

GaAs SPDT Terminated Switch DC - 2.5 GHz



MASWSS0180

Rev. V3

Features

- Very Low Power Consumption
- High Isolation: 30 dB up to 2 GHz
- Very High Intercept Point: 46 dBm IP₃
- Nanosecond Switching Speed
- Temperature Range: -40°C to +85°C
- Lead-Free SOIC-8 Package
- RoHS* Compliant Version of SW-338

Applications

- ISM
- Wireless Networking & Communication

Description

The MASWSS0180 is a GaAs MMIC SPDT terminated switch in a lead-free SOIC 8-lead surface mount plastic package. This switch is ideally suited for use where very low power consumption is required.

Typical applications include transmit/receive switching, switch matrices, and filter banks in systems such as radio and cellular equipment, PCM, GPS, fiber optic modules, and other battery powered radio equipment.

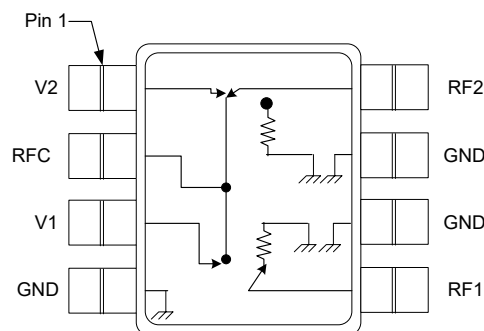
The MASWSS0180 is fabricated with a monolithic GaAs MMIC using a mature 1-micron process. The process features full chip passivation for increased performance and reliability.

Ordering Information^{1,2}

Part Number	Package
MASWSS0180	Bulk Packaging
MASWSS0180TR-3000	3000 piece reel
MASWSS0180SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Functional Schematic



Pin Configuration

Pin #	Function
1	V2
2	RF Common
3	V1
4, 6, 7	Ground
5	RF Port 1
8	RF Port 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.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $V_C = 0\text{ V} / -2.9\text{ V}$, $Z_0 = 50\ \Omega$

Parameter	Test Conditions	Units	Min.	Typ. ³	Max.
Insertion Loss	DC - 0.5 GHz	dB	—	0.55	—
	0.5 - 1.0 GHz			0.60	0.7
	1.0 - 2.0 GHz			0.65	—
Isolation	DC - 0.5 GHz	dB	—	50	—
	0.5 - 1.0 GHz		36	43	—
	1.0 - 2.0 GHz		—	35	—
VSWR On/Off	DC - 2.0 GHz	Ratio	—	1.1:1	—
T_{RISE} , T_{FALL}	10% to 90% RF, 90% to 10% RF	ns	—	10	—
T_{ON} , T_{OFF}	50% Control to 90% RF, 50% Control to 10% RF	ns	—	20	—
Transients	In-Band	mV	—	25	—
1 dB Compression Point	Input Power	dBm	—	15	—
	50 MHz @ 2.9 V			16	
	1 GHz @ 2.9 V			26	
	1 GHz @ 5.0 V			27	
2nd Order Intercept	Measured Relative to Input Power (for two-tone input power up to +5 dBm)	dBm	—	46	—
	50 MHz @ 2.9 V			52	
	1 GHz @ 2.9 V			63	
	1 GHz @ 5.0 V			82	
3rd Order Intercept	Measured Relative to Input Power (for two-tone input power up to +5 dBm)	dBm	—	27	—
	50 MHz @ 2.9 V			27	
	1 GHz @ 2.9 V			47	
	1 GHz @ 5.0 V			50	
Control Current	$ V_C = 2.9\text{ V}$	μA	—	15	35

3. Typical values represent performance at middle of frequency range noted.

Truth Table⁴

Control Inputs		Condition of Switch RF Common to Each RF Port	
V1	V2	RFC-RF1	RFC-RF2
1	0	ON	OFF
0	1	OFF	ON

4. 0 = 0 V \pm 0.2 V, 1 = -2.9 V to -5.0 V

Absolute Maximum Ratings^{5,6}

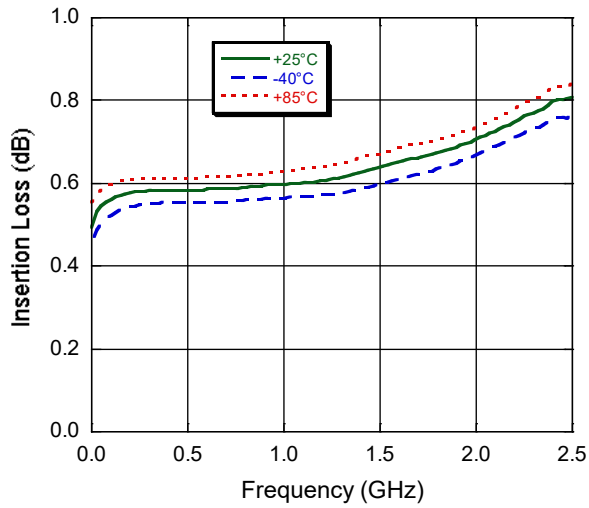
Parameter	Absolute Maximum
Input Power	27 dBm @ 0.05 GHz 34 dBm @ 0.5 - 2.0 GHz
Control Voltage	$-8.5\text{ V} \leq V_C \leq +5\text{ V}$
Operating Temperature	-40°C to $+85^\circ\text{C}$
Storage Temperature	-65°C to $+150^\circ\text{C}$

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

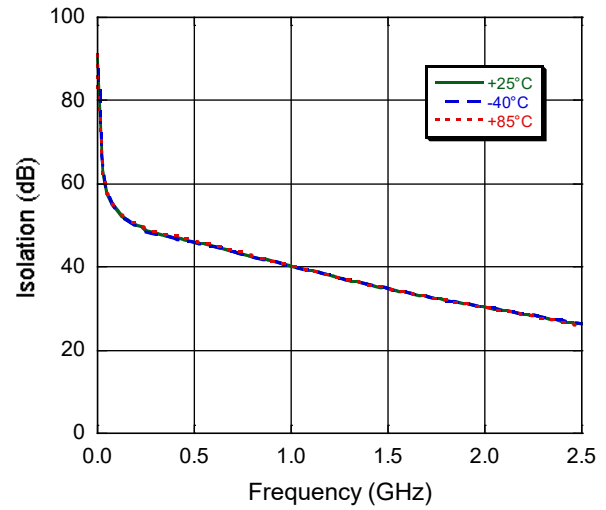
6. MACOM does not recommend sustained operation near these survivability limits.

Typical Performance Curves

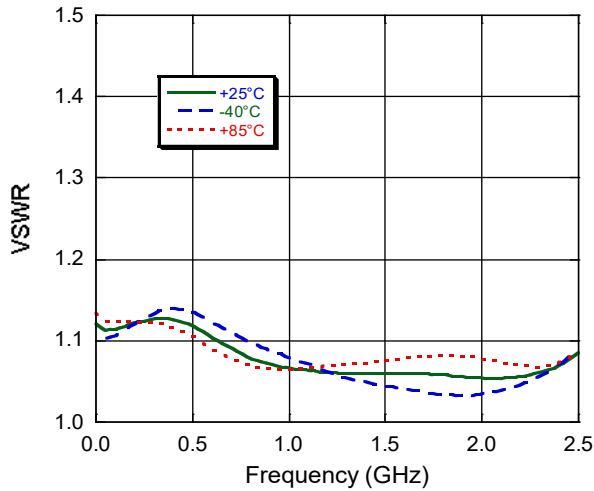
Insertion Loss



Isolation



VSWR

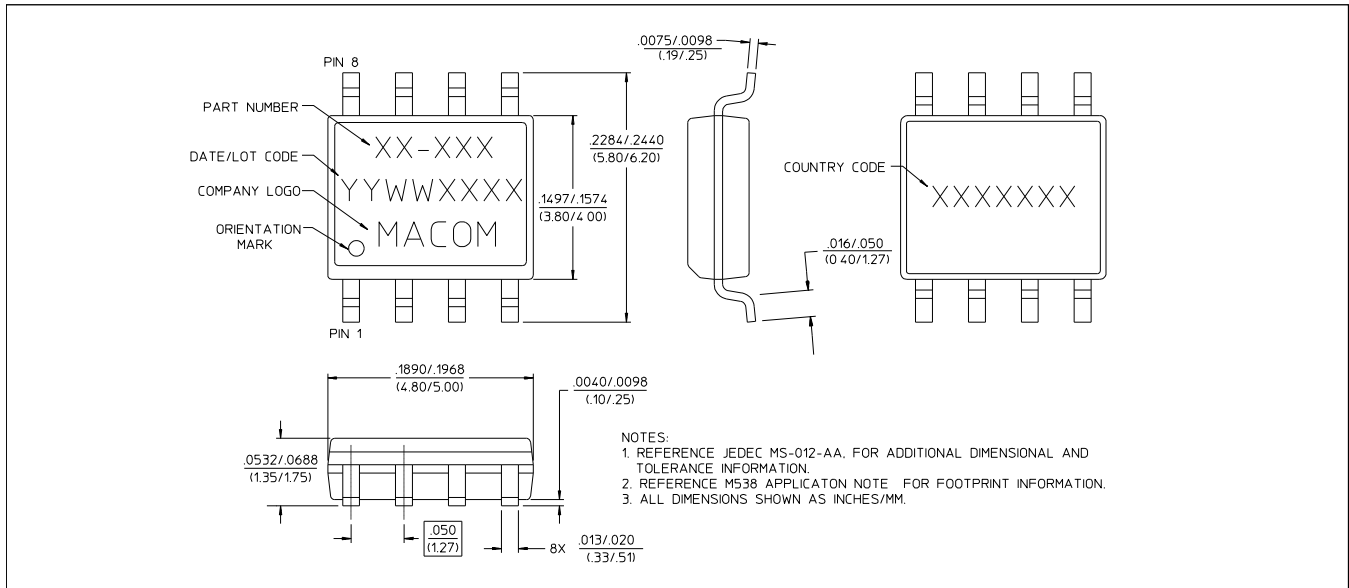


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Lead-Free SOIC-8[†]



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