

GaAs SP4T Absorptive Switch DC - 3 GHz



SW-314-PIN

Rev. V7

Features

- Integral TTL Driver
- Isolation: 50 dB @ 1 GHz
- Ultra Low DC Power Consumption
- Hermetic Surface Mount Package
- 50 Ω Nominal Impedance
- MIL-STD-883 Screening Available
- Lead-Free CR-14 Package
- RoHS* Compliant

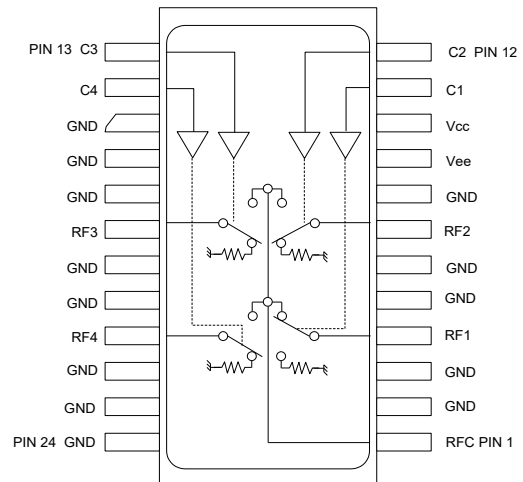
Applications

- RF/IF communications

Description

The SW-314-PIN is a GaAs MMIC SP4T absorptive switch with an integral silicon ASIC driver. This device is in a lead-free 24-lead ceramic surface mount package. This switch exhibits excellent performance from DC - 3 GHz, with very low DC power dissipation. Environmental screening is available. Contact the factory for information.

Functional Block Diagram



Pin Configuration²

Pin #	Function
1	RFC
2,3,5,6,8,15,16, 17,19,20,22,23,24	GND
4	RF1
7	RF2
9	V _{EE}
10	V _{CC}
11	C1
12	C2
13	C3
14	C4
18	RF3
21	RF4

Ordering Information¹

Part Number	Package
SW-314-PIN	Bulk
SW-314-TB	Sample Board

1. Reference Application Note M513 for reel size information.

2. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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Electrical Specifications^{3,4}: Freq. = -55°C - +85°C, Z₀ = 50 Ω

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss	DC - 0.5 GHz	dB	—	—	1.3
	DC - 1.0 GHz				1.4
	DC - 2.0 GHz				1.6
	DC - 3.0 GHz				1.8
Isolation	DC - 0.5 GHz	dB	50	—	—
	DC - 1.0 GHz		40		
	DC - 2.0 GHz		35		
	DC - 3.0 GHz		30		
VSWR	RFC, RF1 - RF4 (On)	ratio	—	—	1.6:1
	DC - 0.5 GHz				1.6:1
	DC - 1.0 GHz				1.6:1
	DC - 2.0 GHz				1.8:1
VSWR	RF1 - RF4 (Off)	ratio	—	—	1.3:1
	DC - 0.5 GHz				1.5:1
	DC - 1.0 GHz				1.9:1
	DC - 2.0 GHz				2.4:1
T _{RISE} , T _{FALL}	10% to 90%	ns	—	7	—
T _{ON} , T _{OFF}	50% Control to 90% / 10% RF	ns	—	25	—
Transients	In-Band (peak-peak)	mV	—	20	—
1 dB Compression	Input Power	dBm	—	20	—
	0.05 GHz				
IP3	Two-Tone Input Power up to 5 dBm	dBm	—	35	—
	0.05 GHz				
IP2	Two-Tone Input Power up to 5 dBm	dBm	—	45	—
	0.05 GHz				
V _{CC}	—	V	4.5	5.0	5.5
V _{EE}	—	V	-8.0	—	-5.0
I _{CC}	V _{CC} = 4.5 to 5.5 V V _{CTL} = 0 to 0.8 V, or V _{CC} -2.1 V to V _{CC}	mA	—	0.2	4.0
I _{EE}	V _{EE} = -5 V to -8 V	mA	—	0.1	1.0
V _{CTL}	Logic 0 (TTL)	V	0.0	—	0.8
	Logic 1 (TTL)		2.0		5.0
Input Leakage Current	Low	μA	—	—	1
	High				2 to 5 V

3. All specifications apply when operated with bias voltages of +5 V for V_{CC} and -5 V for V_{EE}.

4. When DC blocks are used, a 10 KΩ return to GND is required on the RFC port.

Absolute Maximum Ratings^{5,6}

Parameter	Absolute Maximum
Input Return Loss 0.05 GHz 0.5 - 3.0 GHz ⁷	27 dBm 34 dBm
V_{CC}	$-0.5\text{ V} \leq V_{CC} \leq +7.0\text{ V}$
V_{EE}	$-8.5\text{ V} \leq V_{EE} \leq +0.5\text{ V}$
$V_{CC} - V_{EE}$	$-0.5\text{ V} \leq V_{CC} - V_{EE} \leq 14.5\text{ V}$
V_{IN} ⁸	$-0.5\text{ V} \leq V_{IN} \leq V_{CC} + 0.5\text{ V}$
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

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

Truth Table (Switch)⁹

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

9. 0 = TTL Low; 1 = TTL High

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

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

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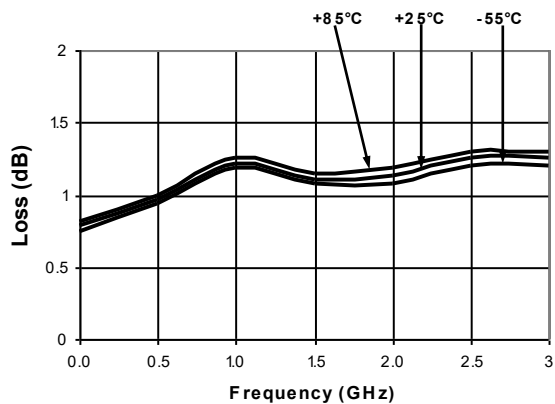


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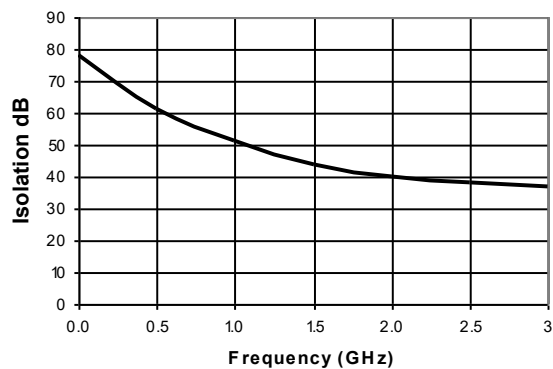
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Typical Performance Curves

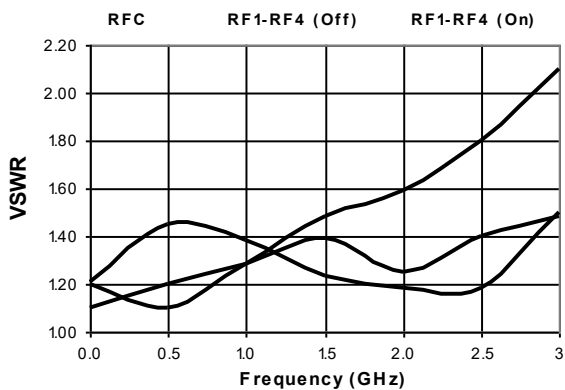
Insertion Loss



Isolation



VSWR



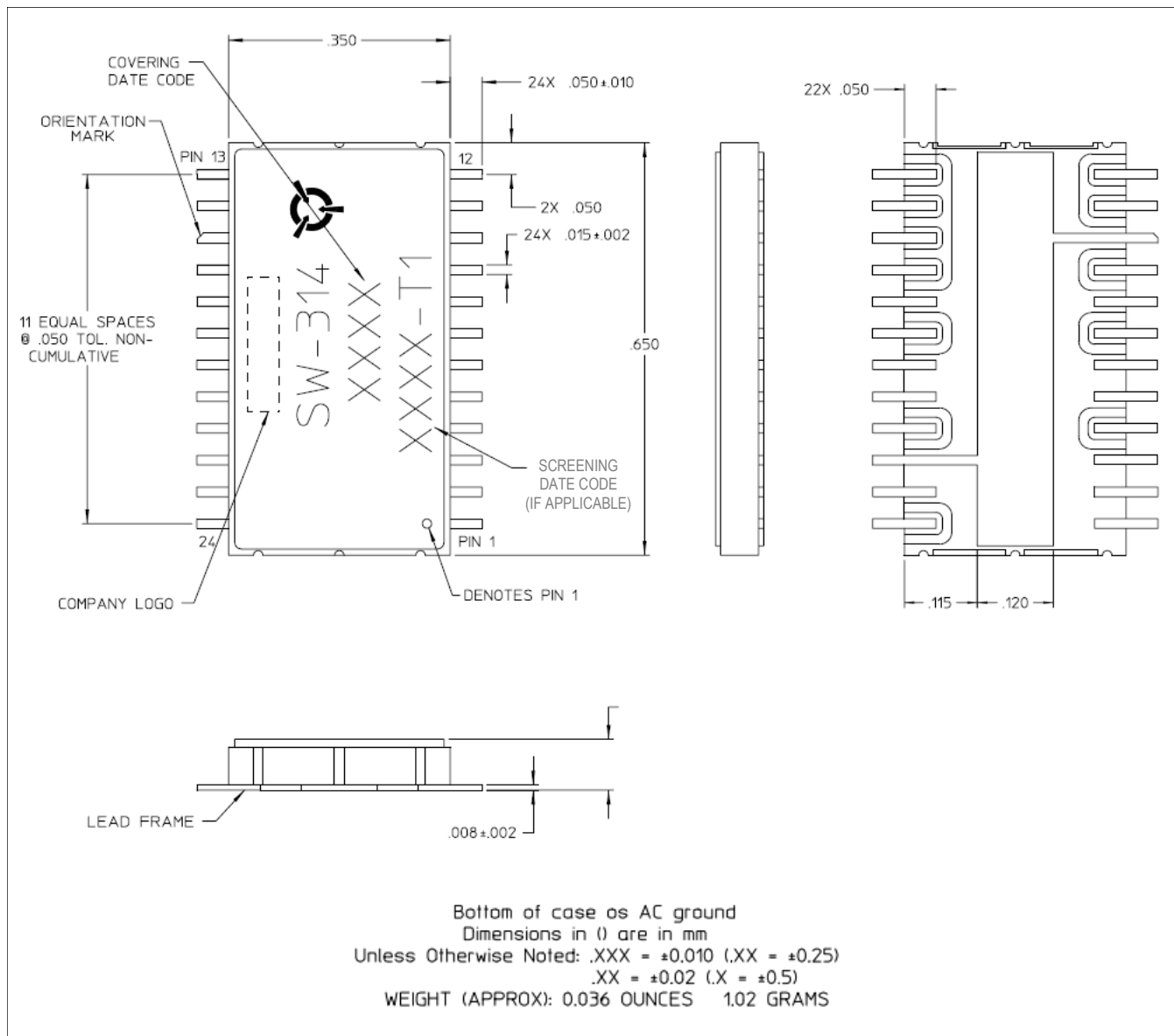
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Lead-Free CR-14 Ceramic Package[†]



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

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