

**GaAs SP3T 2.5 V Switch
DC - 3.0 GHz**

MASW-008330
V1

Features

- Low Voltage Operation: 2.5V
- Low Insertion Loss: 0.3 dB at 1 GHz
- 0.5 micron GaAs PHEMT Process
- Lead-Free 2 mm 8-Lead PDFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant version of MASWSS0028

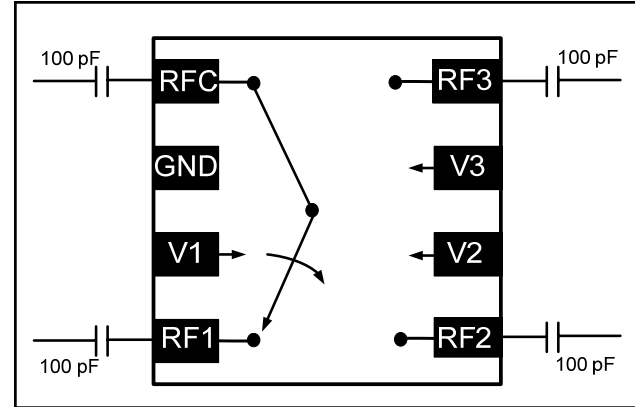
Description

M/A-COM's MASW-008330 is a GaAs PHEMT MMIC single pole three throw (SP3T) switch in a lead-free 2 mm 8-lead PDFN package. The MASW-008330 is ideally suited for applications where low control voltage, low insertion loss, high isolation, small size and low cost are required.

Typical applications are for filter and antenna switching in handset systems that connect separate 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 low control voltage.

The MASW-008330 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. | Function | Description |
|---------|----------|-------------|
| 1 | RFC | RF In/Out |
| 2 | GND | RF Ground |
| 3 | V1 | Control 1 |
| 4 | RF1 | RF In/Out |
| 5 | RF2 | RF In/Out |
| 6 | V2 | Control 2 |
| 7 | V3 | Control 3 |
| 8 | RF3 | RF In/Out |

Ordering Information¹

| Part Number | Package |
|--------------------|---|
| MASW-008330-TR3000 | 3000 piece reel |
| MASW-008330-000SMB | Sample Test Board (Includes 5 samples) |

1. Reference Application Note M513 for reel size information.

Truth Table²

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

2. 0 = 0 V ± 0.2 V, 1 = +2.5 V to +5 V.

Absolute Maximum Ratings^{3,4}

| Parameter | Absolute Maximum |
|--|------------------|
| Max Input Power (0.5 - 3 GHz, 2.5V Control) | +32 dBm |
| Voltage | ±8.5 volts |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

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

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

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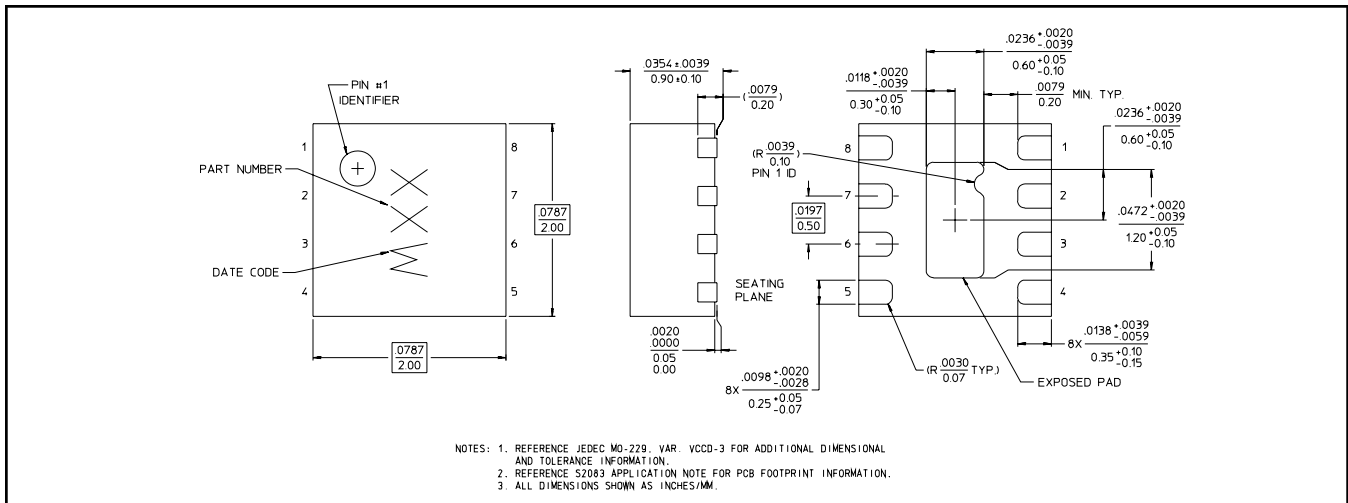
Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V} / 2.5\text{ V}$, $Z_0 = 50\ \Omega$ ⁵

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|-----------------------------|---|---------------|------|------|------|
| Insertion Loss ⁶ | DC - 1 GHz | dB | — | 0.3 | 0.4 |
| | 1 - 2 GHz | dB | — | 0.5 | 0.6 |
| | 2 - 3 GHz | dB | — | 0.75 | 1.0 |
| Isolation | DC - 1 GHz | dB | 19 | 24 | — |
| | 1 - 2 GHz | dB | 13 | 18 | — |
| | 2 - 3 GHz | dB | 10 | 14 | — |
| Return Loss | DC - 2.5 GHz | dB | — | 25 | — |
| | 2.5 - 3 GHz | dB | — | 20 | — |
| IP3 | Two Tone, +0 dBm/tone, 1 MHz Spacing, > 50 MHz | dBm | — | 50 | — |
| P1dB | — | dBm | — | 21 | — |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | nS | — | 13 | — |
| Ton, Toff | 50% control to 90% RF and 50% control to 10% RF | nS | — | 15 | — |
| Transients | In Band | mV | — | 30 | — |
| Control Current | $ V_C = 2.5\text{V}$ | μA | — | 1 | 10 |

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

6. Insertion loss can be optimized by varying the DC blocking capacitor value, e.g. 100 pF for 100 - 500 MHz, 39 pF for 0.5 - 3 GHz.

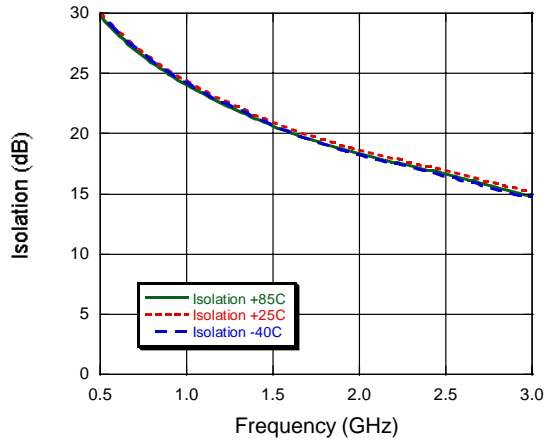
Lead Free 2 mm 8-lead PDFN [†]



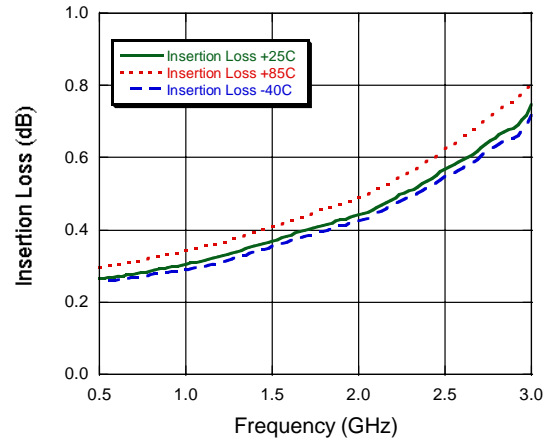
[†] Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.

Typical Performance Curves vs. Frequency and Temperature

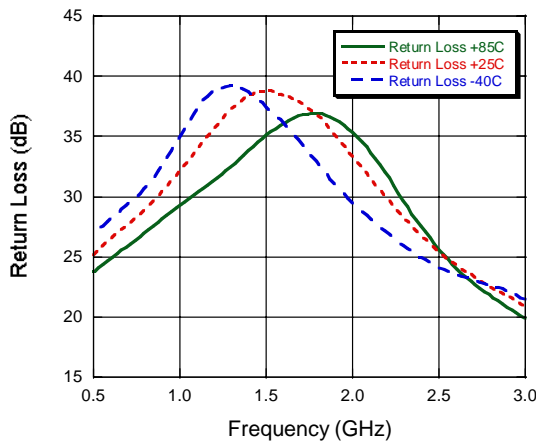
Isolation



Insertion Loss



Return Loss



Qualification

Qualified to M/A-COM specification REL-201, Process Flow -2.

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.