

3 V GaAs SPDT Switch DC - 2.0 GHz

Rev. V3

Features

- Low Insertion Loss: <math><0.5\text{ dB}</math> @ 900 MHz
- Low Power Consumption: <math><1.0\text{ }\mu\text{A}</math> @ 3 VDC
- Very High Intercept Point: 52 dBm IP3
- Both Positive and Negative 3 to 8 V Control
- Lead-Free SOT-26 Package
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of SW-395

Description

The MASWSS0179 is a GaAs single pole, double throw switch in a lead-free SOT-26 surface mount plastic package. The MASWSS0179 is ideally suited for applications where very low power consumption, low intermodulation products, very small size and low cost are required.

Typical application is an internal / external antenna select switch for portable telephones and data radios. In addition, because of its low loss, good isolation and inherent speed, the MASWSS0179 can be used as a conventional T/R switch or as an antenna diversity switch. The MASWSS0179 can be used in power applications up to 0.5 Watts in systems such as cellular, PCS, GSM and other analog / digital wireless communications systems.

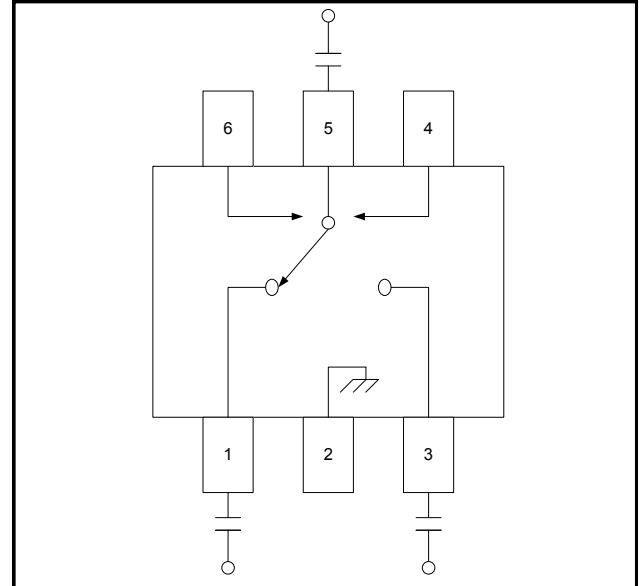
The MASWSS0179 is fabricated using a mature 0.5-micron gate length GaAs pHEMT process. The process features full chip passivation for increased performance and reliability.

Ordering Information ¹

| Part Number | Package |
|-------------------|-----------------|
| MASWSS0179 | Bulk Packaging |
| MASWSS0179TR-3000 | 3000 piece reel |

1. Reference Application Note M513 for reel size information.

Functional Schematic ²



2. DC blocking capacitors are not required if negative control voltage is used.

Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|-----------|
| 1 | RF1 | 4 | Control B |
| 2 | Ground | 5 | RF Common |
| 3 | RF2 | 6 | Control A |

Absolute Maximum Ratings ^{3,4}

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Input Power | +33 dBm |
| Operating Voltage | +8.5 Volts |
| Storage Temperature | -65°C to +150°C |
| Operating Temperature | -40°C to +85°C |

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

4. M/A-COM Technology does not recommend sustained operation near these survivability limits.

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

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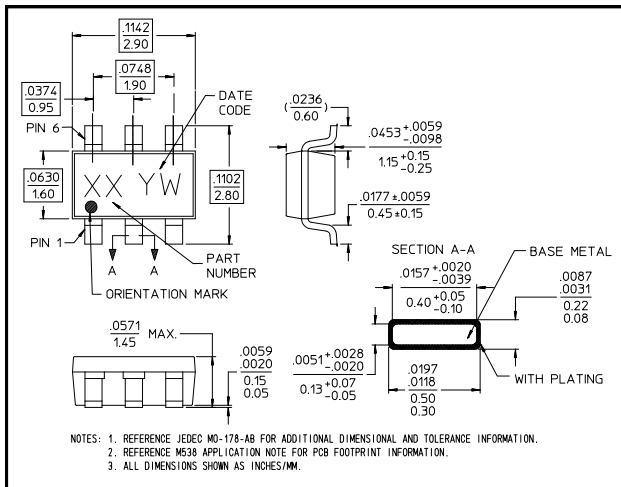
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Electrical Specifications: $T_A = +25^\circ\text{C}$, $V_C = 0\text{ V} / -3\text{ V}$, $Z_0 = 50\ \Omega$ ⁵

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|-----------------------|--|-------|------|-------|------|
| Insertion Loss | DC - 1.0 GHz | dB | — | 0.5 | 0.7 |
| | 1.0 - 2.0 GHz | | — | 0.6 | 0.8 |
| Isolation | DC - 1.0 GHz | dB | 25 | 28 | — |
| | 1.0 - 2.0 GHz | | 19 | 22 | — |
| VSWR | DC - 2.0 GHz | Ratio | — | 1.3:1 | — |
| 1 dB Compression | 0.5 GHz, Input Power (3 V Control) | dBm | — | 26 | — |
| | 0.5 GHz, Input Power (5 V Control) | | — | 30 | — |
| | 0.05 GHz, Input Power (3 V Control) | | — | 16 | — |
| | 0.05 GHz, Input Power (5 V Control) | | — | 16 | — |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | ns | — | 3 | — |
| Ton, Toff | 50% Control to 90% RF, 50% Control to 10% RF | ns | — | 5 | — |
| Transients | In-Band | mV | — | 15 | — |
| Input IP ₂ | 2-Tone, 5 MHz spacing, 3 V Control, +10 dBm each | dBm | — | 69 | — |
| | 0.05 GHz 0.5 GHz | | — | 80 | — |
| Input IP ₃ | 2-Tone, 5 MHz spacing, 3 V Control, +10 dBm each | dBm | — | 48 | — |
| | 0.05 GHz 0.5 GHz | | — | 52 | — |
| Control Current | $ V_C = 3\text{ V}$ | mA | — | 1 | 10 |

5. For positive voltage control, external DC blocking capacitors are required on all RF ports.

Lead-Free SOT-26[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

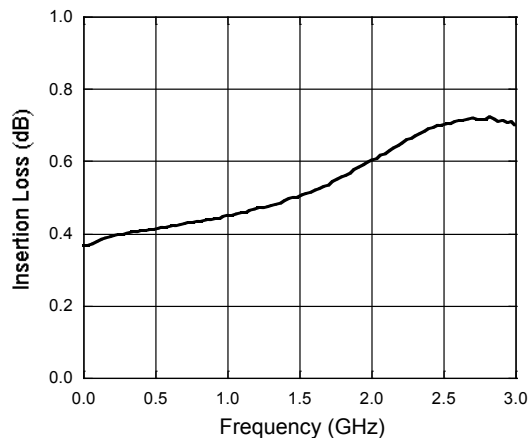
Truth Table^{6,7,8}

| Control A | Control B | RFC to RF1 | RFC to RF2 |
|-----------|-----------|------------|------------|
| 0 | 1 | Off | On |
| 1 | 0 | On | Off |

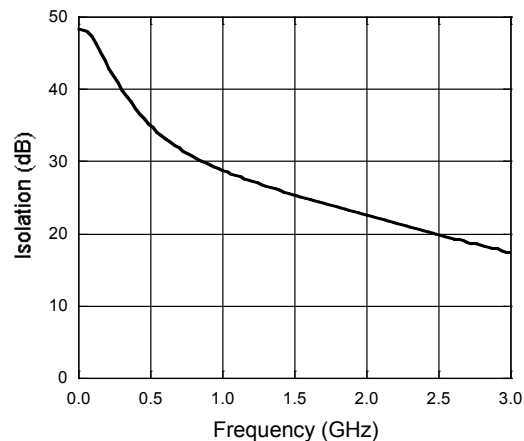
6. For positive voltage control, external DC blocking capacitors are required on all RF ports.
7. 0 = -8 V to 0 V, 1 = 0 V to +8 V.
8. Differential voltage, V (state 1) - V (state 0), must be +2.8 V minimum and must not exceed +8 V.

Typical Performance Curves

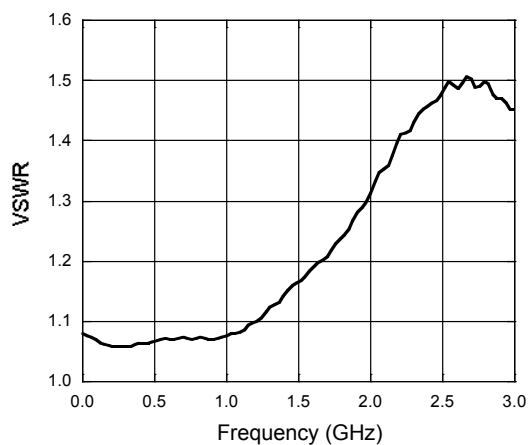
Insertion Loss



Isolation



VSWR



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.

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