

Product Description

The Qorvo TGL2205 is a high power, wideband MMIC GaAs VPIN limiter capable of protecting sensitive receive channel components against high power incident signals. The TGL2205 does not require DC bias and achieves a low insertion loss all in a small form factor. These features allow for simple integration with minimal impact to system performance.

The TGL2205 operates from 1 to 6 GHz and achieves low insertion loss of 0.5 dB and return loss of 12 dB. It can limit up to 100 W incident pulsed-power with a low flat leakage of 16 dBm.

The TGL2205 has a protective surface passivation layer providing environmental robustness and is ideally suited to support both commercial and defense related applications.

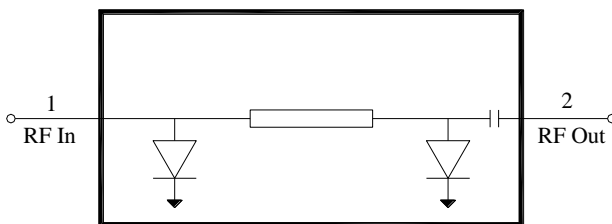


Product Features

- Frequency Range: 1 – 6 GHz
- Insertion Loss: < 0.5 dB
- Peak Power Handling: 100 W (pulsed)
- Flat Leakage: < 16 dBm
- Spike Leakage: < 17 dBm
- Passive (no DC bias required)
- Integrated DC Block on the output
- Recovery Time: < 115 nS
- Die Size: 2.00 x 2.00 x 0.10 mm

Performance is typical across frequency. Please reference electrical specification table and data plots for more details.

Block Diagram



Applications

- Receive Chain Protection
- Commercial and Military Radar

Ordering Information

| Part No. | Description |
|-------------|--------------------------------|
| TGL2205 | S and C-Band 100W VPIN Limiter |
| TGL2205 EVB | Evaluation Board |

Absolute Maximum Ratings

| Parameter | Rating |
|---|---------------|
| Incident Power, CW or Pulsed, 50 Ω , 25 °C | 100 W |
| Incident Power, CW or Pulsed, 50 Ω , 85 °C | 50 W |
| Mounting Temperature (30 seconds) | 320 °C |
| Storage Temperature | -55 to 150 °C |

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Recommended Operating Conditions

| Parameter | Min | Typ | Max | Units |
|-----------------------------|-----|-----|-----|-------|
| Operating Temperature Range | -40 | +25 | +85 | °C |
| Passive – No Bias | | | | |

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

Test conditions, unless otherwise noted: 25 °C

| Parameter | Min | Typ | Max | Units |
|---|-----|-------|-----|--------|
| Operational Frequency Range | 1 | – | 6 | GHz |
| Insertion Loss | | < 0.5 | | dB |
| Input Return Loss | | 12 | | dB |
| Output Return Loss | | 12 | | dB |
| Flat Leakage Power at $P_{IN} > 30$ dBm | | < 16 | | dBm |
| Pulse Recovery Time | | < 115 | | nS |
| Spike Leakage | | < 17 | | dBm |
| Insertion Loss Temperature Coefficient | | 0.003 | | dB/ °C |

Thermal and Reliability Information

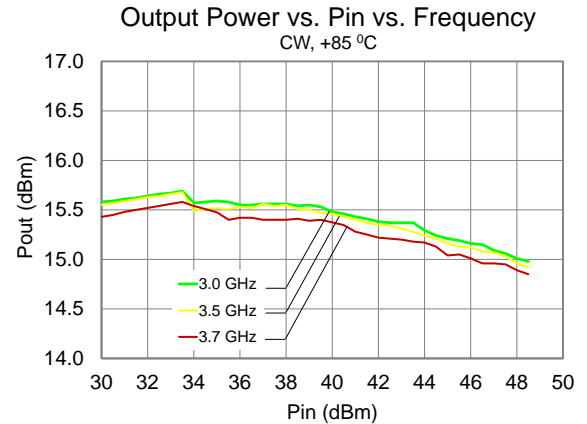
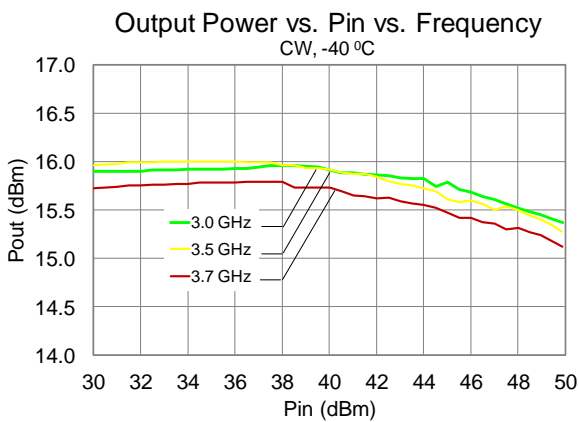
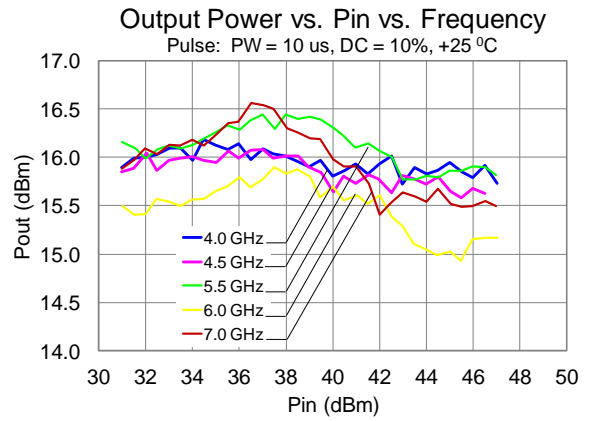
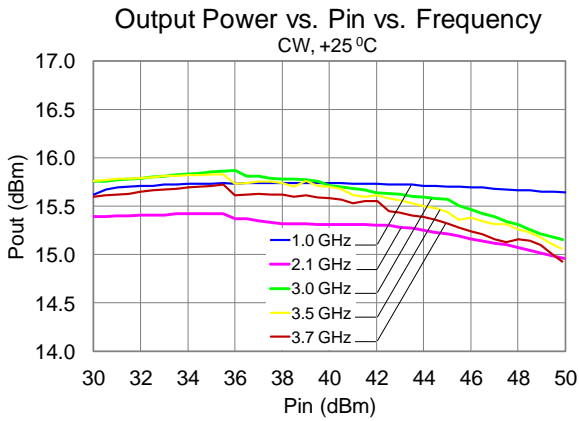
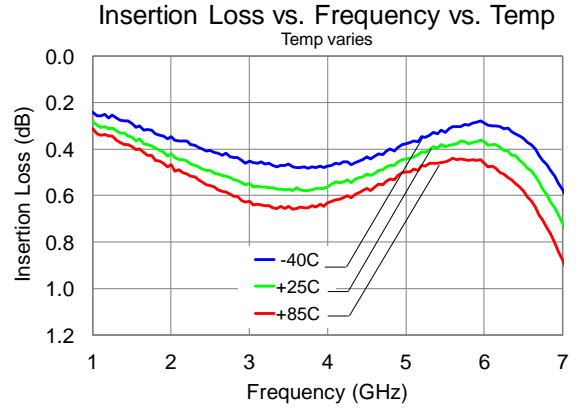
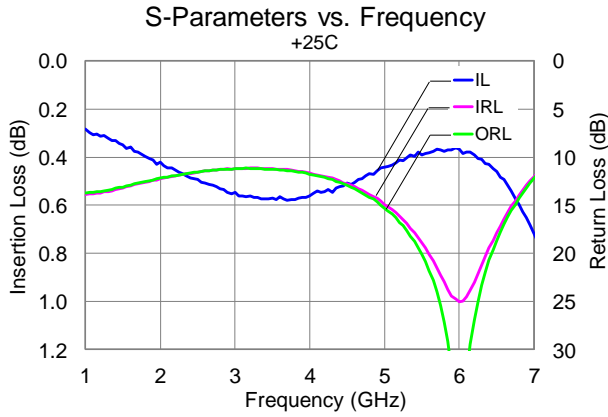
| Parameter | Test Conditions | Value | Units |
|--|---|-------|-------|
| Incident Power (RF Operational Life Test ⁽¹⁾) | Freq. = 4.5 GHz, CW, 50 Ω , 25°C | 31 | W |
| | Freq. = 4.5 GHz, Pulsed: PW=100 μ s, DC=10%, 50 Ω , 25°C | 100 | |

Notes:

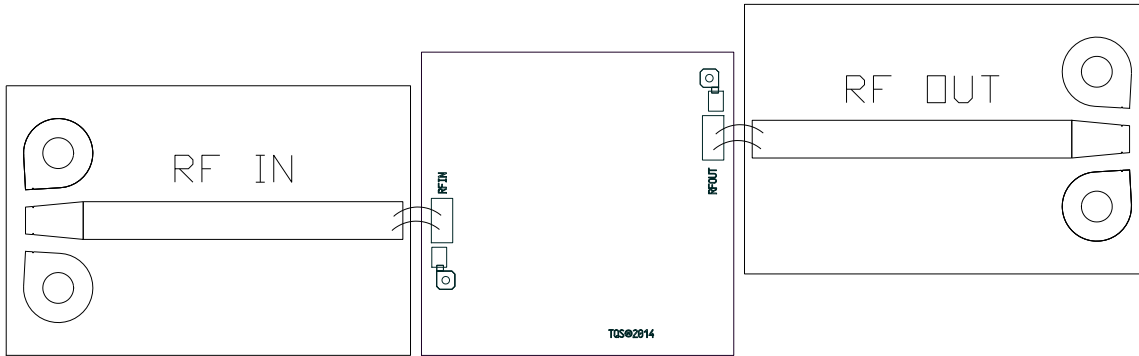
1. Test terminated after 168 hours. Insertion Loss remained \leq 1 dB for device under test.

Performance Plots

Test conditions unless otherwise noted: Temp. = 25 °C

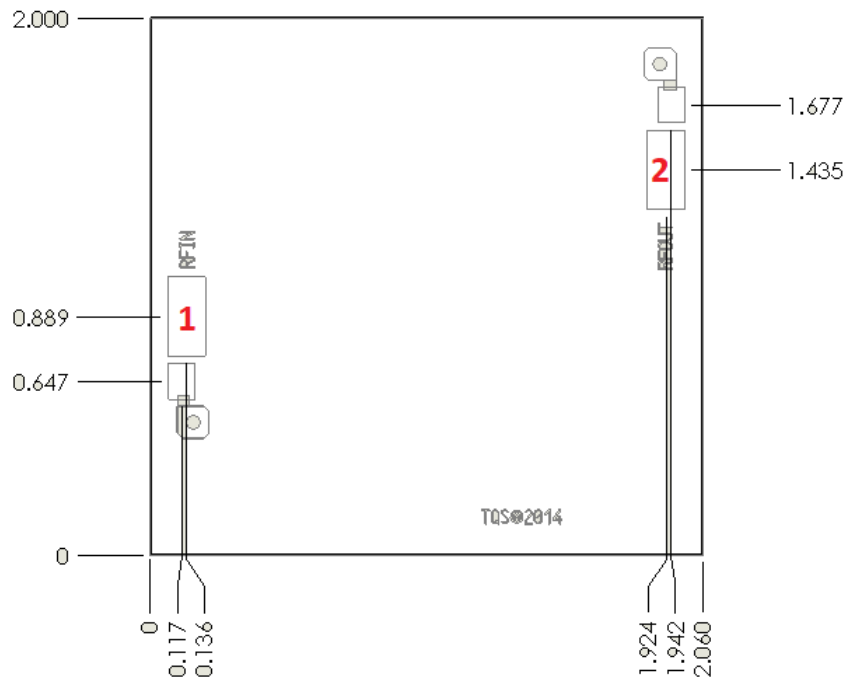


Assembly Drawing



Note: RF Input and RF Output ports are not interchangeable.

Mechanical Drawing and Bond Pad Description



Unit: millimeters
 Thickness: 0.10
 Die x, y size tolerance: ± 0.050
 Chip edge to bond pad dimensions are shown to center of pad
 Ground is backside of die

| Pad No. | Symbol | Description | Pad Size (mm x mm) |
|---------|-----------|--------------------------------------|--------------------|
| 1 | RF Input | RF Input, 50 Ω | 0.141 x 0.293 |
| 2 | RF Output | RF Output, 50 Ω , DC Blocked. | 0.141 x 0.293 |

Assembly Notes

Component placement and adhesive attachment assembly notes:

- Vacuum pencils and/or vacuum collets are the preferred method of pick up.
- Air bridges must be avoided during placement.
- The force impact is critical during auto placement.

Reflow process assembly notes:

- Use AuSn (80/20) solder and limit exposure to temperatures above 300 °C to 3–4 minutes, maximum.
- An alloy station or conveyor furnace with reducing atmosphere should be used.
- Do not use any kind of flux.
- Coefficient of thermal expansion matching is critical for long-term reliability.
- Devices must be stored in a dry nitrogen atmosphere.

Interconnect process assembly notes:

- Thermosonic ball bonding is the preferred interconnect technique.
- Force, time, and ultrasonic are critical parameters.
- Aluminum wire should not be used.
- Devices with small pad sizes should be bonded with 0.0007-inch wire.

Handling Precautions

| Parameter | Rating | Standard |  | Caution! ESD-Sensitive Device |
|------------------------------|---------|--------------------------|---|----------------------------------|
| ESD – Human Body Model (HBM) | Class 2 | ESDA / JEDEC JS-001-2012 | | |

Solderability

Use only AuSn (80/20) solder and limit exposure to temperatures above 300 °C to 3 – 4 minutes, maximum.

RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU. This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Tel: 1-844-890-8163

Web: www.qorvo.com

Email: customer.support@qorvo.com

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