

## GaAs SPST Switch DC - 2.5 GHz

Rev. V3

### Features

- Very Low Power Consumption: 50  $\mu$ W
- Low Insertion Loss: 1.0 dB
- High Isolation: 35 dB up to 2 GHz
- Very High Intercept Point: 46 dBm IP3
- Nanosecond Switching Speed
- Temperature Range:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Lead-Free SOIC-8 Plastic Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- $260^{\circ}\text{C}$  Reflow Compatible
- RoHS\* Compliant Version of SW-259

### Description

M/A-COM's MASWSS0162 is a GaAs MMIC SPST switch in a lead-free SOIC-8 lead surface mount plastic package. The MASWSS0162 is ideally suited for use where low power consumption is required. Typical applications include transmit/receive switching, switch matrices and switched filter banks in systems such as radio and cellular equipment, PCM, GPS, fiber optic modules, and other battery powered radio equipment.

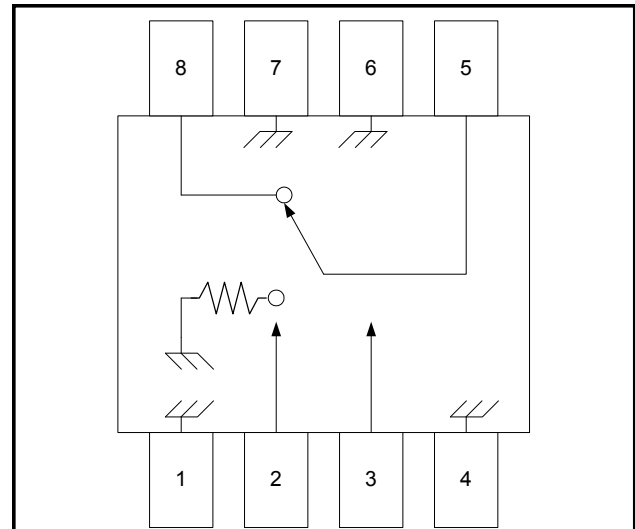
The MASWSS0162 is fabricated using a monolithic GaAs MMIC using a mature 1 micron process. The process features full chip passivation for increased performance and reliability.

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

| Part Number  | Package         |
|--------------|-----------------|
| MASWSS0162   | Bulk Packaging  |
| MASWSS0162TR | 1000 piece reel |

1. Reference Application Note M513 for reel size information.

### Functional Schematic



### Pin Configuration

| PIN No. | Description | PIN No. | Description |
|---------|-------------|---------|-------------|
| 1       | Ground      | 5       | RF Port 2   |
| 2       | A           | 6       | Ground      |
| 3       | B           | 7       | Ground      |
| 4       | Ground      | 8       | RF Port 1   |

### Absolute Maximum Ratings<sup>2,4</sup>

| Parameter   | Absolute Maximum                                |
|---|---|
| Input Power <sup>3</sup><br>0.05 GHz<br>0.5 – 2.0 GHz | +27 dBm<br>+34 dBm                              |
| Control Voltage                                       | +5 V, -8.5 V                                    |
| Operating Temperature                                 | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$  |
| Storage Temperature                                   | $-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ |

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. When the RF Input power is applied to a terminated port, the absolute maximum is +32 dBm.
4. M/A-COM does not recommend sustained operation near these survivability limits.

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

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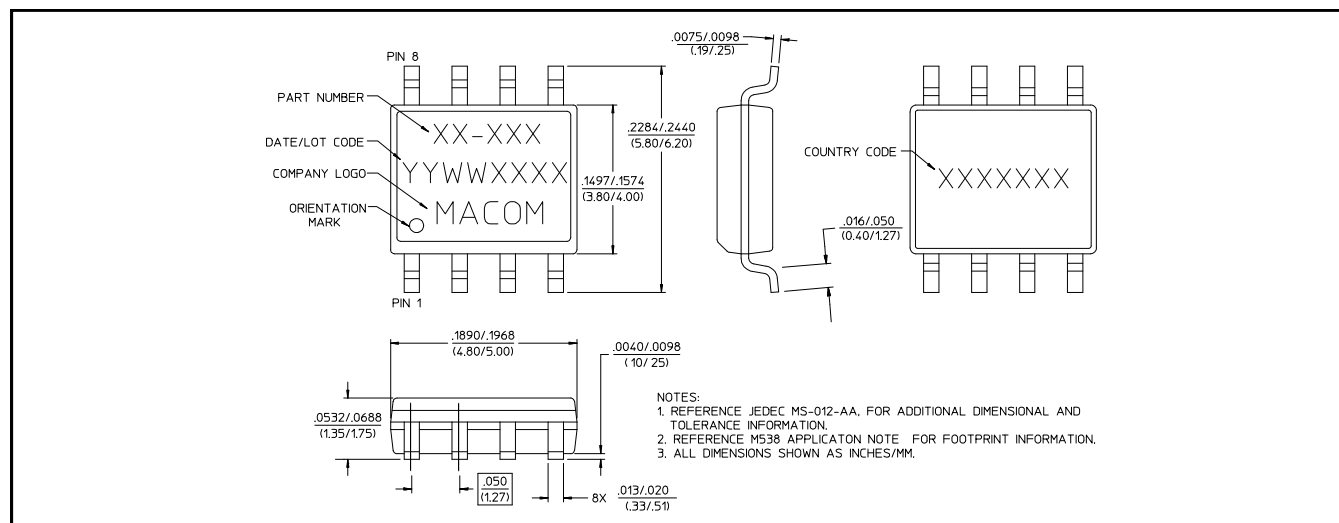
Electrical Specifications:  $T_A = +25^\circ C^5$ ,  $V_C = -5 V / 0 V$ ,  $P_{IN} = 0 \text{ dBm}$

| Parameter                   | Test Conditions   | Units   | Min | Typ <sup>5</sup> | Max |
|-----------------------------|---|---------|-----|------------------|-----|
| Insertion Loss <sup>6</sup> | DC - 0.5 GHz  | dB      | —   | 0.8              | —   |
|                             | 0.5 - 1.0 GHz   | dB      | —   | 0.9              | 1.2 |
|                             | 1.0 - 2.0 GHz   | dB      | —   | 1.1              | —   |
| Isolation <sup>6</sup>      | DC - 0.5 GHz  | dB      | —   | 65               | —   |
|                             | 0.5 - 1.0 GHz   | dB      | 45  | 53               | —   |
|                             | 1.0 - 2.0 GHz   | dB      | —   | 40               | —   |
| VSWR On<br>VSWR Off         | DC - 2.0 GHz  | Ratio   | —   | 1.2:1            | —   |
|                             | DC - 2.0 GHz  | Ratio   | —   | 1.2:1            | —   |
| 1 dB Compression            | Input Power<br>0.05 GHz   | dBm     | —   | 18               | —   |
|                             | 0.5 - 2.0 GHz   | dBm     | —   | 23               | —   |
| Trise, Tfall                | 10% to 90% RF, 90% to 10% RF  | nS      | —   | 4                | —   |
| Ton, Toff                   | 50% Control to 90% RF, Control to 10% RF                            | nS      | —   | 8                | —   |
| Transients                  | In-Band   | mV      | —   | 35               | —   |
| 2nd Order Intercept         | Measured Relative to Input Power, two-tone up to +5 dBm<br>0.05 GHz | dBm     | —   | 55               | —   |
|                             | 0.5 - 2.0 GHz   | dBm     | —   | 68               | —   |
| 3rd Order Intercept         | Measured Relative to Input Power, two-tone up to +5 dBm<br>0.05 GHz | dBm     | —   | 40               | —   |
|                             | 0.5 - 2.0 GHz   | dBm     | —   | 46               | —   |
| Control Current             | —   | $\mu A$ | —   | —                | 25  |

5. All measurements with 0, -5 V control voltages at 1.0 GHz in a 50  $\Omega$  system, unless otherwise specified.

6. Typical values listed are based on average of frequency range noted.

### Lead-Free SOIC-8<sup>†</sup>

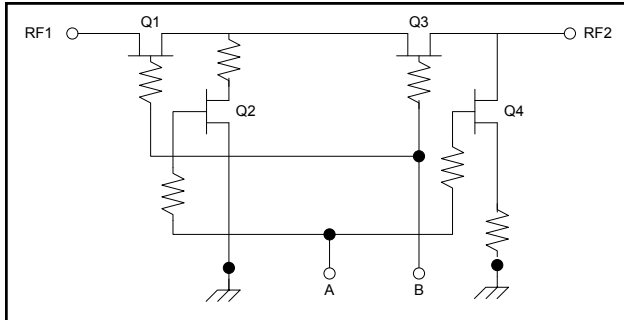


<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.

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### Electrical Schematic



### Truth Table <sup>7,8</sup>

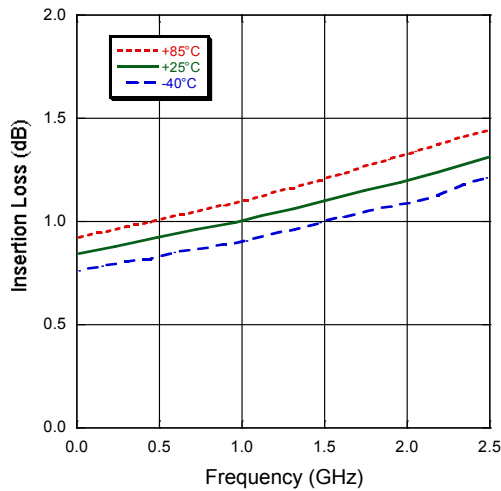
| Control Inputs |   | Condition of Switch |
|----------------|---|---------------------|
| A              | B | RF State            |
| 1              | 0 | On                  |
| 0              | 1 | Off                 |

7. "0" = 0 to -0.2 V @ 20 mA max.

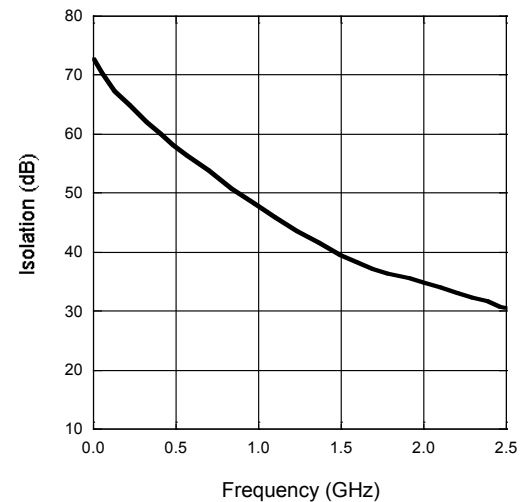
8. "1" = -5 V @ 20 mA Typ to -8 V @ 600 mA max.

### Typical Performance Curves

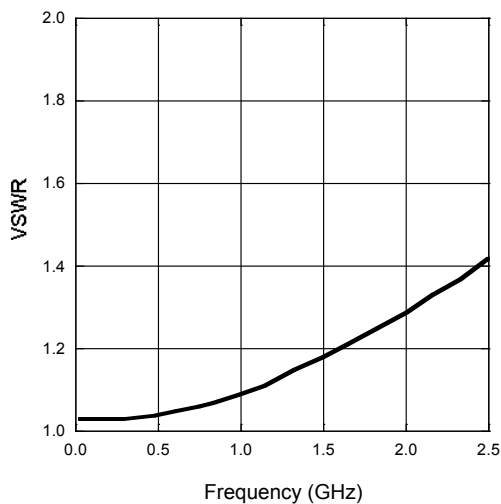
#### Insertion Loss



#### Isolation



#### VSWR



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