

3 Watt Cellular T/R and Antenna Changeover Switch DC - 3.0 GHz

Rev. V5

Features

- Low Insertion Loss: < 0.4 dB @ 1900 MHz
- Low Current Consumption: <20 μ A @ +5V
- High Intercept Point: 58 dBm @ 1 GHz
- Positive or Negative Voltage Control
- CDMA, W-CDMA, TDMA, GSM, PCS and DCS
- Lead-Free Plastic SOT-26 Package
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of SW-425

Description

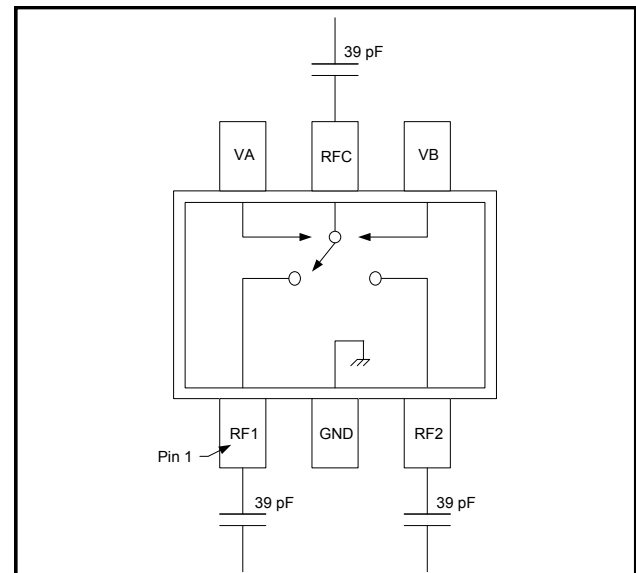
The MASWSS0143 is a GaAs monolithic switch in a lead-free, SOT-26 surface mount plastic package. This device is ideally suited for applications where very low power consumption, low intermodulation products and very small size are required.

Typical applications include internal / external antenna select switch for portable telephones and data radios. In addition because of its low loss, good isolation, and inherent speed, the MASWSS0143 can be used as a conventional T/R switch or as an antenna diversity switch.

The MASWSS0143 can be used in power applications up to 3 watts in systems such as cellular PCS, CDMA, W-CDMA, TDMA, GSM and other analog / digital wireless communications systems.

The MASWSS0143 is fabricated using a 0.5 micron gate length GaAs pHEMT process. The process features full chip passivation for increased performance and reliability.

Functional Block Diagram



Pin Configuration

| Pin No. | Function | Description |
|---------|----------|-------------------|
| 1 | RF1 | RF In/Out |
| 2 | GND | RF Ground |
| 3 | RF2 | RF In/Out |
| 4 | VB | Voltage Control B |
| 5 | RFC | RF Common |
| 6 | VA | Voltage Control A |

Absolute Maximum Ratings ^{2,3}

| Parameter | Absolute Maximum |
|------------------------------------|------------------|
| Input Power (1 GHz) 5 V Control | +36 dBm |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM Technology does not recommend sustained operation near these survivability limits.

Ordering Information ¹

| Part Number | Package |
|-------------------|-----------------|
| MASWSS0143 | Bulk Packaging |
| MASWSS0143TR | 1000 piece reel |
| MASWSS0143TR-3000 | 3000 piece reel |

1. Reference Application Note M513 for reel size information.

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

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_{CTL} = 0/5\text{ V}$, $P_{IN} = 30\text{ dBm}$, $Z_0 = 50\ \Omega^4$

| Parameters | Test Conditions | Units | Min. | Typ. | Max. |
|-----------------|--|-------|------|-------|------|
| Insertion Loss | DC - 1 GHz | dB | — | 0.35 | 0.50 |
| | 1 - 2 GHz | dB | — | 0.40 | — |
| | 2 - 3 GHz | dB | — | 0.65 | — |
| Isolation | DC - 1 GHz | dB | 18 | 22 | — |
| | 1 - 2 GHz | dB | — | 16 | — |
| | 2 - 3 GHz | dB | — | 11 | — |
| VSWR | DC - 3 GHz | Ratio | — | 1.2:1 | — |
| P1dB | 1 GHz | dBm | — | 36 | — |
| IP2 | 2-Tone, 5 MHz Spacing, 1 GHz $P_{in} = +10\text{ dBm}$ / Tone | dBm | — | 110 | — |
| IP3 | 2-Tone, 5 MHz Spacing, 1 GHz $P_{in} = +10\text{ dBm}$ / Tone | dBm | — | 58 | — |
| 2nd Harmonics | $P_{in} = +30\text{ dBm}$, $f_0 = 1\text{ GHz}$ | dBc | — | -78 | — |
| 3rd Harmonics | $P_{in} = +30\text{ dBm}$, $f_0 = 1\text{ GHz}$ | dBc | — | -82 | -70 |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | ns | — | 20 | — |
| Ton, Toff | 50% control to 90% RF, 50% control to 10% RF | ns | — | 60 | — |
| Transients | | mV | — | 20 | — |
| Control Current | $V_{CTL} = 5\text{ V}$ | mA | — | 5 | 20 |

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

Truth Table ^{5,6}

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

5. Differential voltage, V (state 1) - V (state 0), must be +2.5 V minimum and must not exceed 8 V.

6. 0 = -8 V to 0 V, 1 = -5.5 V to 8.0 V

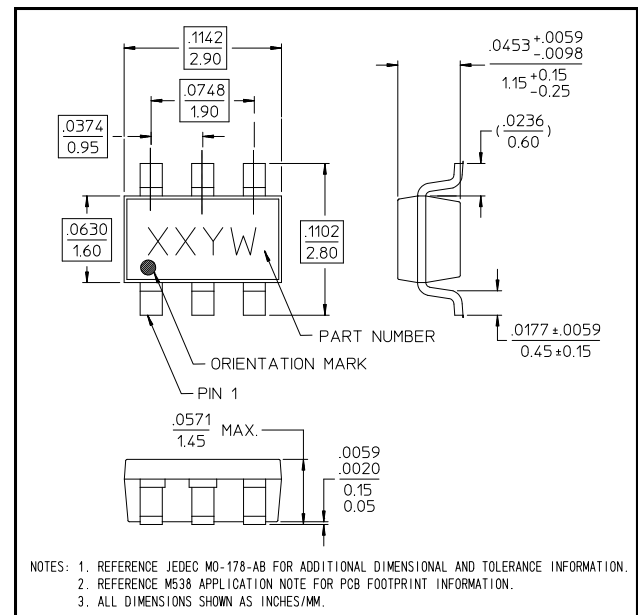
Handling Procedures

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.

Lead-Free SOT-26†



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

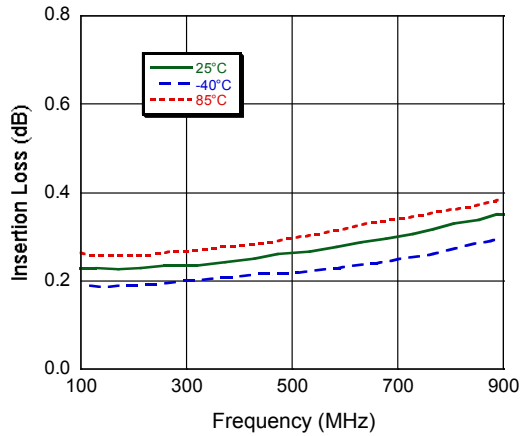
Plating is 100% matte tin over copper.

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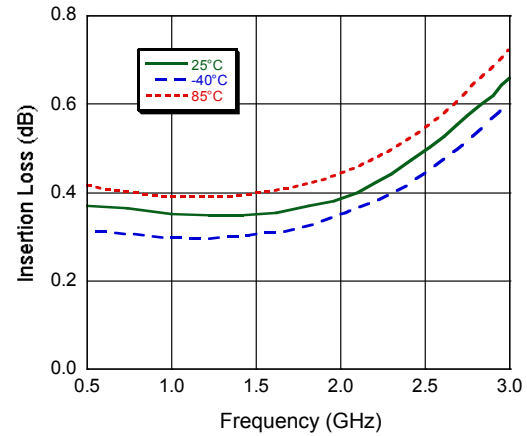
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Typical Performance Curves

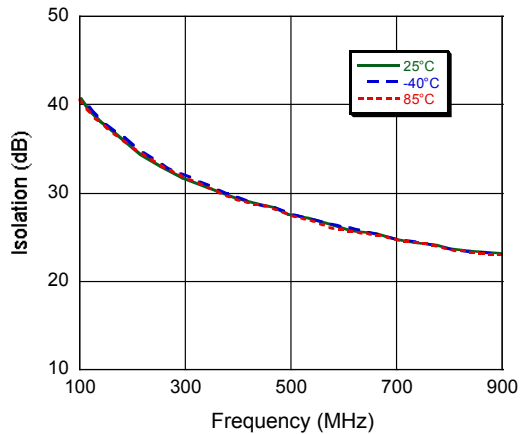
Insertion Loss, 1000 pF



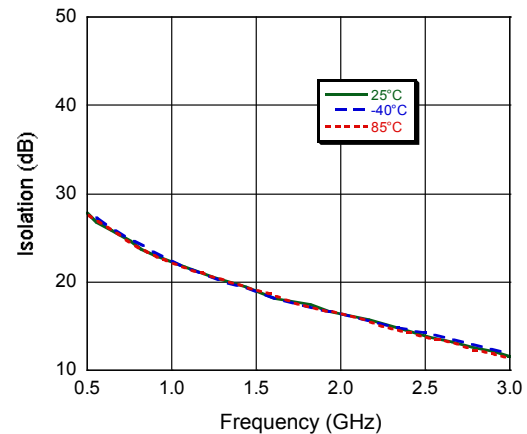
Insertion Loss, 39 pF



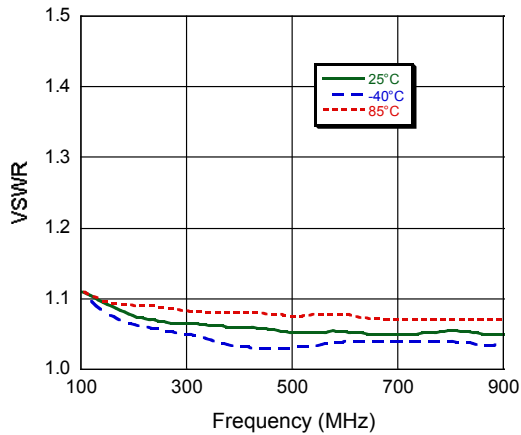
Isolation, 1000 pF



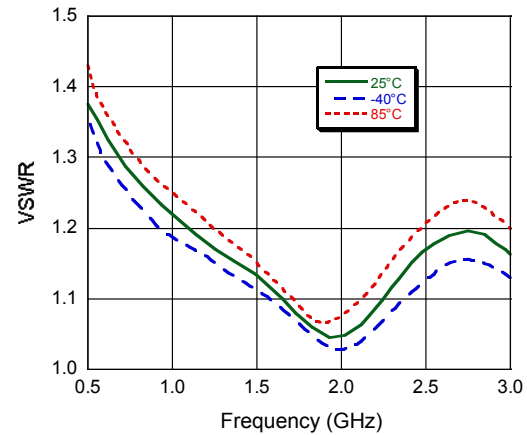
Isolation, 39 pF



VSWR, 1000 pF



VSWR, 39 pF



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