GaAs SPST Switch
DC-25GHz

## Features

- Very Low Power Consumption: $50 \mu \mathrm{~W}$
- Low Insertion Loss: 1.0 dB
- High Isolation: 35 dB up to 2 GHz
- Very High Intercept Point: 46 dBm IP3
- Nanosecond Switching Speed
- Temperature Range: $-40^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$
- Low Cost SOIC-8 Plastic Package
- Tape and Reel Packaging Available


## Description

M/A-COM's SW-259 is a GaAs MMIC SPST switch in a low cost SOIC-8 lead surface mount plastic package. The SW-259 is ideally suited for use where low power consumption is required. Typical applications include transmit/receive switching, switch matrices and switched filter banks in systems such as radio and cellular equipment, PCM, GPS, fiber optic modules, and other battery powered radio equipment.

The SW-259 is fabricated using a monolithic GaAs MMIC using a mature 1 micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information ${ }^{1}$

| Part Number | Package |
| :---: | :---: |
| SW-259 PIN | Bulk Packaging |
| SW-259TR | 1000 piece reel |

1. Reference Application Note M513 for reel size information.

## Functional Schematic



## Pin Configuration

| PIN No. | Description | PIN No. | Description |
| :---: | :---: | :---: | :---: |
| 1 | Ground | 5 | RF2 |
| 2 | A | 6 | Ground |
| 3 | B | 7 | Ground |
| 4 | Ground | 8 | RF1 |

Absolute Maximum Ratings ${ }^{2}$

| Parameter | Absolute Maximum |
| :---: | :---: |
| Input Power ${ }^{3}$ |  |
| 0.05 GHz | +27 dBm |
| $0.5-2.0 \mathrm{GHz}$ | +34 dBm |
| Control Voltage | $+5 \mathrm{~V},-8.5 \mathrm{~V}$ |
| Storage Temperature | $-65^{\circ} \mathrm{C}$ to $+150^{\circ} \mathrm{C}$ |

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. When the RF Input power is applied to a terminated port, the absolute maximum is +32 dBm .

## GaAs SPST Switch DC-25GHz

Electrical Specifications: $\mathrm{T}_{\mathrm{A}}=+25^{\circ} \mathrm{C}{ }^{4}$

| Parameter | Test Conditions | Units | Min | Typ | Max |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Insertion Loss | $\begin{aligned} & \mathrm{DC}-0.1 \mathrm{GHz} \\ & \mathrm{DC}-0.5 \mathrm{GHz} \\ & \mathrm{DC}-1.0 \mathrm{GHz} \\ & \mathrm{DC}-2.0 \mathrm{GHz} \end{aligned}$ | dB <br> dB <br> dB <br> dB | - — — | $\begin{aligned} & 0.5 \\ & 0.8 \\ & 1.0 \\ & 1.4 \end{aligned}$ | $\begin{aligned} & 0.6 \\ & 1.0 \\ & 1.2 \\ & 1.6 \end{aligned}$ |
| Isolation | $\begin{aligned} & \mathrm{DC}-0.1 \mathrm{GHz} \\ & \mathrm{DC}-0.5 \mathrm{GHz} \\ & \mathrm{DC}-1.0 \mathrm{GHz} \\ & \mathrm{DC}-2.0 \mathrm{GHz} \end{aligned}$ | dB <br> dB <br> dB <br> dB | $\begin{aligned} & 62 \\ & 55 \\ & 45 \\ & 32 \end{aligned}$ | $\begin{aligned} & 65 \\ & 58 \\ & 48 \\ & 35 \end{aligned}$ | - - - |
| VSWR On VSWR Off | $\begin{aligned} & \mathrm{DC}-2.0 \mathrm{GHz} \\ & \mathrm{DC}-2.0 \mathrm{GHz} \end{aligned}$ | Ratio Ratio | $\begin{aligned} & 1.2: 1 \\ & 1.2: 1 \end{aligned}$ | — | - |
| 1 dB Compression | $\begin{gathered} \text { Input Power } \\ 0.05 \mathrm{GHz} \\ 0.5-2.0 \mathrm{GHz} \\ \hline \end{gathered}$ | dBm dBm | — | $\begin{aligned} & 18 \\ & 23 \end{aligned}$ | — |
| Trise, Tfall | 10\% to 90\% RF, $90 \%$ to $10 \%$ RF | nS | - | 4 |  |
| Ton, Toff | 50\% Control to 90\% RF, 50\% Control to 10\% RF | nS | - | 8 |  |
| Transients | In-Band | mV | - | 35 |  |
| 2nd Order Intercept | Measured Relative to Input Power, two-tone up to +5 dBm $\begin{gathered} 0.05 \mathrm{GHz} \\ 0.5-2.0 \mathrm{GHz} \end{gathered}$ | dBm dBm | - | $\begin{aligned} & 55 \\ & 68 \end{aligned}$ | - |
| 3rd Order Intercept | Measured Relative to Input Power, two-tone up to +5 dBm $\begin{gathered} 0.05 \mathrm{GHz} \\ 0.5-2.0 \mathrm{GHz} \end{gathered}$ | dBm dBm | — | $\begin{aligned} & 40 \\ & 46 \end{aligned}$ | - |

4. All measurements with $0,-5 \mathrm{~V}$ control voltages at 1 GHz in a $50 \Omega$ system, unless otherwise specified.

## SOIC-8



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Electrical Schematic


## Typical Performance Curves

## Insertion Loss



VSWR


## Truth Table ${ }^{5,6}$

| Control Inputs |  | Condition of Switch |
| :---: | :---: | :---: |
| A | B | RF State |
| 1 | 0 | On |
| 0 | 1 | Off |

5. " 0 " $=0$ to $-0.2 \mathrm{~V} @ 20 \mathrm{~mA}$ max.
6. "1" = -5 V @ 20 mA Typ to -8 V @ 600 mA max.

## Isolation



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## Swept Data Characterized in 75 Ohms

## Isolation



Output Return Loss - On


Input Return Loss - On


Output Return Loss - Off


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