

GaAs SP2T Absorptive Switch with ASIC Driver, DC-3.0 GHz

Rev. V3

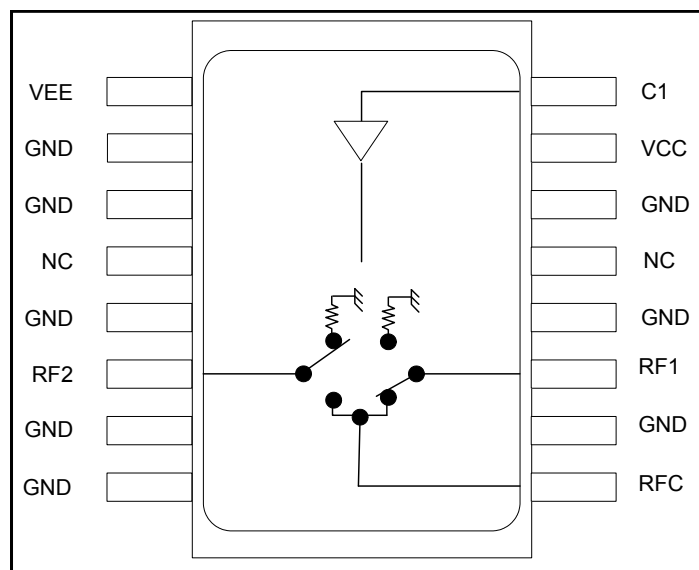
Features

- Typical Isolation: 30 dB (2,000 MHz)
- Typical Insertion Loss: .75 dB (2,000 MHz)
- ASIC TTL/CMOS Driver
- Low DC Power Consumption
- 50 Ohm Nominal Impedance
- Tape and Reel Packaging Available
- Test Boards Available
- Lead-Free SOIC-16 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of SW65-0313

Description

M/A-COM's MASW-007072-000100 is a GaAs MMIC absorptive SP2T switch with an integral silicon ASIC driver. This device is in a 16-lead plastic package. This switch offers excellent broadband performance and repeatability from DC to 3 GHz, while maintaining low DC power dissipation. The MASW-007072-000100 is ideally suited for wireless infrastructure applications. Also available in a ceramic package with improved performance.

Functional Schematic



Pin Configuration¹

| Pin No. | Function | Pin No. | Function |
|---------|-----------------|---------|-----------------|
| 1 | V _{EE} | 9 | RFC |
| 2 | GND | 10 | GND |
| 3 | GND | 11 | RF1 |
| 4 | NC | 12 | GND |
| 5 | GND | 13 | NC |
| 6 | RF2 | 14 | GND |
| 7 | GND | 15 | V _{CC} |
| 8 | GND | 16 | C1 |

1. NC = No Connection

Ordering Information

| Part Number | Package |
|--------------------|-------------------|
| MASW-007072-000100 | Bulk Packaging |
| MASW-007072-0001TR | 1000 piece reel |
| MASW-007072-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

¹ * Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

GaAs SP2T Absorptive Switch with ASIC Driver, DC-3.0 GHz

Rev. V3

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 | — | 0.6 | 0.75 |
| | DC - 2.0 GHz | dB | — | 0.75 | 0.90 |
| | DC - 3.0 GHz | dB | — | 1.2 | 1.45 |
| Isolation (All arms off) | DC - 1.0 GHz | dB | 35 | 38 | — |
| | DC - 2.0 GHz | dB | 27 | 30 | — |
| | DC - 3.0 GHz | dB | 21 | 24 | — |
| VSWR | DC - 1.0 GHz | — | — | 1.2:1 | 1.3:1 |
| | DC - 2.0 GHz | — | — | 1.3:1 | 1.4:1 |
| | DC - 3.0 GHz | — | — | 1.7:1 | 1.9:1 |
| T_{rise} T_{fall} T_{on} T_{off} Transients | 10%/90%, 90%/10% ² | 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 | — | +25 | — |
| | .5 - 3.0 GHz | dBm | — | +30 | — |
| Input IP ₃ | Two tone inputs 0.05 GHz | dBm | — | +40 | — |
| | 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} - 2.1 V | mA | — | — | 1.0 |
| I _{EE} | V _{EE} min to max, V _{in} = V _{IL} or V _{IH} | mA | -1.0 | -0.2 | — |

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

GaAs SP2T Absorptive Switch with ASIC Driver, DC-3.0 GHz

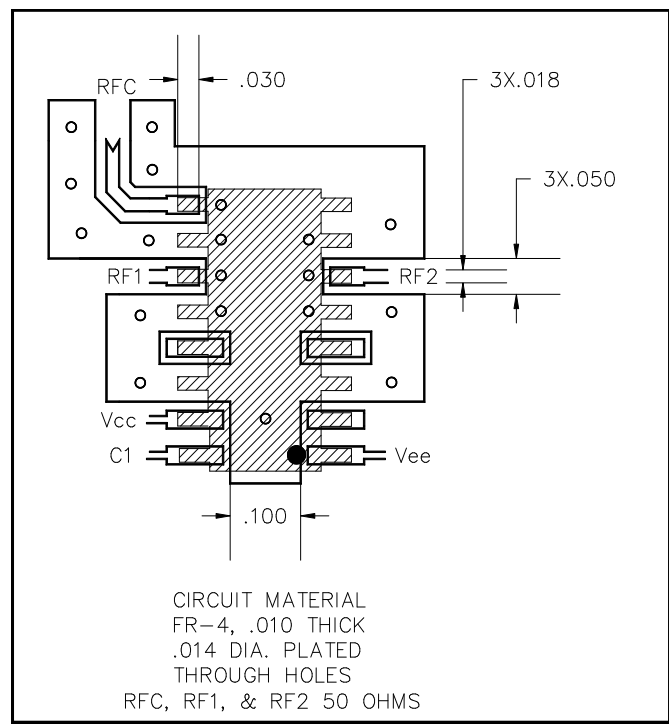
Rev. V3

Absolute Maximum Ratings^{3,4}

| Parameter | Absolute Maximum |
|--|---|
| Max. Input Power 0.05 GHz 0.5 - 3.0 GHz ⁵ | +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 |
| V _{in} ⁶ | -0.5V ≤ V _{in} ≤ V _{CC} + 0.5V |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +125°C |

- 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.

Recommended PCB Configuration



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.

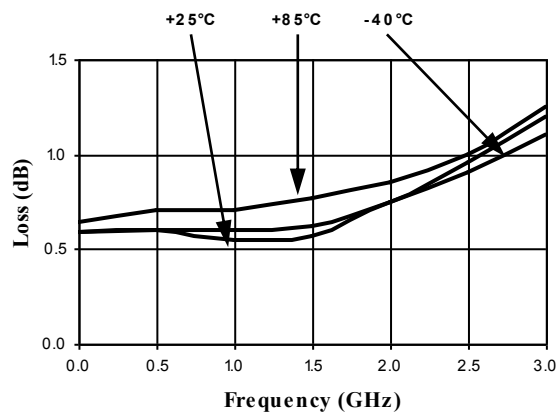
Truth Table (Switch)

| C1 | RF1 | RF2 |
|----|-----|-----|
| 0 | On | Off |
| 1 | Off | On |

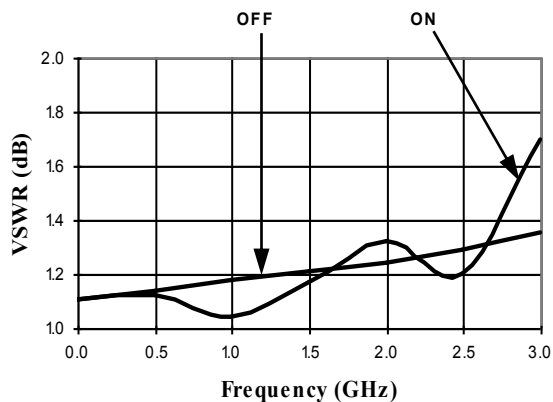
0 = TTL Low; 1 = TTL High

Typical Performance Curves

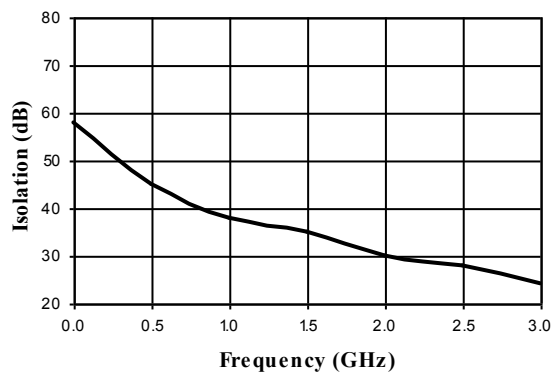
Typical Insertion Loss (dB)



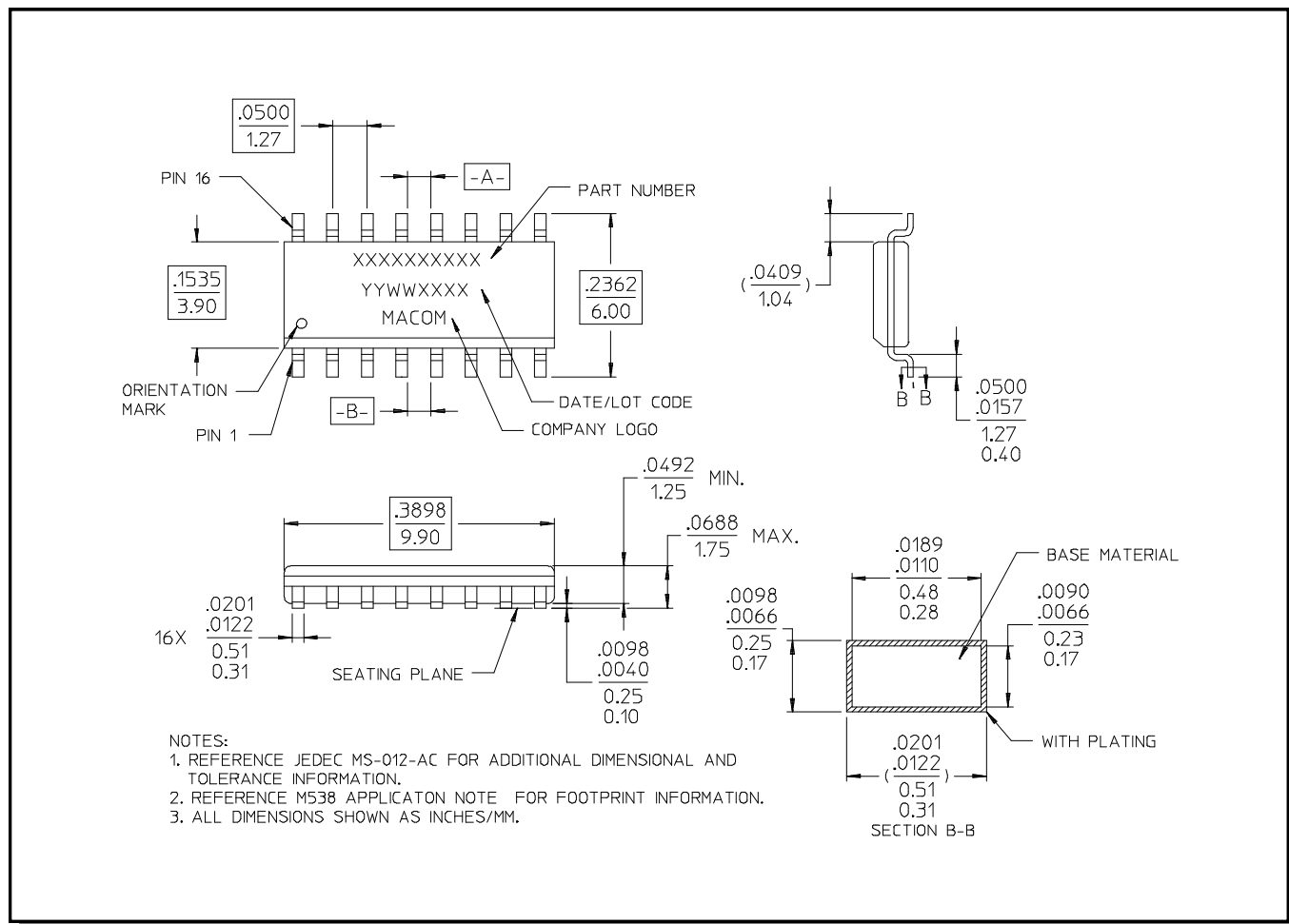
Typical VSWR



Typical Isolation (dB)



Lead-Free, SOIC-16[†]



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

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.