

**Matched GaAs SPDT Switch,  
DC-3.0 GHz with TTL/CMOS Control Input**

**SW-313-PIN  
V5**

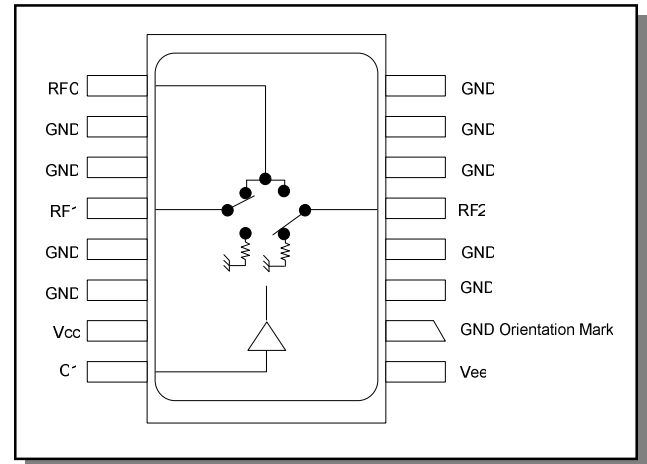
**Features**

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

**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.

Note: Die quantity varies.

**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.

**Matched GaAs SPDT Switch,  
DC-3.0 GHz with TTL/CMOS Control Input**

**SW-313-PIN  
V5**

**Electrical Specifications: (From -55°C to +85°C),  $Z_0 = 50\Omega$  <sup>1,2</sup>**

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 ± 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.

**Matched GaAs SPDT Switch,  
DC-3.0 GHz with TTL/CMOS Control Input**

**SW-313-PIN  
V5**

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

Parameter	Absolute Maximum
Max Input Power 50 MHz 500 - 3000 MHz	+27 dBm +34 dBm
Supply Voltages Vcc Vee	+5.5V -8.5V
Control Voltage <sup>5</sup>	-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.
- 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.

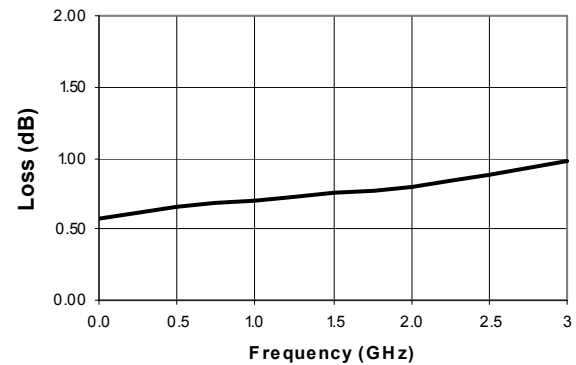
**Truth Table (Switch)**

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

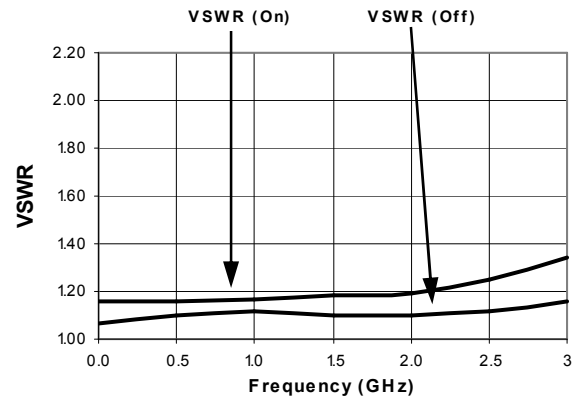
0 = TTL Low; 1 = TTL High

**Typical Performance Curves**

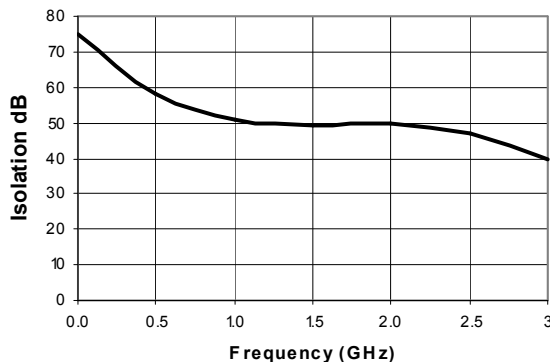
*Insertion Loss vs. Frequency*



*VSWR vs. Frequency*



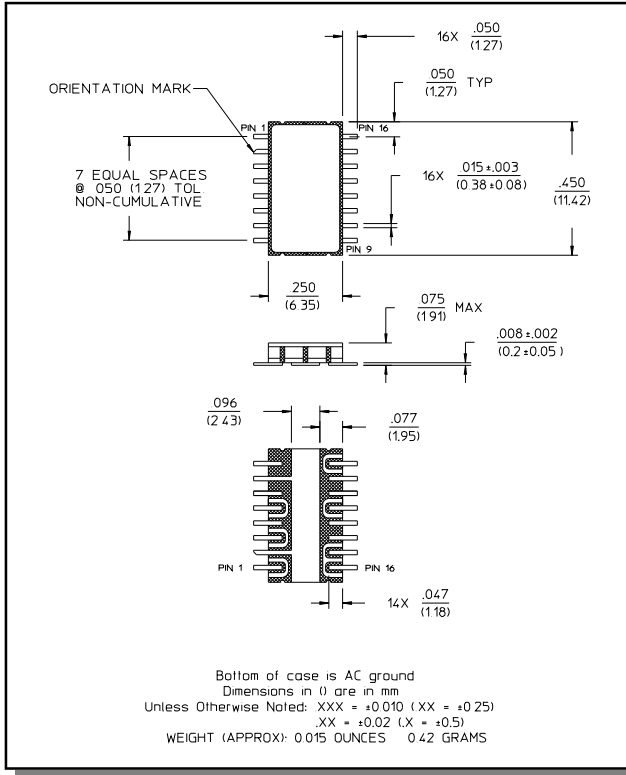
*Isolation vs. Frequency*



**Matched GaAs SPDT Switch,  
DC-3.0 GHz with TTL/CMOS Control Input**

**SW-313-PIN  
V5**

**Lead-Free, CR-9 Ceramic Package<sup>†</sup>**



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