

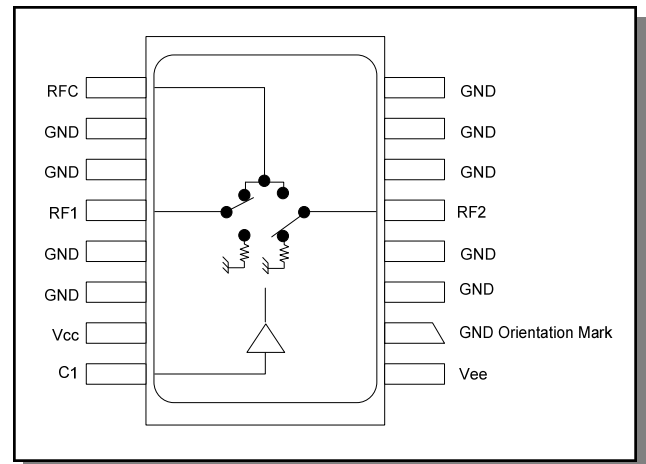
Features

- Integral TTL Driver
- Low DC Power Consumption
- Fast Switching Speed: 7 ns Typical
- Hermetic Surface Mount Package
- 50 Ohm Nominal Impedance
- MIL-STD-883 Screening Available
- Lead-Free CR-9 Package
- 260°C Reflow Compatible
- RoHS* Compliant

Description

M/A-COM's SW-313-PIN is a GaAs FET SPDT absorptive switch with integral silicon ASIC driver. Packaged in a 16-lead ceramic surface mount package, this device offers excellent performance and repeatability from DC to 3 GHz while maintaining low power consumption. The SW-313-PIN is ideally suited for use where fast speed, low power consumption and broadband applications are required. MIL-STD-883 screening available.

Functional Block Diagram



Ordering Information

| Part Number | Package |
|-------------|-------------------|
| SW-313-PIN | Bulk Packaging |
| SW-313-TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1 | Vee | 9 | RFC |
| 2 | GND | 10 | GND |
| 3 | GND | 11 | GND |
| 4 | GND | 12 | RF1 |
| 5 | RF2 | 13 | GND |
| 6 | GND | 14 | GND |
| 7 | GND | 15 | Vcc |
| 8 | GND | 16 | C1 |

The metal bottom of the case must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

Electrical Specifications: (From -55°C to $+85^{\circ}\text{C}$), $Z_0 = 50\Omega$ ^{1,2}

| Parameter | Test Conditions | Frequency | Units | Min | Typ | Max |
|------------------|-----------------------------------|------------------|---------------|-----|-----|--------|
| Insertion Loss | — | DC - 3000 MHz | dB | — | — | 1.2 |
| | | DC - 2000 MHz | dB | — | — | 1.1 |
| | | DC - 1000 MHz | dB | — | — | 0.9 |
| | | DC - 500 MHz | dB | — | — | 0.8 |
| VSWR | — | DC - 3000 MHz | Ratio | — | — | 1.50:1 |
| | | DC - 2000 MHz | Ratio | — | — | 1.40:1 |
| | | DC - 1000 MHz | Ratio | — | — | 1.35:1 |
| | | DC - 500 MHz | Ratio | — | — | 1.30:1 |
| Isolation | — | DC - 3000 MHz | dB | 35 | — | — |
| | | DC - 2000 MHz | dB | 43 | — | — |
| | | DC - 1000 MHz | dB | 48 | — | — |
| | | DC - 500 MHz | dB | 53 | — | — |
| Trise, Tfall | 10% to 90% | — | ns | — | 7 | — |
| Ton, Toff | 1.3V CTL to 90% / 10% | — | ns | — | 18 | — |
| Transients | In-Band | — | mV | — | 25 | — |
| 1 dB Compression | Input Power | 0.05 GHz | dBm | — | +25 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +30 | — |
| IP2 | Two-Tone Input Power up to +5 dBm | 0.05 GHz | dBm | — | +60 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +65 | — |
| IP3 | Two-Tone Input Power up to +5 dBm | 0.05 GHz | dBm | — | +40 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +46 | — |
| Vin Low | 0V to 0.8V | — | μA | — | — | 1 |
| Vin High | 2.0V to 5.0V | — | μA | — | — | 1 |
| Vcc | +5.0V \pm 10% | — | mA | — | — | 1 |
| Vee | -5.0V to -8.0V | — | mA | — | — | 1 |

1. All specifications apply when operated with bias voltages of +5V for Vcc and -5V for Vee.
2. When DC blocks are used, a 10K ohm return to GND is required on the RFC port.

Absolute Maximum Ratings ^{3,4}

| Parameter | Absolute Maximum |
|---|---|
| Max Input Power 50 MHz 500 - 3000 MHz | +27 dBm +34 dBm |
| V_{CC} | $-0.5V \leq V_{CC} \leq +7.0V$ |
| V_{EE} | $-8.5V \leq V_{EE} \leq +0.5V$ |
| $V_{CC} - V_{EE}$ | $-0.5V \leq V_{CC} - V_{EE} \leq 14.5V$ |
| V_{in}^5 | $-0.5V \leq V_{in} \leq V_{CC} + 0.5V$ |
| Operating Temperature | $-55^{\circ}C$ to $+125^{\circ}C$ |
| Storage Temperature | $-65^{\circ}C$ to $+150^{\circ}C$ |

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

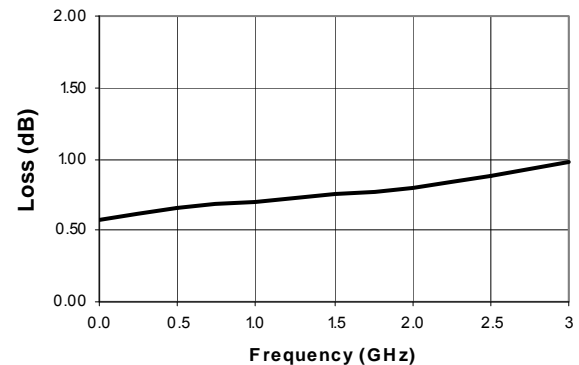
Truth Table (Switch)

| Control Input | Condition of Switch | |
|---------------|---------------------------|-----|
| | RF Common to Each RF Port | |
| C1 | RF1 | RF2 |
| 0 | On | Off |
| 1 | Off | On |

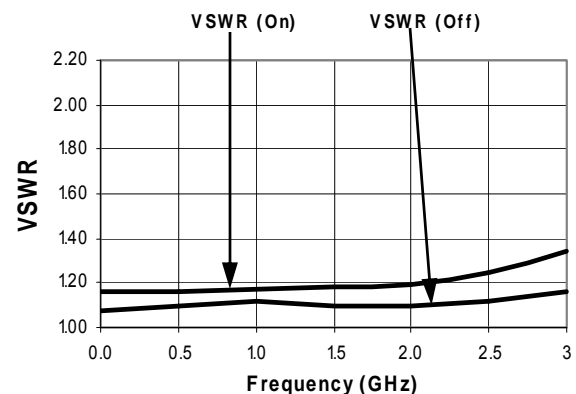
0 = TTL Low; 1 = TTL High

Typical Performance Curves

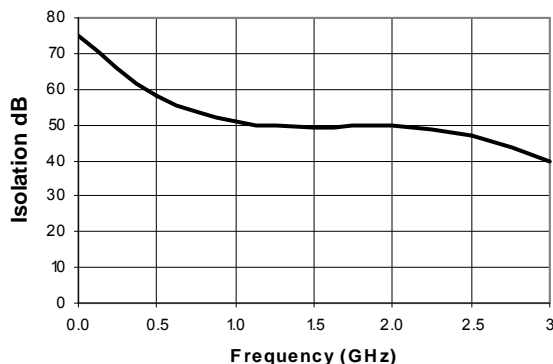
Insertion Loss vs. Frequency



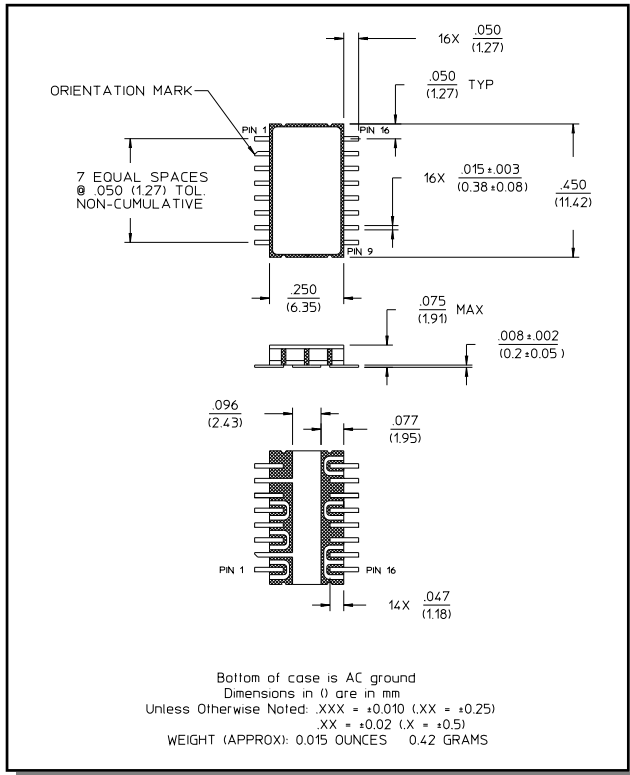
VSWR vs. Frequency



Isolation vs. Frequency



Lead-Free, CR-9 Ceramic Package†



† Reference Application Note M538 for lead-free solder reflow recommendations.