

Product Features

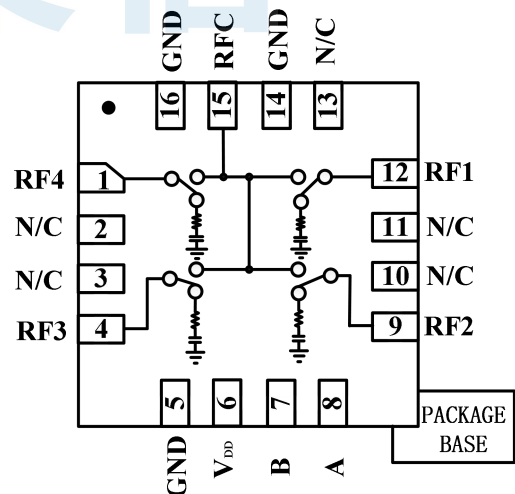
- Frequency: 10MHz~4GHz
- Insertion Loss: 1.0dB@2.0GHz
- Isolation: 50dB@2.0GHz
- Input Power for 1dB Compression:
28.3dBm@2.0GHz
- Input Third-Order Interception:
42.6dBm@2.0GHz
- Switching Speed: 100ns (ON)
16ns (OFF)
- Supply Voltage: +3.3V/+5V
- Control Voltage: 0/+3V~+5V
- Supply Current: 2mA
- Package: QFN16 (3mm×3mm)

General Description

The BR9509FD are a general-purpose, non-reflective SP4T switch manufactured using a GaAs process in a low-cost, leadless surface-mount package over the frequency range of 10MHz~4GHz. At 2 GHz, the switch typically provides 50dB high isolation and 1.0dB low insertion loss. On-chip circuitry allows single positive supply operation with control inputs compatible with CMOS and most TTL logic families. The switch includes an on-chip, binary two to four line decoder that provides logic control from two logic input lines to select one of the four RF lines.

Application

- Cellular/4 G Infrastructure
- Wireless Infrastructure
- Automotive Telematics
- Mobile Radios
- Test Equipment

Functional Block Diagram

Ordering Information

Part Number	Package	Description
BR9509FD	QFN16	10MHz~4GHz Nonreflective SP4T Switch

Electrical Specifications

Parameter	Test Condition	Min.	Typ.	Max.	Units
Insertion Loss	0.01GHz~1.0GHz	-	-0.7	-	dB
	1.0GHz~3.2GHz	-	-1.0	-	dB
	3.2GHz~4.0GHz	-	-1.6	-	dB
Isolation	0.01GHz~1.0GHz	-	-54	-	dB
	1.0GHz~3.2GHz	-	-50	-	dB
	3.2GHz~4.0GHz	-	-40	-	dB
Return Loss	0.01GHz~1.0GHz	-	-18	-	dB
	1.0GHz~3.2GHz	-	-20	-	dB
	3.2GHz~4.0GHz	-	-12	-	dB
Input Power for 1dB Compression	0.6GHz~2.5GHz	-	29	-	dBm
Input Third-Order Interception	0.03GHz~2.7GHz	-	43	-	dBm
Switching Characteristics	0.6GHz~2.7GHz	tON, (50% CTL-90% RF)	100	-	ns
		tOFF (50% CTL-10% RF)	16	-	
V _{dd}	-	-	5	-	V
I _{dd}	-	-	2	-	mA
Test Conditions: V _{dd} =+5V, I _{dd} = 2mA, Temp=+25°C, V _{ctl} =0/+5V, IIP3 spacing=1MHz, P _{in} =10dBm/tone					

Absolute Maximum Ratings

Maximum Operating Voltage: +7V

Maximum RF input Power: 28.5dBm

Maximum RF Absorbed Power: 25dBm

Maximum Hot-swap Power: 22.5dBm

Control Voltage Range: 0V~VDD

Recommended Operating Conditions

Operating Voltage: 5V/3.3V

Control Voltages: 0V~0.8V (Low)

2.7V~VDD (High)

Operating Current: 2mA

Operating Temperature: -55°C~+125°C

Storage Temperature: -65°C~+150°C

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.

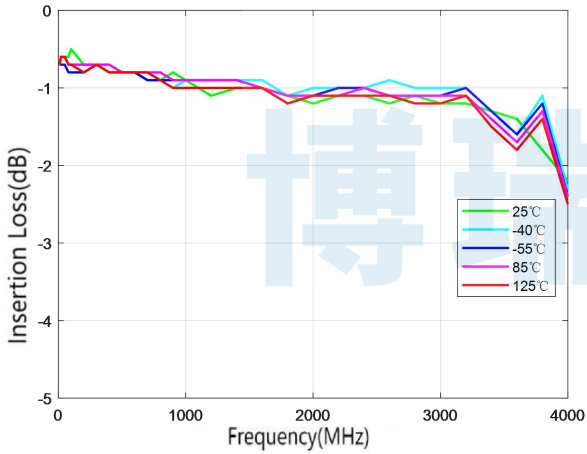
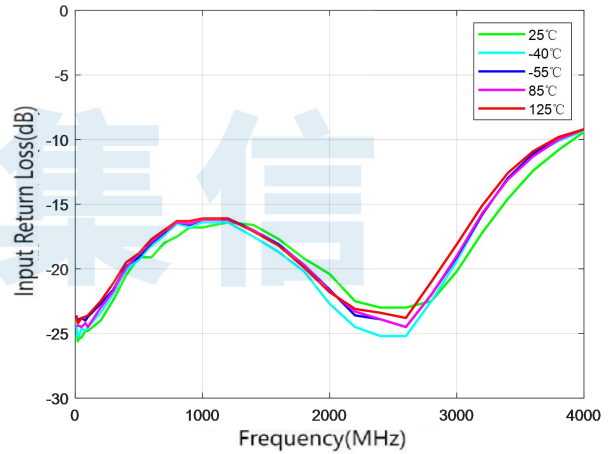
ESD WARNING

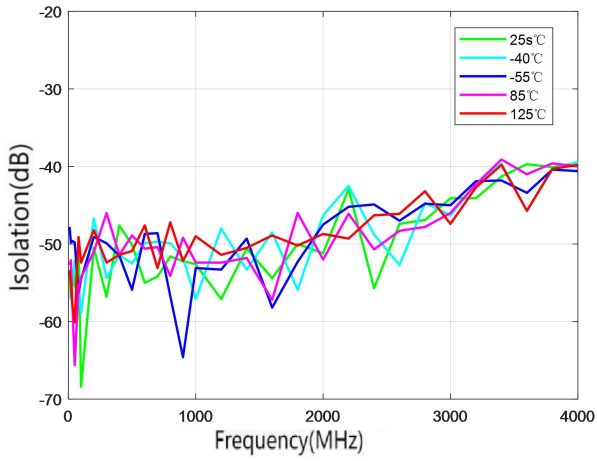
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

博瑞集信

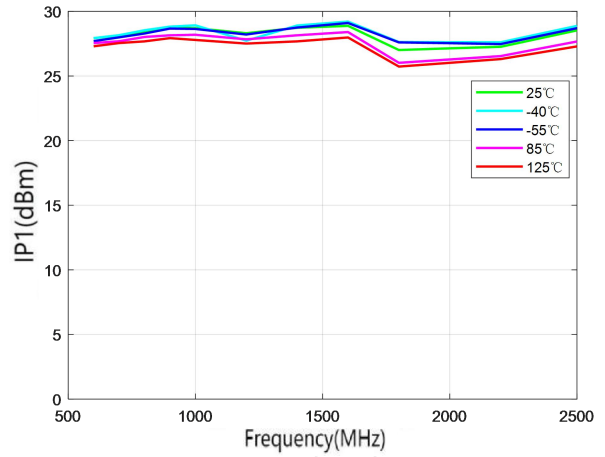
Typical Performance (EVB test results)

Parameter	Typ.							Units
	10	100	500	1500	2500	3500	4000	
Frequency	10	100	500	1500	2500	3500	4000	MHz
Input Return Loss	-24.3	-24.6	-19.6	-17	-22.1	-16.8	-9.9	dB
RF1-4 on Return Loss	-24	-24.4	-20.5	-19.3	-26.4	-19.3	-11.4	dB
RF1-4 off Return Loss	-0.3	-5.2	-12.8	-12.5	-14.4	-18.6	-15.3	dB
RFC to RF1-4 Insertion Loss	-0.61	-0.65	-0.81	-0.89	-0.99	-1.04	-2.13	dB
RFC to RF1-4 Isolation	-52.2	-54.4	-51.7	-53.1	-49.6	-43.8	-40.5	dB
RF1-4 Isolation	-54.7	-56.3	-55.1	-53	-50.6	-44.7	-42.6	dB
Input Power for 1dB Compression	-	-	28.6	30	29.7	-	-	dBm
Input Third-Order Interception	-	40.3	45.8	45.3	45.1	-	-	dBm
Switching Time	100ns turn on				16ns turn off			
Test Conditions: VDD=+5V, Idd= 2mA, Temp=+25°C, Vctl=0/+5V, Two-Tone Space 1MHz, Pin=10dBm/tone								


Insertion Loss vs. Freq

RFC Input Return Loss vs. Freq



RFC To RF1-4 Isolation vs. Freq

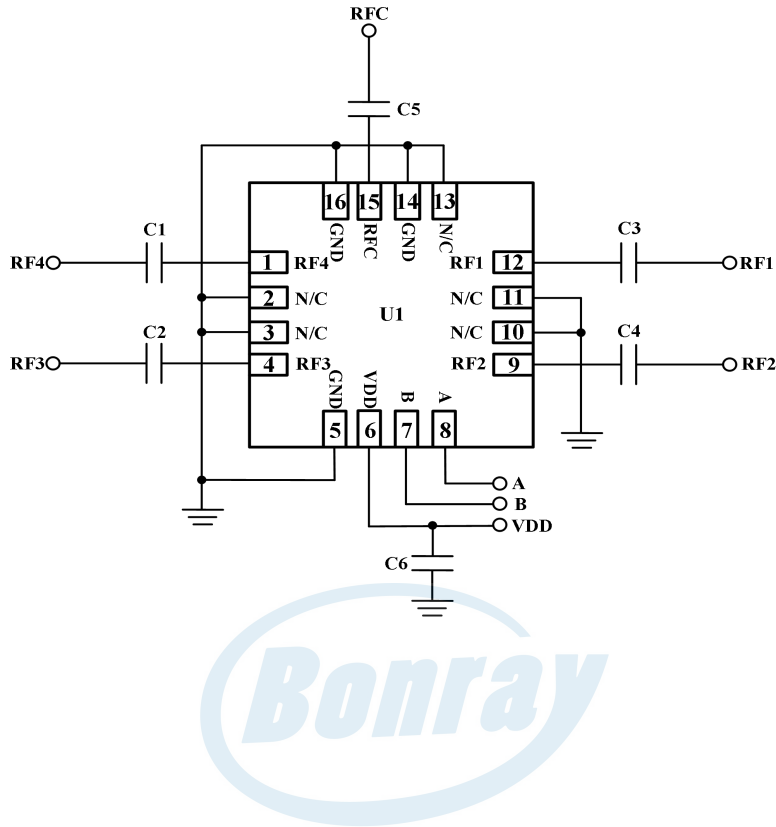


IP1 vs. Freq



博瑞集信

Typical Application Schematic



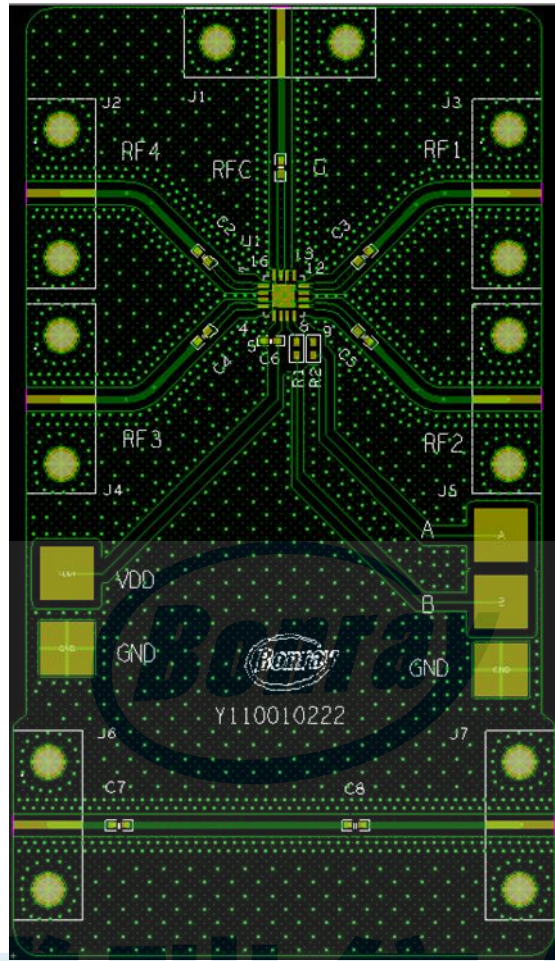
Bill of Material

Designator	Package	Description	Part Number
C1~C6	0402	1μF	GRM1555C1H105JA01

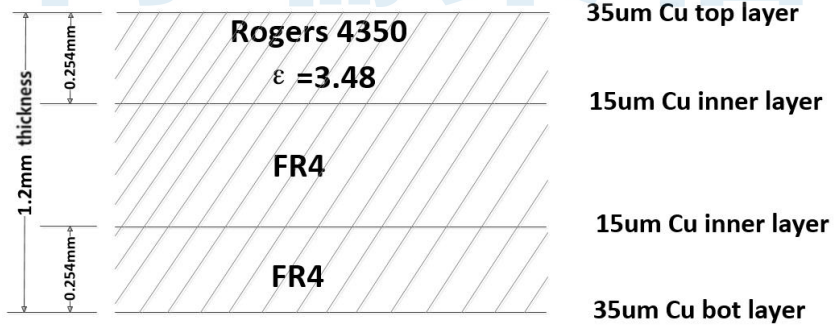
Truth Table

Control Input		RF Paths			
A	B	RFC/RF1	RFC/RF2	RFC/RF3	RFC/RF4
Low	Low	ON	OFF	OFF	OFF
High	Low	OFF	ON	OFF	OFF
Low	High	OFF	OFF	ON	OFF
High	High	OFF	OFF	OFF	ON

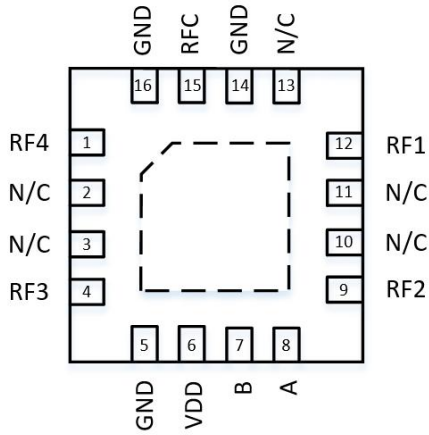
PCB Evaluation Board



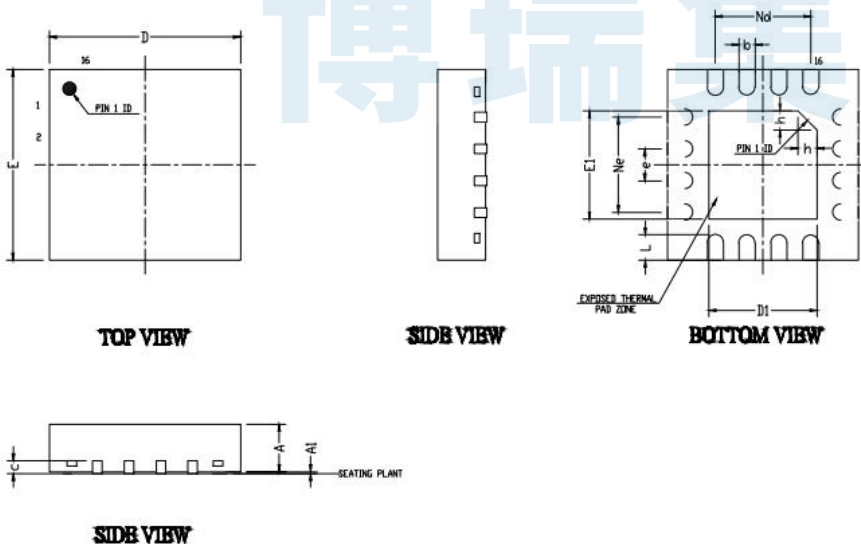
博瑞集信



50 ohms Impedance Signal Lines: width=0.53mm,spacing=0.53mm

Pin Configuration and Description


Pin Number	Pin Name	Description
2,3,10,11,13	N/C	No electrical connection. Provide grounded land pads for PCB mounting integrity.
5,14,16	GND	RF/DC ground pins. Connect to RF/DC ground
1,4,9,12,15	RF4, RF3, RF2, RF1, RFC	RF pins. DC Block is required.
6	VDD	Power supply pin.
7	B	Control pins. See truth table.
8	A	
-	EP	RF/DC ground. Use recommended via pattern for suggested footprint. to minimize inductance and thermal resistance; See PCB Mounting Pattern for suggested footprint.

Package Dimensions (mm)


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.75	0.80	0.85
A1	0.01	0.02	0.05
b	0.20	0.25	0.30
c	0.270REF		
D	2.90	3.00	3.10
D1	1.60	1.70	1.80
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E1	1.60	1.70	1.80
L	0.25	0.30	0.35
h	0.30	0.35	0.40