

# LR201SQ

2-4 GHz 200 W Limiter



## Product Features

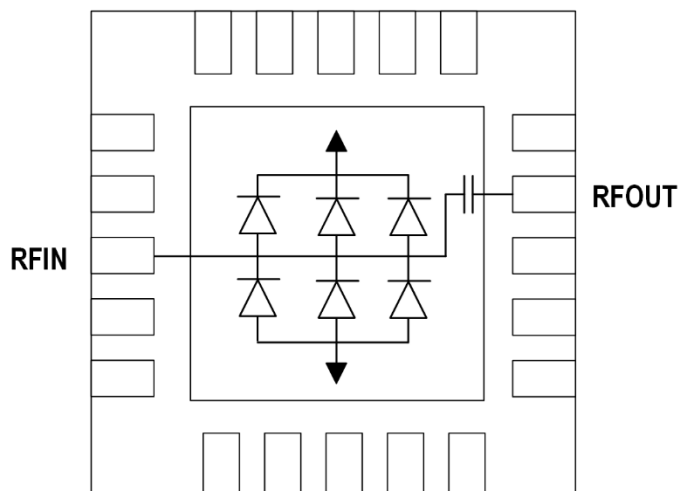
- Frequency band 2.0-4.0 GHz
- Insertion Loss: 0.45 dB
- Peak Power Handling: 200W (pulsed)
- Flat Leakage: 15 dBm
- Passive (no DC bias required)
- Integrated DC Block on output
- Package Dimensions: 4×4×1.0 mm

*Performance is typical at room temperature. Please reference electrical specification table and data plots for more details.*



4 mm × 4 mm QFN package

## Functional Block Diagram



## Description

The LR201SQ is a high-power receive protection circuit (limiter) operating from 2-4 GHz. Capable of withstanding up to 200 W incident power levels, the LR201SQ allows < 15 dBm flat leakage to pass through and contributes < 0.45 dB in insertion loss.

## Applications

- Receive Chain Protection
- Commercial and Military Radar
- Communications
- Electronic Warfare

### Recommend Operating Conditions

| PARAMETER         | MIN | TYP | MAX | UNIT |
|-------------------|-----|-----|-----|------|
| Passive – No Bias |     |     |     |      |
| Temperature Range | -40 | 25  | 85  | °C   |

Electrical specifications are measured at specified test conditions.

Specifications are not guaranteed over all recommended operating conditions.

### Absolute Maximum Ratings

| PARAMETER                                                        | VALUE      | UNIT |
|------------------------------------------------------------------|------------|------|
| Incident Power, Pulsed ( 500 $\mu$ s / 15 %), 50 $\Omega$ , 25°C | 54         | dBm  |
| Incident Power, Pulsed ( 500 $\mu$ s / 15 %), 50 $\Omega$ , 85°C | 50.5       | dBm  |
| Mounting Temperature ( 30 s max)                                 | 200        | °C   |
| Storage Temperature                                              | -55 to 150 | °C   |

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

### Electrical Specifications

| PARAMETER          | Conditions    | MIN  | TYP  | MAX  | UNIT |
|--------------------|---------------|------|------|------|------|
| Frequency          |               | 2.0  |      | 4.0  | GHz  |
| Insertion loss     | 2.0 – 4.0 GHz | 0.37 | 0.45 | 0.51 | dB   |
| Input return loss  |               |      | 18   |      | dB   |
| Output return loss |               |      | 20   |      | dB   |
| Flat Leakage Power | @ Pin>30 dBm  |      | 15   |      | %    |

Note: Test conditions unless otherwise noted: Temp = +25°C, S-Parameters CW, Power Pulse Parameters: PW = 500 $\mu$ s, Duty Cycle = 15 %

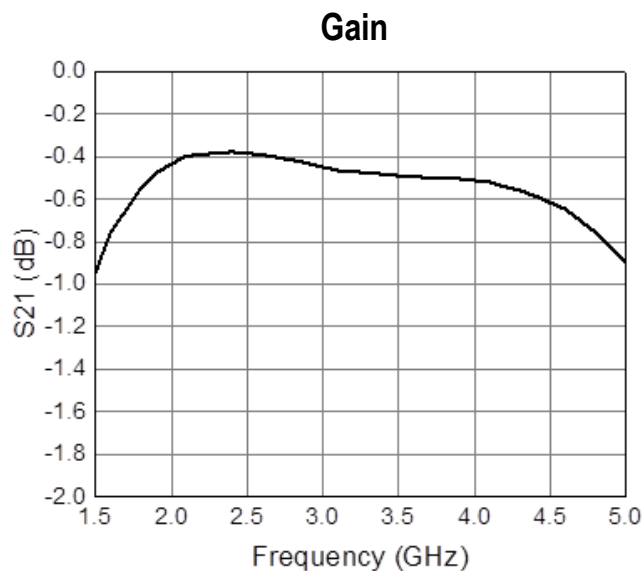
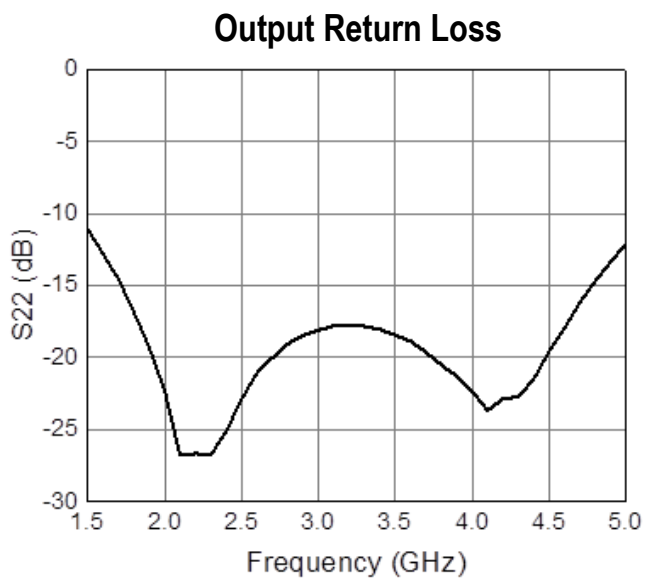
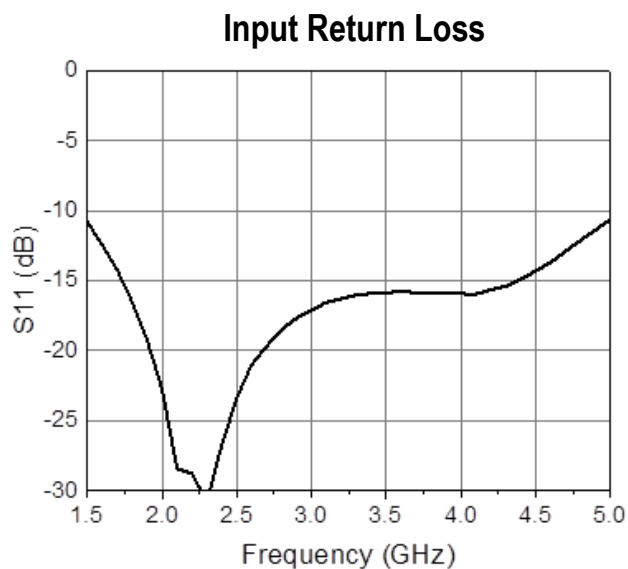
### Thermal and Reliability Information

| PARAMETER                                           | Conditions | TYP | UNIT |
|-----------------------------------------------------|------------|-----|------|
| Incident Power (RF Operational Life Test 168 Hours) | -          | 200 | W    |

Note: Test conditions unless otherwise noted: Temp = +25°C, S-Parameters CW, Power Pulse Parameters: PW = 500 $\mu$ s, Duty Cycle = 15 %

### Small Signal Performance

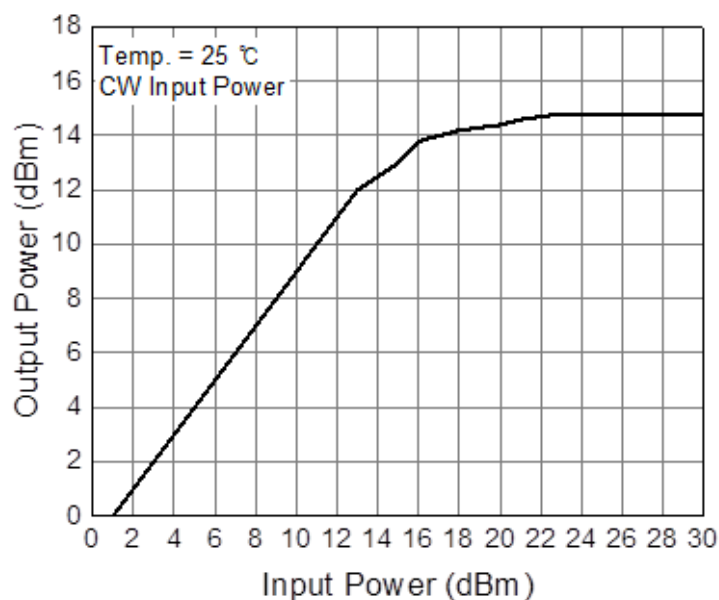
Test conditions unless otherwise noted: 25 °C, S-Parameters CW, Power Pulse Parameters: PW = 500 us, Duty Cycle = 15%



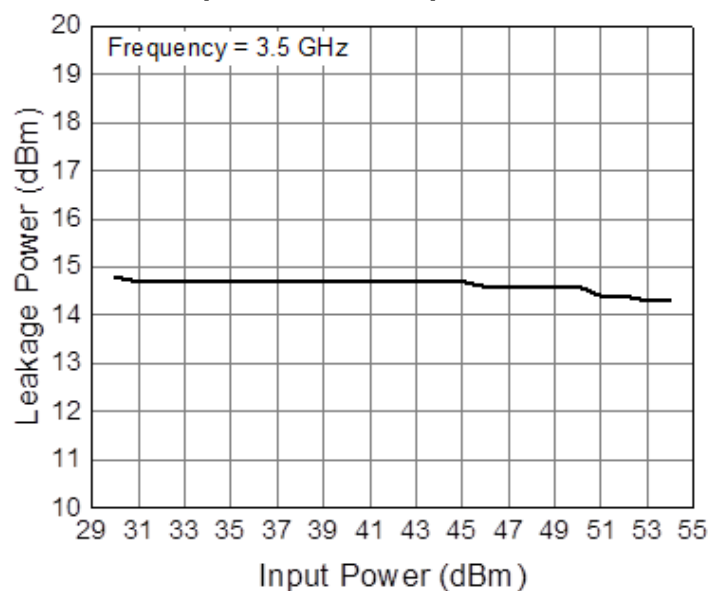
### Large Signal Performance, Transmit

Test conditions unless otherwise noted: 25 °C, S-Parameters CW, Power Pulse Parameters: PW = 500 us, Duty Cycle = 15%

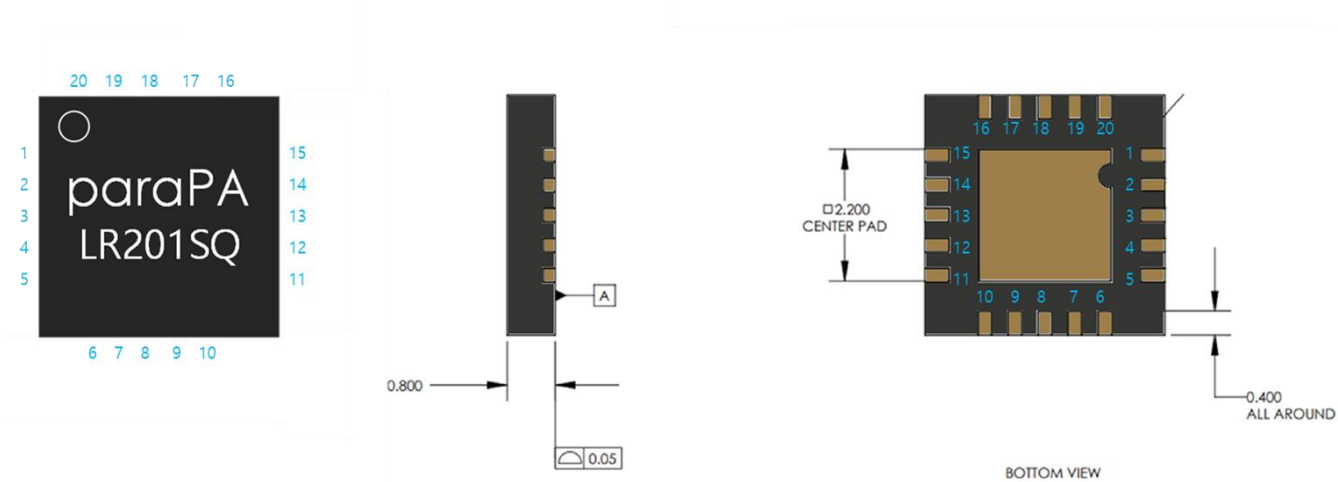
**Output Power vs Input Power**



**Output Power vs Input Power**



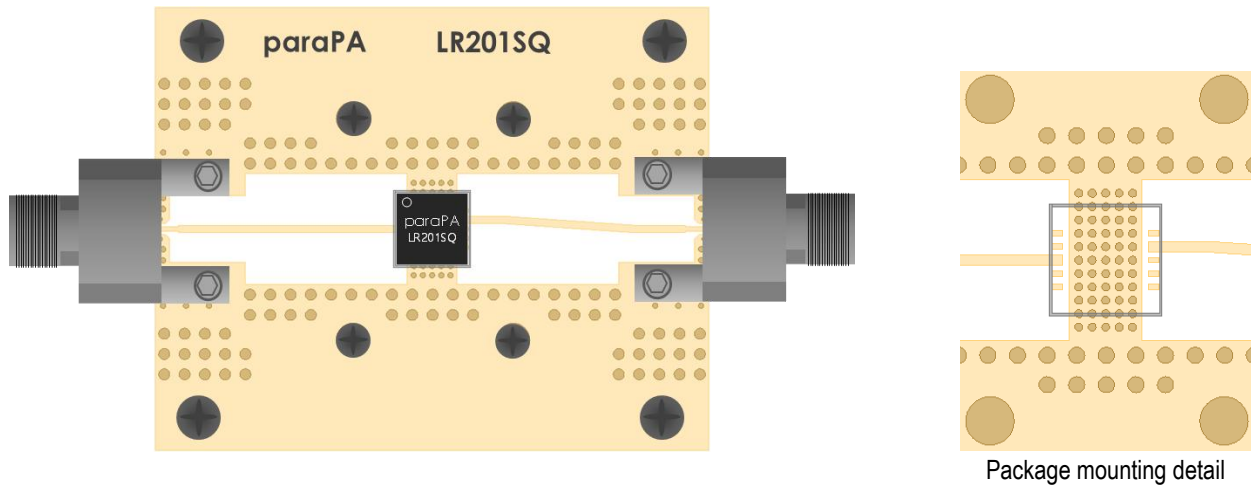
## Mechanical Drawing & Pad Description



Dimensions in mm

| Pin Number        | Label | Description                                                   |
|-------------------|-------|---------------------------------------------------------------|
| Bottom Pad        | GND   | GROUND                                                        |
| 3                 | RFIN  | RF input. 50 $\Omega$ , DC blocked                            |
| 14                | RFOUT | RF output. 50 $\Omega$ , DC blocked                           |
| 1, 2, 4-13, 15-20 | N/C   | No Internal Connections. Connection to PCB ground recommended |

### LR201SQ Evaluation Board



RF Layer is 8 mil thick Rogers Corp. RO4003C,  $\epsilon_r = 3.38$ . Metal layers are 0.5 oz. copper. The microstrip line at the connector interface is optimized for the With-wave end launch connector NE02FS001.

The trace pattern shown has been developed and tested for optimized assembly at Qorvo. The PCB land pattern has been developed to accommodate lead tolerances. Since processes vary from company to company, careful process development is recommended.

For pulsed applications, only. Increased pulse width and/or duty cycle results in lower power handling capability of the EVB.

Notes:

1. Ground / thermal vias under the DUT are critical for the proper performance of this device.
2. The EVB shown herein utilizes copper filled vias (10 mil diameter) under the DUT to maximize heat transfer away from the DUT under large signal conditions.
3. Thermal dissipation is low for normal non-limiting operation.

## Electrostatic Discharge (ESD) Classifications

| PARAMETER           | SYMBOL | CLASS | TEST METHODOLOGY |
|---------------------|--------|-------|------------------|
| Human body model    | HBM    | TBD   | TBD              |
| Charge device model | CDM    | TBD   | TBD              |

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