SW65-0114

GaAs SPDT Absorptive Switch with ASIC Driver, DC-3.0 GHz

Rev. V7

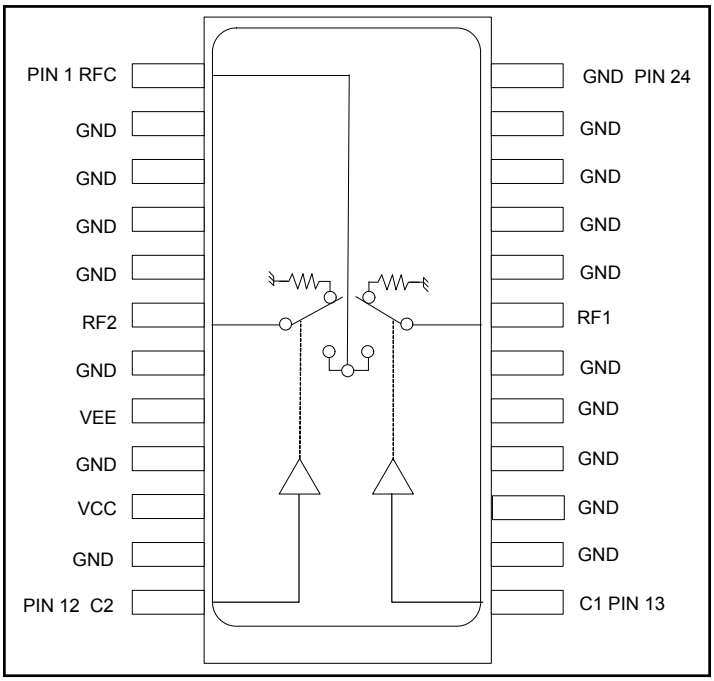
Features

- Typical Isolation: 36 dB (2,000 MHz)
- Typical Insertion Loss: 1.8 dB (2,000 MHz)
- Integral ASIC TTL/CMOS Driver
- Low DC Power Consumption
- 50 Ohm Nominal Impedance
- Tape and Reel Packaging Available
- Test Boards Available
- SOW-24 Package

Description

M/A-COM's SW65-0114 is a GaAs MMIC absorptive SPDT switch with an integral silicon ASIC driver. This device is in a 24-lead plastic package. This switch offers excellent broadband performance and repeatability from DC to 3 GHz, while maintaining low DC power dissipation. The SW65-0114 is ideally suited for wireless infrastructure applications. Also available in ceramic package with improved performance.

Functional Block Diagram



Ordering Information

Part Number	Package
SW65-0114	Bulk Packaging
SW65-0114TR	1000 piece reel
SW65-0114-TB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

Pin Configuration

Pin No.	Function	Pin No.	Function
1	RFC	13	C1
2	GND	14	GND
3	GND	15	GND
4	GND	16	GND
5	GND	17	GND
6	RF2	18	GND
7	GND	19	RF1
8	V_{EE}	20	GND
9	GND	21	GND
10	V_{CC}	22	GND
11	GND	23	GND
12	C2	24	GND

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Electrical Specifications: T_A = 25°C, Z_0 = 50Ω

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 3.0 GHz	dB	—	1.8	2.2
Isolation (All arms off)	DC - 3.0 GHz	dB	33	36	—
VSWR	DC - 3.0 GHz On Off	 — —	 — —	 1.7:1 2.1:1	 2.2:1 2.2:1
T_{rise} T_{fall} T_{on} T_{off} Transients	10%/90%, 90%/10% [1] 50% TTL to 90%/10% RF In-band (peak to peak)	ns ns mV	—- — —	15 50 50	50 150 150
1 dB Compression	.05 GHz .5 - 3.0 GHz	dBm dBm	— —	+20 +27	— —
Input IP_3	Two tone inputs 0.05 GHz up to +5 dBm 0.5 - 3.0 GHz	dBm dBm	— —	+35 +46	— —
V_{CC}	—	V	+4.5	+5.0	+5.5
V_{EE}	—	V	-8.0	-5.0	-4.75
V_{IL} V_{IH}	LOW-level input voltage HIGH-level input voltage	V V	0.0 2.0	— —	0.8 5.0
Iin (Input Leakage Current)	Vin = V_{CC} or GND	uA	-1.0	—	1.0
Icc (Quiescent Supply Current)	Vcntrl = V_{CC} or GND	uA	—	250	400
ΔIcc (Additional Supply Current Per TTL Input Pin)	V_{CC} = Max, Vcntrl = V_{CC} - 2.1 V	mA	—	—	1.0
I_{EE}	V_{EE} min to max, Vin = V_{IL} or V_{IH}	mA	-1.0	-0.2	—

1. Decoupling capacitors (.01 µF) are required on the power supply lines.

Absolute Maximum Ratings [2,3]

Parameter	Absolute Maximum
Max. Input Power 0.05 GHz 0.5 - 3.0 GHz[4]	 +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[5]	-0.5V ≤ Vin ≤ V_{CC} + 0.5V
Operating Temperature	-40ºC to +85ºC
Storage Temperature	-65ºC to +125ºC

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM does not recommend sustained operation near these survivability limits.
4. When the RF input is applied to the terminated port, the absolute maximum power is +30 dBm.
5. 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

TTL Control Input		RF Common To:	
C1	C2	RF1	RF2
1	0	On	Off
0	1	Off	On

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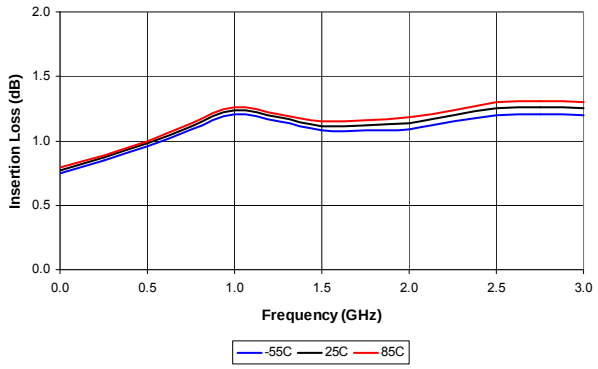
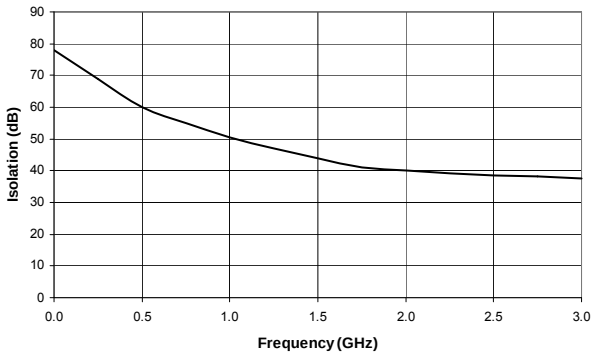
Typical Performance Curves

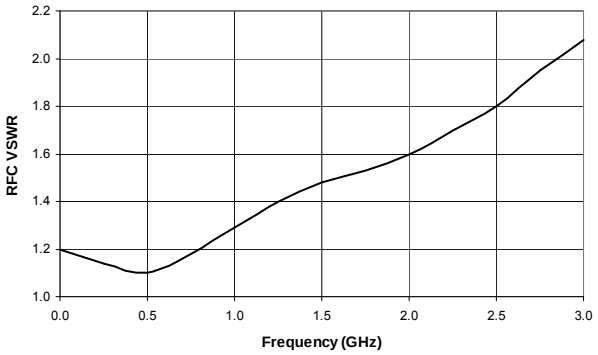
Insertion Loss vs. Frequency



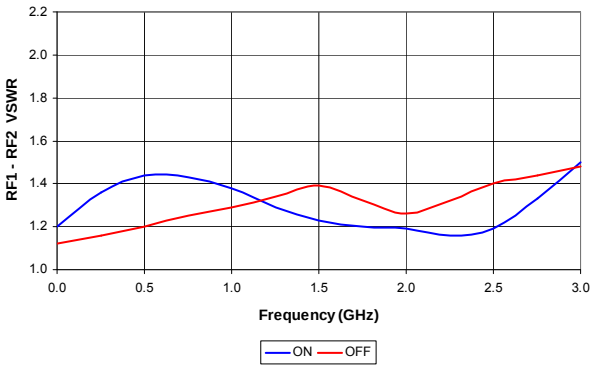
Isolation Loss vs. Frequency



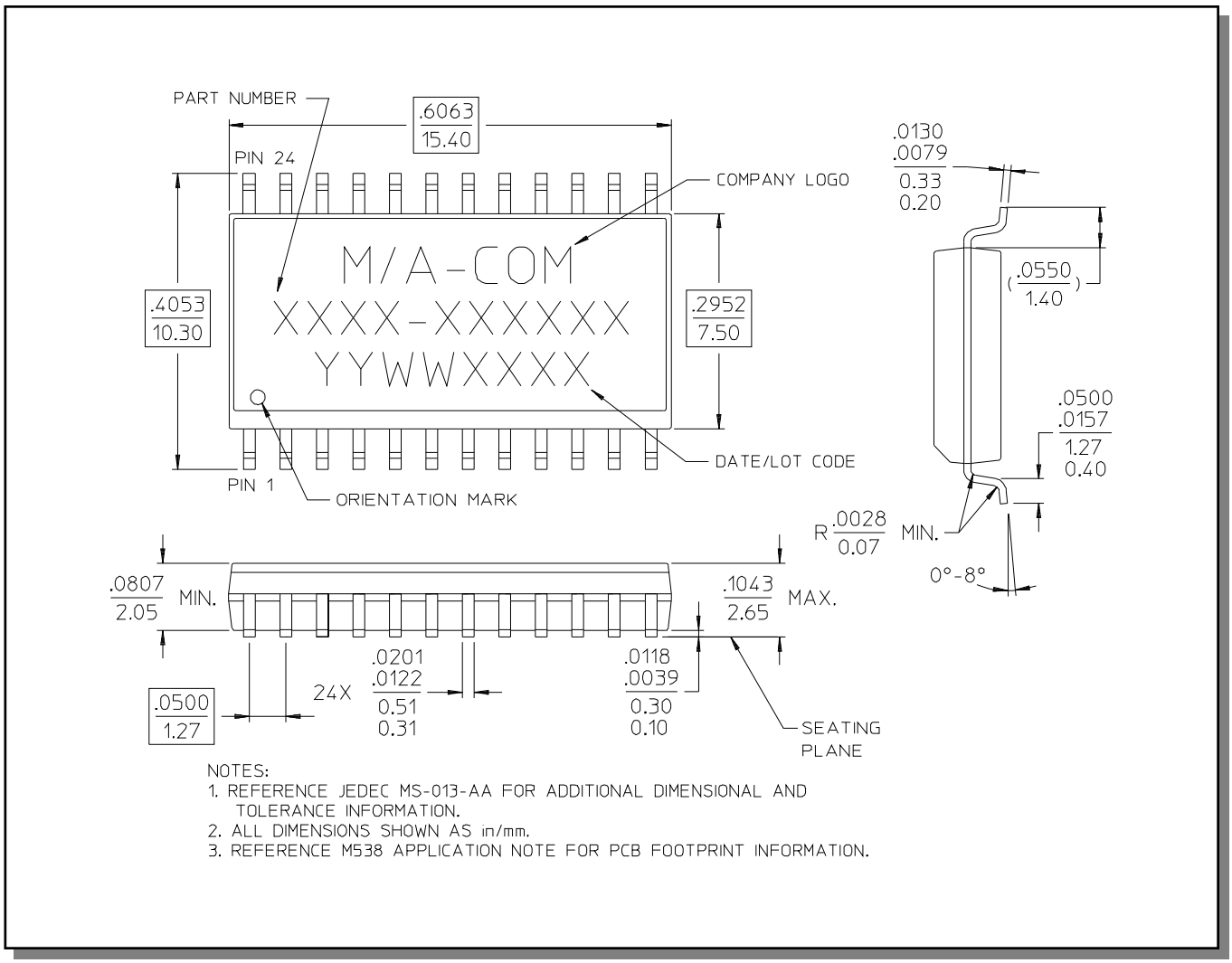
RFC VSWR vs. Frequency



RF1-RF2 VSWR vs. Frequency



SOW-24†



NOTES:
1. REFERENCE JEDEC MS-013-AA FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. ALL DIMENSIONS SHOWN AS in/mm.
3. REFERENCE M538 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION.

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

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