

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 μ 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.

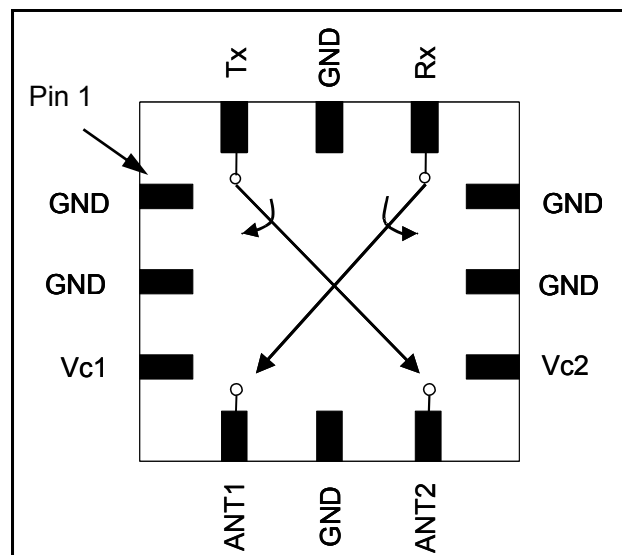
The MASWSS0130 is fabricated using a 0.5 micron gate length GaAs PHEMT process. The process features full passivation for performance and reliability.

Ordering Information ¹

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 _{c1}	Control 1
4	ANT1	Antenna Port 1
5	GND	Ground
6	ANT2	Antenna Port 2
7	V _{c2}	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^{2,3}

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss ³	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 nd Harmonic	2.4 GHz, $P_{IN} = 20 \text{ dBm}$	dBm	—	-80	—
3 rd 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}$	μA	—	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^{4,5}

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

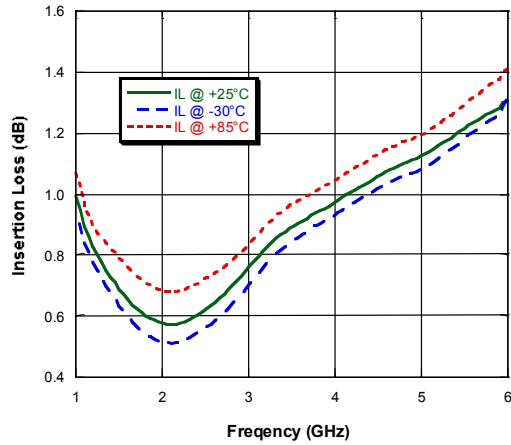
Please observe the following precautions to avoid damage:

Static Sensitivity

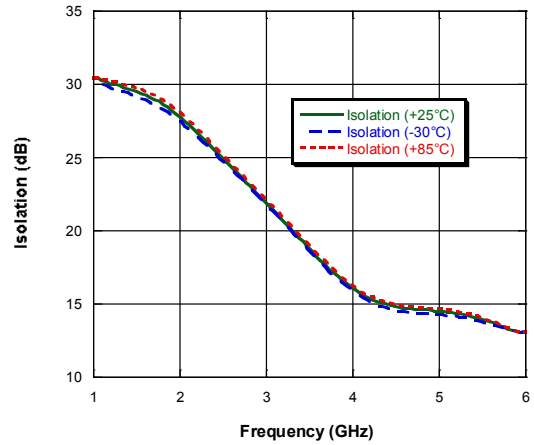
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

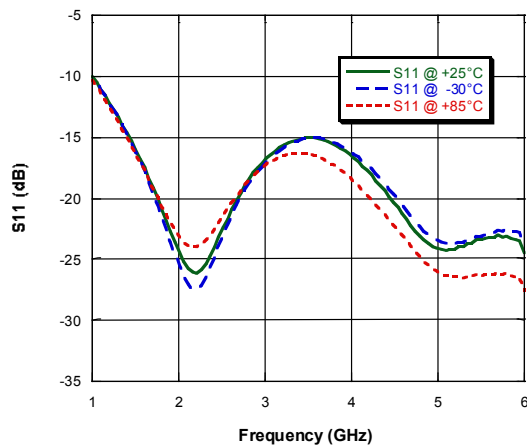
Insertion Loss



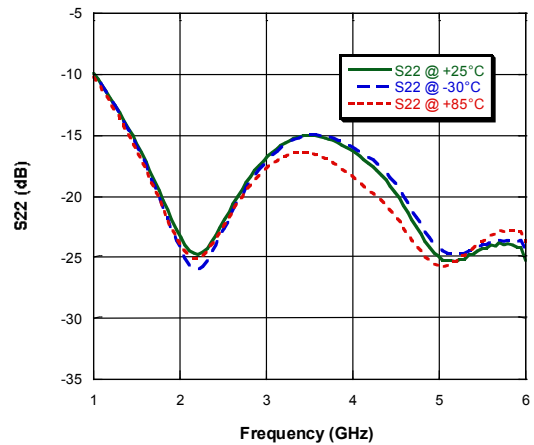
Isolation



Input Return Loss



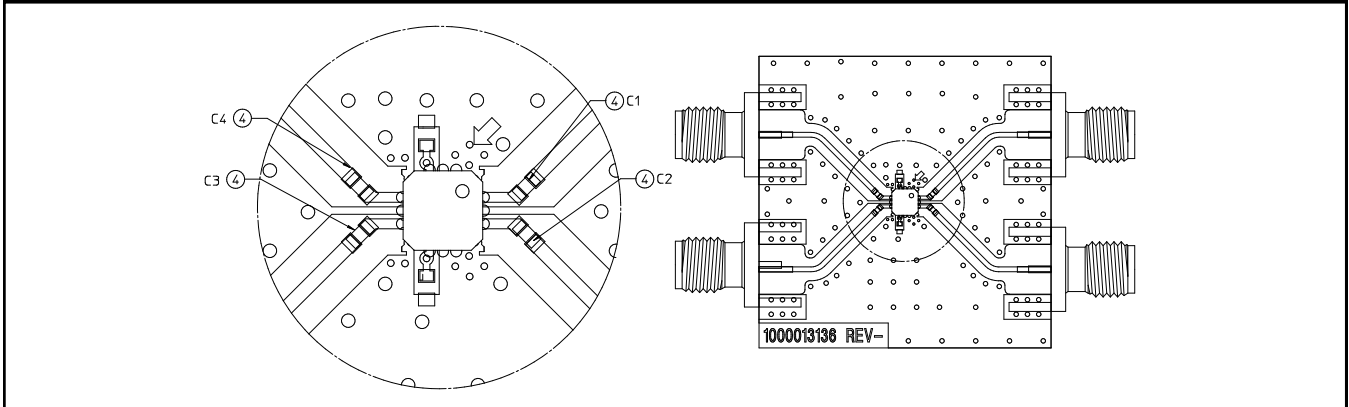
Output Return Loss



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Evaluation Board



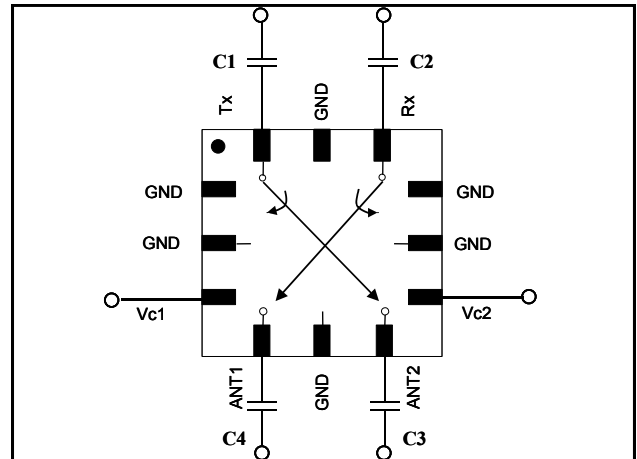
Qty	Description
4	Capacitor, 8 pF, 0402, SMT, 5% (C1 - C4)

Truth Table ⁶

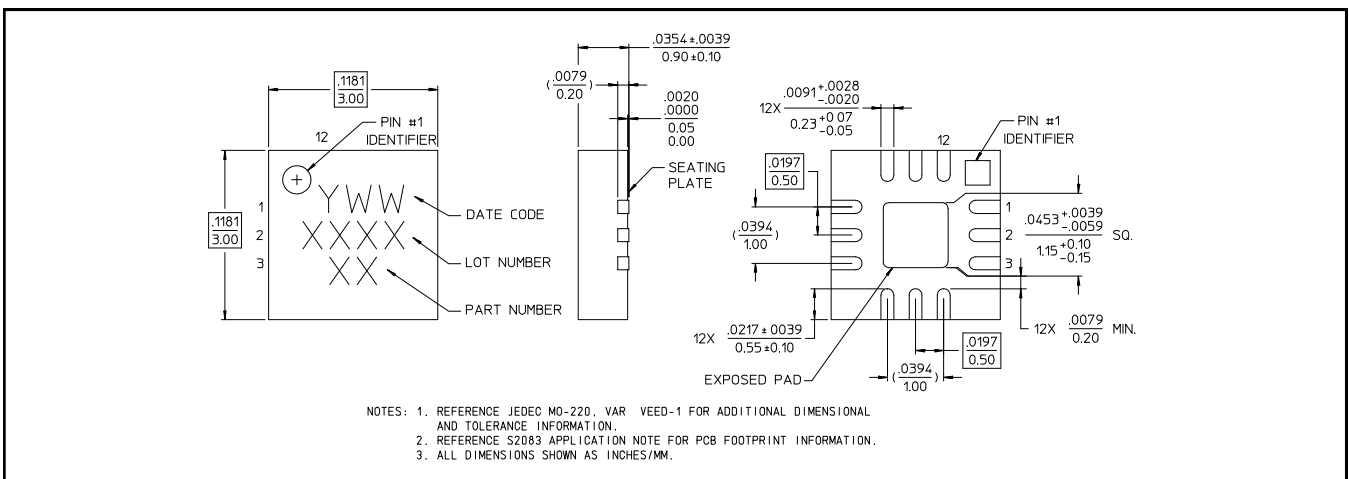
Control V _{c1}	Control V _{c2}	ANT 1- Rx	ANT 1- Tx	ANT 2- Tx	ANT 2- Rx
1	0	On	Off	On	Off
0	1	Off	On	Off	On
1	1	Off	Off	Off	Off
0	0	Off	Off	Off	Off

6. 1 = +2.9 to +5V, 0 = 0 ± 0.2V

Application Schematic



Lead-Free 3 mm 12-Lead PQFN[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.