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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## GaAs Broadband DPDT Diversity Switch 0.5 - 3.0 GHz

Rev. V5

### Features

- Ideal for 802.11 b/g Applications
- Broadband Performance: 0.5 - 3.0 GHz
- Low Insertion Loss: 0.6 dB @ 2.4 GHz
- High Isolation: 25 dB @ 2.4 GHz
- Fast Switching Speed: 0.5  $\mu$ m GaAs PHEMT Process
- High P1dB: 34 dBm @ 3 V
- 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 MASWSS0130 is a broadband GaAs PHEMT MMIC DPDT diversity switch in a low cost, lead-free 3 mm 12-lead PQFN plastic package. The MASWSS0130 is ideally suited for applications where very small size and low cost are required.

Typical applications are for WLAN IEEE 802.11b/g systems that employ two antennas for transmit and receive diversity. Designed for high power, this DPDT switch is optimized for high linearity at 2.4 GHz.

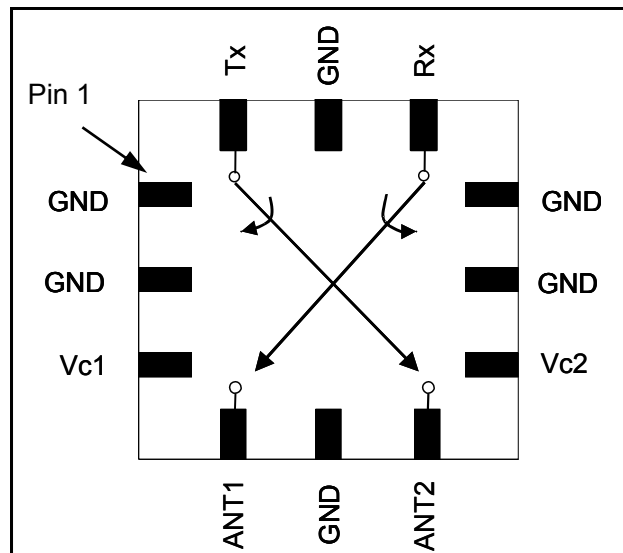
The MASWSS0130 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

### Ordering Information <sup>1</sup>

Part Number	Package
MASWSS0130	Bulk Packaging
MASWSS0130TR	7 inch, 1000 piece reel
MASWSS0130TR-3000	13 inch, 3000 piece reel
MASWSS0130SMB	Sample Test Board (Includes 5 Samples)

1. Reference Application Note M513 for reel size information.

### Functional Schematic



### Pin Configuration

PIN No.	PIN Name	Description
1	GND	Ground
2	GND	Ground
3	V <sub>c1</sub>	Control 1
4	ANT1	Antenna Port 1
5	GND	Ground
6	ANT2	Antenna Port 2
7	V <sub>c2</sub>	Control 2
8	GND	Ground
9	GND	Ground
10	Rx	Receive Port
11	GND	Ground
12	Tx	Transmit Port

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

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**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 50 \Omega$ ,  $V_C = 0 \text{ V}/3 \text{ V}$ , 8 pF Capacitor<sup>2,3</sup>**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss <sup>3</sup>	2.4 GHz	dB	—	0.6	0.9
Isolation (on/off or off/on)	2.4 GHz	dB	20	25	—
Return Loss	2.4 GHz	dB		23	—
IP2	Two Tone, +15 dBm per tone, 5 MHz Spacing, 2.4 GHz	dBm	—	94	—
IIP3	Two Tone, +15 dBm per tone, 5 MHz Spacing, 2.4 GHz	dBm	—	55	—
Input P1dB	2.4 GHz	dBm	—	34	—
Input P0.1dB	2.4 GHz	dBm	—	30	—
2 <sup>nd</sup> Harmonic	2.4 GHz, $P_{IN} = 20 \text{ dBm}$	dBm	—	-80	—
3 <sup>rd</sup> Harmonic	2.4 GHz, $P_{IN} = 20 \text{ dBm}$	dBm	—	-95	—
Trise, Tfall	10% to 90% RF 90% to 10% RF	nS nS	— —	34 35	— —
Ton, Toff	50% control to 90% RF 50% control to 10% RF	nS	— —	48 54	— —
Transients		mV	—	7	—
Control Current	$ V_C  = 3 \text{ V}$	$\mu\text{A}$	—	5	25

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

3. Insertion loss can be optimized by varying the DC blocking capacitor value.

### Absolute Maximum Ratings<sup>4,5</sup>

Parameter	Absolute Maximum
Input Power @ 3 V Control	+35 dBm
Input Power @ 5 V Control	+35 dBm
Operating Voltage	+8.5 volts
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

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

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

### Qualification

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

### Handling Procedures

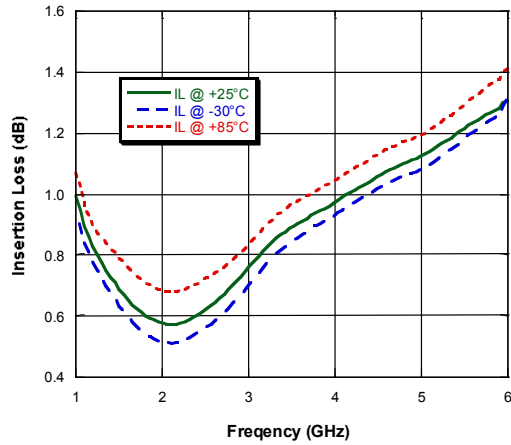
Please observe the following precautions to avoid damage:

### Static Sensitivity

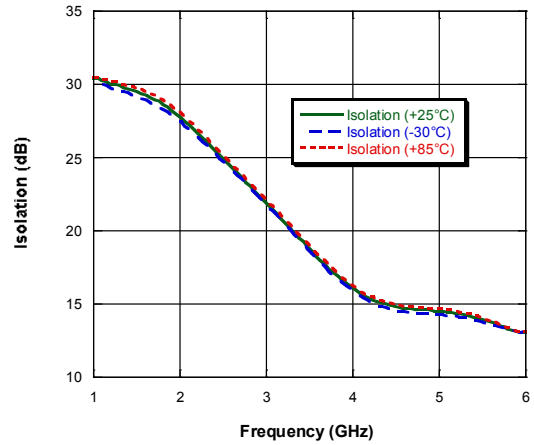
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

## Typical Performance Curves

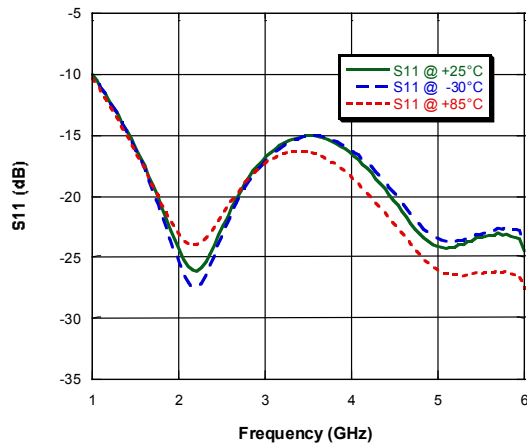
**Insertion Loss**



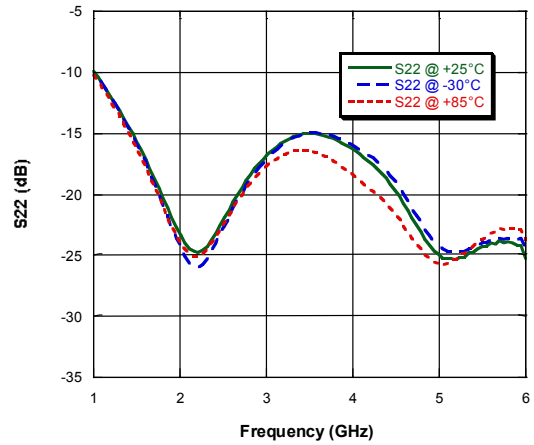
**Isolation**



**Input Return Loss**



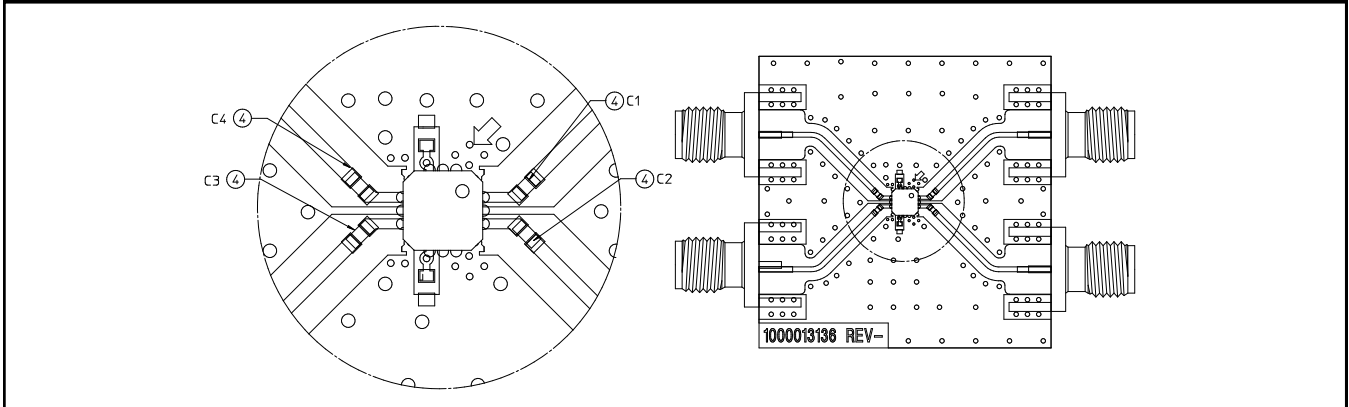
**Output Return Loss**



## GaAs Broadband DPDT Diversity Switch 0.5 - 3.0 GHz

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### Evaluation Board



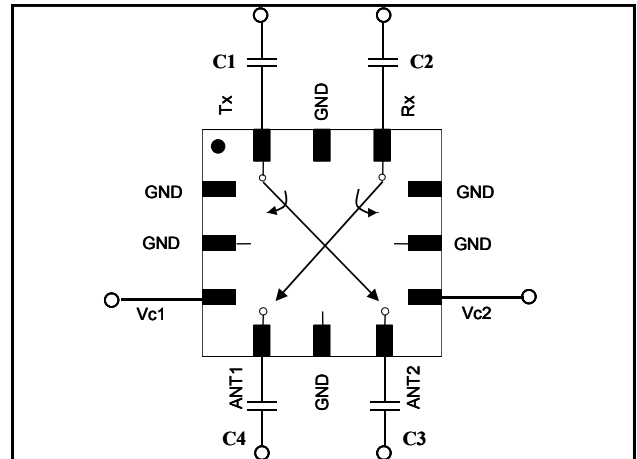
Qty	Description
4	Capacitor, 8 pF, 0402, SMT, 5% (C1 - C4)

### Truth Table <sup>6</sup>

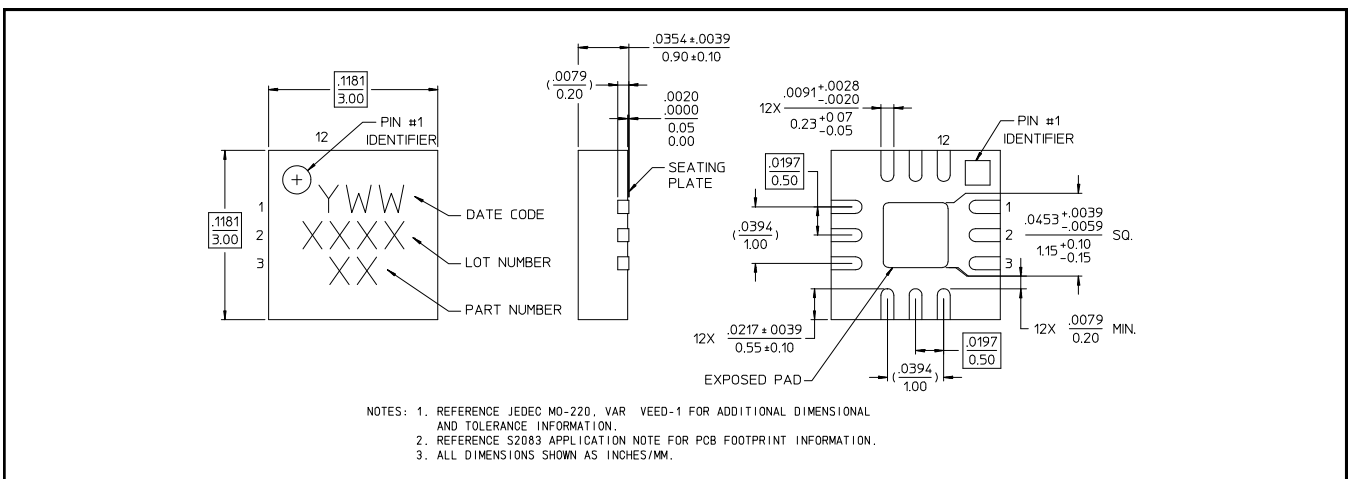
Control V <sub>c1</sub>	Control V <sub>c2</sub>	ANT 1- Rx	ANT 1- Tx	ANT 2- Tx	ANT 2- Rx
1	0	On	Off	On	Off
0	1	Off	On	Off	On
1	1	Off	Off	Off	Off
0	0	Off	Off	Off	Off

6. 1 = +2.9 to +5V, 0 = 0 ± 0.2V

### Application Schematic



### Lead-Free 3 mm 12-Lead PQFN<sup>†</sup>



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.

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