

MASWSS0144

2.7 V GaAs SP3T Switch: GSM - CDMA - GPS
DC - 3.0 GHz

Rev. V1

Features

- Dedicated RF Ports (GSM, CDMA, GPS)
- Low Cross Modulation: -105 dBm
- Low Insertion Loss: 0.6 dB at 2 GHz
- High Isolation: 24 dB at 2 GHz
- Lead-Free 3 mm 12-lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

M/A-COM's MASWSS0144 is an industry leading GaAs PHEMT single pole, three throw (SP3T) switch in a lead-free 3 mm 12-lead PQFN package.

The MASWSS0144 is uniquely configured to enable switching from a common antenna port to Dual Band GSM, CDMA Cellular and PCS, or GPS Receive ports. The design is asymmetric and has dedicated paths for each mode, which allows each path to be optimized for the assigned mode of operation.

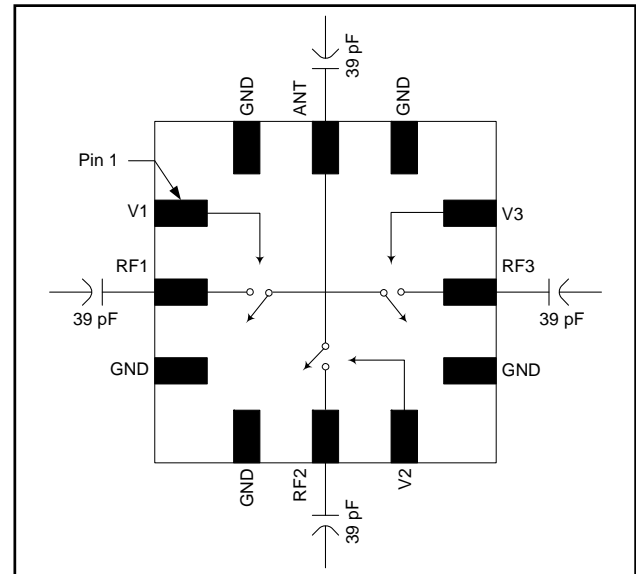
The MASWSS0144 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information ¹

| Part Number | Package |
|-------------------|-------------------|
| MASWSS0144 | Bulk Packaging |
| MASWSS0144TR-3000 | 3000 piece reel |
| MASWSS0144SMB | Sample Test Board |

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

| Pin No. | Pin Name | Description |
|---------|---------------------------|----------------------------|
| 1 | V1 | Control 1 |
| 2 | RF1 | CDMA Transmit/Receive Port |
| 3 | GND | RF Ground |
| 4 | GND | RF Ground |
| 5 | RF2 | GSM Transmit/Receive Port |
| 6 | V2 | Control 2 |
| 7 | GND | RF Ground |
| 8 | RF3 | CDMA and GPS |
| 9 | V3 | Control 3 |
| 10 | GND | RF Ground |
| 11 | ANT | Antenna Port |
| 12 | GND | RF Ground |
| 13 | GND (paddle) ² | RF Ground |

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

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

1

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V}$, 2.7 V , $\text{Pin} = +34\text{ dBm}$, $Z_0 = 50\ \Omega$ ³

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|--|---|---------------|------|-------|------|
| Insertion Loss ⁴ RF1 and RF2 Paths | 1 GHz | dB | — | 0.60 | 0.75 |
| | 1-2 GHz | dB | — | 0.60 | — |
| | 2-3 GHz | dB | — | 0.65 | — |
| Insertion Loss ⁴ RF3 Path | 1 GHz | dB | — | 0.65 | 0.85 |
| | 1-2 GHz | dB | — | 0.65 | — |
| | 2-3 GHz | dB | — | 0.75 | — |
| Isolation All Paths | 0.5-1 GHz | dB | 25 | 30 | — |
| | 1-2 GHz | dB | — | 24 | — |
| | 2-3 GHz | dB | — | 19 | — |
| Return Loss (All RF ports) | 0.5-3 GHz | dB | — | 21 | — |
| Cross Modulation RF1 Path | Cell Band: CDMA TX = +25 dBm @ 820 MHz, RX _{INT} = -23 dBm @ 865 MHz | dBm | — | -102 | — |
| | PCS Band: CDMA TX = +20 dBm @ 1950 MHz, RX _{INT} = -23 dBm @ 1870 MHz | dBm | — | -105 | — |
| 2nd Harmonic RF2 Path | GSM Band: Pin = 34 dBm | dBc | — | -75 | — |
| | DCS/PCS Band: Pin = 32 dBm | dBc | — | -75 | — |
| 3rd Harmonic RF2 Path | GSM Band: Pin = 34 dBm | dBc | — | -72.5 | -70 |
| | DCS/PCS Band: Pin = 32 dBm | dBc | — | -68.0 | — |
| P0.1dB RF1 & RF2 Paths | $V_C = 2.7\text{ V}$ | dBm | — | 36.0 | — |
| | $V_C = 5.0\text{ V}$ | dBm | — | 37.5 | — |
| IP2 | Two Tone, +18 dBm / Tone, 1 MHz spacing, >50 MHz | dBm | — | 70 | — |
| IP3 | Two Tone, +18 dBm / Tone, 1 MHz spacing, >50 MHz | dBm | — | 55 | — |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | nS | — | 50 | — |
| Ton, Toff | 50% control to 90% RF, and 50% control to 10% RF | nS | — | 70 | — |
| Transients | In Band | mV | — | 10 | — |
| Control Current | $ V_C = 2.7\text{ V}$ | μA | — | 10 | 25 |

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

4. Insertion Loss can be optimized by varying the DC blocking capacitor value, e.g. 1000 pF for 100 MHz - 500 MHz, 100 pF for 0.5 GHz - 2.5 GHz. The low frequency response will be determined by the capacitor value used.

Truth Table⁵

| V1 | V2 | V3 | ANT-RF1 | ANT-RF2 | ANT-RF3 |
|----|----|----|---------|---------|---------|
| 1 | 0 | 0 | On | Off | Off |
| 0 | 1 | 0 | Off | On | Off |
| 0 | 0 | 1 | Off | Off | On |

5. 1 = 2.7 V to 5.0 V, 0 = 0 V \pm 0.2 V

Absolute Maximum Ratings^{6,7}

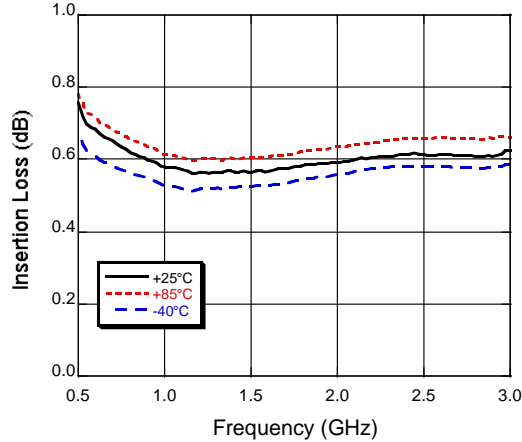
| Parameter | Absolute Maximum |
|---|------------------|
| Input Power (0.5 - 2.5 GHz, 2.7 V Control) | +36 dBm |
| Operating Voltage | +8.5 volts |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

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

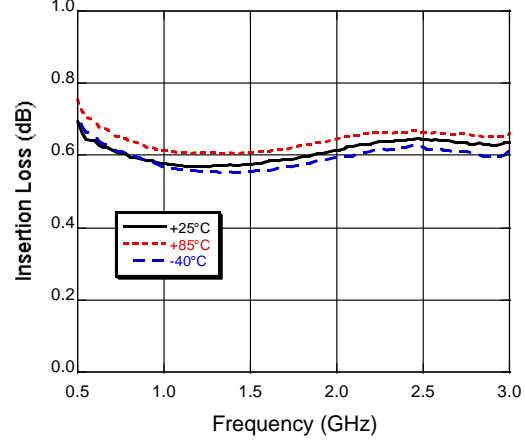
7. M/A-COM does not recommend sustained operation near these survivability limits.

Typical Performance Curves (using 39 pF external DC blocking capacitors)

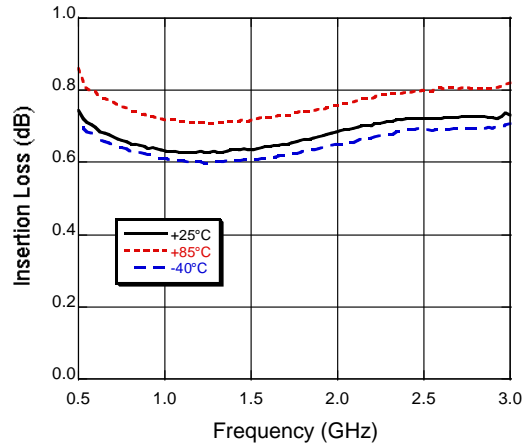
RF1 Insertion Loss



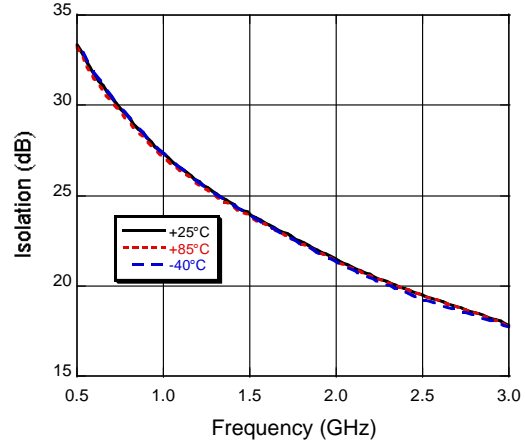
RF2 Insertion Loss



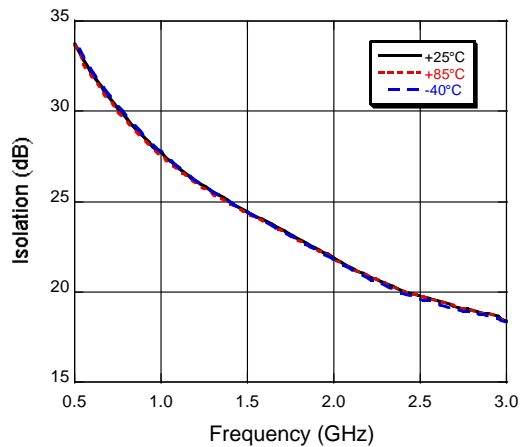
RF3 Insertion Loss



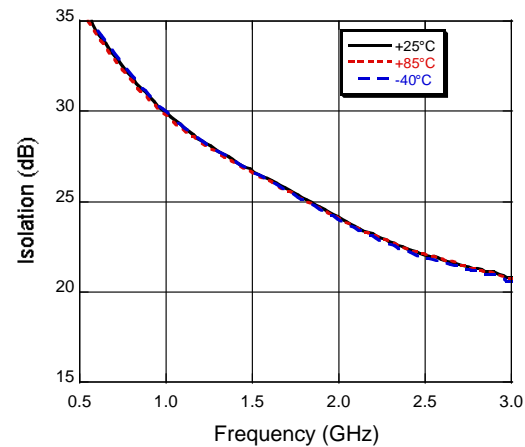
RF1 Isolation



RF2 Isolation



RF3 Isolation



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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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