

GaAs SPDT Reflective Switch DC-3 GHz with TTL/CMOS Control Input **SW-110**

V 2.00

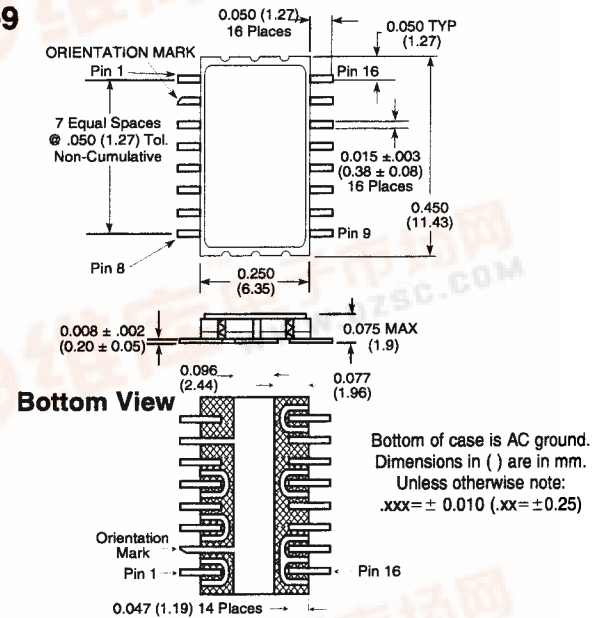
Features

- 1 dB Compression Point: +39 dBm Typ., -8V Control
- IP₃: +65 dBm, Typ., -8V Control
- Insertion Loss: 0.45 dB Typ.
- Low Power Consumption
- Fast Switching Speed
- 50Ω Nominal Impedance

Description

M/A-COM's SW-110 is a GaAs MMIC SPDT reflective switch with an integral silicon ASIC driver. This device is in a 16 lead ceramic surface mount package. These switches exhibit excellent performance and repeatability from DC to 3.0 GHz, with very low DC power dissipation. The SW-110 is ideally suited for RF/IF communications applications. Environmental screening is available. Contact the factory for information.

CR-9



Electrical Specifications, T_A = +25°C 1, 2, 3

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|---|--|---------|------|-------|-------|
| Reference Insertion Loss | DC - 0.5 GHz | dB | | | 0.6 |
| | DC - 1.0 GHz | dB | | | 0.7 |
| | DC - 2.0 GHz | dB | | | 0.9 |
| | DC - 3.0 GHz | dB | | | 1.1 |
| Isolation | DC - 0.5 GHz | dB | 40 | | |
| | DC - 1.0 GHz | dB | 35 | | |
| | DC - 2.0 GHz | dB | 24 | | |
| | DC - 3.0 GHz | dB | 18 | | |
| VSWR | DC - 0.5 GHz | | | | 1.2:1 |
| | DC - 1.0 GHz | | | | 1.4:1 |
| | DC - 2.0 GHz | | | | 1.4:1 |
| | DC - 3.0 GHz | | | | 1.5:1 |
| Trise, Tfall Ton, Toff Transients | 10% to 90% | nS | | 12 | |
| | 1.3V Control to 90/10% RF | nS | | 35 | |
| | In-band (peak-peak) | mV | | 30 | |
| 1 dB Compression | Input Power, 0.1 dB, -5V Control | 0.9 GHz | | +32.5 | |
| | Input Power, 1.0 dB, -5V Control | 0.9 GHz | | +32.5 | |
| | Input Power, 0.1 dB, -8V Control | 0.9 GHz | | +32.5 | |
| | Input Power, 1.0 dB, -8V Control | 0.9 GHz | | +39.5 | |
| Input IP ₃ | For two-tone input power up to +10 dBm | | | | |
| | -5V Control | 0.9 GHz | | +61 | |
| | -8V Control | 0.9 GHz | | +65 | |
| V _{CC} | | V | 4.5 | 5.0 | 5.5 |
| V _{EE} | | V | -8.0 | | -5.0 |
| I _{CC} | V _{CC} = 4.5 to 5.5 V Vctl = 0 to 0.8 V, or V _{CC} - 2.1 V to V _{CC} | mA | | | 1.0 |
| I _{EE} | V _{EE} = -5.0 to -8.0 V | mA | | | 1.0 |
| Vctl | Logic 0 (TTL) | V | 0.0 | | 0.8 |
| Vctl | Logic 1 (TTL) | V | 2.0 | | 5.0 |
| Input Leakage Current (Low) | 0 to 0.8 V | μA | | | 1.0 |
| Input Leakage Current (High) | 2.0 to 5.0 V | μA | | | 1.0 |

1. All specifications apply when operated with bias voltages of +5 V for V_{CC} and -5.0 to -8.0 V for V_{EE}, and 50Ω impedance at all RF ports unless otherwise specified. For this switch to meet the guaranteed specifications, it is necessary to have a DC return on either RF1 or RF2. The DC return can be either a 10k Ω resistor, or an RF choke.
Specifications Subject to Change Without Notice.

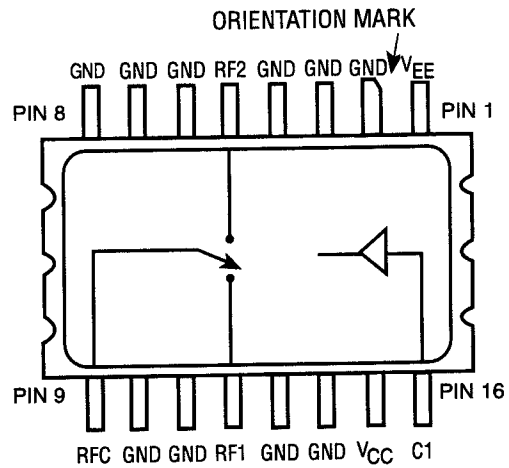
3. High power (greater than 1W) handling specifications apply to cold switching only. For input powers under 1 W, hot switching can be used.

Absolute Maximum Ratings

| Parameter | Absolute Maximum |
|---|------------------------------------|
| Maximum Input Power | |
| 0.05 GHz | +35 dBm |
| 0.5 - 3.0 GHz | |
| -5V Control | +36 dBm |
| -8V Control | +39 dBm |
| Power Dissipation ^{2,3} | 2.0W |
| Control Voltage | -0.5 V to V _{CC} to 0.5 V |
| Operating Temperature | -55°C to +125°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature | +175°C |
| Thermal Resistance ² : θ_{jC} | +50°C/W |

1. Operation of this device above any one of these parameters may cause permanent damage.
2. T_{case} = 25°C, where T_{case} is the temperature at the bottom of the case.
3. Special consideration must be given to the mounting of the switch to minimize the thermal resistance. The bottom of the case should be thermally attached to the mounting surface to maintain the junction temperature under the absolute maximum rating.

Functional Schematic (Top View)



Truth Table

| Control Inputs | Condition of Switch | |
|----------------|---------------------------|-----|
| | RF Common to Each RF Port | |
| C1 | RF1 | RF2 |
| Low | On | Off |
| High | Off | On |

0 = TTL Low 1 = TTL High

Ordering Information ⁴

| Part Number | Package |
|-------------|---------|
| SW-110 PIN | Ceramic |

4. Contact the factory for standard or custom screening requirements.

Two Tone IP₃ Measurements

| Bias Voltage | Input Power for Each Tone (dBm) | 3rd Order Intermodulation Products (dBc) | IP ₃ (dBm) | Second Harmonic (dBc) |
|--------------|---------------------------------|--|-----------------------|-----------------------|
| 0, -5V | +27 | -34 | +44 | -61 |
| 0, -6V | +27 | -49 | +51 | -61 |
| 0, -7V | +27 | -64 | +59 | -63 |
| 0, -8V | +27 | -65 | +59 | -63 |
| 0, -5V | +28 | -30 | +43 | -58 |
| 0, -6V | +28 | -41 | +48 | -58 |
| 0, -7V | +28 | -52 | +54 | -57 |
| 0, -8V | +28 | -60 | +58 | -57 |
| 0, -5V | +29 | -28 | +43 | -54 |
| 0, -6V | +29 | -34 | +46 | -54 |
| 0, -7V | +29 | -44 | +51 | -54 |
| 0, -8V | +29 | -52 | +55 | -54 |
| 0, -5V | +30 | -26 | +43 | -52 |
| 0, -6V | +30 | -32 | +46 | -51 |
| 0, -7V | +30 | -38 | +49 | -51 |
| 0, -8V | +30 | -44 | +52 | -51 |

Typical Performance @ +25°C

