Product Features

Frequency Range: 30MHz～18GHz

Insertion Loss: 0.17dB@4GHz

Threshold Level: 14.0dBm@4GHz

Response Time: 11.7ns

Application

Mobile Infrastructure

LTE/WCDMA/CDMA/GSM

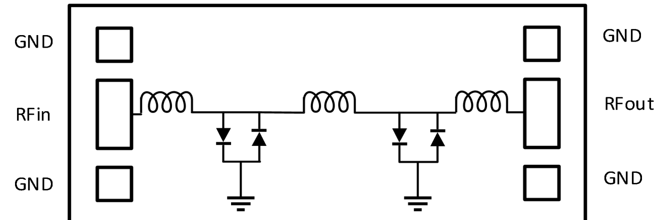
General Purpose Wireless

TDD or FDD System

General Description

The BR9308LDZ is a high-power MMIC limiter using GaAs process with frequency range of 30 MHz to 18 GHz, and only require blocking capacitors for RF input and output ports. The limiter is a passive device without DC bias, and provides high reliability, low insertion loss, low limiting level and fast response time. The product is widely used in the front end of receiving systems such as Beidou anti-jamming antennas, communication systems, and receiver protection.

Functional Block Diagram



Absolute Maximum Ratings

Maximum RF input power: +37dBm

Recommended Operating Conditions

Storage Temperature: -65℃～+150℃

Operating Temperature: -55℃～+125℃

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

Electrical Specifications (probe test）

<table>
<tr><th>Parameter</th><th colspan="2">Test Condition</th><th>Min</th><th>Typ</th><th>Max</th><th>Units</th></tr>
<tr><td rowspan="4">Insertion Loss</td><td colspan="2">30MHz</td><td>-</td><td>-0.01</td><td>-</td><td rowspan="4">dB</td></tr>
<tr><td colspan="2">5GHz</td><td>-</td><td>-0.22</td><td>-</td></tr>
<tr><td colspan="2">10GHz</td><td>-</td><td>-0.32</td><td>-</td></tr>
<tr><td colspan="2">18GHz</td><td>-</td><td>-1.55</td><td>-</td></tr>
<tr><td rowspan="4">Input Return Loss</td><td colspan="2">30MHz</td><td>-</td><td>-51.61</td><td>-</td><td rowspan="4">dB</td></tr>
<tr><td colspan="2">5GHz</td><td>-</td><td>-14.32</td><td>-</td></tr>
<tr><td colspan="2">10GHz</td><td>-</td><td>-14.47</td><td>-</td></tr>
<tr><td colspan="2">18GHz</td><td>-</td><td>-6.64</td><td>-</td></tr>
<tr><td rowspan="4">Output Return Loss</td><td colspan="2">30MHz</td><td>-</td><td>-52.90</td><td>-</td><td rowspan="4">dB</td></tr>
<tr><td colspan="2">5GHz</td><td>-</td><td>-14.01</td><td>-</td></tr>
<tr><td colspan="2">10GHz</td><td>-</td><td>-14.16</td><td>-</td></tr>
<tr><td colspan="2">18GHz</td><td>-</td><td>-6.68</td><td>-</td></tr>
<tr><td rowspan="4">Threshold Level</td><td colspan="2">30MHz</td><td>-</td><td>13.88</td><td>-</td><td rowspan="4">dBm</td></tr>
<tr><td colspan="2">1GHz</td><td>-</td><td>13.78</td><td>-</td></tr>
<tr><td colspan="2">2GHz</td><td>-</td><td>13.72</td><td>-</td></tr>
<tr><td colspan="2">6GHz</td><td>-</td><td>14.19</td><td>-</td></tr>
<tr><td rowspan="9">Δ Output
/Δ 1dB Input</td><td rowspan="3">input 10 to 20 dBm</td><td>30MHz</td><td>-</td><td>0.37</td><td>-</td><td rowspan="9">dB/dB</td></tr>
<tr><td>2000MHz</td><td>-</td><td>0.39</td><td>-</td></tr>
<tr><td>6000MHz</td><td>-</td><td>0.41</td><td>-</td></tr>
<tr><td rowspan="3">input 20 to 30 dBm</td><td>30MHz</td><td>-</td><td>0.08</td><td>-</td></tr>
<tr><td>2000MHz</td><td>-</td><td>0.05</td><td>-</td></tr>
<tr><td>6000MHz</td><td>-</td><td>0.06</td><td>-</td></tr>
<tr><td rowspan="3">input 30 to 37 dBm</td><td>30MHz</td><td>-</td><td>0.04</td><td>-</td></tr>
<tr><td>2000MHz</td><td>-</td><td>0.01</td><td>-</td></tr>
<tr><td>6000MHz</td><td>-</td><td>0.03</td><td>-</td></tr>
<tr><td>Response Time</td><td colspan="2">20dBm input, pulse width 50 us, cycle 1ms, freq. 100 MHz</td><td>-</td><td>11.65</td><td>-</td><td>ns</td></tr>
</table>

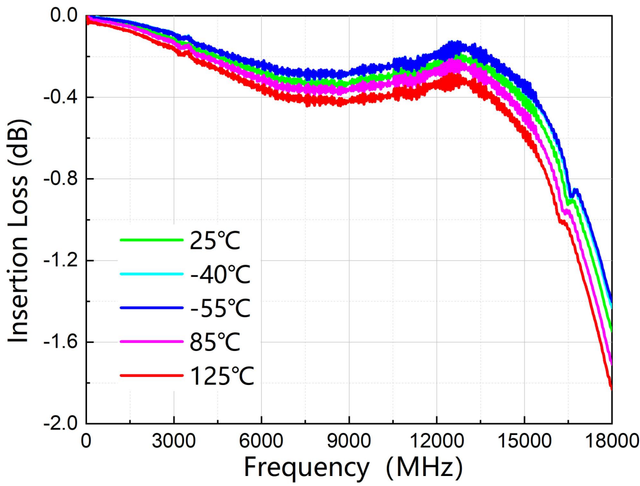
Typical Performance

Output power vs Input power vs Freq. with probe test（Die, Temp=+25℃）

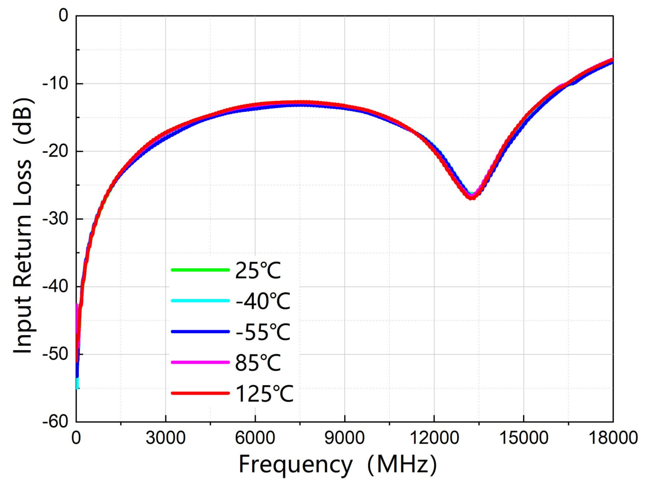
30MHz		2GHz		6GHz	
Pin (dBm)	Pout (dBm)	Pin (dBm)	Pout (dBm)	Pin (dBm)	Pout (dBm)
0.3	0.2	0.2	0.1	-0.8	-1.2
1.3	1.3	1.3	1.1	0.2	-0.2
2.4	2.3	2.2	2.1	1.1	0.8
3.4	3.3	3.2	3.1	2.2	1.8
4.4	4.3	4.2	4.1	3.2	2.8
5.4	5.3	5.2	5.1	4.2	3.8
6.4	6.3	6.2	6.1	5.2	4.8
7.4	7.3	7.2	7.1	6.2	5.8
8.4	8.3	8.2	8.1	7.2	6.8
9.4	9.3	9.2	9.1	8.2	7.8
10.4	10.3	10.2	10.1	9.2	8.8
11.4	11.2	11.2	11.0	10.2	9.8
12.4	12.0	12.2	11.8	11.2	10.7
13.4	12.5	13.2	12.4	12.2	11.6
14.4	12.9	14.2	12.9	13.2	12.3
15.4	13.2	15.2	13.2	14.2	12.9
16.4	13.4	16.2	13.4	15.2	13.4
17.4	13.6	17.2	13.6	16.2	13.6
18.4	13.7	18.2	13.8	17.2	13.8
19.4	13.9	19.2	13.9	18.2	13.8
20.4	14.0	20.2	14.0	19.2	13.9
21.4	14.2	21.2	14.1	20.3	13.9
22.4	14.3	22.2	14.2	21.3	14.0
23.4	14.4	23.2	14.3	22.3	14.0
24.4	14.5	24.2	14.3	23.3	14.0
25.4	14.6	25.3	14.4	24.4	14.1
26.4	14.6	26.2	14.4	25.4	14.1
27.4	14.7	27.3	14.4	26.4	14.2
28.4	14.7	28.3	14.4	27.5	14.3
29.4	14.8	29.3	14.4	28.5	14.5
30.4	14.8	30.3	14.5	29.7	14.5
31.4	14.9	31.3	14.5	30.7	14.7
32.4	14.9	32.3	14.5	31.8	14.7
33.4	15.0	33.4	14.5	32.9	14.6
34.4	15.0	34.4	14.6	34.1	14.6
35.4	15.1	35.4	14.6	35.2	14.5
36.4	15.1	36.4	14.6	36.3	14.4
37.4	15.1	37.5	14.6	37.5	14.3

S Parameters with probe test（Die, 25℃）

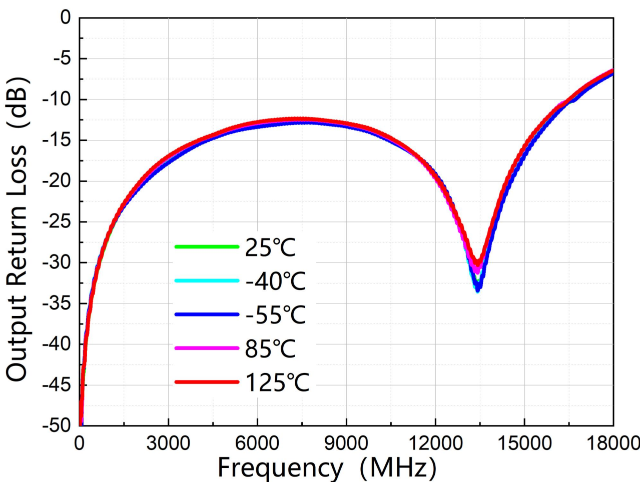
Parameter	Typ										Units
Frequency	30	500	1000	2000	3000	4000	5000	6000	7000	8000	MHz
Insertion Loss	-0.01	-0.02	-0.03	-0.07	-0.11	-0.17	-0.22	-0.27	-0.33	-0.36	dB
Input Return Loss	-51.61	-32.74	-26.75	-20.99	-17.72	-15.67	-14.32	-13.48	-13.06	-13.03	dB
Output Return Loss	-52.90	-32.55	-26.50	-20.71	-17.42	-15.35	-14.01	-13.18	-12.79	-12.76	dB
Parameter	**Typ**										**Units**
Frequency	9000	10000	11000	12000	13000	14000	15000	16000	17000	18000	MHz
Insertion Loss	-0.33	-0.32	-0.26	-0.23	-0.21	-0.30	-0.38	-0.65	-1.04	-1.55	dB
Input Return Loss	-13.48	-14.47	-16.40	-19.61	-25.47	-22.50	-15.76	-11.57	-8.80	-6.64	dB
Output Return Loss	-13.21	-14.16	-16.07	-19.47	-27.79	-25.39	-16.40	-11.82	-8.89	-6.68	dB
Test Condition: Pin=0dBm, Temp=+25°C											



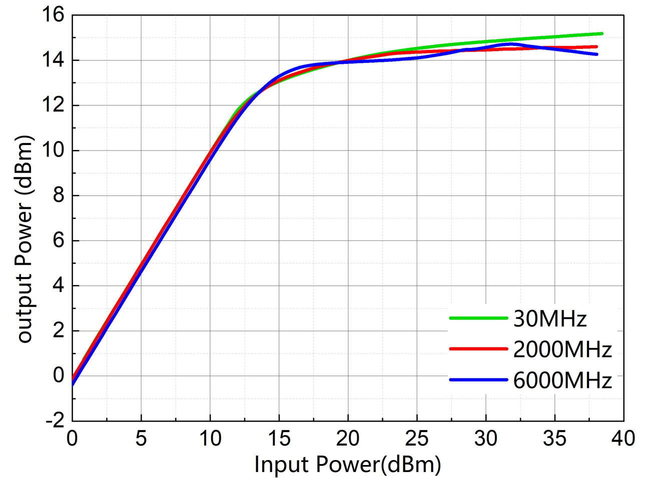
Insertion Loss vs. Freq



Input Return Loss vs. Freq



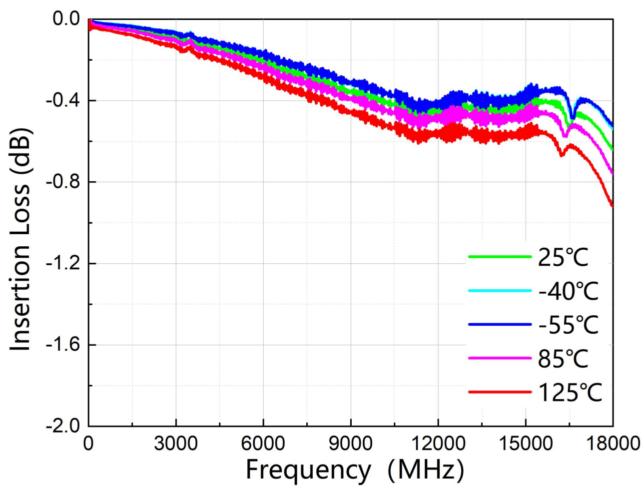
Output Return Loss vs. Freq



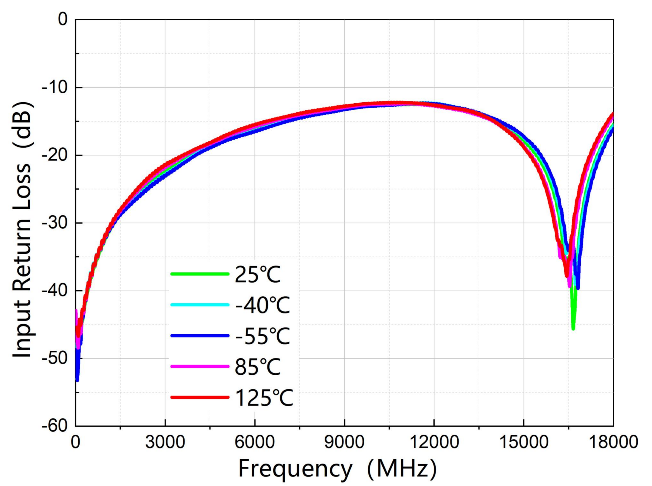
Pin vs. Pout

S Parameters with Bonding Wire Model

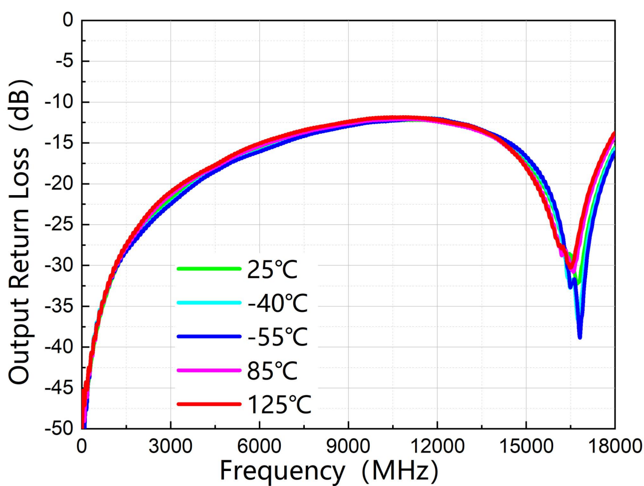
Parameter	Typ										Units
Frequency	30	500	1000	2000	3000	4000	5000	6000	7000	8000	MHz
Insertion Loss	-0.003	-0.03	-0.04	-0.06	-0.09	-0.12	-0.15	-0.20	-0.27	-0.34	dB
Input Return Loss	-48.64	-38.16	-32.17	-26.15	-22.38	-19.78	-17.79	-16.19	-14.90	-13.88	dB
Output Return Loss	-51.63	-37.90	-31.73	-25.70	-21.91	-19.30	-17.37	-15.81	-14.59	-13.59	dB
Parameter	**Typ**										**Units**
Frequency	9000	10000	11000	12000	13000	14000	15000	16000	17000	18000	MHz
Insertion Loss	-0.36	-0.41	-0.43	-0.44	-0.43	-0.47	-0.38	-0.40	-0.48	-0.64	dB
Input Return Loss	-13.17	-12.67	-12.53	-12.66	-13.38	-14.77	-17.78	-25.45	-27.41	-15.45	dB
Output Return Loss	-12.88	-12.36	-12.19	-12.32	-13.02	-14.28	-17.19	-24.01	-27.32	-15.53	dB
Test Condition：Pin=0dBm，Temp=+25℃											



Insertion Loss vs. Freq

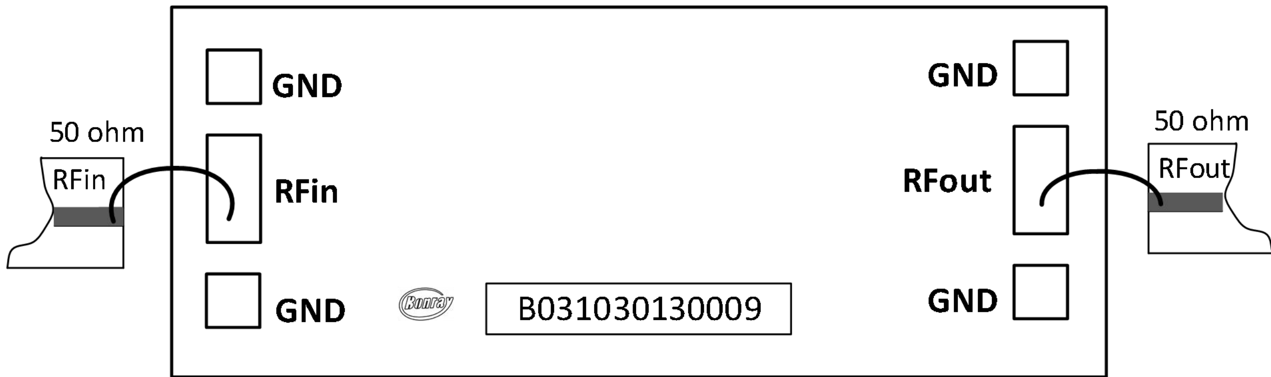


Input Return Loss vs. Freq



Output Return Loss vs. Freq

Assembly Diagram



Handling Precautions:

1. **Storage:** All bare die are placed in ESD protective containers, and then sealed in an ESD protective bag for shipment. Once the sealed ESD protective bag has been opened, all die should be stored in a dry nitrogen environment.

2. **Cleanliness**: Handle the chips in a clean environment. DO NOT attempt to clean the chip using liquid cleaning systems.

3. **Electrostatic protection:** Follow ESD precautions to protect against ESD strikes

4. **General Handling**: Handle the chip along the edges with a vacuum collet or with a sharp pair of bent tweezers. The surface of the chip should not be touched with vacuum collet, tweezers, or fingers.

5. **Mouning:** The chip is back-metallized and can be die mounted with AuSn eutectic preforms or with electrically conductive epoxy. The mounting surface should be clean and flat.

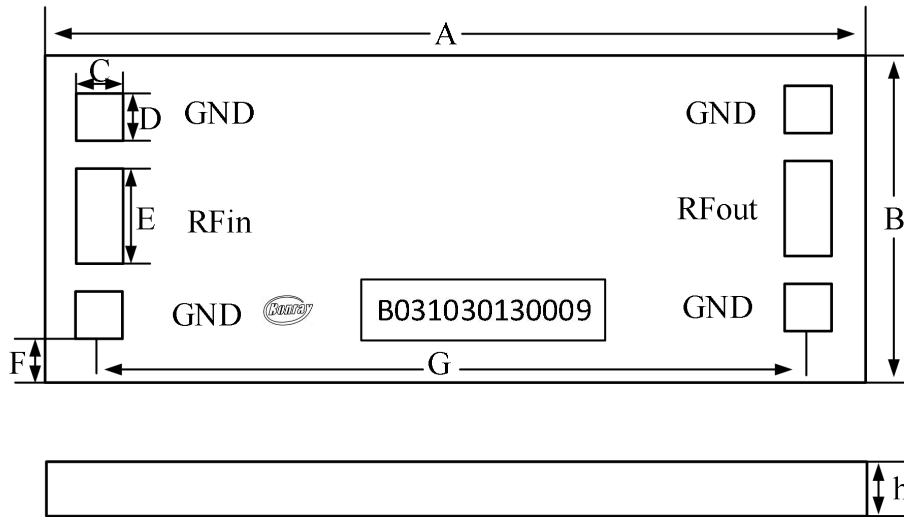
6. **Eutectic Die Attach**: A 80/20 gold tin preform is recommended with a work surface temperature of 255 °C and a tool temperature of 265 °C. When hot 90/10 nitrogen/hydrogen gas is applied, tool tip temperature should be 290 °C. DO NOT expose the chip to a temperature greater than 320 °C for more than 20 seconds. No more than 3 seconds of scrubbing should be required for attachment

7. **Conductive epoxy Die Attach:** Apply conductive epoxy to the mounting surface so that the overflow of conductive epoxy on all four sides should not be less than 75%, and the height of conductive epoxy climbing on all four sides should not exceed the surface of the chip. Cure conductive epoxy per the manufacturer’s schedule.

8. **Die bonding process unless otherwise noted**: Ball or wedge bond with 0.025mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package or substrate.

9. If you have any questions, please contact customer service.

Mechanical Information（Units：mm）



Dimensions	Value		
	Min.	Typ.	Max.
A	1.750	1.800	1.850
B	0.700	0.750	0.800
C	0.075	0.100	0.125
D	0.075	0.100	0.125
E	0.130	0.150	0.170
F	0.090	0.175	0.250
G	1.480	1.566	1.640
h	0.080	0.100	0.120

Notes:

1. Backside and bond pad metal: Gold
2. Backside is RF and DC ground
3. Pad size: RFin: 100um×150um; RFout: 100um×150um
4. Cannot be bonded on the via

Pad Description

Pad	Description
RFin	RF Input, matched to 50 Ohms.
RFout	RF Output, matched to 50 Ohms.
GND	Connected to DC/RF ground.