



# GaAs SP4T Absorptive Switch, DC - 3 GHz

V 3.00

SW15-0314

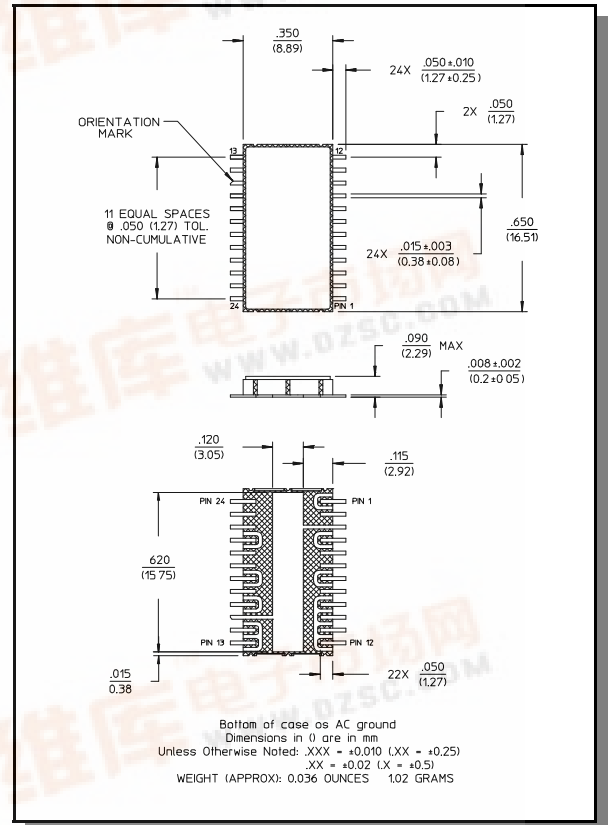
## Features

- Integral TTL Driver
- Isolation: 50 dB Typ. At 1 GHz
- Low DC Power Consumption
- Surface Mount Package
- Low Cost/High Performance
- 50 Ohm Nominal Impedance

## Description

M/A-COM's SW15-0314 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 SW15-0314 is ideally suited for wireless infrastructure applications. Available with enhanced performance as fully hermetic version. Environmentally screenable as SW-314.

## CR-14



## Electrical Specifications<sup>1,2</sup>, T<sub>A</sub> = +25°C

| Parameter        | Test Conditions             | Frequency        | Units | Min | Typ   | Max |
|------------------|-----------------------------|------------------|-------|-----|-------|-----|
| Insertion Loss   | —                           | DC - 0.5 GHz     | dB    | —   | 1.0   | 1.3 |
|                  |                             | DC - 1.0 GHz     | dB    | —   | 1.2   | 1.4 |
|                  |                             | DC - 2.0 GHz     | dB    | —   | 1.2   | 1.6 |
|                  |                             | DC - 3.0 GHz     | dB    | —   | 1.4   | 1.8 |
| Isolation        | —                           | DC - 0.5 GHz     | dB    | 50  | 60    | —   |
|                  |                             | DC - 1.0 GHz     | dB    | 40  | 50    | —   |
|                  |                             | DC - 2.0 GHz     | dB    | 30  | 40    | —   |
|                  |                             | DC - 3.0 GHz     | dB    | 25  | 35    | —   |
| 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 | —   | 1.6:1 | —   |
| 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    | —   | 50    | —   |
| Ton, Toff        | 50% Control to 90% / 10% RF | —                | ns    | —   | 150   | —   |
| Transients       | In-Band (peak-peak)         | —                | mV    | —   | 50    | —   |
| 1 dB Compression | Input Power                 | 0.05 GHz         | dBm   | —   | +20   | —   |
|                  |                             | 0.5 GHz to 3 GHz | dBm   | —   | +27   | —   |

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.



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

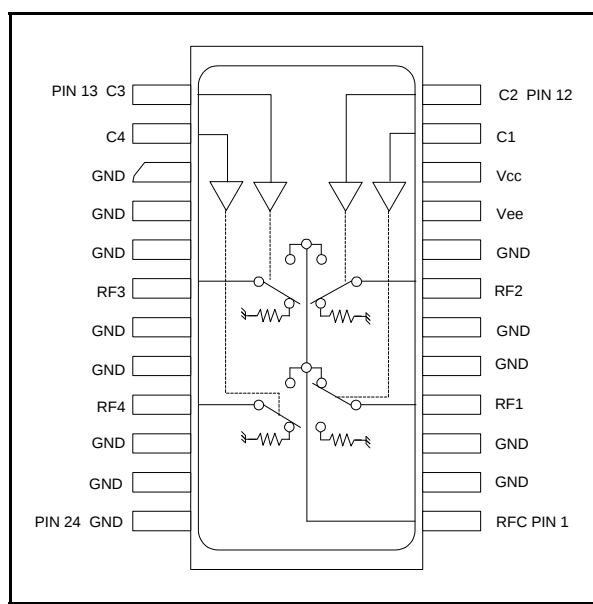
| Parameter        | Test Conditions                                             | Frequency        | Units | Min  | Typ | Max  |
|------------------|-------------------------------------------------------------|------------------|-------|------|-----|------|
| IP3 <sup>3</sup> | Two-Tone Input Power up to +5 dBm                           | 0.05 GHz         | dBm   | —    | +35 | —    |
|                  |                                                             | 0.5 GHz to 3 GHz | dBm   | —    | +46 | —    |
| IP2 <sup>3</sup> | 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<br>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  |

Absolute Maximum Ratings <sup>3,4</sup>

| Parameter                                                 | Absolute Maximum                |
|-----------------------------------------------------------|---------------------------------|
| Max Input Power<br>0.05 GHz<br>0.5 - 3.0 GHz <sup>4</sup> | +27 dBm<br>+34 dBm              |
| Bias Voltages<br>Vcc<br>Vee                               | -0.5 to +5.5V<br>-8.5V to +0.5V |
| Control Voltage <sup>5</sup>                              | -0.5V, to Vcc +0.5V             |
| Operating Temperature                                     | -40°C to +85°C                  |
| Storage Temperature                                       | -65°C to +150°C                 |

- Operation of this device above any one of these parameters may cause permanent damage.
- 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.

## Functional Schematic



## Truth Table

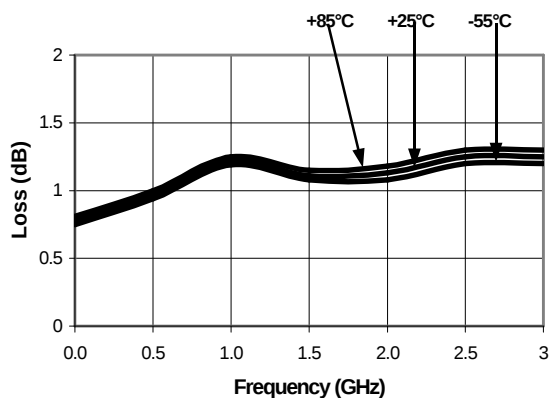
| TTL Control Inputs |    |    |    | Condition of Switch       |     |     |     |
|--------------------|----|----|----|---------------------------|-----|-----|-----|
|                    |    |    |    | RF Common to Each RF Port |     |     |     |
| C1                 | C2 | C3 | C4 | RF1                       | 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

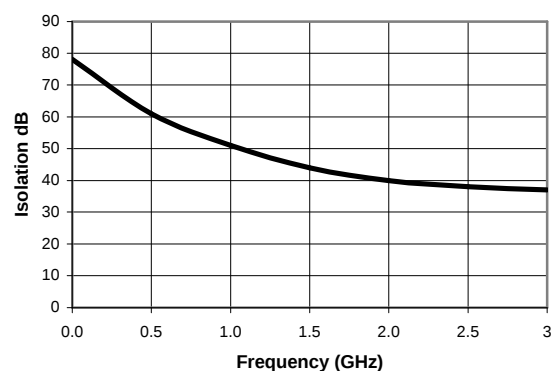
1 = TTL High

## Typical Performance Curves

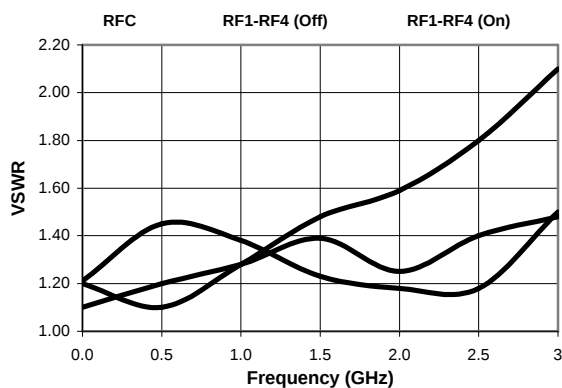
Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency



## Ordering Information

| Part Number | Package |
|-------------|---------|
| SW15-0314   | CR-14   |

Specifications subject to change without notice.

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