

GaAs SP4T Absorptive Switch with ASIC Driver, DC-3.0 GHz

Rev. V4

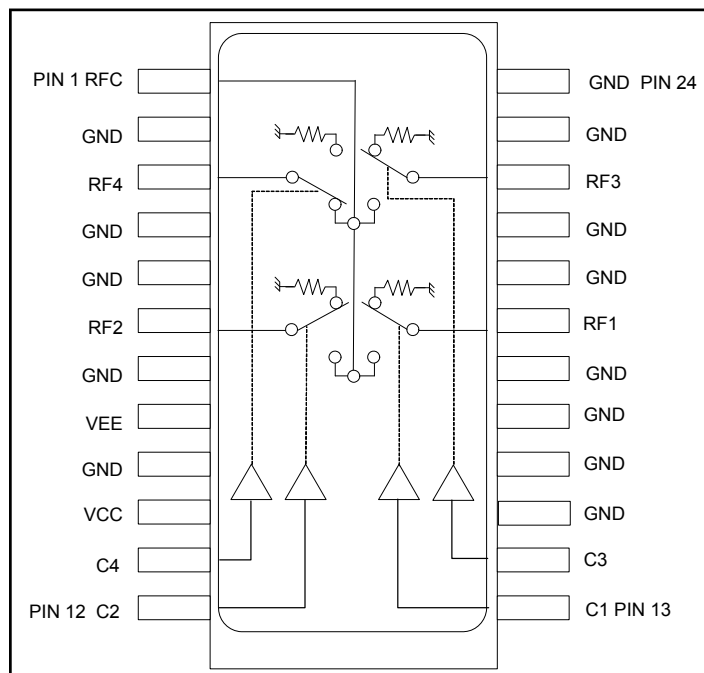
Features

- Typical Isolation: 33 dB (2,000 MHz)
- Typical Insertion Loss: 1.6 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 SW65-0314

Description

M/A-COM's MASW-007073-000100 is a GaAs MMIC absorptive SP4T 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-007073-000100 is ideally suited for wireless infrastructure applications. Also available in a ceramic package with improved performance.

Functional Block Diagram



Pin Configuration

Pin No.	Function	Pin No.	Function
1	RFC	13	C1
2	GND	14	C3
3	RF4	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	RF3
11	C4	23	GND
12	C2	24	GND

Ordering Information

Part Number	Package
MASW-007073-000100	Bulk Packaging
MASW-007073-0001TR	1000 piece reel
MASW-007073-0001TB	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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Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\Omega$

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 1.0 GHz	dB	—	1.5	1.7
	DC - 2.0 GHz	dB	—	1.6	1.8
	DC - 3.0 GHz	dB	—	2.0	2.3
Isolation (One Arm On)	DC - 1.0 GHz	dB	35	38	—
	DC - 2.0 GHz	dB	27	33	—
	DC - 3.0 GHz	dB	25	27	—
VSWR	DC - 1.0 GHz	—	—	On 1.3:1	1.5:1
	DC - 2.0 GHz	—	—	1.5:1	2.0:1
	DC - 3.0 GHz	—	—	1.7:1	2.4:1
T_{rise} T_{fall} T_{on} T_{off} Transients	10%/90%, 90%/10% ¹	ns	—	15	50
	50% TTL to 90%/10% RF	ns	—	50	150
	In-band (peak to peak)	mV	—	50	150
1 dB Compression	.05 GHz	dBm	—	+20	—
	.5 - 3.0 GHz	dBm	—	+27	—
Input IP ₃	Two tone inputs 0.05 GHz	dBm	—	+35	—
	Up to +5 dBm 0.5 - 3.0 GHz	dBm	—	+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	V	0.0	—	0.8
	HIGH-level input voltage	V	2.0	—	5.0
I _{in} (Input Leakage Current)	V _{in} = V _{CC} or GND	uA	-1.0	—	1.0
I _{CC} (Quiescent Supply Current)	V _{cntrl} = V _{CC} or GND	uA	—	250	400
ΔI_{CC} (Additional Supply Current Per TTL Input Pin)	V _{CC} = Max, V _{cntrl} = V _{CC} - 2.1V	mA	—	—	1.0
I _{EE}	V _{EE} min to max, V _{in} = 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 $\leq$ V _{CC} $\leq$ +7.0V
V _{EE}	-8.5V $\leq$ V _{EE} $\leq$ +0.5V
V _{CC} - V _{EE}	-0.5V $\leq$ V _{CC} - V _{EE} $\leq$ 14.5V
V _{in} ⁵	-0.5V $\leq$ V _{in} $\leq$ V _{CC} + 0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +125°C

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.

- 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.
- When the RF input is applied to the terminated port, the absolute maximum power is +30 dBm.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.

PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology 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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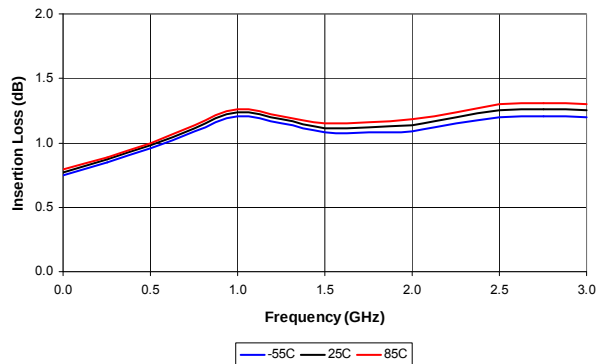
Truth Table

TTL Control Input				RF Common To:			
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

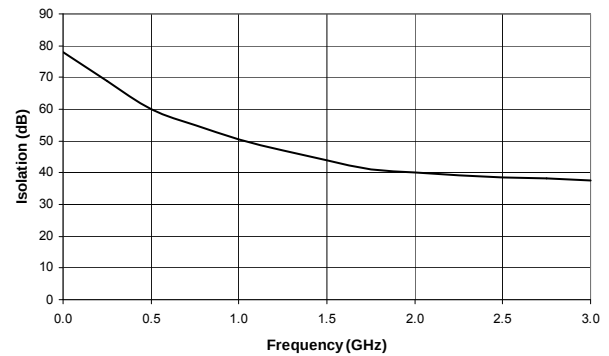
0 = TTL Low; 1 = TTL High

Typical Performance Curves

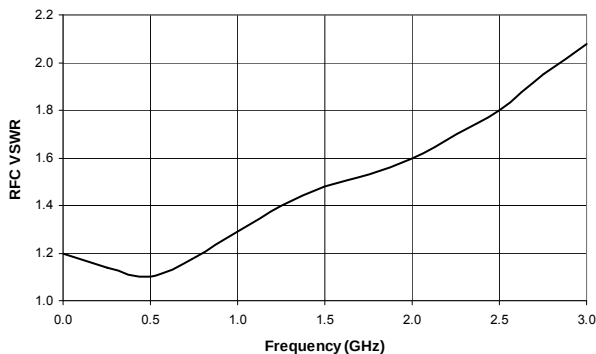
Insertion Loss vs. Frequency



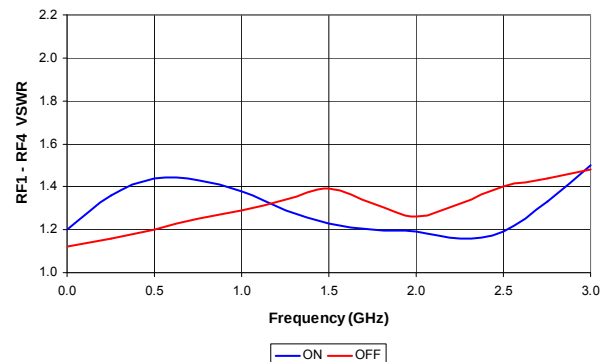
Isolation Loss vs. Frequency



RFC VSWR vs. Frequency



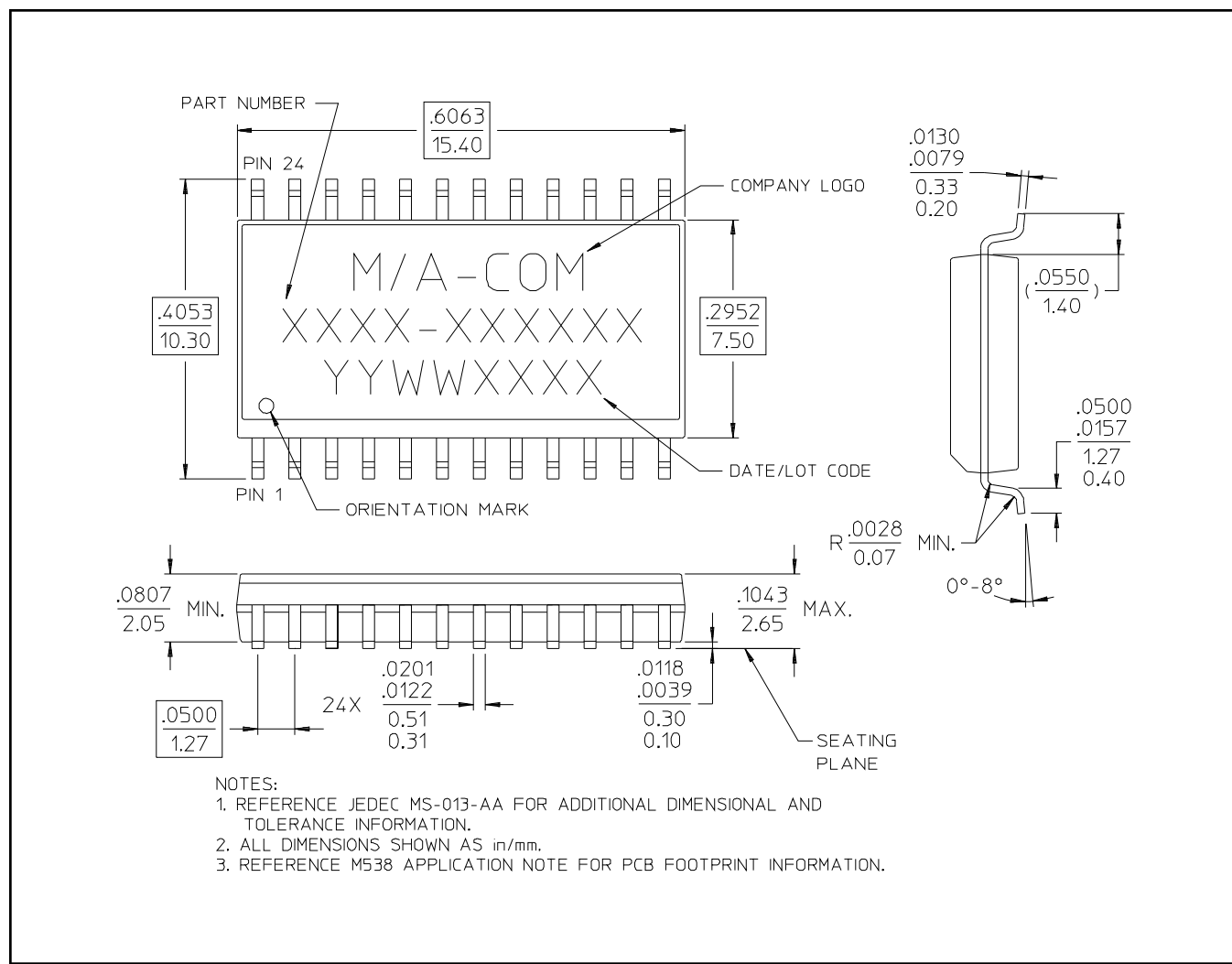
RF1-RF4 VSWR vs. Frequency



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Lead-Free, SOW-24[†]



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