

GaAs SP2T 2.5V High Power Switch

DC - 3 GHz

Jan 17 2002

Preliminary

MASWSS0006

Features

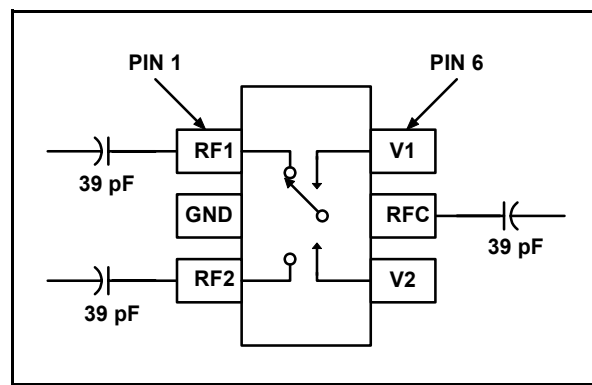
- Low Voltage Operation 2.5V
- Low Harmonics > 65 dBc at +34 dBm & 1 GHz
- Low Insertion Loss 0.45 dB at 1 GHz
- High Isolation 18.5 dB at 2 GHz
- Miniature SOT-26 Package
- 0.5 micron GaAs pHEMT Process

Description

M/A-COM's MASWSS0006 is a GaAs PHEMT MMIC single pole two throw (SP2T) high power switch in a low cost miniature SOT-26 package. The MASWSS0006 is ideally suited for applications where high power, low control voltage, low insertion loss, high isolation, small size and low cost are required. Typical applications are for GSM and DCS handset systems that connect separate transmit and receive functions to a common antenna, as well as other related handset and general purpose applications. This part can be used in all systems operating up to 3 GHz requiring high power at low control voltage.

The MASWSS0006 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Functional Schematic



Pin Configuration

| PIN No. | PIN Name | Description |
|---------|----------|----------------|
| 1 | RF1 | RF Port 1 |
| 2 | GND | RF Ground |
| 3 | RF2 | RF Port 2 |
| 4 | V1 | Control 1 |
| 5 | RFC | RF Common Port |
| 6 | V2 | Control 2 |

Absolute Maximum Ratings ¹

| Parameter | Absolute Maximum |
|---|-------------------|
| Max Input Power (0.5 - 3 GHz, 2.5V Control) | +38 dBm |
| Operating Voltage | +8.5 volts |
| Operating Temperature | -40 °C to +85 °C |
| Storage Temperature | -65 °C to +150 °C |

1. Exceeding any one or combination of these limits may cause permanent damage.

Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\Omega$ ²

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|--------------------------|--|----------------|------------|----------------------|--------------|
| Insertion Loss | DC – 1 GHz 1 – 2 GHz 2 – 3 GHz | dB dB dB | | 0.45 0.55 0.65 | 0.65 0.75 |
| Isolation | DC – 1 GHz 1 – 2 GHz 2 – 3 GHz | dB dB dB | 23 17.5 | 24.5 18.5 14 | |
| Return Loss | DC – 2 GHz 2 – 3 GHz | dB dB | | 20 16 | |
| IP3 | Two Tone +21 dBm, 1 MHz Spacing, > 50 MHz $V_c = 0V/3V$ | dBm | | 64 | |
| P1dB | $V_c = 0V/2.5V$ | dBm | | 38 | |
| 2 nd Harmonic | 1 GHz, $P_{IN} = +34$ dBm, $V_c = 0V/2.5V$ | dBc | 65 | | |
| 3 rd Harmonic | 1 GHz, $P_{IN} = +34$ dBm, $V_c = 0V/2.5V$ | dBc | 65 | | |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | uS | | 1 | |
| Ton, Toff | 50% control to 90% RF, and 50% control to 10% RF | uS | | 1 | |
| Transients | In Band | mV | | 10 | |
| Gate Leakage | $ V_c = 2.5V$ | uA | | | 100 |

2. Insertion Loss can be optimized by varying the DC Blocking Capacitor value, ie. 1000 pF for 100 MHz - 500 MHz, 39 pF for 0.5 GHz - 3 GHz.

Truth Table ³

| V1 | V2 | ANT- RF1 | ANT - RF2 |
|--------------|--------------|----------|-----------|
| +2.5 to +5V | $0 \pm 0.2V$ | On | Off |
| $0 \pm 0.2V$ | +2.5 to +5V | Off | On |

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

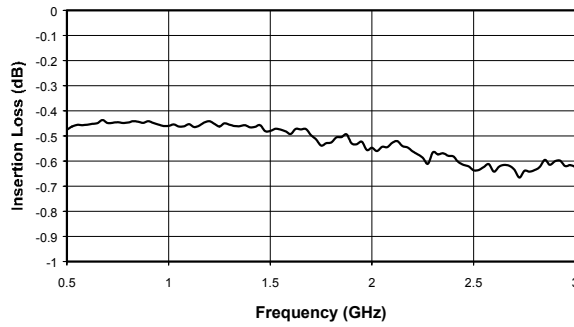
Specifications subject to change without notice.

■ North America: Tel. (800) 366-2266, Fax (800) 618-8883
 ■ Asia/Pacific: Tel.+81-44-844-8296, Fax +81-44-844-8298
 ■ Europe: Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

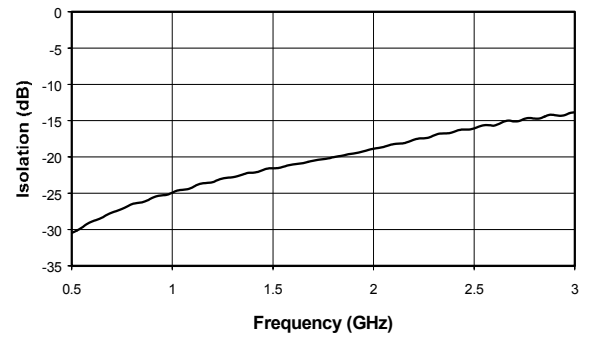
Visit www.macom.com for additional data sheets and product information.

Typical Performance Curves

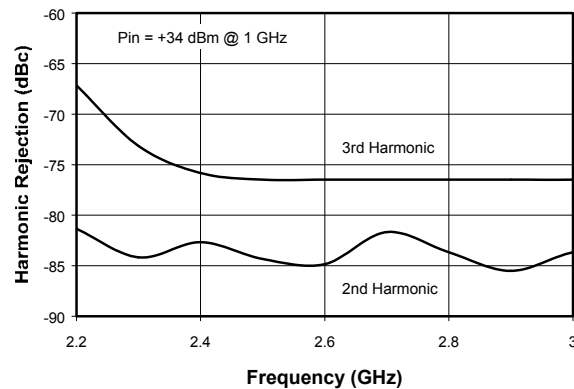
**Insertion Loss vs. Frequency,
25 °C, 39 pF**



**Isolation vs. Frequency,
25 °C, 39 pF**



**Harmonic Rejection vs. Control Voltage,
25 °C, 39 pF**



Specifications subject to change without notice.

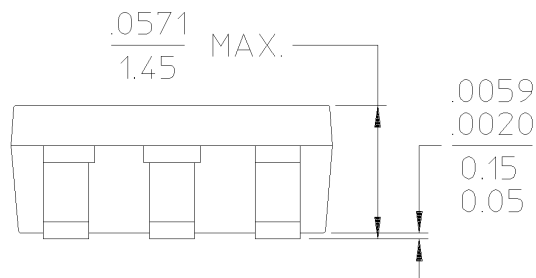
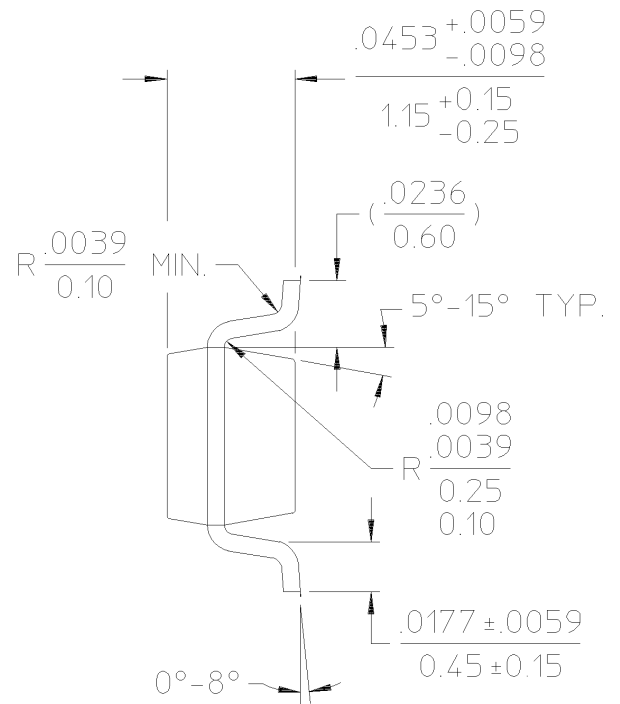
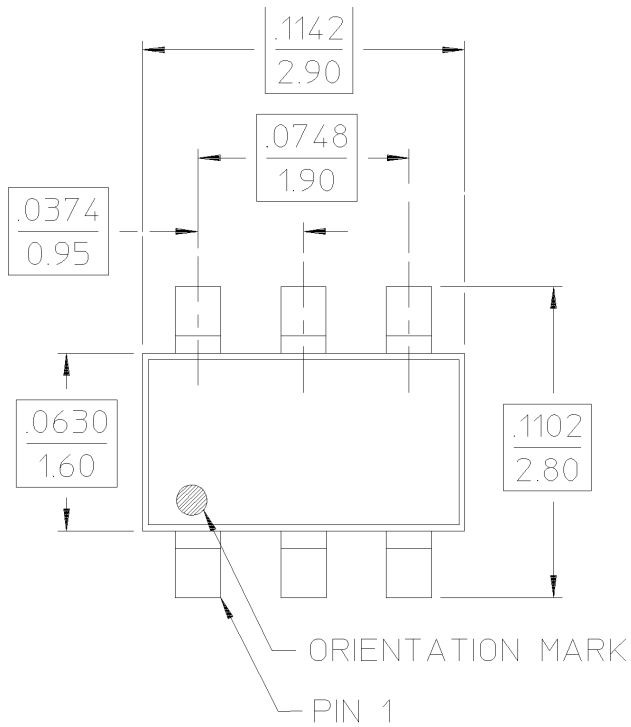
- North America: Tel. (800) 366-2266, Fax (800) 618-8883
- Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

Visit www.macom.com for additional data sheets and product information.

tyco / Electronics

MACOM

SOT-26 Plastic Package



Specifications subject to change without notice.

- North America: Tel. (800) 366-2266, Fax (800) 618-8883
- Asia/Pacific: Tel. +81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax +44 (1344) 300 020

Visit www.macom.com for additional data sheets and product information.

tyco / Electronics

MACOM

Handling Procedures

The following precautions should be observed to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are ESD sensitive and can be damaged by static electricity. Proper ESD techniques should be used when handling these devices.

Ordering Information

| Part Number | Package |
|---------------|-------------------------------|
| MASWSS0006 | SOT-26 6-lead Plastic Package |
| MASWSS0006TR | 1000 piece reel |
| MASWSS0006SMB | Sample Test Board |

Specifications subject to change without notice.

- North America: Tel. (800) 366-2266, Fax (800) 618-8883
- Asia/Pacific: Tel.+81-44-844-8296, Fax +81-44-844-8298
- Europe: Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

Visit www.macom.com for additional data sheets and product information.

tyco / Electronics

MACOM