

Surface Mount

# High Isolation Switch

## RSW-2-25PA+

50Ω DC to 2500 MHz

### The Big Deal

- Footprint Compatible with RSW-2-25P+<sup>a</sup>
- High Isolation, 50 dB typ. at 1 GHz
- Fast Switching, 3 ns typ. Rise/fall Time



CASE STYLE: CL620-1

### Product Overview

The RSW-2-25PA+ is a 50Ω high isolation, reflective SPDT RF switch designed for wireless applications, covering a broad frequency range from DC to 2500 MHz. This model is footprint compatible with Mini-Circuits' model number RSW-2-25P+ which is at End of Life. It provides very fast switching time of 14 ns and operates on a single positive supply voltage.

### Key Features

Feature	Advantages
High isolation; 50 dB typ. at 1 GHz 33 dB typ. At 2.5 GHz	With one switch, high isolation can be achieved, saving component count.
Fast switching 3 ns. rise/fall Time 14 ns switching Time	Most competitive switches have slow switching time of the order of $\mu$ s. The RSW-2-25PA+ is ideally suited for applications requiring fast switching time of the order of ns.
Positive voltage operation	Eliminates need for negative voltage which is generally required for fast switching, simplifying circuit layout.
Footprint compatible with RSW-2-25P+	Both RSW-2-25P+ & RSW-2-25PA+ use the same suggested foot print. RSW-2-25P+ is at end of Life. RSW-2-25PA+ can be used in its place without PCB re-design at the customer end.

Notes:

a. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.

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# High Isolation Switch

50Ω DC-2500 MHz

SPDT Reflective, Single Supply Voltage, +5V

## Product Features

- Wide bandwidth, DC to 2500 MHz
- High Isolation, 50 dB typ. at 1 GHz
- Fast switching, 3ns rise/fall time
- Dual positive control
- Aqueous washable

## Typical Applications

- Automated switching networks
- Transmitters and Receivers

## RSW-2-25PA+



Generic photo used for illustration purposes only

CASE STYLE: CL620-1

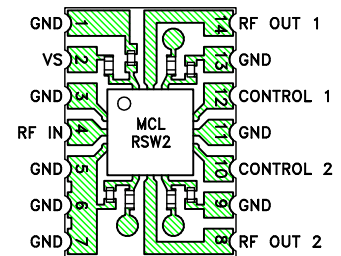
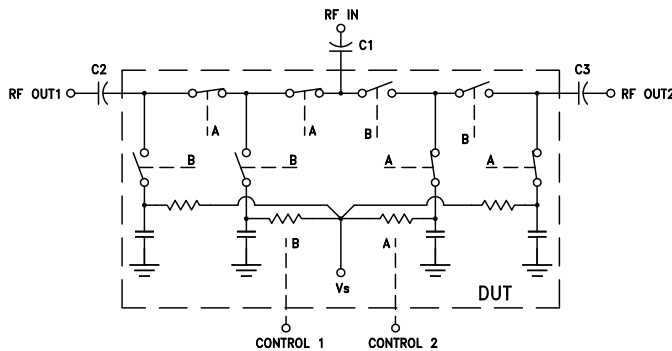
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The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## General Description

The RSW-2-25PA+ is a 50Ω high isolation, reflective SPDT RF switch designed for wireless applications, covering a broad frequency range from DC to 2500 MHz is footprint compatible with Mini-Circuits' model RSW-2-25P+.

## Simplified Schematic and Pad Description



Function	Pad Number	Description (Reference to Fig. 2)
RF IN	4	RF Common / Sum Port, Pad 4 connected to RF IN via C1
RF OUT 1	14	RF Out #1 / IN Port #1, Pad 14 connected to RF OUT1 via C2
RF OUT 2	8	RF Out #1 / IN Port #2, Pad 8 connected to RF OUT2 via C3
VS	2	DC Positive Supply Voltage
Control 1	12	Control Port #1
Control 2	10	Control Port #2
GND	1,3,5,6,7,9,11,13	RF Ground

**RF Electrical Specifications<sup>1,2</sup>, DC - 2500 MHz, Vs=+5V, T<sub>AMB</sub>=25°C**

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range (Note 2)		DC		2500	MHz
Insertion Loss	DC to 100		0.5	0.9	dB
	100 to 1000		0.7	1.1	
	1000 to 2000		0.9	1.5	
	2000 to 2500		1.2	1.8	
IN-OUT Isolation	DC to 100	55	80		dB
	100 to 1000	44	54		
	1000 to 2000	34	43		
	2000 to 2500	26	33		
Return Loss, all ports (ON STATE)			17.6		dB
Return Loss @ RF OUT PORTS (OFF STATE)				5.0	dB
Input IP3	10		33		dBm
	100		38		
	500		39		
	1000		38		
	2500		41		
Input 1dB Compression <sup>(3)</sup>	10		13		dBm
	100		18		
	500		29		
	1000		29		
	2500		28		

Notes:

1. Tested on Mini-Circuits Test Board TB-23A+ (See Characterization Circuit, Fig 1)
2. All RF ports must be DC blocked

**DC Electrical Specifications**

Parameter	Min.	Typ.	Max.	Units
Vs, Supply Voltage	5		7	V
Supply Current (Vs= 5V)		30		μA
Control Voltage Low	0		0.2	V
Control Voltage High	Vs-0.2		Vs	V
Control Current		30		μA

**Switching Specifications at Vs=5V**

Parameter	Min.	Typ.	Max.	Units
Rise/Fall Time (10 to 90% or 90 to 10% RF)		3		nSec
Switching Time (50% CTRL to 90/10% RF)		14		nSec
Video Leakage <sup>3</sup>		44		mV <sub>p,p</sub>

3. Video leakage or break through is defined as leakage of switching signal to RF output ports.

**Absolute Maximum Ratings<sup>4</sup>**

Parameter	Ratings
Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
Vs, Supply Voltage	+8V
Control Voltage	+8V
RF input power <sup>5</sup>	1W (>10 MHz)

4. Permanent damage may occur if any of these limits are exceeded.
5. Above 25°C, derate linearly to zero at 150°C.

**Truth Table** (State of control voltage selects the desired switch state)

State of Control Voltage		Switch State - RF IN to	
Control 1	Control 2	RF OUT 1	RF OUT 2
Low	High	ON	OFF
High	Low	OFF	ON

ON- low insertion loss state  
OFF- Isolation State

Characterization Test Circuit

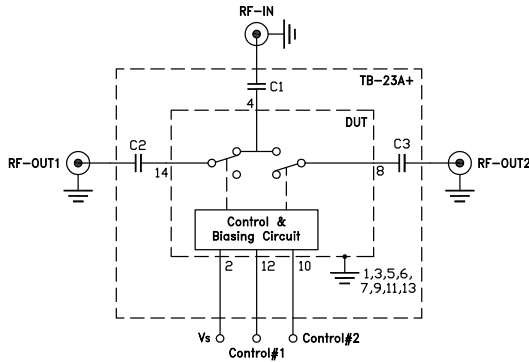


Figure 1 Block Diagram Of Test Circuit Used For Characterization. (DUT soldered on Mini-Circuit's TB-23A+)

Test Equipment:

For Insertion loss, Isolation, Return loss:

Agilent's N5230A Network Analyzer , E3631A power supply.

For Switching Time and Video Feed through

Agilent's AG54832B HP81110A pulse generator, HPE3631A Network Analyzer , E3631A power supply.

Agilent's N90A Spectrum Analyzer , E8257D Generator U200A

For Compression:

Agilent's N5230A Network Analyzer.

Conditions:

Control= 0 and Vs

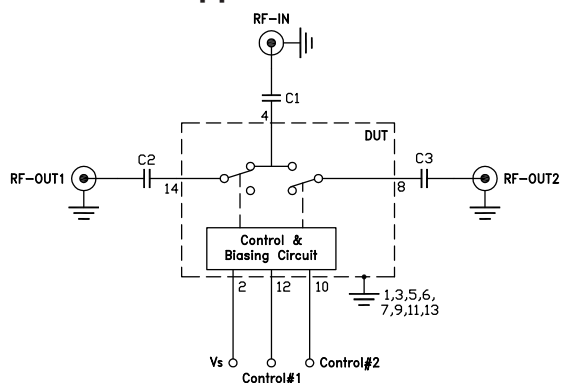
For Insertion loss, isolation and return loss: Vs= +5/7V. Pin=0 dBm

For P1dB: Vs= +7V

For Input IP3: Vs= +5V, Pin=+0dBm/tone, 1 MHz tone spacing.

For Switching time: RF frequency: 100 MHz at 0 dBm, Control Frequency: 10 KHz and 0 and +5V.

Recommended Application Circuit



Product Marking

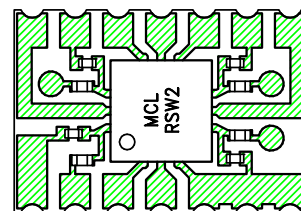


Figure 2 Test Board TB-23A+ includes case connectors & components soldered to PCB. C1, C2, C3=0.1µF, 0805 size

<b>Additional Detailed Technical Information</b>	
<i>additional information is available on our dash board. To access this information <a href="#">click here</a></i>	
<b>Performance Data</b>	Data Table
	Swept Graphs
<b>Case Style</b>	CL620-1, Base: FR4 PCB, Termination Finish: Gold over Nickel
<b>Tape &amp; Reel</b> Standard quantities available on reel	F43 <i>7" reels with 500 devices</i>
<b>Suggested Layout for PCB Design</b>	PL-444
<b>Evaluation Board</b>	TB-23A+
<b>Environmental Ratings</b>	ENV65

**ESD Rating**

Human Body Model (HBM): Class 1B (500 to <1000V) in accordance with ANSI/ESD STM 5.1 - 2007

Machine Model (MM): Class M2 (100 to <200V) in accordance with ANSI/ESD STM5.2-1999

**Additional Notes**

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

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