

Product Features

Operating Frequency: 10MHz ~ 4GHz

Insertion Loss: 0.9dB@1.5GHz

Isolation: 51.4dB@1.5GHz

Input Power for 1dB Compression:

34.0dBm@1.5GHz

Input Third-Order Interception:

54.3dBm@1.5GHz

Switching Speed: 140ns (ON)

38ns (OFF)

Supply Voltage: +3.3V/+5V

Positive Control Voltage: 0/+3V ~ +5V

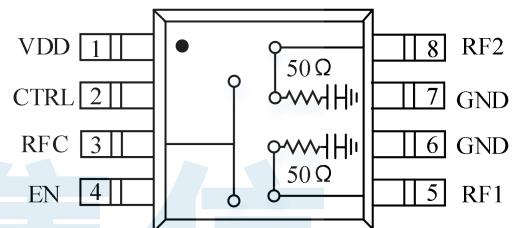
Supply Current: 1mA

Package: eMSOP8

General Description

The BR9147EA is a DC~4GHz high isolation non-reflective SPDT switch with typical insertion loss of 0.9dB and isolation of 51.4dB. It operates with positive control voltage of 0/+3V~+5V, and provides a CMOS-/TTL-compatible control interface. The product features small size, low insertion loss, high isolation, fast switching speed and low DC power consumption, making it well suitable for IF and RF switching applications.

Functional Block Diagram



Application

Microcellular /3G/ 4G Infrastructure

Dedicated mobile Wireless Devices

Test Equipment

Ultrashort Wave Equipment

Ordering Information

Part Number	Package	Description
BR9147EA	eMSOP8	10MHz ~ 4GHz SPDT Switch

Electrical Specifications

Parameters		Min.	Typ.	Max.	Units
Insertion Loss	0.01GHz to 4GHz	-	-0.8	-	dB
Isolation	0.01GHz to 4GHz	-	-50	-	dB
Return Loss	0.01GHz to 4GHz	-	-22	-	dB
Input Power for 1dB Compression	0.01GHz to 2.5GHz	-	32	-	dBm
Input-Third-Order Interception	0.03GHz to 4GHz	-	53	-	dBm
Switching Time Characteristics	200MHz		140		ns
	t _{ON} , (50% CTL-90% RF)	-		-	
	t _{OFF} (50% CTL-10% RF)	-	38	-	ns
Test Conditions: VDD=+5V, I=1mA, Vctl=0/+5V, IIP3 spacing=1MHz, Pin=10dBm/tone, Temp.=+25°C					

Absolute Maximum Ratings

Maximum Supply Voltage: +7V

Maximum RF Pass Power:

28dBm@5V@125°C

26dBm@3V@125°C

Maximum RF Absorbed Power:

21dBm@5V@125°C

21dBm@3V@125°C

Control Voltage: 0V ~ VDD

Maximum Hot-Switching Power:

Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

25dBm@2GHz

Recommended Operating Conditions

Operating Voltage: 5V/3.3V

Control Threshold: 0V ~ 0.8V (low level)

2.7V ~ VDD (high level)

Supply Current: 1mA

Operating Temperature: -55°C ~ +125°C

Storage Temperature: -65°C ~ +150°C

ESD WARNING

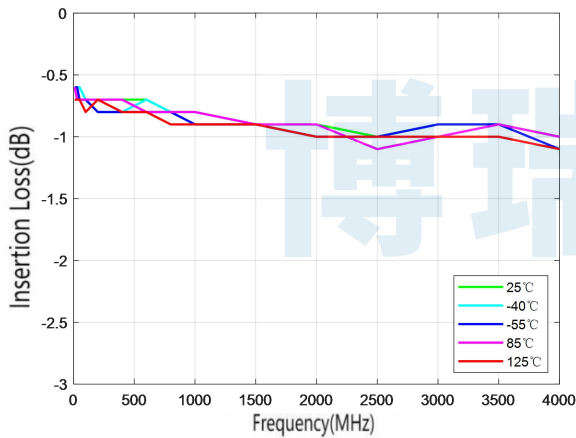


ELECTROSTATIC SENSITIVE DEVICE

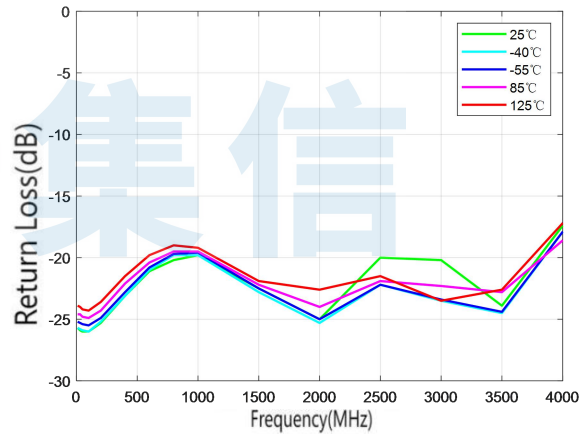
OBSERVE HANDLING PRECAUTIONS

Typical Performance (EVB test results)

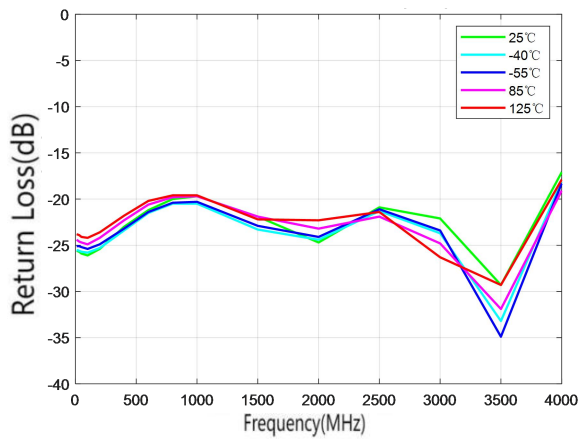
Test item	Typ.							Units
Frequency	10	100	600	1500	2500	3500	4000	MHz
Input RFC Return Loss	-25.6	-28.9	-21.4	-22.9	-19.6	-22.9	-15.9	dB
Output Channel Return Loss	-25.6	-25.9	-21.4	-22.9	-19.6	-22.9	-15.7	dB
Output Absorbing Return Loss	-0.6	-10.1	-21.6	-26.3	-23.6	-17.7	-16.5	dB
Insertion Loss	-0.6	-0.7	-0.7	-0.9	-1.0	-0.9	-1.0	dB
Path Isolation	-74.7	-73.1	-55.2	-46.0	-41.3	-37.6	-36.5	dB
Port Isolation	-74.1	-66.2	-62.2	-51.4	-46.3	-42.0	-41.8	dB
Input Power for 1dB Compression	21.8	27.2	32.9	34.0	34.2	-	-	dBm
Input Third-Order Interception	43.5	51.0	54.6	54.3	53.3	54.7	51.2	dBm
Switching Time	140ns rise switch				38ns Down switch			
Test Conditions: VDD=+5V, I=1mA, Vctl=0/+5V, IIP3 spacing=1MHz, Pin=10dBm/tone, Temp=+25°C								



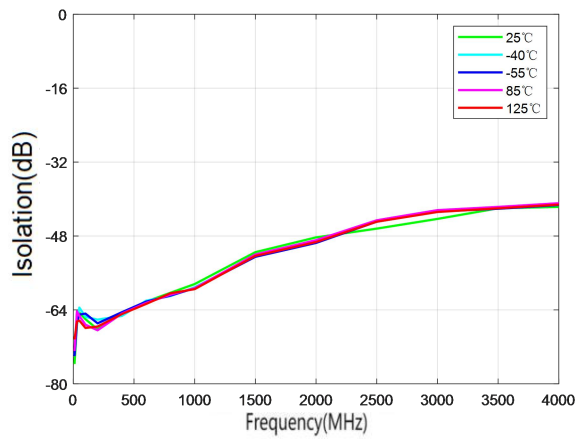
Insertion Loss Between RFC and RF1/RF2



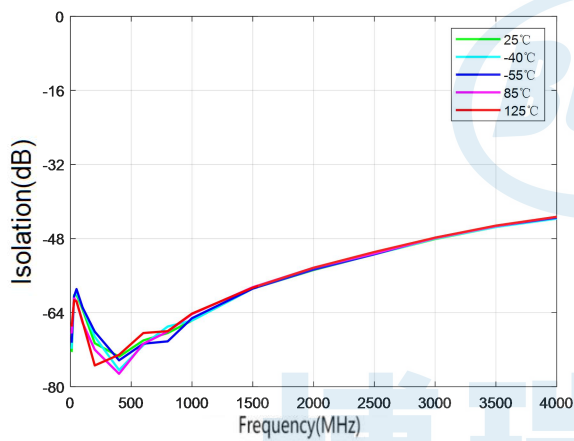
RFC Return Loss



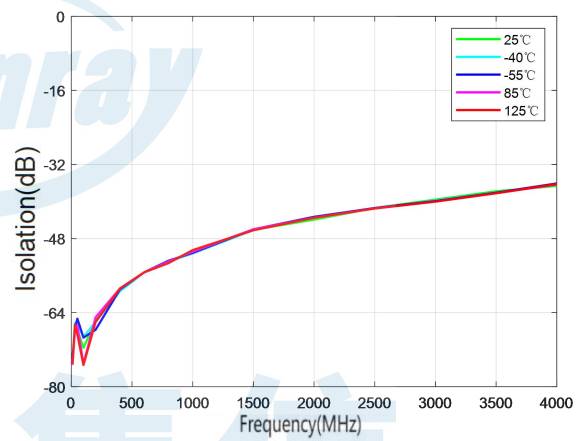
RF1/RF2 Return Loss in ON-State



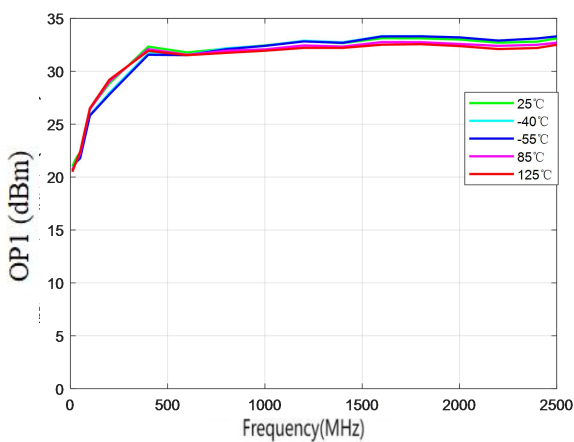
Isolation Between RFC and RF1/RF2



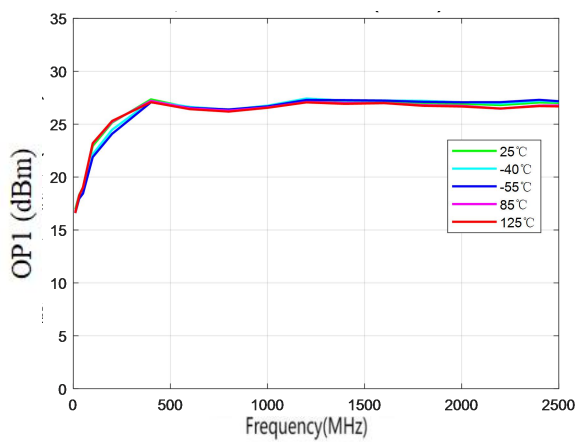
Isolation Between RFC and RF at EN=1



Isolation Between RF1 and RF2

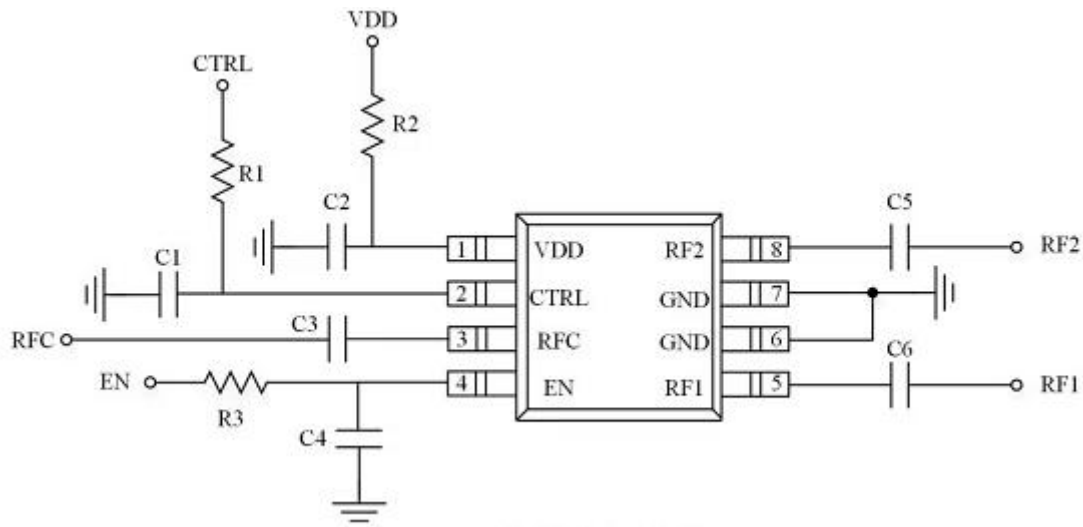


Input Power for 1dB Compression at +5V



Input Power for 1dB Compression at +3V

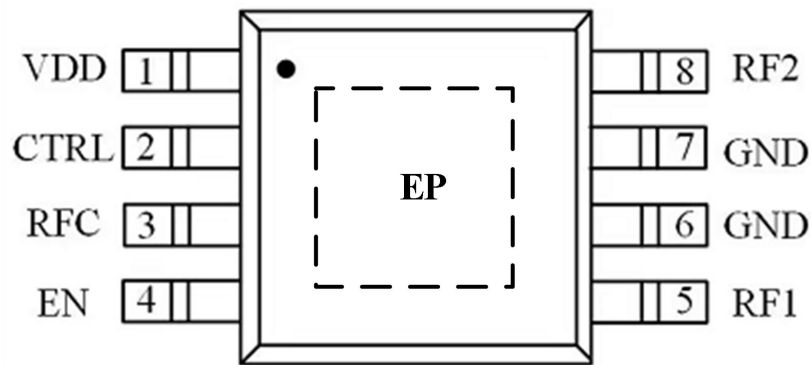
Typical Application Schematic



Bill of Material

Reference Designator	Package	Description	Part Number
R1, R2, R3	0402	100Ω	RC0402JR-07100RL
C1, C2, C4	0402	100pF	GRM1555C1H101JA01D
C3, C5, C6	0402	1uF	GRM1555C1H105JA01

Pin Configuration and Description



Pin Numbers	Pin Name	Description
1	VDD	Supply pins. A 100Ω series resistor should be added to optimize insertion loss.
2	CTRL	Control input pins. See truth table.
3,5,8	RFC, RF1, RF2	RF pins. DC Block is required.
4	EN	Enable pin. See truth table.
6, 7	GND	Ground pins. These pins must be connected to RF/DC ground.
-	EP	Exposed pin. The exposed pad must be connected to RF/DC ground.

Truth Table

Control Inputs		Switch Mode	
EN	CTRL	RFC/RF1	RFC/RF2
0	0	OFF	ON
0	1	ON	OFF
1	0	OFF	OFF
1	1	OFF	OFF

