

High Power GaAs SPDT Switch DC - 2.5 GHz

SW-277

V3.00

Features

- Positive Supply and Control Voltages
- +36 dBm Typ. 1 dB Compression Point, 8V Supply
- +65 dBm Typ. 3rd Order Intercept Point, 8V Supply
- Low Insertion Loss: 0.4 dB Typical
- Low Power Consumption: 100 μ W
- Fast Switching Speed
- Tape and Reel Packaging Available¹

Description

M/A-COM's SW-277 is a GaAs MMIC SPDT switch in a low cost SOIC 8-lead surface mount plastic package. The SW-277 is 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 SW-277 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

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

| Parameter | Test Conditions ² | Unit | Min. | Typ. | Max |
|---|--|---------|------|-------|-----|
| Insertion Loss | DC – 2.0 GHz | dB | | 0.6 | 0.8 |
| | DC – 1.0 GHz | dB | | 0.4 | 0.6 |
| | DC – 0.5 GHz | dB | | 0.35 | 0.5 |
| | DC – 0.1 GHz | dB | | 0.2 | 0.4 |
| Isolation | DC – 2.0 GHz | dB | 14 | 16 | |
| | DC – 1.0 GHz | dB | 28 | 32 | |
| | DC – 0.5 GHz | dB | 35 | 38 | |
| | DC – 0.1 GHz | dB | 35 | 38 | |
| VSWR | DC – 2.0 GHz | | | 1.2:1 | |
| Trise, Tfall Ton, Toff Transients | 10% to 90% RF, 90% to 10% RF | nS | | 30 | |
| | 50% Control to 90% RF, 50% Control to 10% RF | nS | | 35 | |
| | In Band | mV | | 12 | |
| One dB Compression Point | Input Power (5V Supply/Control) | 0.9 GHz | | 33 | |
| | Input Power (8V Supply/Control) | 0.9 GHz | | 35.8 | |
| 3rd Order Intercept | Measured Relative (5V Supply/Control) | 0.9 GHz | | 61 | |
| | to Input Power (8V Supply/Control) (for two-tone input power up to +10 dBm) | 0.9 GHz | | 65 | |

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

2. All specifications apply when operated with bias voltages of 0V for Vin Low and 5 to 10V for Vin Hi, and 50 Ohm impedance at all RF ports, unless otherwise specified. High power (greater than 1W) handling specifications apply to cold switches only. For input powers under 1W, hot switching can be used. The high control voltage must be within +/- 0.2V of the supply voltage. The RF ports must be blocked outside of the package from ground or any other voltage.

Specifications Subject to Change Without Notice.

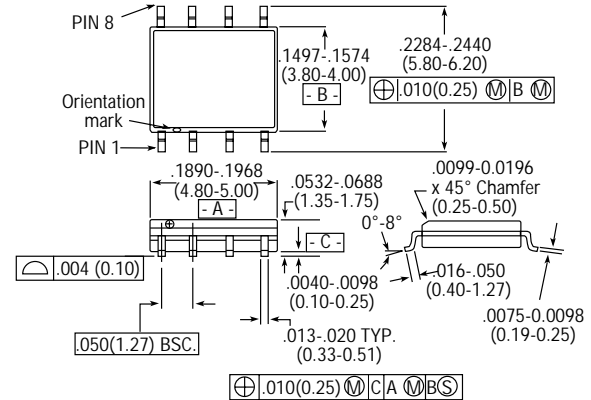
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SO-8



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 = ± 0.010 (xx = ± 0.25)
.xx = ± 0.02 (x = ± 0.5)

Ordering Information

| Model Number | Package |
|--------------|-----------------------------|
| SW-277 PIN | SOIC 8-Lead Plastic Package |
| SW-277TR | Forward Tape and Reel |
| SW-277RTR | Reverse Tape and Reel |

Absolute Maximum Ratings

| Parameter | Absolute Maximum |
|---|---------------------------------|
| Max. Input Power 0.5 – 2.0 GHz | |
| 5V Control and Supply | +37 dBm |
| 8V Control and Supply | +40 dBm |
| 10V Control and Supply | +42 dBm |
| Power Dissipation | 1.0 W |
| Supply Voltage | -1V, +12V |
| Control Voltage | -1V, V _{supply} + 0.2V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| Thermal Resistance ² : $\theta_{jC} = 87 \text{ }^\circ\text{C/W}$ | |

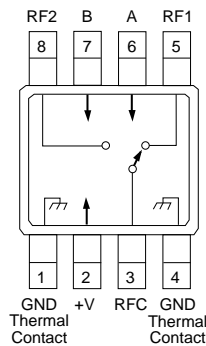
1. Operation of this device above any one of these parameters may cause permanent damage.
2. Thermal resistance is given for T_A = 25°C. T_{CASE} is the temperature of leads 1 and 4.

Pin Configuration

| Pin No. | Description |
|----------------|----------------------|
| 1 | GND, Thermal Contact |
| 2 | +V Supply |
| 3 ¹ | RF Common |
| 4 | GND, Thermal Contact |
| 5 ¹ | RF1 |
| 6 | A |
| 7 | B |
| 8 ¹ | RF2 |

1. External DC blocking capacitors required on all RF ports.

Functional Schematic



Two Tone IP₃ Measurements

| Supply & Control Voltage | Input Power (dBm) | 3rd Order Intermodulation Products (dBc) | IP ₃ (dBm) | Second Harmonic (dBc) |
|--------------------------|-------------------|--|-----------------------|-----------------------|
| 0,5V | +27 | -32 | +43 | -74 |
| 0,6V | +27 | -45 | +49.5 | -77 |
| 0,7V | +27 | -58 | +56 | -79 |
| 0,8V | +27 | -72 | +63 | -79 |
| 0,10V | +27 | -72 | +63 | -81 |
| 0,5V | +28 | -30 | +43 | -69 |
| 0,6V | +28 | -40 | +48 | -76 |
| 0,7V | +28 | -53 | +54.5 | -78 |
| 0,8V | +28 | -64 | +60 | -79 |
| 0,10V | +28 | -72 | +64 | -80 |
| 0,5V | +29 | -28 | +43 | -59 |
| 0,6V | +29 | -37 | +47.5 | -74 |
| 0,7V | +29 | -49 | +53.5 | -75 |
| 0,8V | +29 | -50 | +54 | -75 |
| 0,10V | +29 | -50 | +54 | -75 |
| 0,5V | +30 | -36 | +43 | -67 |
| 0,6V | +30 | -46 | +48 | -73 |
| 0,7V | +30 | -50 | +53 | -75 |
| 0,8V | +30 | -50 | +55 | -75 |
| 0,10V | +30 | -50 | +55 | -75 |

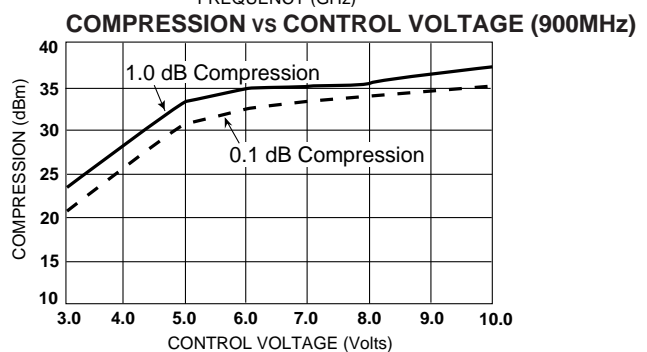
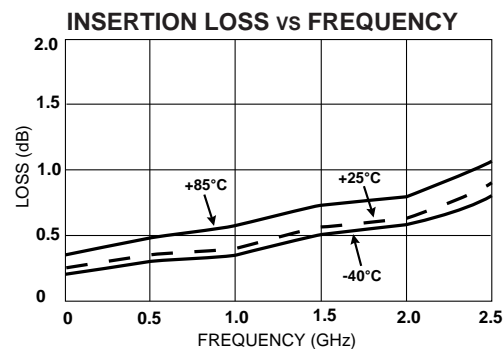
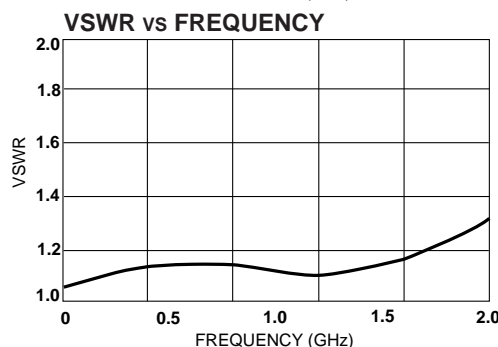
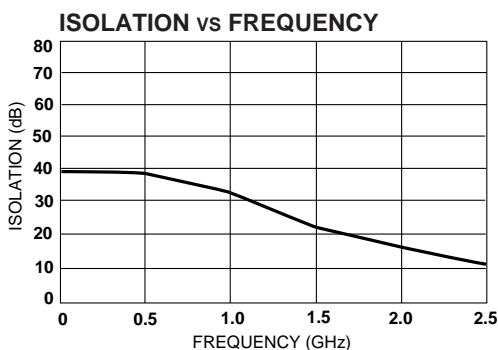
Truth Table

| Control Inputs | | Condition of Switch RF Common to Each RF Port | |
|----------------|---|--|-----|
| A | B | RF1 | RF2 |
| 1 | 0 | Off | On |
| 0 | 1 | On | Off |

"0" – 0 to +0.2V @ 20 μ A max.

"1" – +5V @ 20 μ A Typ to 10V @ 500 μ A max.

Typical Performance



Specifications Subject to Change Without Notice.