            | dBm  |                | 60    |      |        | 60    |      |
|                                         | to Input Power                               | dBm  |                | 65    |      |        | 65    |      |
| 3rd Order<br>Intercept                  | Measured Relative                            | dBm  |                | 40    |      |        | 40    |      |
|                                         | to Input Power                               | dBm  |                | 46    |      |        | 46    |      |

1. Refer to "Tape and Reel Packaging" Section, or contact factory.

2. All measurements with 0, -5 control voltages at 1 GHz in a 50 $\Omega$  system, unless otherwise specified.

Specifications Subject to Change Without Notice.

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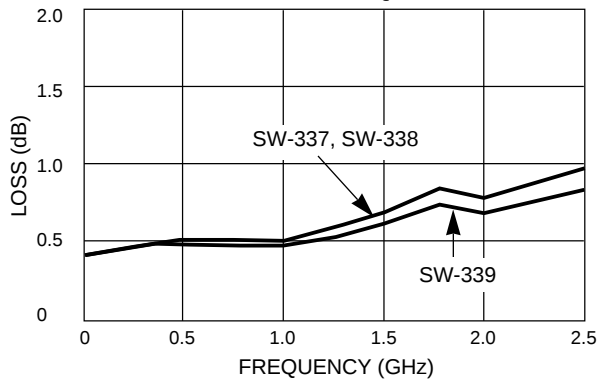
## Absolute Maximum Ratings

| Parameter             | Absolute Maximum <sup>1</sup> |
|-----------------------|-------------------------------|
| Max. Input Power      |                               |
| 0.05 GHz              | +27 dBm                       |
| 0.5 – 2.0 GHz         | +34 dBm                       |
| Control Voltage       | +5V, -8.5V                    |
| Operating Temperature | -40°C to +85°C                |
| Storage Temperature   | -65°C to +150°C               |

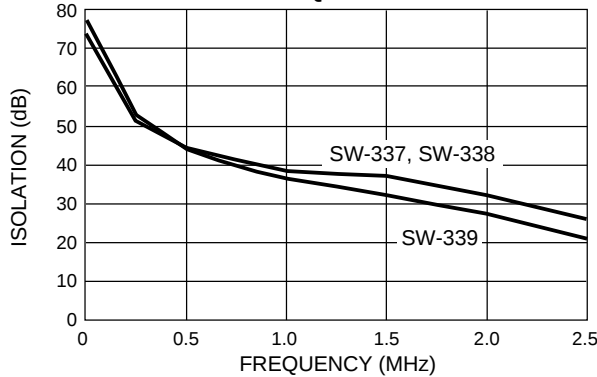
1. Operation of this device above any one of these parameters may cause permanent damage.

## Typical Performance @ +25°C

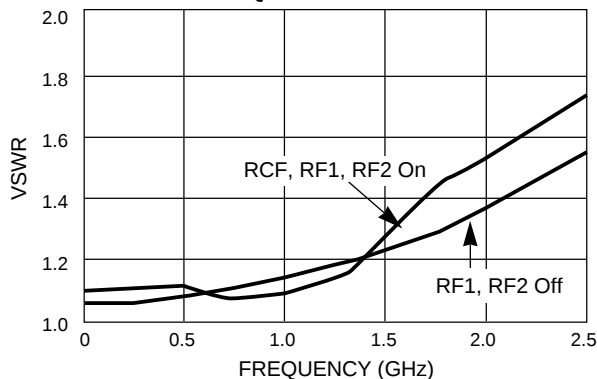
INSERTION LOSS vs FREQUENCY



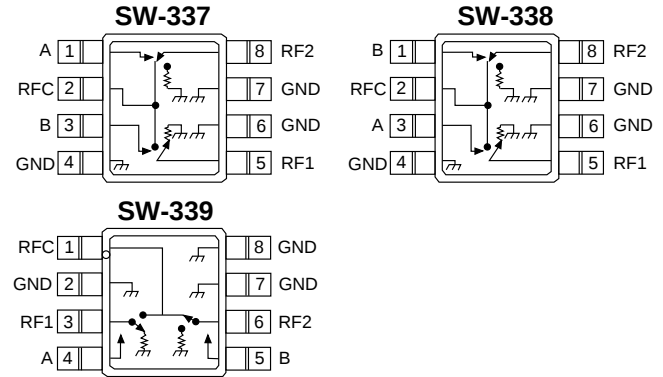
ISOLATION vs FREQUENCY



VSWR vs FREQUENCY



## Functional Schematics



## Pin Configuration

| SW-337  |             | SW-338  |             | SW-339  |             |
|---------|-------------|---------|-------------|---------|-------------|
| Pin No. | Description | Pin No. | Description | Pin No. | Description |
| 1       | A           | 1       | B           | 1       | RF Common   |
| 2       | RF Common   | 2       | RF Common   | 2       | GND         |
| 3       | B           | 3       | A           | 3       | RF1         |
| 4       | GND         | 4       | GND         | 4       | A           |
| 5       | RF1         | 5       | RF1         | 5       | B           |
| 6       | GND         | 6       | GND         | 6       | RF2         |
| 7       | GND         | 7       | GND         | 7       | GND         |
| 8       | RF2         | 8       | RF2         | 8       | GND         |

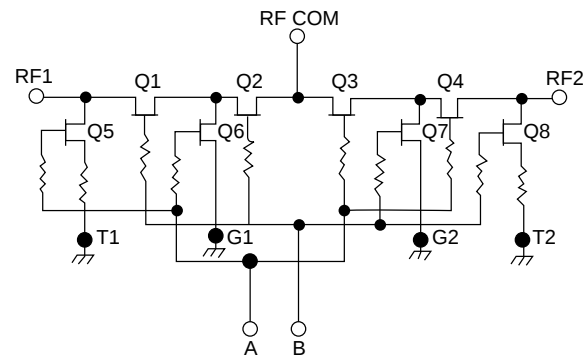
## Truth Table

| Control Inputs |   | Condition of Switch<br>RF Common to Each RF Port |     |
|----------------|---|--------------------------------------------------|-----|
| A              | B | RF1                                              | RF2 |
| 1              | 0 | ON                                               | OFF |
| 0              | 1 | OFF                                              | ON  |

"0" – 0 – -0.2V @ 20  $\mu$ A max.

"1" – -5V @ 30  $\mu$ A Typ to -8V @ 720  $\mu$ A max.

## Electrical Schematic



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