

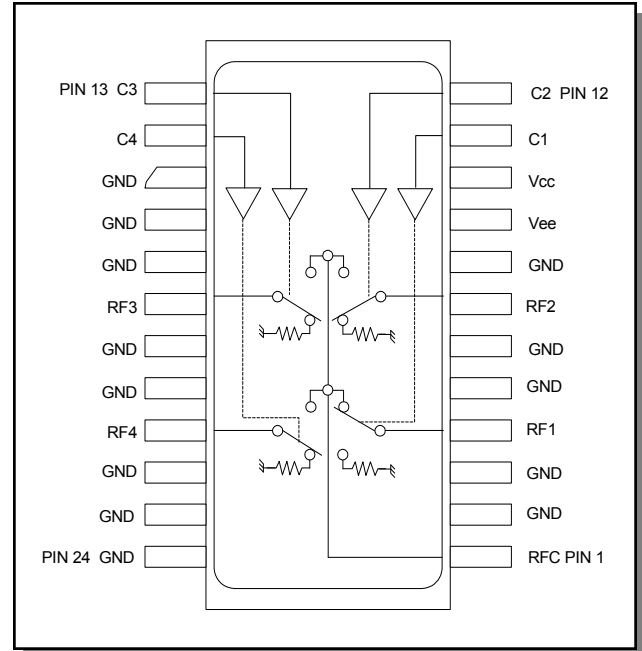
## Features

- 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
- Lead-Free CR-14 Package
- 260°C Reflow Compatible
- RoHS\* Compliant

## 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.

## Functional Block Diagram



## Ordering Information

Part Number	Package
SW15-0314	Bulk Packaging
SW15-0314-TB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

## 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.

## Electrical Specifications: $T_A = 25^\circ\text{C}^{1,2}$

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	—
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

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 <sup>3,4,5</sup>

Parameter	Absolute Maximum
Max Input Power 0.05 GHz 0.5 - 3.0 GHz <sup>5</sup>	+27 dBm +34 dBm
V <sub>CC</sub>	-0.5V ≤ V <sub>CC</sub> ≤ +7.0V
V <sub>EE</sub>	-8.5V ≤ V <sub>EE</sub> ≤ +0.5V
V <sub>CC</sub> - V <sub>EE</sub>	-0.5V ≤ V <sub>CC</sub> - V <sub>EE</sub> ≤ 14.5V
V <sub>in</sub> <sup>6</sup>	-0.5V ≤ V <sub>in</sub> ≤ V <sub>CC</sub> + 0.5V
Operating Temperature	-40°C to +85°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

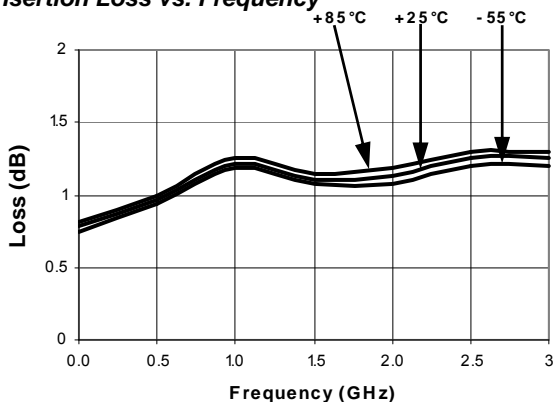
Please observe the following precautions to avoid damage:

## Static Sensitivity

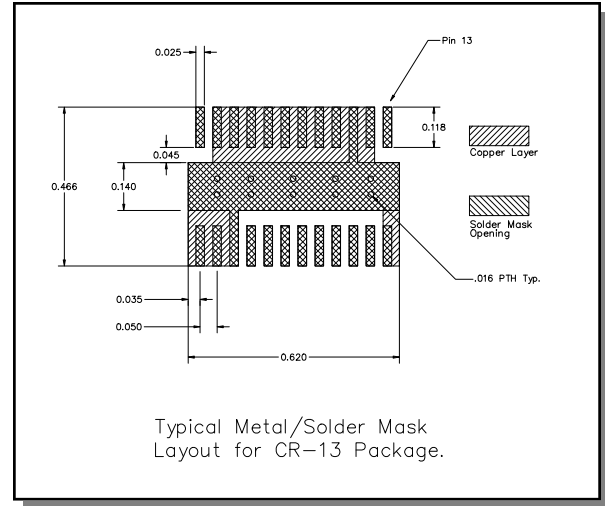
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

## Typical Performance Curves

Insertion Loss vs. Frequency



## Recommended PCB Configuration

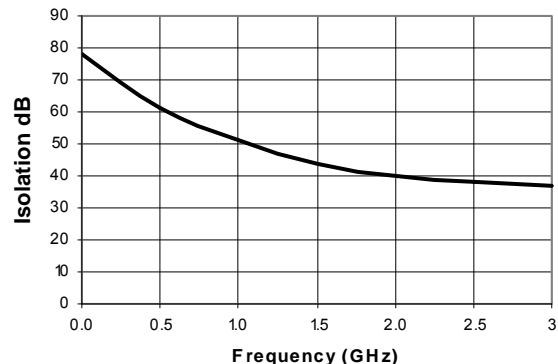


## Truth Table (Switch)

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

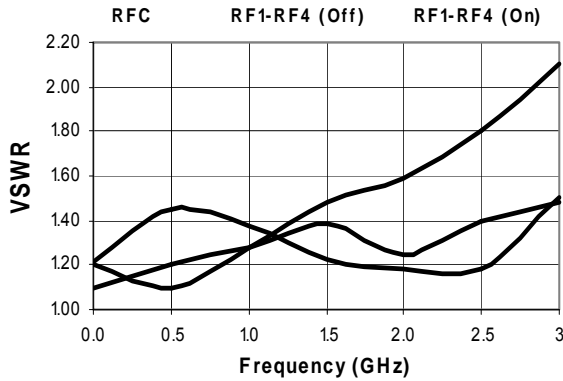
0 = TTL Low; 1 = TTL High

Isolation vs. Frequency

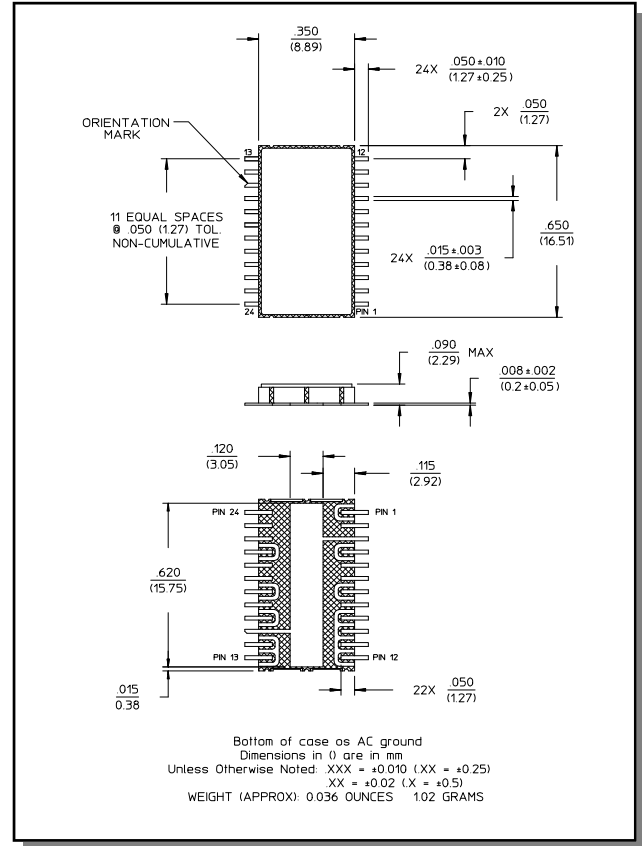


## Typical Performance Curves

VSWR vs. Frequency



## Lead-Free, CR-14 Ceramic Package<sup>†</sup>



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.