

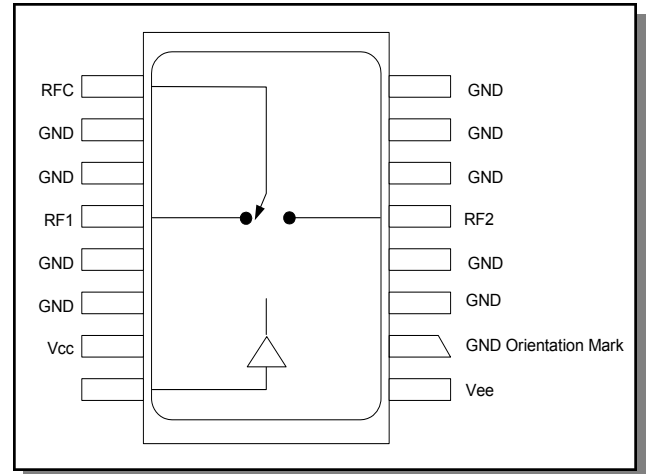
## Features

- Integral TTL Driver
- Low DC Power Consumption
- Surface Mount Package
- Low Cost/High Performance
- 50 Ohm Nominal Impedance
- Lead-Free CR-9 Package
- 260°C Reflow Compatible
- RoHS\* Compliant

## Description

M/A-COM's SW10-0312 is a GaAs FET SPDT reflective 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 SW10-0312 is ideally suited for use where fast speed, low power consumption and broadband applications are required.

## Functional Block Diagram



## Ordering Information

| Part Number        | Package           |
|--------------------|-------------------|
| SW10-0312          | Bulk Packaging    |
| MASW-008842-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

## 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.

## GaAs SPDT Reflective Switch, DC-3.0 GHz with TTL/CMOS Control Input

Rev. V8

### Electrical Specifications: $T_A = +25^\circ\text{C}^{1,2}$

| Parameter        | Test Conditions                      | Frequency        | Units         | Min | Typ   | Max   |
|------------------|--------------------------------------|------------------|---------------|-----|-------|-------|
| Insertion Loss   | —                                    | DC - 3000 MHz    | dB            | —   | 0.9   | 1.2   |
|                  |                                      | DC - 2000 MHz    | dB            | —   | 0.8   | 1.1   |
|                  |                                      | DC - 1000 MHz    | dB            | —   | 0.7   | 0.9   |
|                  |                                      | DC - 500 MHz     | dB            | —   | 0.6   | 0.8   |
| VSWR             | —                                    | DC - 3000 MHz    | Ratio         | —   | 1.4:1 | 1.5:1 |
|                  |                                      | DC - 2000 MHz    | Ratio         | —   | 1.3:1 | 1.4:1 |
|                  |                                      | DC - 1000 MHz    | Ratio         | —   | 1.2:1 | 1.4:1 |
|                  |                                      | DC - 500 MHz     | Ratio         | —   | 1.1:1 | 1.3:1 |
| Isolation        | —                                    | DC - 3000 MHz    | dB            | 27  | 36    | —     |
|                  |                                      | DC - 2000 MHz    | dB            | 30  | 38    | —     |
|                  |                                      | DC - 1000 MHz    | dB            | 35  | 42    | —     |
|                  |                                      | DC - 500 MHz     | dB            | 40  | 45    | —     |
| Trise, Tfall     | 10% to 90%                           | —                | ns            | —   | 50    | —     |
| Ton, Toff        | 1.3V CTL to 90% / 10%                | —                | ns            | —   | 150   | —     |
| Transients       | In-Band                              | —                | mV            | —   | 50    | —     |
| 1 dB Compression | Input Power                          | 0.05 GHz         | dBm           | —   | +25   | —     |
|                  |                                      | 0.5 GHz to 3 GHz | dBm           | —   | +30   | —     |
| IP2              | Two-Tone Input Power<br>up to +5 dBm | 0.05 GHz         | dBm           | —   | +60   | —     |
|                  |                                      | 0.5 GHz to 3 GHz | dBm           | —   | +65   | —     |
| IP3              | Two-Tone Input Power<br>up to +5 dBm | 0.05 GHz         | dBm           | —   | +40   | —     |
|                  |                                      | 0.5 GHz to 3 GHz | dBm           | —   | +46   | —     |
| Vin Low          | 0V to 0.8V                           | —                | $\mu\text{A}$ | —   | —     | 1     |
| Vin High         | 2.0V to 5.0V                         | —                | $\mu\text{A}$ | —   | —     | 1     |
| Vcc              | +5.0V $\pm$ 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.

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

| Parameter                                   | Absolute Maximum  |
|---|---|
| Max Input Power<br>50 MHz<br>500 - 3000 MHz | +27 dBm<br>+34 dBm  |
| V <sub>CC</sub>                             | -0.5V $\leq$ V <sub>CC</sub> $\leq$ +7.0V                   |
| V <sub>EE</sub>                             | -8.5V $\leq$ V <sub>EE</sub> $\leq$ +0.5V                   |
| V <sub>CC</sub> - V <sub>EE</sub>           | -0.5V $\leq$ V <sub>CC</sub> - V <sub>EE</sub> $\leq$ 14.5V |
| Vin <sup>5</sup>                            | -0.5V $\leq$ Vin $\leq$ V <sub>CC</sub> + 0.5V              |
| Operating Temperature                       | -40°C to +125°C   |
| Storage Temperature                         | -65°C to +150°C   |

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.
5. Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

2

**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.

• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400  
 • **India** Tel: +91.80.4155721 • **China** Tel: +86.21.2407.1588  
 Visit [www.macomtech.com](http://www.macomtech.com) for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

## 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.

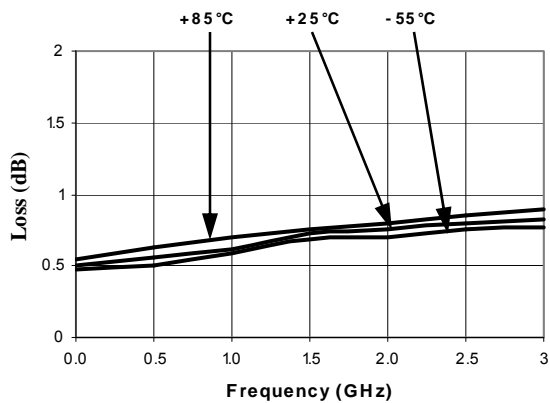
## Truth Table (Switch)

| C1 | Condition of Switch       |     |
|----|---------------------------|-----|
|    | RF Common to Each RF Port |     |
|    | RF1                       | RF2 |
| 0  | On                        | Off |
| 1  | Off                       | On  |

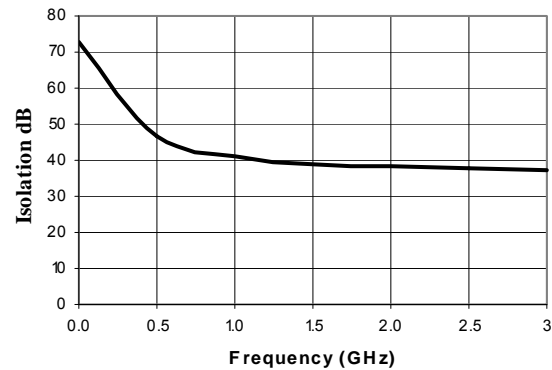
0 = TTL Low; 1 = TTL High

## Typical Performance Curves

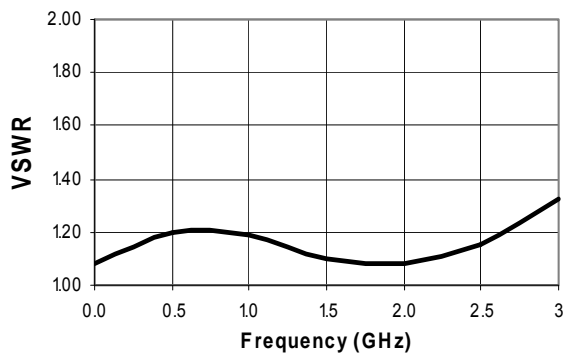
### Insertion Loss vs. Frequency



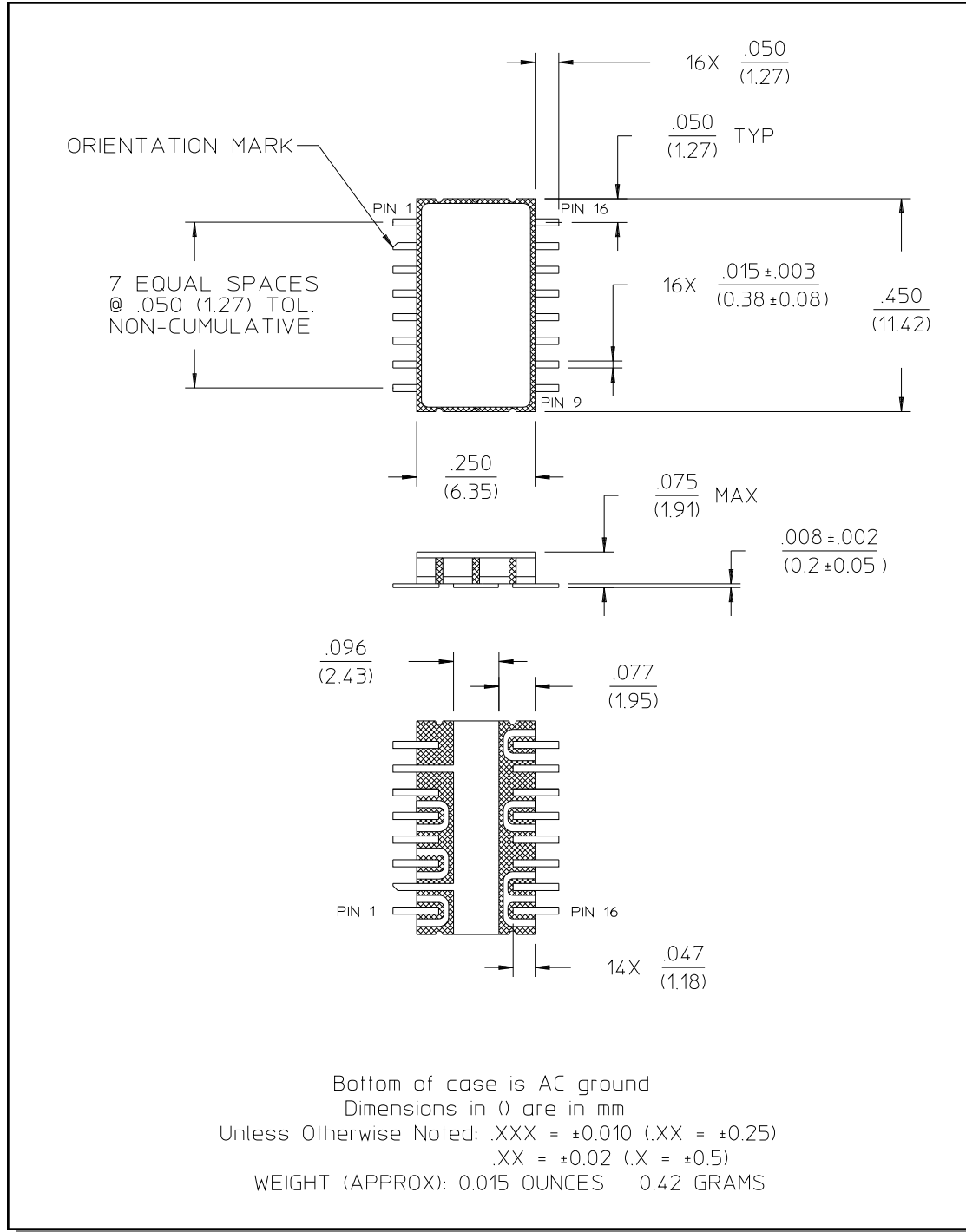
### Isolation vs. Frequency



### VSWR vs. Frequency



## Lead-Free, CR-9 Ceramic Package†



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