SW15-0314

GaAs SP4T Absorptive Switch, DC-3.0 GHz

Rev. V6

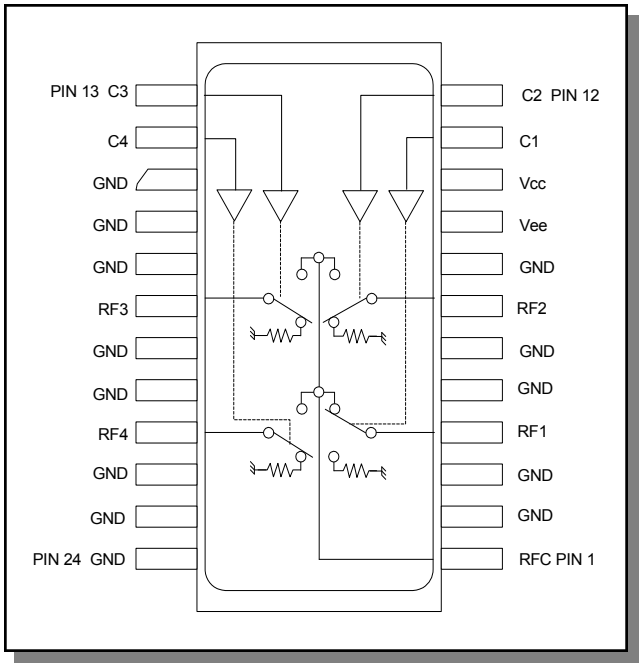
Features

- 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



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.

Ordering Information

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

Note: Reference Application Note M513 for reel size information.

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

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Electrical Specifications: T_A = 25°C[1,2]

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Insertion Loss	—	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 3.0 GHz	dB dB dB dB	— — — —	1.0 1.2 1.2 1.4	1.3 1.4 1.6 1.8
Isolation	—	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 3.0 GHz	dB dB dB dB	50 40 30 25	60 50 40 35	— — — —
VSWR	RFC, RF1 - RF4 (On)	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 3.0 GHz	Ratio Ratio Ratio Ratio	— — — —	1.6:1 1.6:1 1.6:1 1.6:1	— — — —
VSWR	RF1 - RF4 (Off)	DC - 0.5 GHz DC - 1.0 GHz DC - 2.0 GHz DC - 3.0 GHz	Ratio Ratio Ratio Ratio	— — — —	1.3:1 1.5:1 1.9:1 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 0.5 GHz to 3 GHz	dBm dBm	— —	+20 +27	— —
IP3	Two-Tone Input Power up to +5 dBm	0.05 GHz 0.5 GHz to 3 GHz	dBm dBm	— —	+35 +46	— —
IP2	Two-Tone Input Power up to +5 dBm	0.05 GHz 0.5 GHz to 3 GHz	dBm dBm	— —	+45 +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.

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Absolute Maximum Ratings [3,4,5]

Parameter	Absolute Maximum
Max Input Power 0.05 GHz 0.5 - 3.0 GHz [5]	 +27 dBm +34 dBm
V_{CC}	-0.5V ≤ V_{CC} ≤ +7.0V
V_{EE}	-8.5V ≤ V_{EE} ≤ +0.5V
V_{CC} - V_{EE}	-0.5V ≤ V_{CC} - V_{EE} ≤ 14.5V
Vin[6]	-0.5V ≤ Vin ≤ V_{CC} + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.
5. When the input power is applied to the terminated port, the absolute maximum is +30 dBm.
6. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

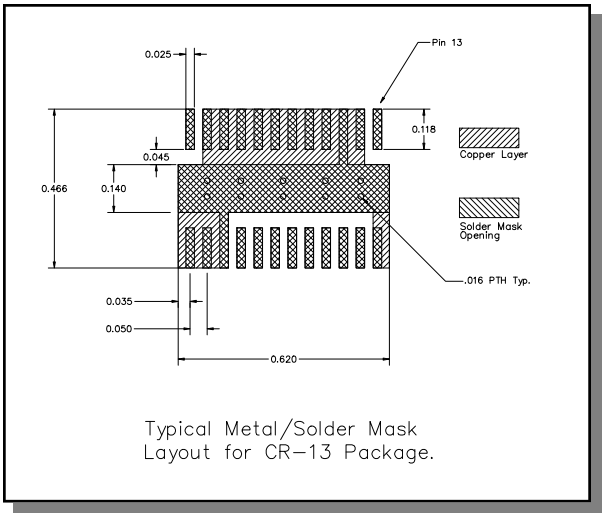
Handling Procedures

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.

Recommended PCB Configuration



Typical Metal/Solder Mask Layout for CR-13 Package.

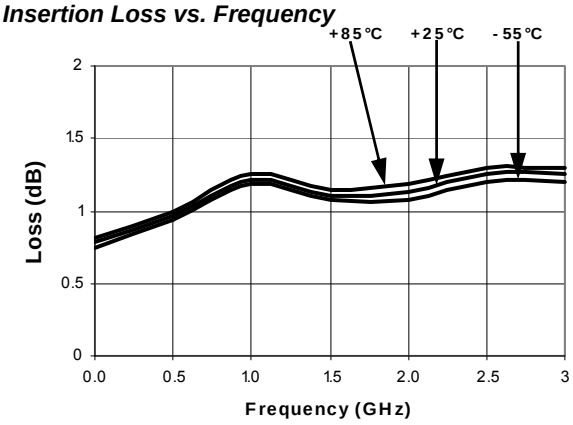
Truth Table (Switch)

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

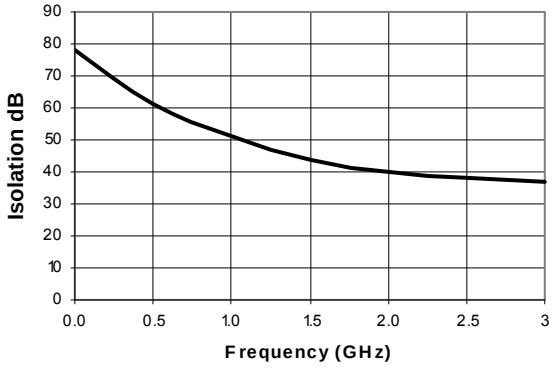
0 = TTL Low; 1 = TTL High

Typical Performance Curves

Insertion Loss vs. Frequency



Isolation vs. Frequency



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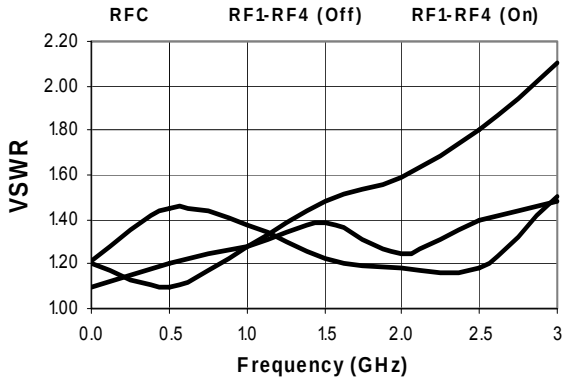
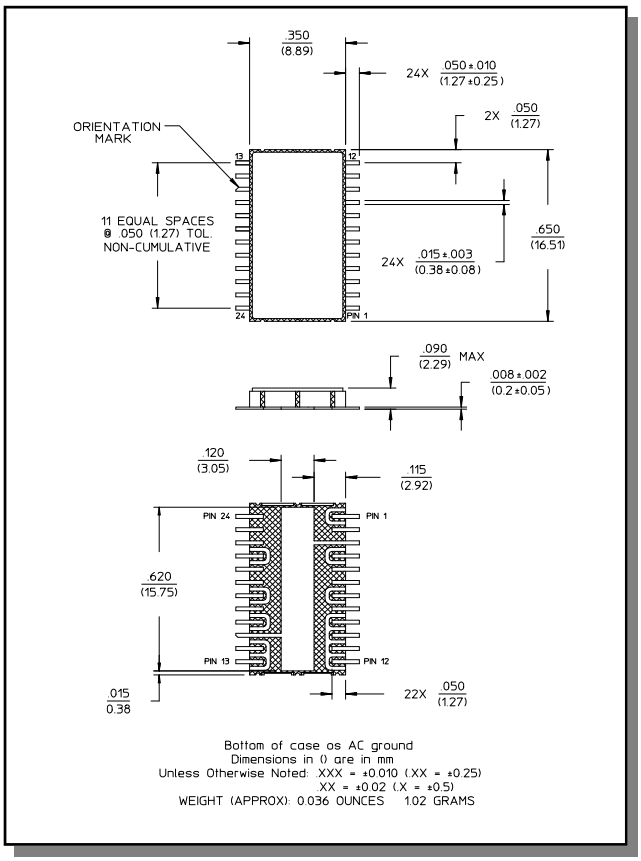
Typical Performance Curves

VSWR vs. Frequency



Lead-Free, CR-14 Ceramic Package†



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

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