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



Rev. V4

### **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
- Lead-Free SOW-24 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS\* Compliant Version of SW65-0114

### Description

M/A-COM's MASW-007075-000100 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 MASW-007075-000100 is ideally suited for wireless infrastructure applications. Also available in ceramic package with improved performance.

### PIN 1 RFC GND PIN 24 GND GND GND GND GND GND GND GND -W~\_ ٦. -^/// RF1 RF2 q Q GND GND GND VEE GND GND VCC GND GND GND C1 PIN 13 PIN 12 C2

# **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 <sub>EE</sub>	20	GND
9	GND	21	GND
10	V <sub>CC</sub>	22	GND
11	GND	23	GND
12	C2	24	GND

**Ordering Information** 

Part Number	Package	
MASW-007075-000100	Bulk Packaging	
MASW-007075-0001TR	1000 piece reel	
MASW-007075-0001TB	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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Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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# **Functional Block Diagram**

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# Electrical Specifications: $T_A = 25^{\circ}C$ , $Z_0 = 50\Omega$

Parameter	Test Conditions	Units	Min	Тур	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 <sub>rise</sub> T <sub>fall</sub> T <sub>on</sub> T <sub>off</sub> Transients	10%/90%, 90%/10% <sup>1</sup> 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 <sub>3</sub>	Two tone inputs 0.05 GHz up to +5 dBm 0.5 - 3.0 GHz	dBm dBm	—	+35 +46	—
V <sub>CC</sub>	_	V	+4.5	+5.0	+5.5
V <sub>EE</sub>	_	V	-8.0	-5.0	-4.75
V <sub>IL</sub> V <sub>IH</sub>	LOW-level input voltage HIGH-level input voltage	V V	0.0 2.0	_	0.8 5.0
lin (Input Leakage Current)	Vin = $V_{CC}$ or GND	uA	-1.0	_	1.0
Icc (Quiescent Supply Current)	Vcntrl = V <sub>CC</sub> or GND	uA	—	250	400
∆Icc (Additional Supply Current Per TTL Input Pin)	$V_{CC}$ = Max, Vcntrl = $V_{CC}$ - 2.1 V	mA	—	-	1.0
IEE	VEE 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 <sup>2,3</sup>

Parameter	Absolute Maximum		
Max. Input Power 0.05 GHz 0.5 - 3.0 GHz <sup>4</sup>	+27 dBm +34 dBm		
V <sub>CC</sub>	$-0.5 V \leq V_{CC} \leq +7.0 V$		
V <sub>EE</sub>	$-8.5 \text{V} \leq \text{V}_{\text{EE}} \leq +0.5 \text{V}$		
$V_{CC}$ - $V_{EE}$	$-0.5 V \leq V_{CC} - V_{EE} \leq 14.5 V$		
Vin⁵	$-0.5 \text{V} \leq \text{Vin} \leq \text{V}_{\text{CC}} + 0.5 \text{V}$		
Operating Temperature	-40°C to +85°C		
Storage Temperature	-65°C to +125°C		

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.

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# **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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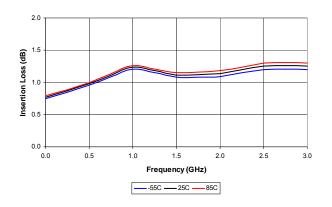
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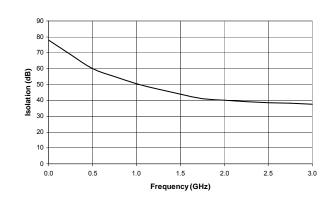


# **Typical Performance Curves**

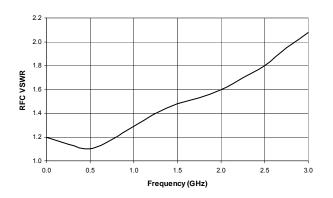
### Insertion Loss vs. Frequency



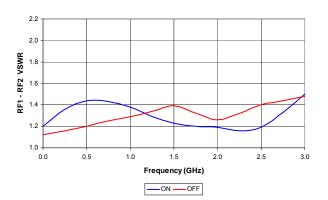
Isolation Loss vs. Frequency



### RFC VSWR vs. Frequency



RF1-RF2 VSWR vs. Frequency



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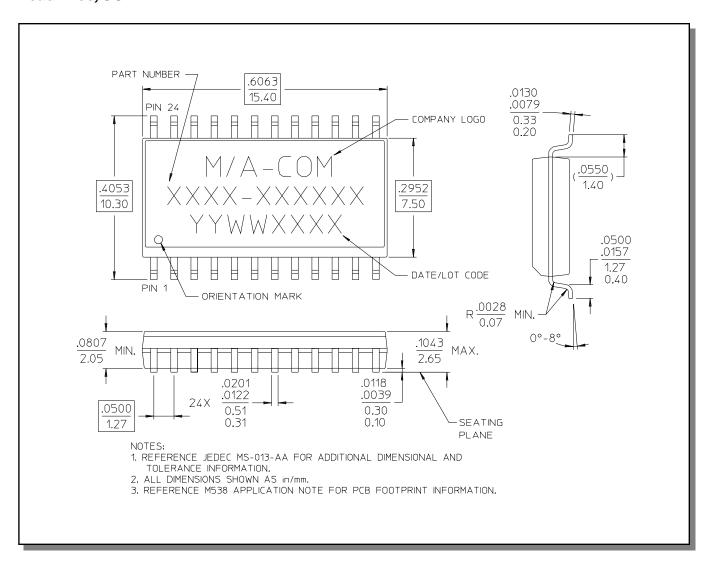
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# Lead-Free, SOW-24<sup>†</sup>



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

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