

**GaAs SP4T Absorptive Switch,
DC-3.0 GHz**

**SW-314-PIN
V6**

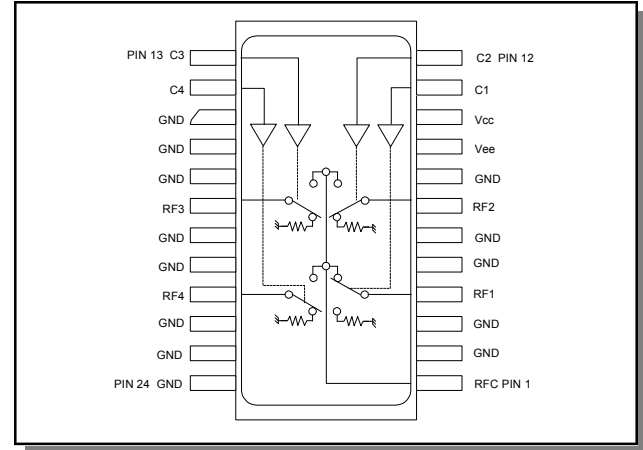
Features

- Integral TTL Driver
- Isolation: 50 dB Typ. At 1 GHz
- Ultra Low DC Power Consumption
- Hermetic Surface Mount Package
- 50 Ohms Nominal Impedance
- MIL-STD-883 Screening Available
- Lead-Free CR-14 Package
- 260°C Reflow Compatible

Description

M/A-COM's SW-314-PIN is a GaAs MMIC SP4T absorptive switch with an integral silicon ASIC driver. This device is in a 24-lead ceramic surface mount package. These switches exhibit excellent performance from DC to 3 GHz, with very low DC power dissipation. The SW-314-PIN is ideally suited for RF/IF communications applications. Environmental screening is available. Contact the factory for information.

Functional Block Diagram



Ordering Information

| Part Number | Package |
|-------------|-------------------|
| SW-314-PIN | Bulk Packaging |
| SW-314-TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Note: Die quantity varies.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1 | RFC | 13 | C3 |
| 2 | GND | 14 | C4 |
| 3 | GND | 15 | GND |
| 4 | RF1 | 16 | GND |
| 5 | GND | 17 | GND |
| 6 | GND | 18 | RF3 |
| 7 | RF2 | 19 | GND |
| 8 | GND | 20 | GND |
| 9 | Vee | 21 | RF4 |
| 10 | Vcc | 22 | GND |
| 11 | C1 | 23 | GND |
| 12 | C2 | 24 | GND |

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

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

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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 - 0.5 GHz | dB | — | — | 1.3 |
| | | DC - 1.0 GHz | dB | — | — | 1.4 |
| | | DC - 2.0 GHz | dB | — | — | 1.6 |
| | | DC - 3.0 GHz | dB | — | — | 1.8 |
| Isolation | — | DC - 0.5 GHz | dB | 50 | — | — |
| | | DC - 1.0 GHz | dB | 40 | — | — |
| | | DC - 2.0 GHz | dB | 35 | — | — |
| | | DC - 3.0 GHz | dB | 30 | — | — |
| VSWR | RFC, RF1 - RF4 (On) | DC - 0.5 GHz | Ratio | — | — | 1.6:1 |
| | | DC - 1.0 GHz | Ratio | — | — | 1.6:1 |
| | | DC - 2.0 GHz | Ratio | — | — | 1.6:1 |
| | | DC - 3.0 GHz | Ratio | — | — | 1.8:1 |
| VSWR | RF1 - RF4 (Off) | DC - 0.5 GHz | Ratio | — | — | 1.3:1 |
| | | DC - 1.0 GHz | Ratio | — | — | 1.5:1 |
| | | DC - 2.0 GHz | Ratio | — | — | 1.9:1 |
| | | DC - 3.0 GHz | Ratio | — | — | 2.4:1 |
| Trise, Tfall | 10% to 90% | — | ns | — | 7 | — |
| Ton, Toff | 50% Control to 90% / 10% RF | — | ns | — | 25 | — |
| Transients | In-Band (peak-peak) | — | mV | — | 20 | — |
| 1 dB Compression | Input Power | 0.05 GHz | dBm | — | +20 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +27 | — |
| IP3 | Two-Tone Input Power up to +5 dBm | 0.05 GHz | dBm | — | +35 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +46 | — |
| IP2 | Two-Tone Input Power up to +5 dBm | 0.05 GHz | dBm | — | +45 | — |
| | | 0.5 GHz to 3 GHz | dBm | — | +60 | — |
| Vcc | — | — | V | 4.5 | 5.0 | 5.5 |
| Vee | — | — | V | -8.0 | — | -5.0 |
| Icc | Vcc = 4.5 to 5.5 V Vctl = 0 to 0.8V, or Vcc -2.1V to Vcc | — | mA | — | 0.2 | 4.0 |
| Iee | Vee = -5.0V to -8.0V | — | mA | — | 0.1 | 1.0 |
| Vctl Vcti | Logic 0 (TTL) | — | V | 0.0 | — | 0.8 |
| | Logic 1 (TTL) | — | V | 2.0 | — | 5.0 |
| Input Leakage Current (Low) | 0 to 0.8V | — | μA | — | — | 1.0 |
| Input Leakage Current (High) | 2.0 to 5.0V | — | μA | — | — | 1.0 |

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.

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Absolute Maximum Ratings ^{3,4}

| Parameter | Absolute Maximum |
|---|---------------------------------|
| Max Input Power 0.05 GHz 0.5 - 3.0 GHz ⁵ | +27 dBm +34 dBm |
| Bias Voltages Vcc Vee | -0.5 to +5.5V -8.5V to +0.5V |
| Control Voltage ⁶ | -0.5V, to Vcc +0.5V |
| Operating Temperature | -55°C to +125°C |
| Storage Temperature | -65°C to +150°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.
- When the input power is applied to the terminated port, the absolute maximum is +30 dBm.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Handling Procedures

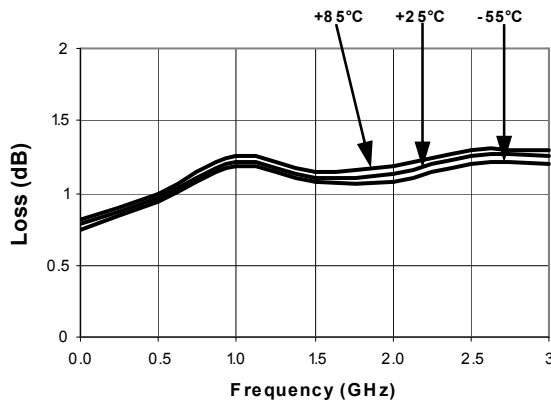
Please observe the following precautions to avoid damage:

Static Sensitivity

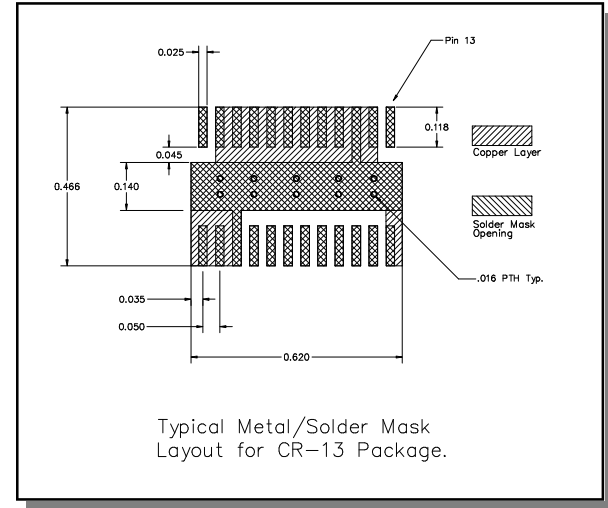
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

Insertion Loss vs. Frequency



Recommended PCB Configuration

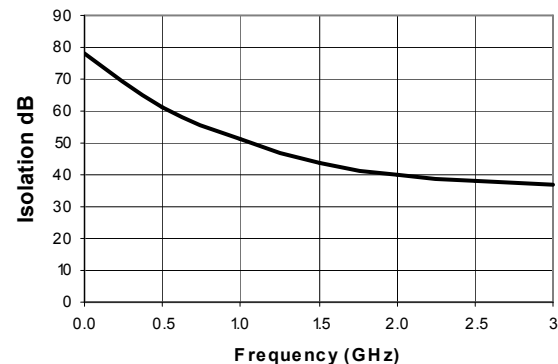


Truth Table (Switch)

| TTL Control Inputs | | | | Condition of Switch | | | |
|--------------------|----|----|----|---------------------------|-----|-----|-----|
| | | | | RF Common to Each RF Port | | | |
| C1 | C2 | C3 | C4 | RF1 | RF2 | RF3 | RF4 |
| 1 | 0 | 0 | 0 | On | Off | Off | Off |
| 0 | 1 | 0 | 0 | Off | On | Off | Off |
| 0 | 0 | 1 | 0 | Off | Off | On | Off |
| 0 | 0 | 0 | 1 | Off | Off | Off | On |

0 = TTL Low; 1 = TTL High

Isolation vs. Frequency

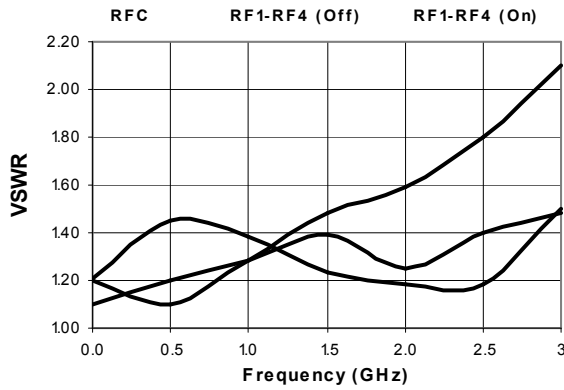


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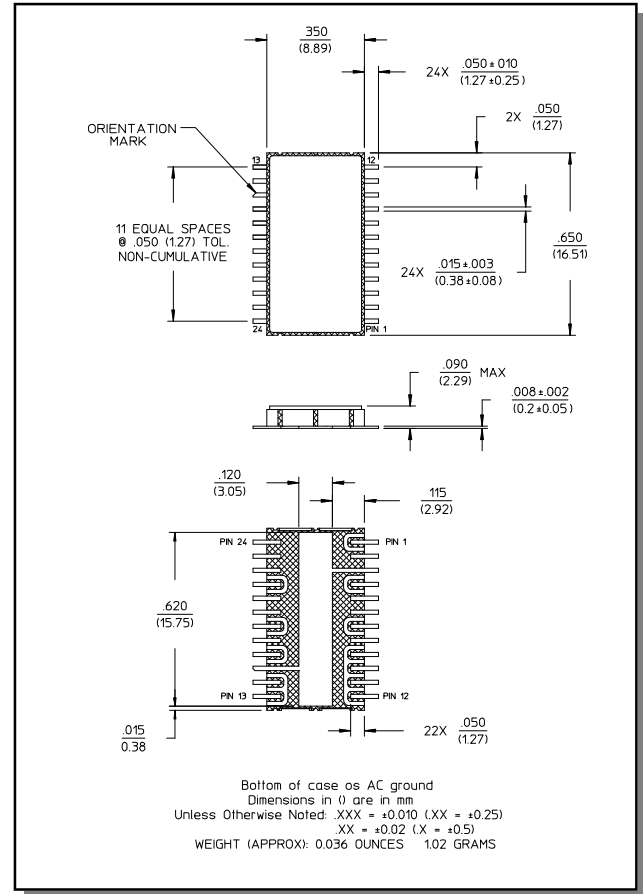
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Typical Performance Curves

VSWR vs. Frequency



Lead-Free, CR-14 Ceramic Package†



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