

MPSW0060TC

PIN Diode SP2T 100W Switch For 0.05~6GHz Applications

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Features

- 1, Insertion Loss: 0.6 dB @ 3 GHz
- 2, High Isolation: 20 dB @ 6 GHz
- 3, High TX RF Input Power = 100 W C.W. @ 0.5 GHz, 85°C
- 4, Exceptional Broadband Performance

Applications

- 1, 802.11 b/g WLAN Transceivers
- 2, Military Radio Applications
- 3, High Power LTE, TD-SCDMA, WiMAX,

Description

The MPSW0060TC is a high power PIN diode SP2T switch in a common anode configuration, operating from 0.5 to 6.0 GHz. It features low insertion loss and excellent linearity. This device is capable of handling 100 Watts CW of incident power at a base plate temperature of 85°C. The device is provided in an industry standard lead free 4mm PQFN plastic package, High Isolation Switching Diode processes. All components are 100% RF tested.

Absolute Maximum Ratings

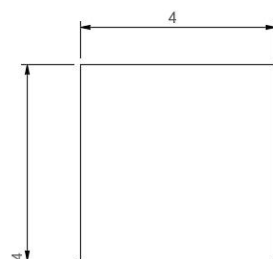
Parameter	Min	Max	Unit
Forward Current	-	150	mA
Reverse Voltage	-	150	V
Operating Temperature	-40	85	°C
Storage Temperature	-55	150	°C
Junction Temperature	-	175	°C

Minimum Reverse DC Voltage

Frequency(MHz)	Min	Max	Unit
500	41	-	V
1000	22	-	V
2000	11	-	V
3000	8	-	V
4000	6	-	V

SHAPES AND DIMENSIONS

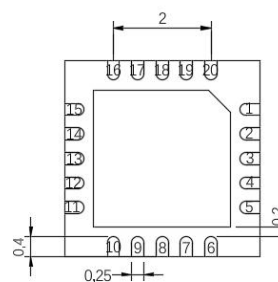
Top View



Side View



Bottom View



Unit: mm

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PinConfiguration

Terminal Functions	
1-4,6,8,10, 12-17,19,20	No Connection
5	RF1 / V1 Bias
7	B1 Bias
9	B2 Bias
11	RF2 / V2 Bias
18	RFC / V3 Bias
Paddle	Ground

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

Electrical Specifications @ +25°C, Bias= 28V 50Ω

Parameter	Condition	Minimum	Typical	Maximum	Unit
Operation frequency		500		6000	MHz
Insertion loss Pin=0dBm	0.5 GHz	-	0.20	-	dB
	1 GHz	-	0.24	-	
	2 GHz	-	0.39	-	
	3 GHz	-	0.63	-	
	4 GHz	-	0.81	-	
	5 GHz	-	1.19	-	
	6 GHz	-	2.17	-	
Input Return Loss	$P_{IN} = 0 \text{ dBm}$	12	-	-	dB
CW Input Power	25°C Base plate, 2 GHz	-	50	-	dBm
	VDC = 0 V / 28 V	-	100	-	W
CW Input Power	85°C Base plate, 2 GHz	-	49.03	-	dBm
	VDC = 0 V / 28 V	-	80	-	W
P0.1dB	25°C Base plate, 2 GHz VDC = 0 V / 28 V	-	51	-	dBm
Input IP3	F1 = 3000 MHz, F2 = 3010 MHz PIN = 40 dBm/Tone, VDC = 0 V / 28 V	-	75	-	dBm
TON, TOFF	50% control to 90% RF, 50% control to 10% RF	-	1.5	-	μs
TRISE, TFALL	90% to 10% RF	-	1.1	-	μs

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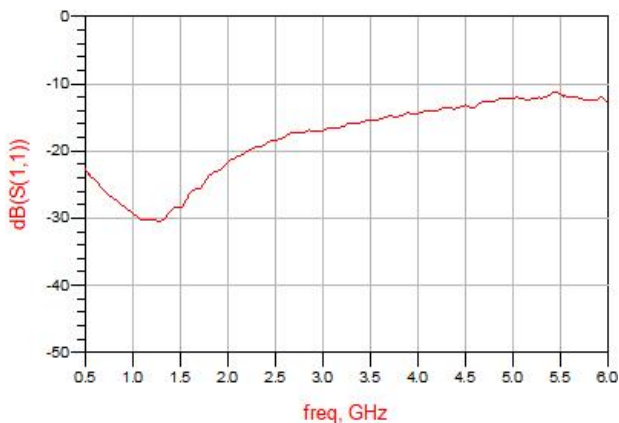
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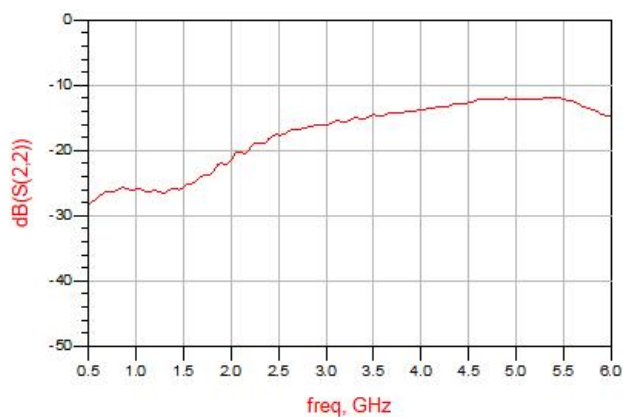
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FREQUENCY CHARACTERISTICS

Return Loss (S11)



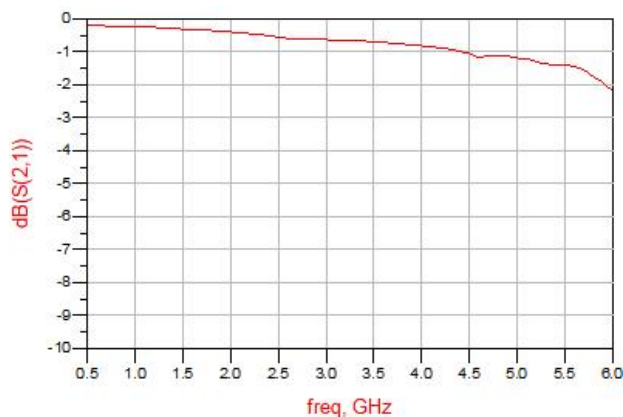
Return Loss (S22)



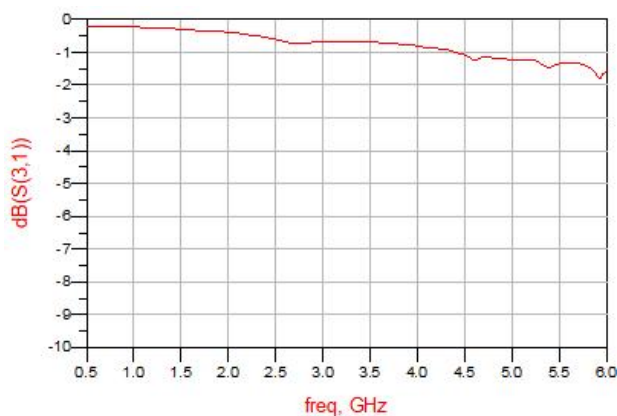
Return Loss (S33)



Insertion Loss (S21)



Insertion Loss (S31)



Isolation (S31)



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Shenzhen Megasine technology co., ltd www.megasine.com sales@megasine.com may contain us for future information

Feb. 03, 2020

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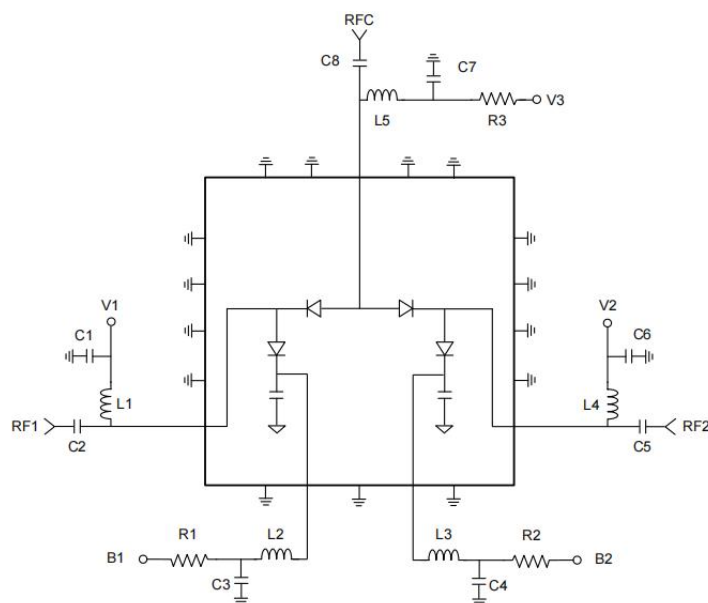
Isolation (S21)



Bias Table for Small Signal Operation: Positive Only DC Bias 0 / +5 V

RF State	V1 Bias(V)	V2 Bias(V)	V3 Bias(V)	B1 Bias(V)	B2 Bias(V)
Pin#	Pin5	Pin11	Pin18	Pin7	Pin9
RFC – RF1 Insertion Loss	0 V @ -100 mA	+5 V @ 50 mA	+5 V @ 100 mA	+5 V @ 0 mA	0 V @ -50 mA
RFC – RF2 Isolation					
RFC – RF2 Insertion Loss	+5 V @ 50 mA	0 V @ -100 mA	+5 V @ 100 mA	0 V @ -50 mA	+5 V @ 0 mA
RFC – RF1 Isolation					

Bias Schematic



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Parts List

Component	Value	Packaeg
C1, C3, C4,C6, C7	47 pF	0603
C2, C5,	20 pF	0603
C8	98pF	0603
L1,L4	75nH	0603
L5	68nH	0603
L2,L3	47nh	0603
R1 - R2	10KΩ	2510
R3	39 Ω	1206

3. Off-chip component values are used for small signal testing under +5 / 0 V bias conditions. These must be rated appropriately to ensure safe performance under high power operation.

4. Shunt resistor (R1, R2) values can be adjusted using the following formula: $R = (V-1) / I_{SHUNT}$ where R is the shunt resistor value, V is the DC voltage applied to the reverse-biased series PIN diode, and I_{SHUNT} is the current through the forward-biased shunt PIN diode.

Large Signal Operation @ 1 GHz

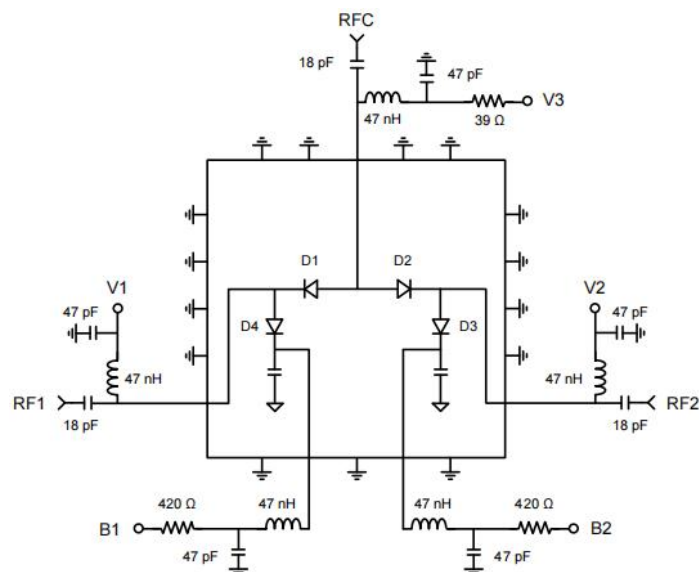
Operation of the MPS0060TC high power switch requires four complementary DC control signals. Bias voltages are applied to DC ports B1 and V1 (corresponding to RF port RF1), B2 and V2 (corresponding to RF port RF2), and static V3.

For positive-only DC bias at 1 GHz, 5 V and 22 V are required. A constant 5 V is applied at the V3 DC port at all times. To set the switch to a RFC-RF1 low loss state and RFC-RF2 in Isolation, D1 PIN diode must be forward biased, D2 PIN diode must be reversed biased, D3 PIN diode must be forward biased, and D4 PIN diode must be reversed biased.

D1 PIN diode is forward biased by setting V1 port to 0 V. A 39 Ω resistor sets the forward current to a nominal of 100 mA. D2 PIN diode is reverse biased by applying 22 V at V2 port. This is the minimum reverse bias voltage that is required to maintain the PIN diode in its non-conducting, high impedance state under 100 W incident power with a 1.5:1 VSWR. D3 PIN diode is forward biased by setting B2 to 0 V. To determine the forward current of the shunt PIN diode, equation listed on note 10 can be used. The resultant resistance is 420 Ω to achieve 50 mA nominal forward current. D4 PIN diode is reverse biased by applying 22 V to B1 port.

To set the switch to a RFC-RF2 low loss state and RFC-RF1 in isolation, reverse 0 V and 22 V.

In order to safely operate at 100 W incident power, the values of the reactive components that make up the bias decoupling networks and DC blocking must be rated appropriately. Proper heat sinking is essential to safe operation under high incident power.



Large Signal Operation @ 1 GHz DC Bias 0V/+22V

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MPSW0060TC

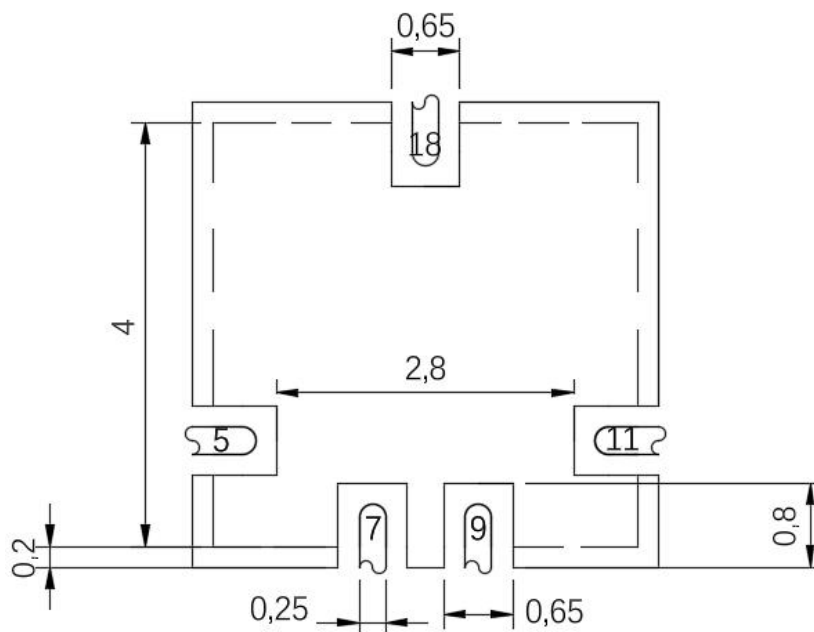
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Bias 0 / +22 V (Large Signal Operation @ 1 GHz)

RF State	V1 Bias(V)	V2 Bias(V)	V3 Bias(V)	B1 Bias(V)	B2 Bias(V)
Pin#	Pin5	Pin11	Pin18	Pin7	Pin9
RFC – RF1 Insertion Loss	0 V @ -100 mA	+22 V @ 50 mA	+5 V @ 100 mA	+22 V @ 0 mA	0 V @ -50 mA
RFC – RF2 Isolation					
RFC – RF2 Insertion Loss	+22 V @ 50 mA	0 V @ -100 mA	+5 V @ 100 mA	0 V @ -50 mA	+22 V @ 0 mA
RFC – RF1 Isolation					

RECOMMENDED LAND PATTERN



ORDERING INFORMATION

Device	Package	Reel	Shipping
MPSW0060TC	4*4	7"	1000 Reel

Revision	Description	Date
Rev0	Preliminary	2026/1/16
Rev	Update	2026/4/10

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