# GaAs SPDT Switch DC - 3.0 GHz 

## Features

- Low Cost Plastic SOT-363 Package
- Low Insertion Loss $<0.3 \mathrm{~dB}$ @ 900 MHz
- Low Power Consumption $<15 \mu \mathrm{~A} @+2.7 \mathrm{~V}$
- 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 0.8 micron GaAs MESFET process. The process features full passivation for increased performance and reliability.

SOT-363 Plastic Package ${ }^{1}$


1. All dimensions are JEDEC MO-203-AB Issue A and are shown as in $/ \mathrm{mm}$.

## Ordering Information

| Part Number | Package |
| :--- | :--- |
| SW-437 PIN | SOT-363 Plastic Package |
| SW-437TR | Forward Tape and Reel ${ }^{1}$ |
| SW-437RTR | Reverse Tape and Reel ${ }^{1}$ |
| SW-437SMB | Sample Board |

1. Reference Application Note M513 for reel size information.

Electrical Specifications $\mathrm{T}_{\mathrm{A}}=25^{\circ} \mathrm{C}$

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Insertion Loss | $\begin{aligned} & \mathrm{DC}-1 \mathrm{GHz} \\ & 1-2 \mathrm{GHz} \\ & 2-3 \mathrm{GHz} \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \hline \end{aligned}$ |  | $\begin{gathered} 0.3 \\ 0.4 \\ 0.55 \\ \hline \end{gathered}$ | $\begin{aligned} & \hline 0.4 \\ & 0.5 \\ & 0.7 \\ & \hline \end{aligned}$ |
| Isolation | $\begin{aligned} & \mathrm{DC}-1 \mathrm{GHz} \\ & 1-2 \mathrm{GHz} \\ & 2-3 \mathrm{GHz} \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \hline \end{aligned}$ | $\begin{aligned} & 19 \\ & 13 \\ & 10 \\ & \hline \end{aligned}$ | $\begin{aligned} & 21 \\ & 15 \\ & 12 \end{aligned}$ |  |
| VSWR | DC - 3 GHz |  |  | 1.2:1 | 1.3:1 |
| $\mathrm{P}_{\text {1dB }}$ (2.7V supply) | $500 \mathrm{MHz}-3 \mathrm{GHz}$ | dBm |  | 24 |  |
| $\mathrm{P}_{1 \mathrm{~dB}}$ (5V supply) | $500 \mathrm{MHz}-3 \mathrm{GHz}$ | dBm |  | 27 |  |
| Input IP ${ }_{2}$ | 2-Tone 900 MHz , 5 MHz spacing ( 2.7 V ) | dBm |  | 81 |  |
| Input $\mathrm{IP}_{3}$ | 2-Tone $900 \mathrm{MHz}, 5 \mathrm{MHz}$ spacing ( 2.7 V ) | dBm |  | 55 |  |
| $\begin{aligned} & \mathbf{T}_{\text {rise }}, \mathbf{T}_{\text {fall }} \\ & \mathbf{T}_{\text {on }}, \mathbf{T}_{\text {off }} \\ & \text { Transients } \end{aligned}$ | $10 \%$ to $90 \%$ RF, $90 \%$ to $10 \%$ RF <br> $50 \%$ Control to $90 \%$ RF, Control to 10\% RF In-Band | $\begin{aligned} & \hline \mathrm{ns} \\ & \mathrm{~ns} \\ & \mathrm{mV} \\ & \hline \end{aligned}$ |  | $\begin{aligned} & 10 \\ & 20 \\ & 10 \end{aligned}$ |  |
| Gate Leakage | $\mathrm{V}_{\text {CTL }}=2.5 \mathrm{~V}$ | $\mu \mathrm{A}$ |  | 4 | 15 |

## Absolute Maximum Ratings ${ }^{1}$

| Parameter | Absolute Maximum |
| :--- | :---: |
| Max. Input Power $(0.5-3.0 \mathrm{GHz})$ |  |
| 3 V Control | +30 dBm |
| 5 V Control | +33 dBm |
| Operating Voltage | +8.5 Volts |
| Operating Temperature | $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$ |
| Storage Temperature | $-65^{\circ} \mathrm{C}$ to $+150^{\circ} \mathrm{C}$ |

1. Exceeding any one or combination of these limits may cause permanent damage.

Truth Table

| Mode <br> (Control) | V1 | V2 | RFC - RF1 | RFC - RF2 |
| :--- | :---: | :---: | :---: | :---: |
| Positive $^{1}$ | $0 \pm 0.2 \mathrm{~V}$ | +2.5 to +8 V | On |  |
|  | +2.5 to +8 V | $0 \pm 0.2 \mathrm{~V}$ | Off | Off <br> On |
| Negative $^{2}$ | $0 \pm 0.2 \mathrm{~V}$ | -2.5 V to -8 V | Off | On |
|  | -2.5 V to -8 V | $0 \pm 0.2 \mathrm{~V}$ | On | Off |

1. External DC blocking capacitors are required on all RF ports. 39 pF capacitors used for positive control voltage.
2. If negative control is used, DC blocking capacitors are not required on RF Ports.

## 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 |

## Functional Schematic Positive Control Voltage



## Functional Schematic Negative Control Voltage



## Handling Procedures

The following precautions should be observed to avoid damage:

## Static Sensitivity

Gallium Arsenide Integrated Circuits are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices.

## Typical Performance Curves





v2.00

