

GaAs SP3T Absorptive Switch with ASIC Driver, DC-3.0 GHz

MASW-007074-000100
V3

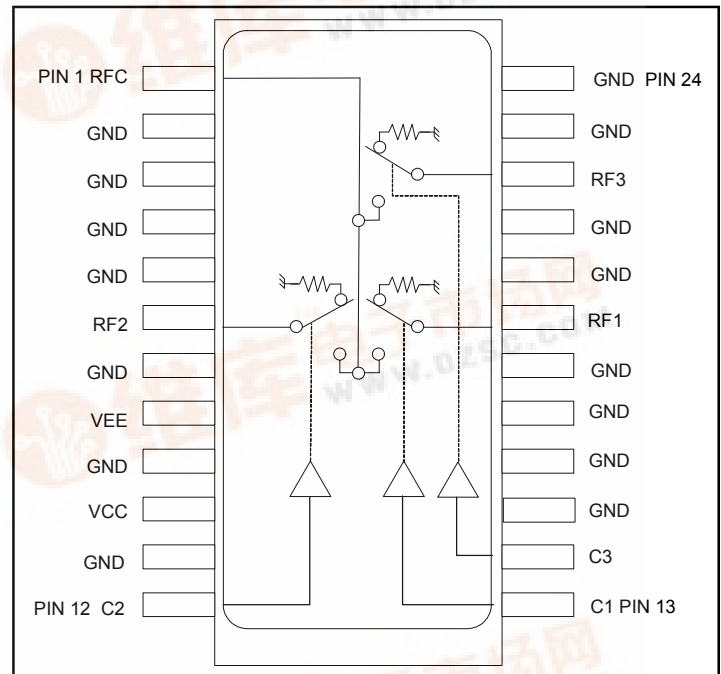
Features

- Typical Isolation: 32 dB (2,000 MHz)
- Typical Insertion Loss: 2.0 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 SW65-0214

Description

M/A-COM's MASW-007074-000100 is a GaAs MMIC absorptive SP3T 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-007074-000100 is ideally suited for wireless infrastructure applications. Also available in 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 | GND | 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 | GND | 23 | GND |
| 12 | C2 | 24 | GND |

Ordering Information

| Part Number | Package |
|--------------------|-------------------|
| MASW-007074-000100 | Bulk Packaging |
| MASW-007074-0001TR | 1000 piece reel |
| MASW-007074-0001TB | Sample Test Board |

Note: Reference Application Note M513 for reel size information.

Note: Die quantity varies.

* 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 - 3.0 GHz | dB | — | 2.0 | 2.3 |
| Isolation (All arms off) | DC - 3.0 GHz | dB | 30 | 32 | — |
| VSWR | DC - 3.0 GHz On Off | — — | — — | 1.7:1 2.2:1 | 2.4:1 2.4:1 |
| T_{rise} T_{fall} T_{on} T_{off} Transients | 10%/90%, 90%/10% ¹ 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_3 | Two tone inputs 0.05 GHz up to +5 dBm 0.5 - 3.0 GHz | dBm dBm | — — | +35 +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 HIGH-level input voltage | V V | 0.0 2.0 | — — | 0.8 5.0 |
| I_{in} (Input Leakage Current) | $V_{in} = V_{CC}$ or GND | μA | -1.0 | — | 1.0 |
| I_{cc} (Quiescent Supply Current) | $V_{cntrl} = V_{CC}$ or GND | μA | — | 250 | 400 |
| ΔI_{cc} (Additional Supply Current Per TTL Input Pin) | $V_{CC} = \text{Max}$, $V_{cntrl} = V_{CC} - 2.1 \text{ V}$ | 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} | $-0.5\text{V} \leq V_{CC} \leq +7.0\text{V}$ |
| V_{EE} | $-8.5\text{V} \leq V_{EE} \leq +0.5\text{V}$ |
| $V_{CC} - V_{EE}$ | $-0.5\text{V} \leq V_{CC} - V_{EE} \leq 14.5\text{V}$ |
| V_{in} ⁵ | $-0.5\text{V} \leq V_{in} \leq V_{CC} + 0.5\text{V}$ |
| 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.

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 | C3 | RF1 | RF2 | RF3 |
| 1 | 0 | 0 | On | Off | Off |
| 0 | 1 | 0 | Off | On | Off |
| 0 | 0 | 1 | Off | Off | On |

0 = TTL Low; 1 = TTL High

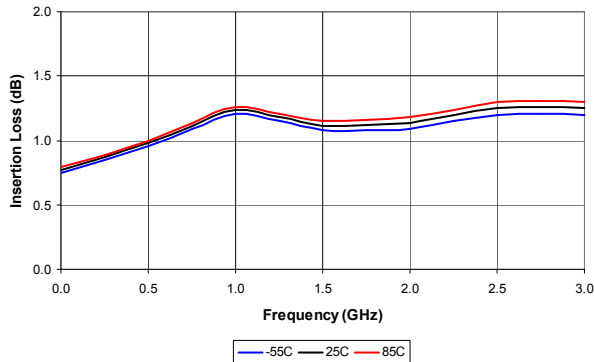
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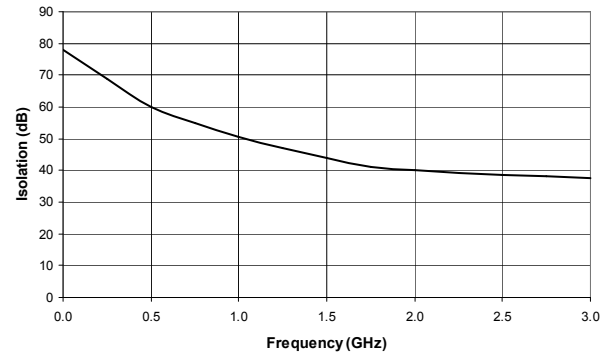
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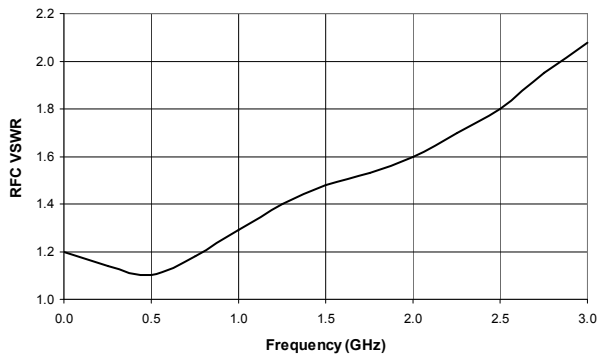
Insertion Loss vs. Frequency



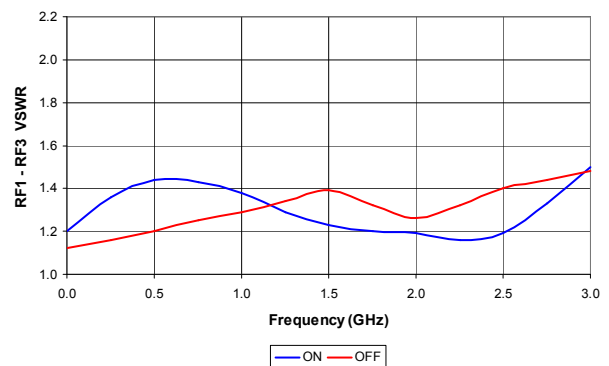
Isolation Loss vs. Frequency



RFC VSWR vs. Frequency



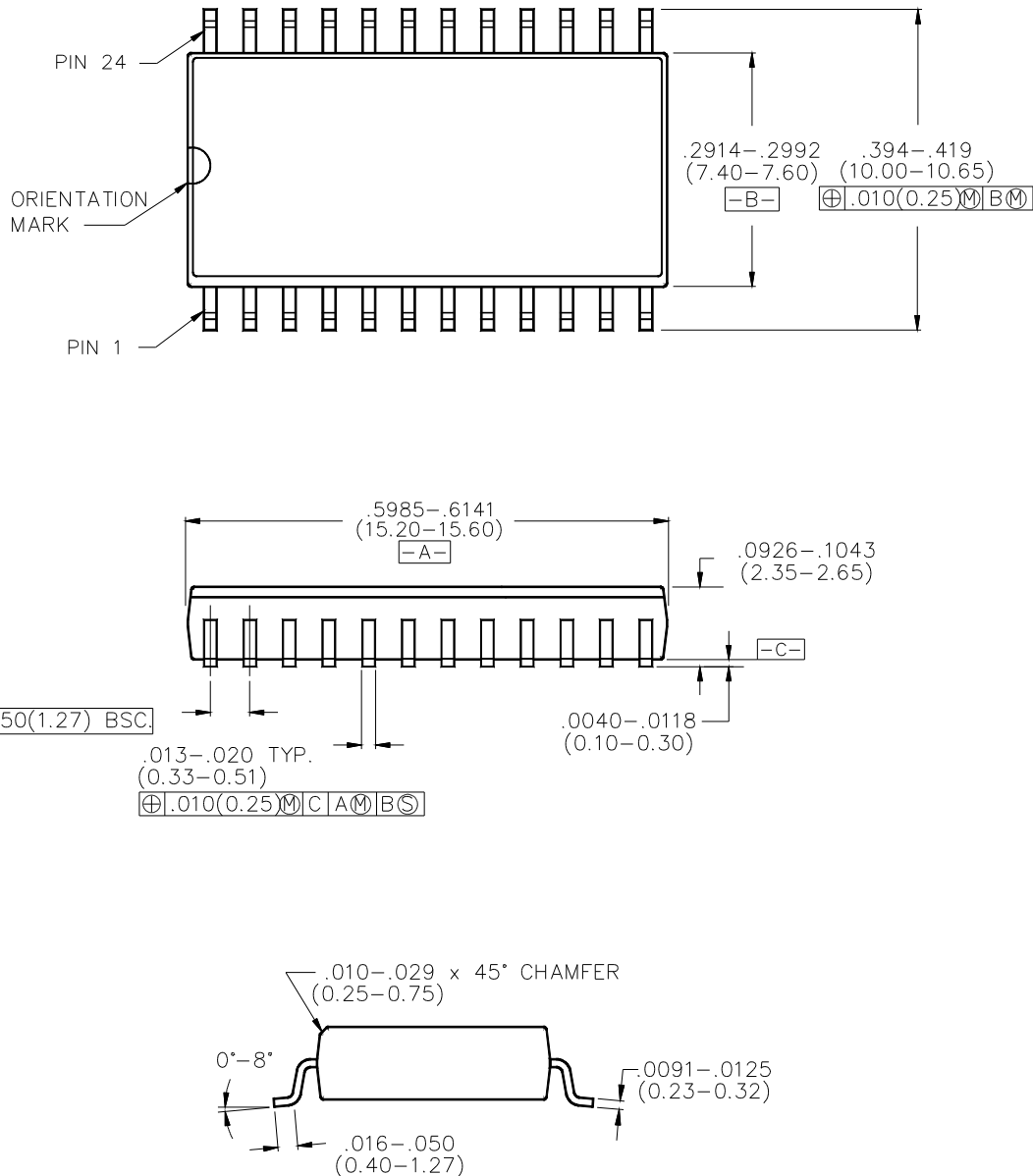
RF1-RF3 VSWR vs. Frequency



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Lead-Free, SOW-24[†]



Package outline conforms to JEDEC standard MS-013AD.

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