

SPDT High Isolation CATV Switch

Advanced

A5

MASWSS0069

MASWSS0069

Features

- 75 Ohms
- Positive Voltage Control (0 / +5 V)
- Non-reflective
- Low Insertion Loss 0.74 dB at 870 MHz
- High Isolation 52 dB at 870 MHz
- 4 mm FQFP-N 20 Lead Package
- 0.5 micron GaAs pHEMT Process

Description

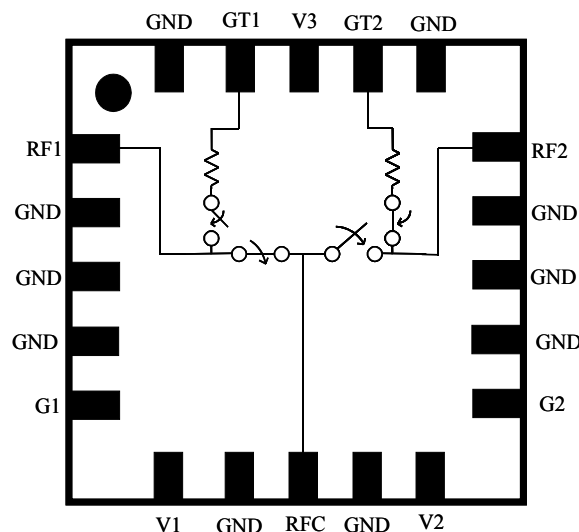
M/A-COM's MASWSS0069 is a GaAs PHEMT MMIC single pole double throw (SPDT) switch in a low cost miniature 4 mm FQFP-N 20 Lead package. The MASWSS0069 is ideally suited for applications where low control voltage, low insertion loss, high isolation, small size and low cost are required. A typical application is to replace mechanical relays in CATV systems. This device has an additional state where both arms are off and the device maintains a terminated and isolated state. This state is achieved using a third control line. The MASWSS0069 can be used in all 75 ohm systems operating up to 1 GHz.

The MASWSS0069 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information

| Part Number | Package |
|---------------|--------------------------------|
| MASWSS0069 | FQFP-N 20 Lead Plastic Package |
| MASWSS0069TR | 7 inch, 1000 piece reel |
| MASWSS0069SMB | Sample Test Board |

Functional Schematic



Absolute Maximum Ratings ^{1,2}

| Parameter | Absolute Maximum |
|-------------------------------------------------|-------------------|
| Max Input Power (5 - 1000 MHz, 2.5V Control) | +32 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.
2. * RFC Port is reflective in 'All Off' state.

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Pin Configuration ¹

| PIN No. | PIN Name | Description |
|---------|----------|-------------|
| 1 | RF1 | RF In/Out |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | GND | Ground |
| 5 | G1 | RF Ground |
| 6 | V1 | Control 1 |
| 7 | GND | Ground |
| 8 | RFC | RF In/Out |
| 9 | GND | Ground |
| 10 | V2 | Control 2 |
| 11 | G2 | RF Ground |
| 12 | GND | Ground |
| 13 | GND | Ground |
| 14 | GND | Ground |
| 15 | RF2 | RF In/Out |
| 16 | GND | Ground |
| 17 | GT2 | RF Ground |
| 18 | V3 | Control 3 |
| 19 | GT1 | RF Ground |
| 20 | GND | Ground |

- Center paddle should be connected to ground.

Truth Table ²

| V1 | V2 | V3 | RFC - RF1 | RFC - RF2 |
|-------------|-------------|-------------|-----------|-----------|
| +2.5 to +5V | 0 ± 0.2V | 0 ± 0.2V | On | Off |
| 0 ± 0.2V | +2.5 to +5V | 0 ± 0.2V | Off | On |
| 0 ± 0.2V | 0 ± 0.2V | +2.5 to +5V | Off | Off |

- External 0.01 uF DC blocking capacitors are required on all RF In/Out and all RF Ground ports.

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.

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

Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 75 \Omega$

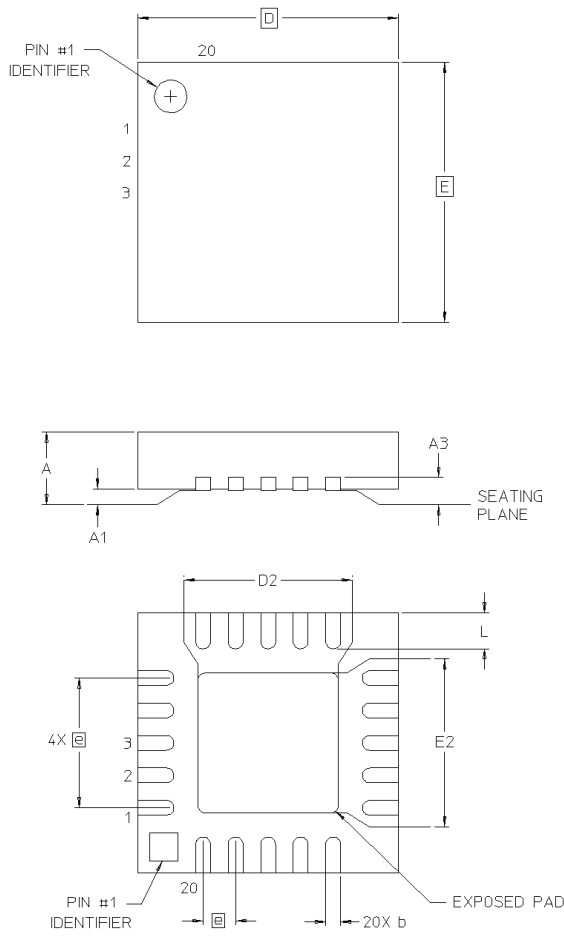
| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|--------------------------|------------------------------------------------------------|-------|------|------|------|
| Insertion Loss | 5 - 50 MHz | dB | | 0.45 | |
| | 50 - 1000 MHz | dB | | 0.80 | |
| Isolation (One Arm On) | 5 - 50 MHz | dB | | 70 | |
| | 50 - 1000 MHz | dB | | 51 | |
| Isolation (All Arms Off) | 5 - 50 MHz | dB | | 70 | |
| | 50 - 1000 MHz | dB | | 55 | |
| Return Loss (On) | 5 - 50 MHz | dB | | 33 | |
| | 50 - 1000 MHz | dB | | 20 | |
| Return Loss *(Off) | 5 - 50 MHz | dB | | 33 | |
| | 50 - 1000 MHz | dB | | 22 | |
| IP3 | Two Tone -10 dBm, 6 MHz Spacing, > 50 MHz $V_c = 0V/5V$ | dBm | | 52 | |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | nS | | 20 | |
| Ton, Toff | 50% control to 90% RF, and 50% control to 10% RF | nS | | 40 | |
| Transients | In Band | mV | | 30 | |
| Gate Leakage | $ V_c = 2.5V$ | uA | | 14 | |

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4 mm FQFP-N 20 Lead Saw Singulated



| DIMENSION SYMBOL | MEASUREMENT (mm) | | |
|------------------|------------------|------|------|
| | MIN | NOM | MAX |
| A | 0.80 | 0.90 | 1.00 |
| A1 | 0 | 0.02 | 0.05 |
| A3 | 0.25 REF | | |
| b | 0.18 | 0.23 | 0.30 |
| D | 4.00 BSC | | |
| D2 | 0.75 | 1.70 | 2.25 |
| e | 0.50 BSC | | |
| E | 4.00 BSC | | |
| E2 | 0.75 | 1.70 | 2.25 |
| L | 0.35 | 0.55 | 0.75 |
| | | | |
| | | | |
| | | | |

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