

**Product Features**

Operating Band: 10MHz ~ 1GHz

Threshold Level: +11dBm

Insertion Loss: 0.4dB

Response Time: 2.4ns

Package: DFN8 (plastic seal)

**General Description**

The BR9301DA is a surface mount low capacitance diode limiter. The chip adopts DFN8 package, working band 10MHz ~ 1GHz, Threshold Level +11dBm, Insertion Loss 0.4dB, clipping response time 2.4ns.

**Apply**

Low Insertion Loss

High Power limiting

Receiver Protection

**Ordering Information**

| Part Number | Package | Description |
|-------------|---------|-------------|
| BR9301DA    | DFN8    | limiter     |

**Absolute Maximum Ratings**

Maximum RF input Power: +30dBm

**Recommended Operating Conditions**

Storage Temperature: -65°C ~ +150°C

Operating Temperature: -55°C ~ +125°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**

## Electrical Specifications

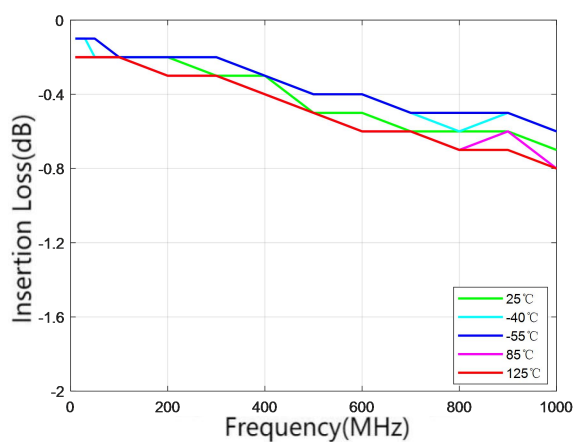
| Parameters                                           | Test Condition                                                           | Min. | Typ.  | Max. | Units |
|------------------------------------------------------|--------------------------------------------------------------------------|------|-------|------|-------|
| Operating Frequency Band                             | -                                                                        | 10   | -     | 1000 | MHz   |
| Linear Range                                         |                                                                          |      |       |      |       |
| Maximum input Power                                  | 30MHz                                                                    | -    | 9.2   | -    | dBm   |
|                                                      | 100MHz                                                                   | -    | 9.2   | -    |       |
|                                                      | 1000MHz                                                                  | -    | 9.5   | -    |       |
| Insertion Loss                                       | 30MHz                                                                    | -    | -0.14 | -    | dB    |
|                                                      | 100MHz                                                                   | -    | -0.16 | -    |       |
|                                                      | 1000MHz                                                                  | -    | -0.59 | -    |       |
| Input Return Loss                                    | 30MHz                                                                    | -    | -35.0 | -    | dB    |
|                                                      | 100MHz                                                                   | -    | -29.1 | -    |       |
|                                                      | 1000MHz                                                                  | -    | -13.1 | -    |       |
| Limiting Range                                       |                                                                          |      |       |      |       |
| Input Power                                          | The input power is greater than the input 1dB compression point          | 10   | -     | 30   | dBm   |
| Output Power                                         | -                                                                        | -    | +11   | -    | dBm   |
| Response Time                                        | Input 20dBm pulse signal, pulse width 50us, period 1ms, frequency 100MHz | -    | 2.4   | -    | ns    |
| Test Condition: Pin=0dBm, Temp=+25°C in linear range |                                                                          |      |       |      |       |

## Typical Performance (EVB test results)

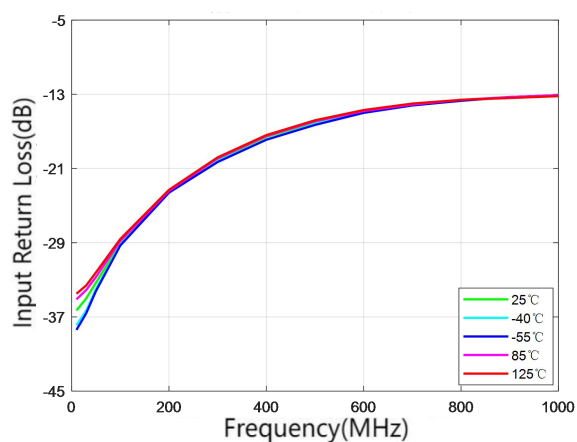
| Parameters                           | Typ.  |       |       |       |       |       |       | Units |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency                            | 10    | 30    | 100   | 200   | 500   | 800   | 1000  | MHz   |
| Insertion Loss                       | -0.14 | -0.14 | -0.16 | -0.20 | -0.36 | -0.54 | -0.59 | dB    |
| Input Return Loss                    | -36.3 | -35.0 | -29.1 | -23.5 | -16.0 | -13.6 | -13.1 | dB    |
| Output Return Loss                   | -35.9 | -35.0 | -29.1 | -23.7 | -16.5 | -14.2 | -13.7 | dB    |
| Test Condition: Pin=0dBm, Temp=+25°C |       |       |       |       |       |       |       |       |

**Test Results of limiting Power**

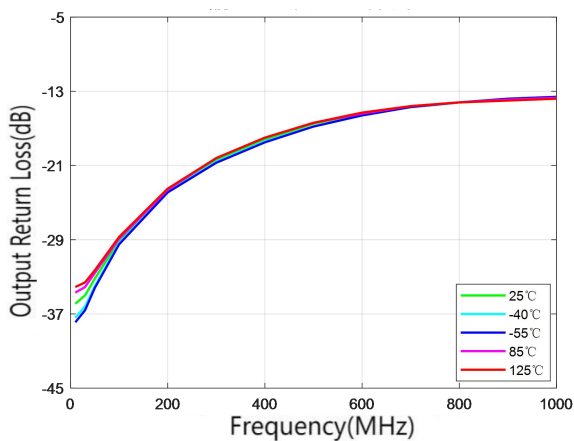
| Frequency Point | 30MHz        | 100MHz | 1000MHz |
|-----------------|--------------|--------|---------|
| Pin ( dBm )     | Pout ( dBm ) |        |         |
| -2              | -2.1         | -2.1   | -3.2    |
| -1              | -1.1         | -1.1   | -2.2    |
| 0               | -0.1         | -0.1   | -1.2    |
| 1               | 0.9          | 0.9    | -0.2    |
| 2               | 1.9          | 1.9    | 0.9     |
| 3               | 2.9          | 2.9    | 1.8     |
| 4               | 3.9          | 3.9    | 2.8     |
| 5               | 4.9          | 4.9    | 3.8     |
| 6               | 5.9          | 5.9    | 4.8     |
| 7               | 6.9          | 6.8    | 5.8     |
| 8               | 7.7          | 7.7    | 6.7     |
| 9               | 8.4          | 8.4    | 7.5     |
| 10              | 8.8          | 8.9    | 8.2     |
| 11              | 9.2          | 9.3    | 8.7     |
| 12              | 9.6          | 9.7    | 9.1     |
| 13              | 9.8          | 9.9    | 9.4     |
| 14              | 10.1         | 10.2   | 9.9     |
| 15              | 10.3         | 10.4   | 10.1    |
| 16              | 10.4         | 10.6   | 10.2    |
| 17              | 10.6         | 10.7   | 10.3    |
| 18              | 10.7         | 10.8   | 10.5    |
| 19              | 10.9         | 11.0   | 10.6    |
| 20              | 11.0         | 11.1   | 10.7    |
| 21              | 11.1         | 11.3   | 10.8    |
| 22              | 11.2         | 11.4   | 10.9    |
| 23              | 11.4         | 11.5   | 11.0    |
| 24              | 11.5         | 11.6   | 11.2    |
| 25              | 11.5         | 11.7   | 11.3    |
| 26              | 11.5         | 11.9   | 11.4    |
| 27              | 11.5         | 12.0   | 11.5    |
| 28              | 11.6         | 12.2   | 11.6    |
| 29              | 11.6         | 12.4   | 11.7    |
| 30              | 11.7         | 12.6   | 11.8    |



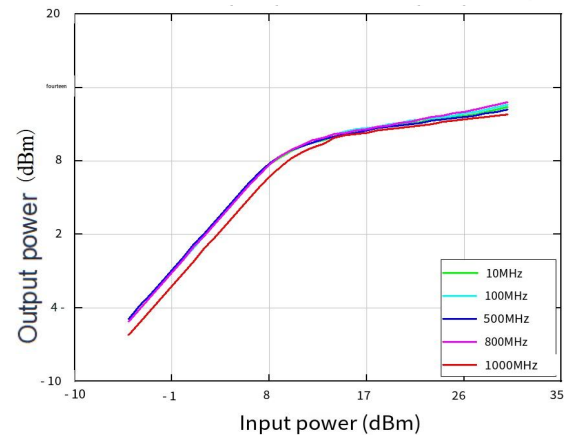
Insertion Loss vs. Freq



Input Return Loss vs. Freq

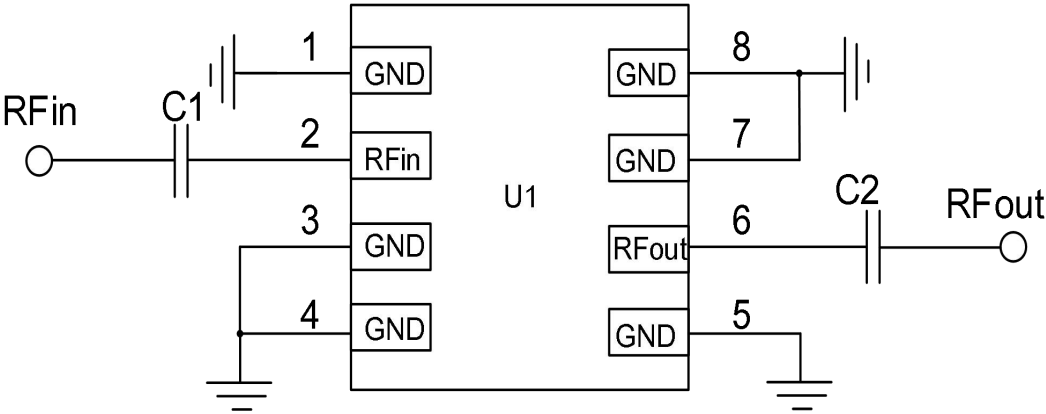


Output Return Loss vs. Freq



$P_{out}$  vs.  $P_{in}$

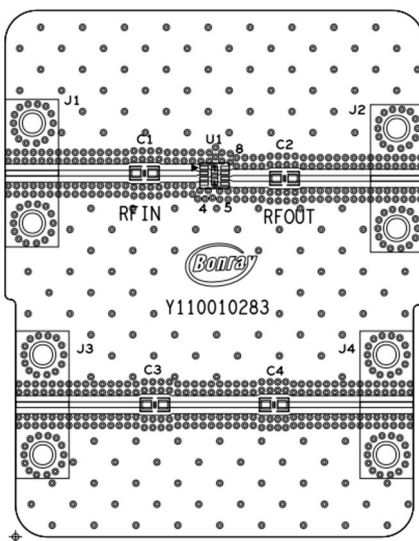
Typical Application Schematic



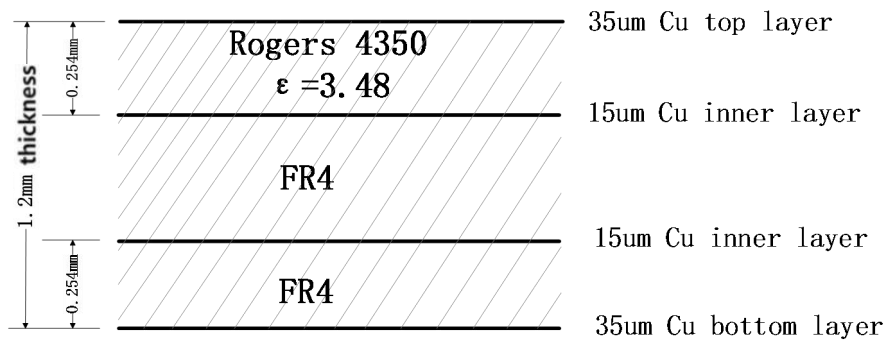
Bill of Material

| Designator | Package | Description | Part Number       |
|------------|---------|-------------|-------------------|
| C1, C2     | 0402    | 1uF         | GRM1555C1H105JA01 |

## PCB Evaluation Board

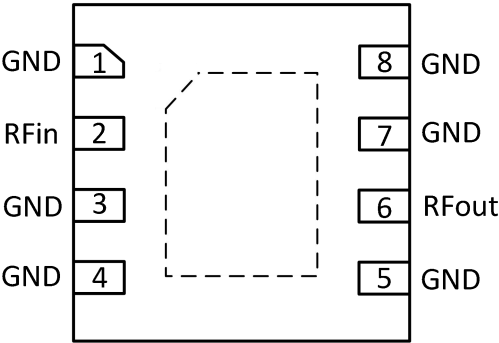


PCB



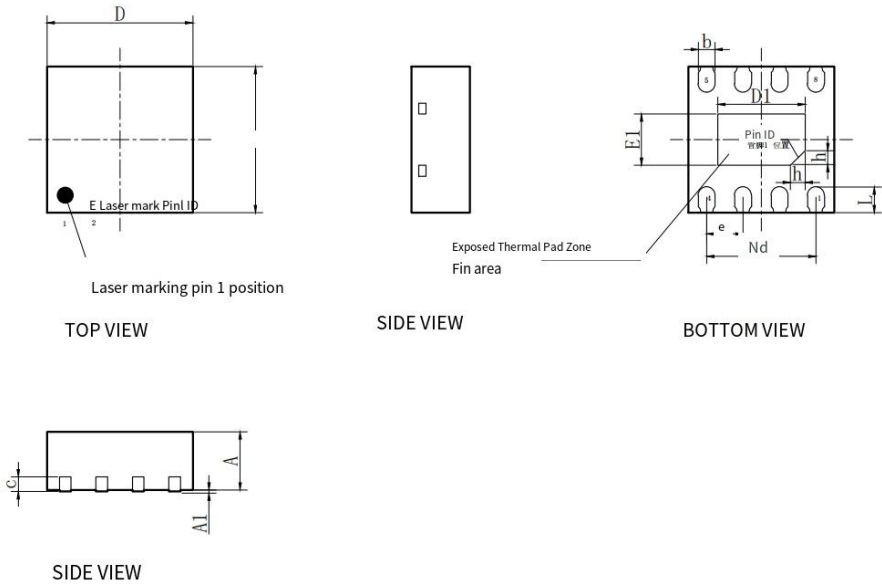
50 ohms Impedance Signal Lines: width=0.53mm, spacing=0.53mm

Pin Configuration and Description



| Pin Number  | Pin Name | Description                                                                                                                          |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------------|
| 2           | RFin     | Rf input pins; The pin is DC coupled and has been internally matched to 50 ohms, and only needs to be added with a spacer capacitor. |
| 1,3,4,5,7,8 | GND      | Ground pins; This pin and the package substrate must be connected to the RF/DC ground.                                               |
| 6           | RFout    | Rf output pins; The pin is DC coupled and has been internally matched to 50 ohms, requiring an additional isolation capacitor.       |
| -           | EP       | Be grounded.                                                                                                                         |

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      | 1.95       | 2.00 | 2.05 |
| D1     | 1.50       | 1.60 | 1.70 |
| e      | 0.50BSC    |      |      |
| Nd     | 1.50BSC    |      |      |
| E      | 1.95       | 2.00 | 2.05 |
| E1     | 0.80       | 0.90 | 1.00 |
| L      | 0.20       | 0.25 | 0.30 |
| h      | 0.25       | 0.30 | 0.35 |