

## Features

- Suitable for High Power Military and Civilian Radio Applications
- Power Handling: 100 W @ 85°C
- Insertion Loss: 0.35 dB @ 2 GHz
- Isolation: 51 dB @ 2 GHz
- Lead-Free 5 mm HQFN-12LD Package
- RoHS\* Compliant and 260°C Reflow Compatible

## Description

The MASW-011055 is a high power PIN diode SP2T switch in a common anode configuration, operating from 30 MHz to 3 GHz. It features low insertion loss and excellent linearity. This device is capable of handling 100 Watts CW incident power at a base plate temperature of 85°C.

This high power switch is ideal for use on land mobile radio and MIL-COM applications that require higher CW and pulsed power operation.

The MASW-011055 is manufactured using MACOM's hybrid manufacturing process featuring high voltage PIN diodes and passive devices integrated in a 5 mm HQFN 12-lead package.

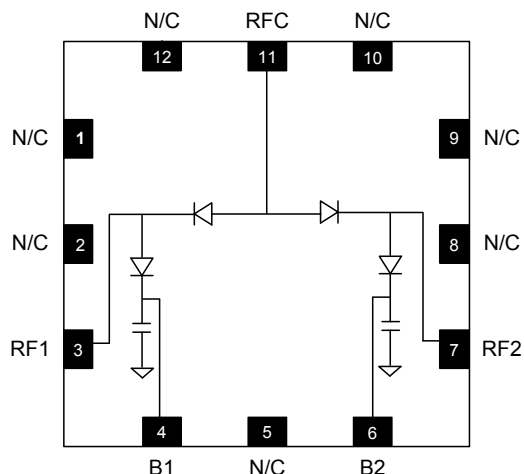
## Ordering Information<sup>1</sup>

Part Number	Package
MASW-011055-TR0500	500 piece reel
MASW-011055-SMB	Sample Board

1. Reference Application Note M513 for reel size information.

\* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

## Functional Schematic



## Pin Configuration

Pin	Function	Pin	Function
1	No Connection	7	RF2 / V2 Bias
2	No Connection	8	No Connection
3	RF1 / V1 Bias	9	No Connection
4	B1 Bias	10	No Connection
5	No Connection	11	RFC / V3 Bias
6	B2 Bias	12	No Connection
		Paddle <sup>2</sup>	Ground

2. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

## Switch, SP2T 100 Watt Reflective 0.03 - 3.0 GHz

Rev. V2

Electrical Specifications:  $T_A = 25^\circ\text{C}$ , Bias<sup>3</sup> = +5 / -5 V, 50 mA / 100 mA

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Insertion Loss $P_{IN} = 0$ dBm	0.5 GHz 1 GHz 2 GHz	dB	—	0.10 0.20 0.35	— 0.50 —
Isolation $P_{IN} = 0$ dBm	0.5 GHz 1 GHz 2 GHz	dB	— 48 —	52 54 51	—
Input Return Loss	$P_{IN} = 0$ dBm	dB	—	>15	—
CW Input Power	25°C base plate, 2 GHz	dBm W	—	52 158	—
CW Input Power	85°C base plate, 2 GHz	dBm W	—	50 100	—
P0.1dB	25°C base plate, 2 GHz	dBm	—	>52	—
Input IP3	F1 = 2000 MHz, F2 = 2010 MHz $P_{IN} = 40$ dBm/Tone, 28 V	dBm	—	66	—
RF Switching Speed	(10-90% RF Voltage) 1 MHz Rep Rate in Modulating Mode	ns	—	500	—

3. See Bias table.

### Bias (+5 V / -5 V)

RF State	V1 Bias (V)	V2 Bias (V)	V3 Bias (V)	B1 Bias (V)	B2 Bias (V)
RFC – RF1 Low Loss RFC – RF2 Isolation	-5 V @ 100 mA	+5 V @ 50 mA	0 V	0 V	0 V
RFC – RF2 Low Loss RFC – RF1 Isolation	+5 V @ 50 mA	-5 V @ 100 mA	0 V	0 V	0 V

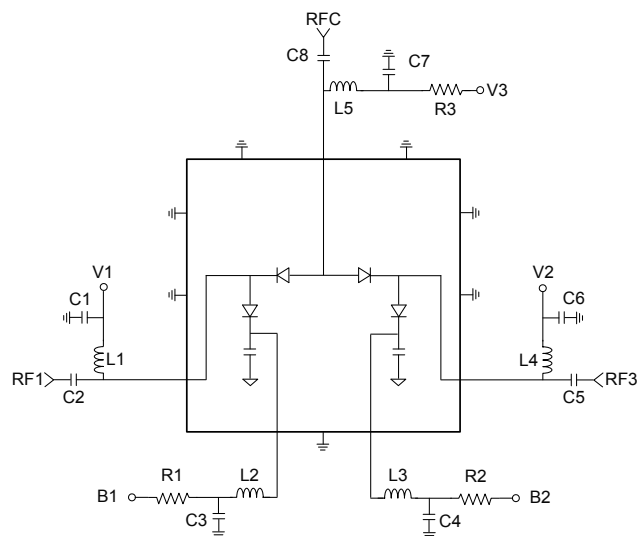
4. DC reverse bias of a PIN Diode operating at a high power is dependent on RF frequency, incident power, and VSWR. See Minimum Reverse DC Voltage table for high power operation.

## Minimum Reverse DC Voltage<sup>5</sup>

Frequency (MHz)	Minimum Reverse DC Voltage
30	-120 V
100	-119 V
200	-114 V
300	-106 V
500	-90 V
1000	-59 V
1500	-43 V
2000	-33 V

5. Required to maintain low loss under 100 W of incident power with 1.5:1 VSWR.

## Application Schematic



## Absolute Maximum Ratings<sup>6,7</sup>

Parameter	Absolute Maximum
Forward Current	200 mA
Reverse DC Voltage	-150 V
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +150°C
Junction Temperature	+175°C

6. Exceeding any one or combination of these limits may cause permanent damage to this device.  
7. MACOM does not recommend sustained operation near these survivability limits.

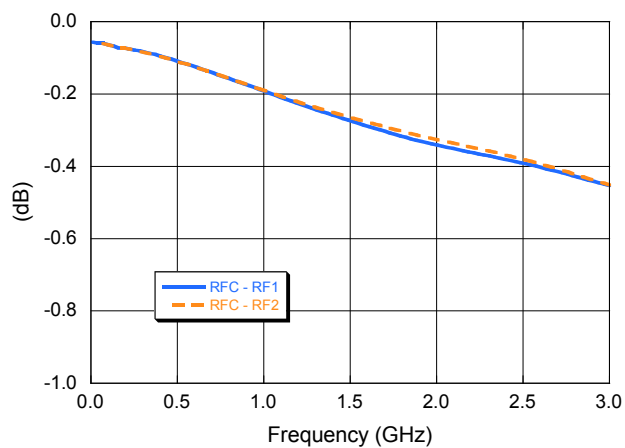
## Off-Chip Component Values

Component	Operating Frequency		Size
	0.03 - 1.0 GHz	0.5 - 3.0 GHz	
C1, C3, C4, C6, C7, C8	0.1 $\mu$ F	270 pF	0603
C2, C5, C8	0.1 $\mu$ F	27 pF	0603
L1 - L5	3.3 $\mu$ H	82 nH	0603
R1 - R2 <sup>8</sup>	82 $\Omega$	82 $\Omega$	1210
R3 <sup>8</sup>	39 $\Omega$	39 $\Omega$	1210

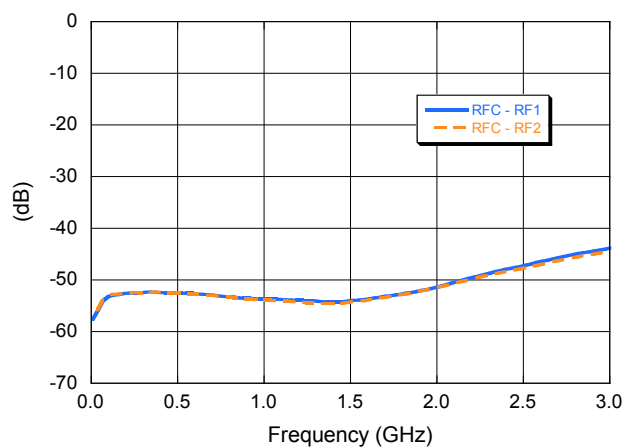
8. Resistance values are used for small signal testing under +5 V / -5 V bias conditions.

Typical Performance Curves @ +25°C (using external bias tees):

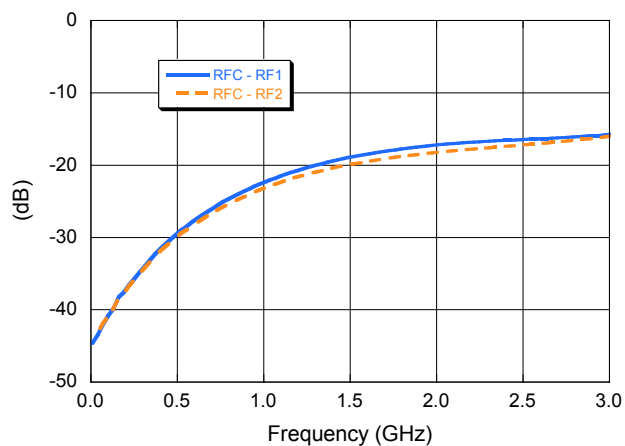
**Insertion Loss**



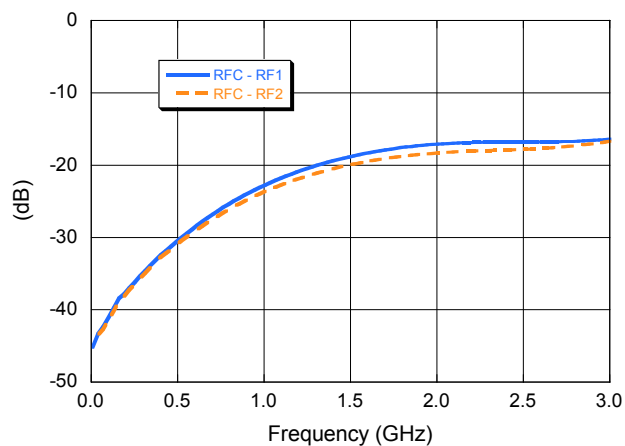
**Isolation**



**Input Return Loss**



**Output Return Loss**





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