

Matched GaAs SPST Switch, DC-3.0 GHz with TTL/CMOS Control Input

Rev. V6

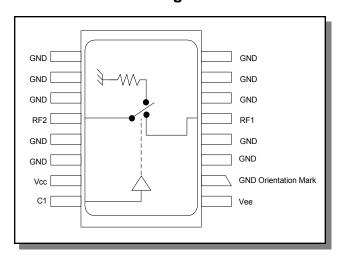
Features

- 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 SW05-0311 is a GaAs FET SPST absorptive 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 SW05-0311 is ideally suited for use where fast speed, low power consumption and broadband applications are required.

Functional Block Diagram



Ordering Information

| Part Number | Package |
|--------------------|-------------------|
| SW05-0311 | Bulk Packaging |
| SW05-0311TR | 1000 piece reel |
| MASW-008843-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1 | Vee | 9 | GND |
| 2 | GND | 10 | GND |
| 3 | GND | 11 | GND |
| 4 | GND | 12 | RF2 |
| 5 | RF1 | 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.

[•] North America Tel: 800.366.2266 • Europe Tel: +353.21.244.6400

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SW05-0311



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

| Parameter | Test Conditions | Frequency | Units | Min | Тур | Max |
|------------------|--------------------------------------|---|----------------------------------|----------------------|----------------------------------|----------------------------------|
| Insertion Loss | _ | DC - 3000 MHz DC - 2000 MHz DC - 1000 MHz DC - 500 MHz | dB dB dB dB | 1111 | 1.0 0.8 0.7 0.6 | 1.3 1.2 1.0 0.8 |
| VSWR | _ | DC - 3000 MHz DC - 2000 MHz DC - 1000 MHz DC - 500 MHz | Ratio Ratio Ratio Ratio | _ _ _ | 1.4:1 1.3:1 1.2:1 1.1:1 | 1.5:1 1.4:1 1.3:1 1.2:1 |
| Isolation | _ | DC - 3000 MHz DC - 2000 MHz DC - 1000 MHz DC - 500 MHz | dB dB dB dB | 25 35 35 65 | 29 40 60 70 | |
| Trise, Tfall | 10% to 90% | _ | ns | _ | 50 | _ |
| Ton, Toff | D1.3V CTL to 90% / 10% | _ | ns | _ | 150 | _ |
| Transients | In-Band | _ | mV | _ | 50 | _ |
| 1 dB Compression | Input Power | 0.05 GHz 0.5 GHz to 3 GHz | dBm dBm | _ | +21 +27 | _ |
| IP2 | Two-Tone Input Power up to +5 dBm | 0.05 GHz 0.5 GHz to 3 GHz | dBm dBm | _ | +62 +68 | _ |
| IP3 | Two-Tone Input Power up to +5 dBm | 0.05 GHz 0.5 GHz to 3 GHz | dBm dBm | _ | +40 +46 | _ |
| Vin Low | 0V to 0.8V | _ | μA | _ | _ | 1 |
| Vin High | 2.0V to 5.0V | _ | μA | _ | _ | 1 |
| Vcc | +5.0V ± 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.

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Absolute Maximum Ratings 3,4

| Parameter | Absolute Maximum |
|---|---|
| Max Input Power 50 MHz 500 - 3000 MHz | +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 | -40°C to +125°C |
| Storage Temperature | -65°C to +150°C |

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

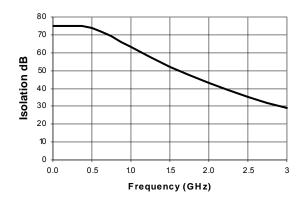
Handling Procedures

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.

Isolation vs. Frequency



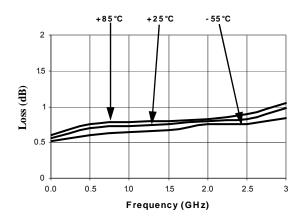
Truth Table (Switch)

| Control Input | Condition of Switch |
|---------------|---------------------|
| C1 | RF1 to RF2 |
| 0 | ON |
| 1 | OFF |

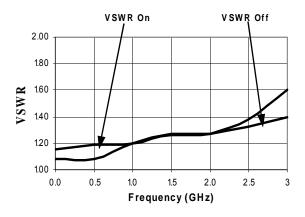
0 = TTL Low; 1 = TTL High

Typical Performance Curves

Insertion Loss vs. Frequency



VSWR vs. Frequency



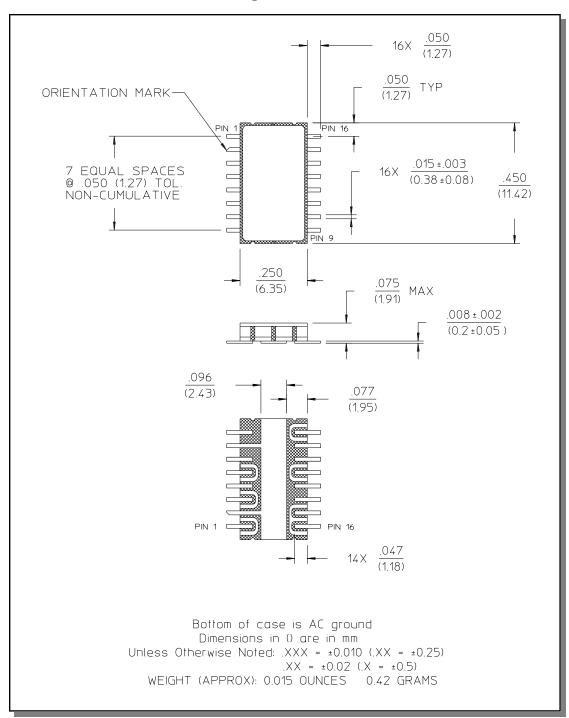
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Lead-Free, CR-9 Ceramic Package[†]



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

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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