

GaAs SPDT Switch

DC– 3.0 GHz

V 1.00

Features

- Low Insertion Loss, 0.7 dB @ 2.4 GHz¹
- High Isolation, 25 dB @ 2.4 GHz¹
- Low Power Consumption, < 10 μ A @ +3 V
- Low Cost Plastic SOT-363 Package

1. For best results at 2.4 GHz, use 8 pF 0402 profile SMT capacitors on RF ports and 100 pF bypassing on pins 4 and 6.

Description

The SW-438 is a GaAs MMIC SPDT switch in a low cost SOT-363 surface mount plastic package. Typical applications include transmit/receive switching for Bluetooth and WLAN equipment. The SW-438 can also be used in applications up to 500 mW in systems such as cellular, PCS, DCS1800, GSM, CDMA and other analog and digital wireless communications systems.

M/A-COM fabricates the SW-438 using a 0.5 micron gate length GaAs p-HEMT process. The process features full passivation for increased performance and reliability.

External Component Requirements

Please note the values of the external capacitors. The capacitors at each of the RF ports are used as for achieving optimum insertion loss. They also provide DC blocking for positive control. The 8 pF (0402) capacitor is recommended for 2 - 3 GHz operation. If this value is changed or the capacitor placed too far from the switch, the performance will be affected. We also recommend 100 pF bypass capacitors on pins 4 and 6.

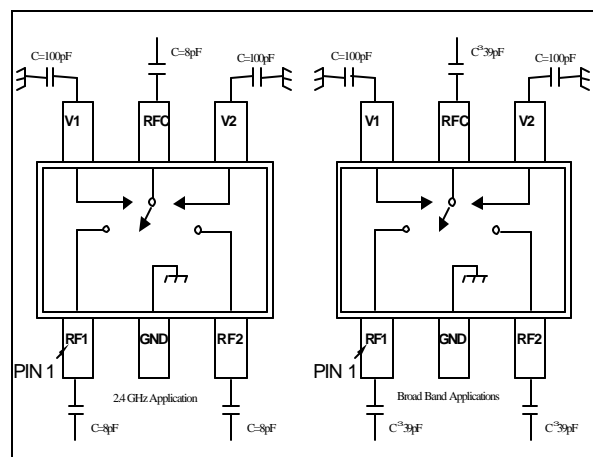
For broadband applications with positive control voltages, use DC blocking capacitors with value of 39 pF or more.

Truth Table

| Mode (Control) | V1 | V2 | RFC-RF1 | RFC-RF2 |
|-----------------------|-----------------------------|-----------------------------|-----------|-----------|
| Positive ¹ | 0 \pm 0.2V +2.3 to +5V | +2.3 to +5V 0 \pm 0.2V | Off On | On Off |
| Negative ² | 0 \pm 0.2V -2.3 to +5V | -2.3 to +5V 0 \pm 0.2V | On Off | Off On |

1. External DC blocking capacitors are required on all RF ports.
2. If negative control is used, DC blocking capacitors are not required on RF ports.

Functional Schematic



Pin Configuration

| Pin No. | Function | Description |
|---------|----------|-----------------|
| 1 | RF1 | RF Input/Output |
| 2 | GND | RF Ground |
| 3 | RF2 | RF Input/Output |
| 4 | V2 | Control 2 Input |
| 5 | RFC | RF Common Port |
| 6 | V1 | Control 1 Input |

Ordering Information

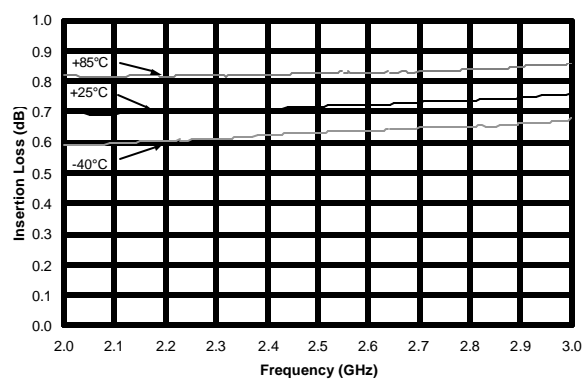
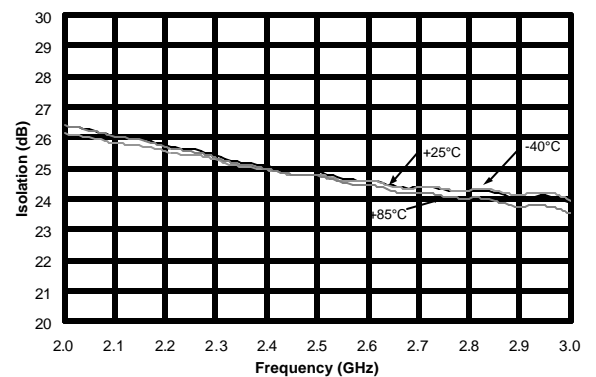
| Part Number | Package |
|---------------|------------------------------------|
| SW-438TR-3000 | SW-438 on 13 Inch, 3000 piece Reel |
| SW-438SMB | SW-438 sample test board |

Electrical Specifications: $T_A = 25^\circ\text{C}$, 3V Control

| Parameter | Test Conditions | Units | Min | Typ | Max |
|--------------------------|--------------------------------------|---------------|-----|-----|-----|
| Insertion Loss | DC-3.0 GHz | dB | | 0.7 | 0.8 |
| Isolation | DC-1.0 GHz | dB | 29 | 31 | |
| | 1.0-2.0 GHz | dB | 23 | 25 | |
| | 2.0-3.0 GHz | dB | 21 | 23 | |
| Return Loss | DC-1.5 GHz | dB | 18 | 22 | |
| | 1.5-3.0 GHz | dB | 16 | 20 | |
| P1dB (2.3 V supply) | 500 MHz-2.0 GHz | dBm | 23 | 26 | |
| P1dB (3V supply) | 500 MHz-2.0 GHz | dBm | 28 | 31 | |
| IP2 | 2-tone 900 MHz, 5 MHz spacing (2.3V) | dBm | | 81 | |
| IP3 | 2-tone 900 MHz, 5 MHz spacing (2.3V) | dBm | | 55 | |
| 2 nd Harmonic | 2.4 GHz Pin = 20 dBm, Vc = 2.3V | dBc | | 70 | |
| 3 rd Harmonic | 2.4 GHz Pin = 20 dBm, Vc = 2.3V | dBc | | 60 | |
| Ton, Toff | 50% ctl to 10/90% RF | ns | | 20 | |
| Trise, Tfall | 10% to 90% RF | ns | | 10 | |
| Gate Leakage | Vctl = 5V | μA | | 5 | 10 |

Typical Performance Curves**Bluetooth Applications**

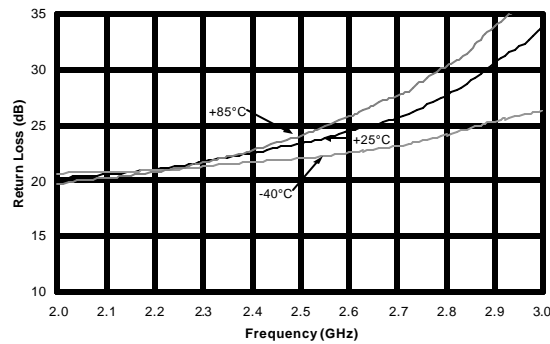
(8 pF DC Blocking Capacitors, +2.3V Control)

Insertion Loss vs. Frequency Over Temperature**Isolation vs. Frequency Over Temperature**

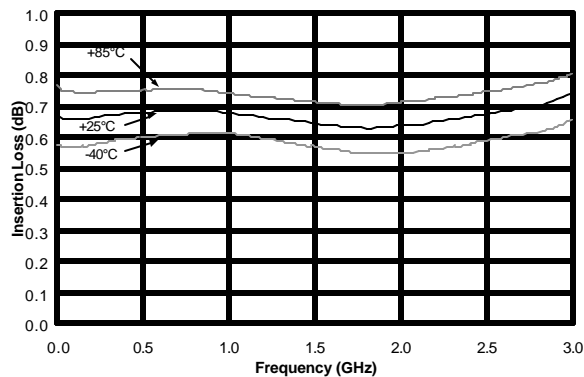
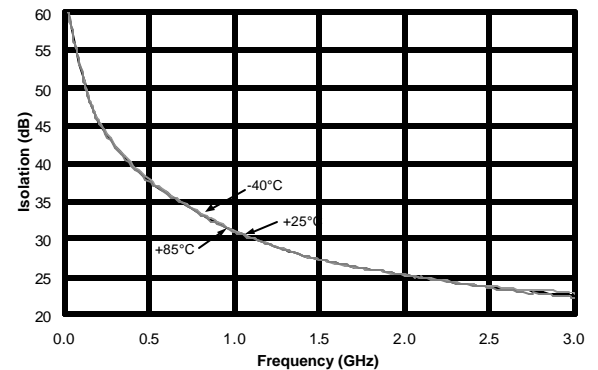
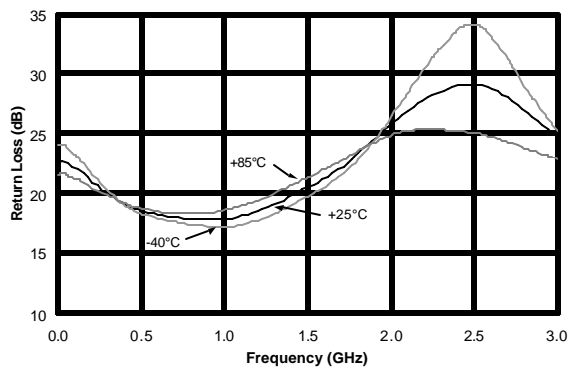
Specifications subject to change without notice.

- 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

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

Return Loss vs. Frequency Over Temperature

Broadband Applications (No DC Blocking Capacitors, -2.3 V Control)

Insertion Loss vs. Frequency Over Temperature*Isolation vs. Frequency Over Temperature**Return Loss vs. Frequency Over Temperature*

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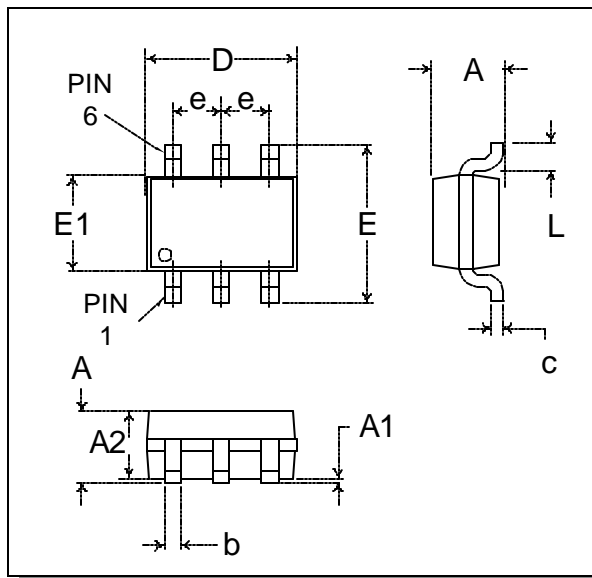
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SOT-363 (SC-70) Plastic Package

| Dimension | Measurement (mm) | | |
|-----------|------------------|------------|------|
| | Min. | Nom. | Max. |
| A | — | — | 1.10 |
| A1 | 0 | — | 0.10 |
| A2 | 0.70 | 0.90 | 1.00 |
| b | 0.15 | — | 0.30 |
| c | 0.08 | — | 0.22 |
| D | | 2.00 basic | |
| e | | 0.65 basic | |
| E | | 2.10 basic | |
| E1 | | 1.25 basic | |
| L | | 0.42 ref. | |

Note: See JEDEC MO-203 VAR AB for Additional dimensions and tolerances.



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