

## SPST High Isolation CATV Switch 5 - 1000 MHz

Rev. V1

### Features

- 75 Ohm Impedance
- Positive Voltage Control (0 / +5 V)
- Input Terminated (Off State)
- Low Insertion Loss: 0.62 dB at 870 MHz
- High Isolation: 54 dB at 870 MHz
- 3 mm FQFP-N 12 Lead Package
- 0.5 micron GaAs PHEMT Process

### Description

M/A-COM's MASWSS0067 is a GaAs PHEMT MMIC single pole single throw (SPST) switch in a low cost 3 mm FQFP-N 12 lead package. The MASWSS0067 is ideally suited for applications where low control voltage, low insertion loss, high isolation, small size and low cost are required. Typical applications are to replace mechanical relays in CATV systems. This part can be used in all 75 ohm systems operating up to 1.0 GHz.

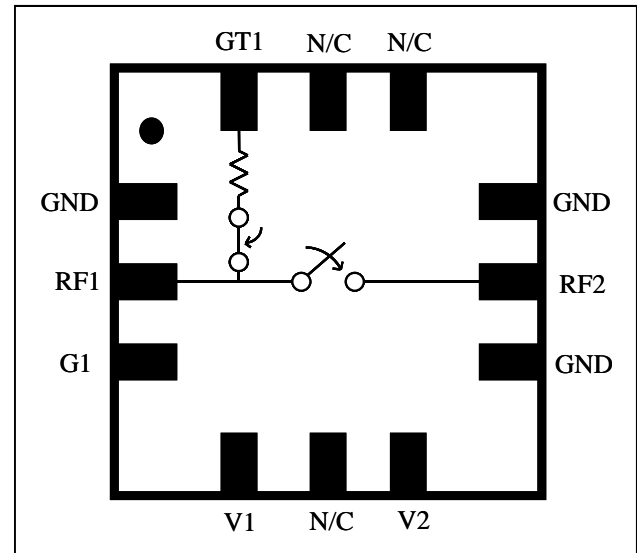
The MASWSS0067 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

### Ordering Information <sup>1</sup>

| Part Number       | Package                                   |
|-------------------|---|
| MASWSS0067        | FQFP-N 12-lead Plastic Package            |
| MASWSS0067TR      | 7 inch, 1000 piece reel                   |
| MASWSS0067TR-3000 | 13 inch, 3000 piece reel                  |
| MASWSS0067SMB     | Sample Test Board<br>(Includes 5 Samples) |

1. Reference Application Note M513 for reel size information.

### Functional Schematic



### Pin Configuration <sup>2</sup>

| PIN No. | PIN Name | Description   |
|---------|----------|---------------|
| 1       | GND      | Ground        |
| 2       | RF1      | RF In         |
| 3       | G1       | RF Ground     |
| 4       | V1       | Control 1     |
| 5       | N/C      | No Connection |
| 6       | V2       | Control 2     |
| 7       | GND      | Ground        |
| 8       | RF2      | RF Out        |
| 9       | GND      | Ground        |
| 10      | N/C      | No Connection |
| 11      | N/C      | No Connection |
| 12      | GT1      | RF Ground     |

2. The exposed pad centered on the package bottom must be connected to both RF and DC ground.

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### Electrical Specifications: $T_A = 25^\circ\text{C}$ , $V_C = 0\text{V} / 5\text{V}$ , $Z_0 = 75 \Omega$ <sup>3</sup>

| Parameter                       | Test Conditions                                   | Units         | Min. | Typ. | Max. |
|---------------------------------|---|---------------|------|------|------|
| Insertion Loss                  | 5 - 50 MHz  | dB            | —    | 0.45 | —    |
|                                 | 50 - 1000 MHz                                     | dB            | —    | 0.65 | 0.9  |
| Isolation                       | 5 - 50 MHz  | dB            | —    | 70   | —    |
|                                 | 50 - 1000 MHz                                     | dB            | 50   | 53   | —    |
| Return Loss (On)                | 5 - 50 MHz  | dB            | —    | 30   | —    |
|                                 | 50 - 1000 MHz                                     | dB            | —    | 16   | —    |
| Return Loss (Off)<br>(RF1 only) | 5 - 50 MHz  | dB            | —    | 30   | —    |
|                                 | 50 - 1000 MHz                                     | dB            | —    | 18   | —    |
| IP3                             | Two Tone, +10 dBm / tone, 6 MHz Spacing, > 50 MHz | dBm           | —    | 52   | —    |
| Trise, Tfall                    | 10% to 90% RF, 90% to 10% RF                      | nS            | —    | 20   | —    |
| Ton, Toff                       | 50% control to 90% RF, and 50% control to 10% RF  | nS            | —    | 40   | —    |
| Transients                      | In Band   | mV            | —    | 30   | —    |
| Control Current                 | $ V_C  = 5\text{V}$                               | $\mu\text{A}$ | —    | 10   | 25   |

3. External DC blocking capacitors are required on all RF ports.

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

| Parameter                                       | Absolute Maximum  |
|---|-------------------|
| Max Input Power<br>(5 - 1000 MHz, 2.5V Control) | +32 dBm           |
| Operating Voltage                               | +8.5 volts        |
| Operating Temperature                           | -40 °C to +85 °C  |
| Storage Temperature                             | -65 °C to +150 °C |

4. Exceeding any one or combination of these limits may cause permanent damage to this device.

### Truth Table<sup>5</sup>

| V1 | V2 | RF1—RF2 |
|----|----|---------|
| 1  | 0  | On      |
| 0  | 1  | Off     |

5. 0 = 0 V  $\pm$  0.2 V; 1 = +2.5 V to +5.0 V.

### Qualification

Qualified to M/A-COM Specification Rel 201, Process Flow -2.

### Handling Procedures

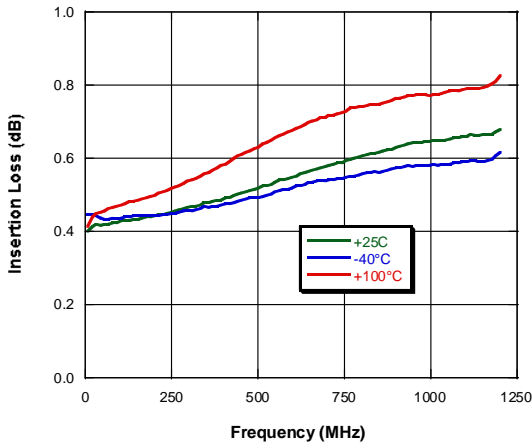
Please observe the following precautions to avoid damage:

### Static Sensitivity

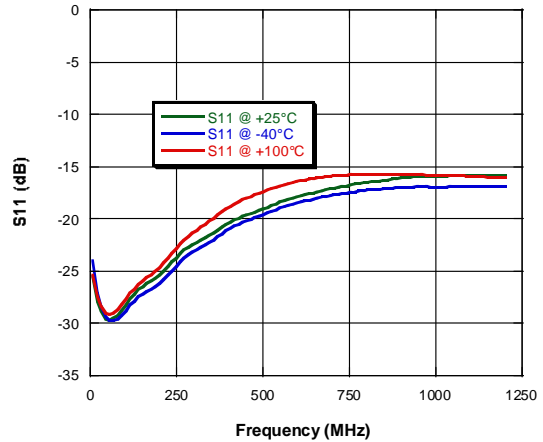
Gallium arsenide integrated circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Use proper ESD control precautions when handling these devices.

## Typical Performance Curves

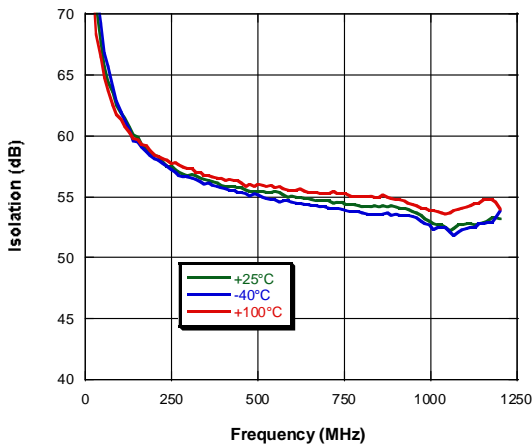
*Insertion Loss vs. Frequency over Temperature*



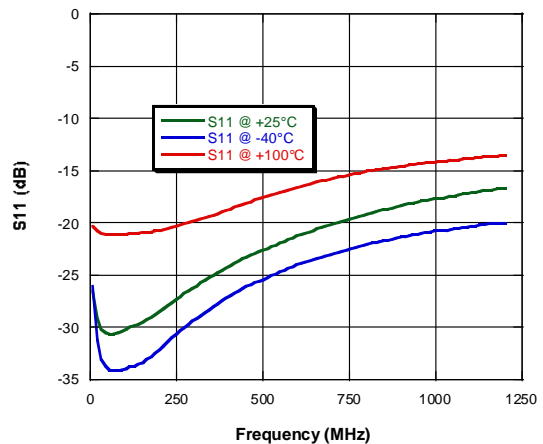
*S11 (Switch On) vs. Frequency over Temperature*



*Isolation vs. Frequency over Temperature*



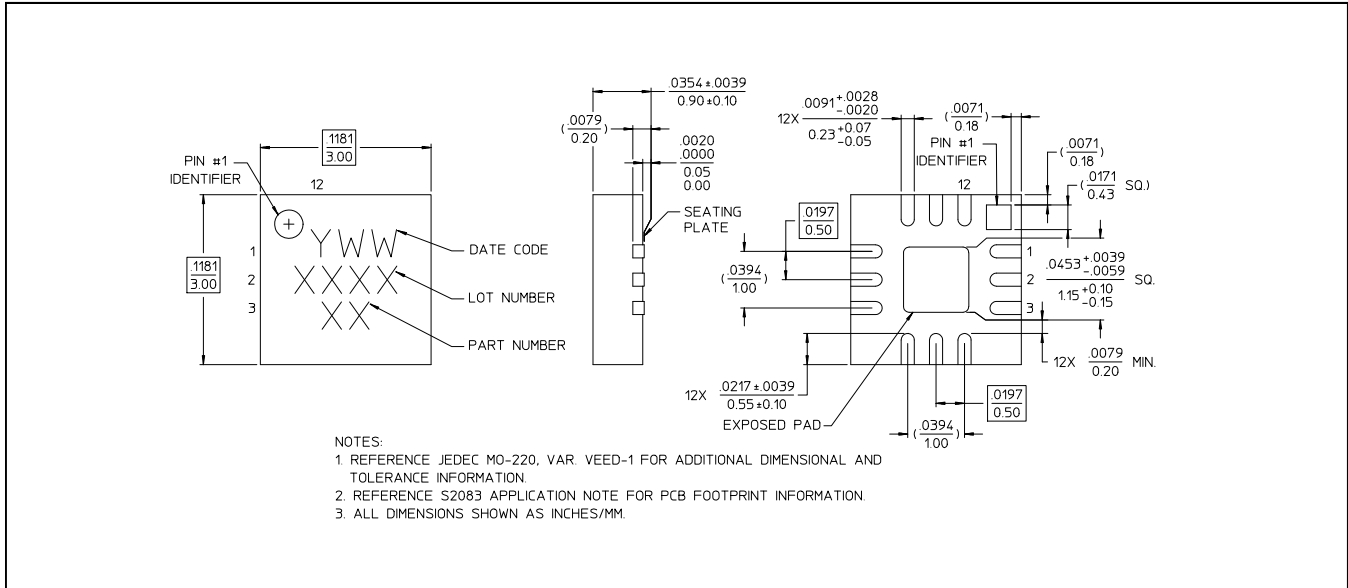
*S11 (Switch Off) vs. Frequency over Temperature*



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### 3 mm PQFN 12 Lead



### Application Schematic

