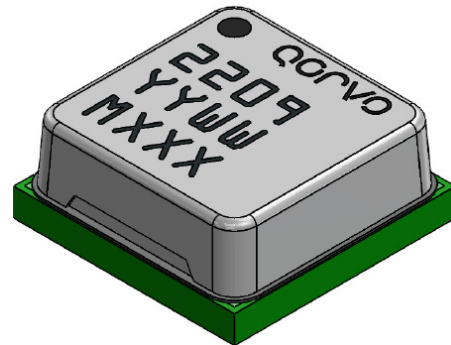


Applications

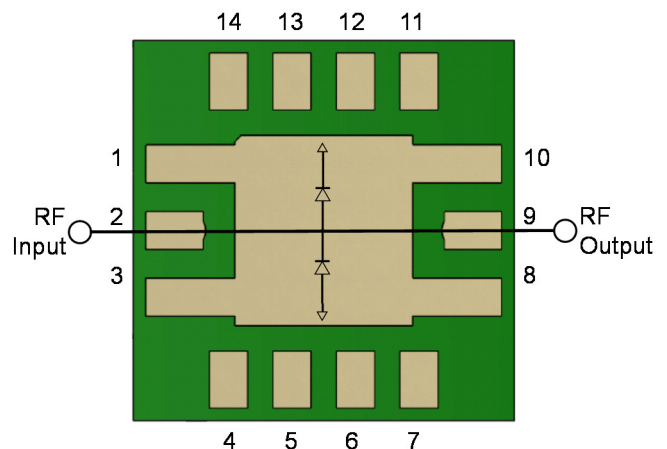
- Receive Chain Protection
- Commercial and Military Radar



Product Features

- Frequency Range: 8.0 to 12.0 GHz
- Insertion Loss: < 0.5 dB
- Peak Power Handling: 50 W (pulsed)
- Flat Leakage: < 18.5 dBm
- Spike Leakage < 20.5 dBm
- Passive (no DC bias required)
- Recovery time < 115 ns
- Package Dimensions: 4.00 x 4.00 x 1.54 mm

Functional Block Diagram



General Description

The Qorvo TGL2209-SM is a high power, X-band GaAs VPIN limiter capable of protecting sensitive receive channel components against high power incident signals. The TGL2209-SM does not require DC bias and achieves a low insertion loss in a small form factor. These features allow for simple integration with minimal impact to system performance.

The TGL2209-SM operates from 8.0–12 GHz with low insertion loss of less than 0.5 dB. Receive protection is rated up to 50 W incident pulsed-power with a low flat leakage of less than 18.5 dBm.

The TGL2209-SM is offered as a packaged limiter, and is well suited for both commercial and defense related applications.

Lead-free and RoHS compliant.

Evaluation boards available on request.

Pad Configuration

| Pad Number | Symbol |
|-----------------|-----------|
| 1, 3, 8, 10, 15 | GND |
| 2 | RF Input |
| 4–7, 11–14 | NC |
| 9 | RF Output |

NOTE: The RF Input and Output ports are not interchangeable.

Ordering Information

| Part | ECCN | Description |
|----------------|-------|--|
| TGL2209-SM | EAR99 | 8.0–12.0 GHz 50W VPIN Limiter |
| TGL2209-SM_EVB | EAR99 | 8.0–12.0 GHz 50W VPIN Limiter Evaluation Board |

Absolute Maximum Ratings

| Parameter | Value |
|---|---------------|
| Incident Power, Pulsed ¹ , 50 Ω, 25 °C | 47 dBm |
| Incident Power, Pulsed ¹ , 50 Ω, 85 °C | 46 dBm |
| Incident Power, CW, 50 Ω, 25 °C | 40 dBm |
| Incident Power, CW, 50 Ω, 85 °C | 36 dBm |
| Mounting Temperature (30 s max) | 260 °C |
| Storage Temperature | -40 to 150 °C |

Note:

¹ Pulse conditions: PW = 100 us, Duty Cycle = 10%

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 | Value |
|-------------------|-------|
| Passive – No bias | |

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

Electrical Specifications

Test conditions unless otherwise noted: 25 °C

| Parameter | Min | Typical | Max | Units |
|--|-----|---------|------|--------|
| Operational Frequency Range | 8.0 | | 12.0 | GHz |
| Insertion Loss | | < 0.5 | | dB |
| Input Return Loss | | > 17 | | dB |
| Output Return Loss | | > 18 | | dB |
| Flat Leakage Power at P _{IN} > 30 dBm | | < 18.5 | | dBm |
| Pulse Recovery Time | | < 115 | | ns |
| Spike Leakage | | < 20.5 | | dBm |
| Insertion Loss Temperature Coefficient | | 0.006 | | dB/ °C |

Thermal and Reliability Information

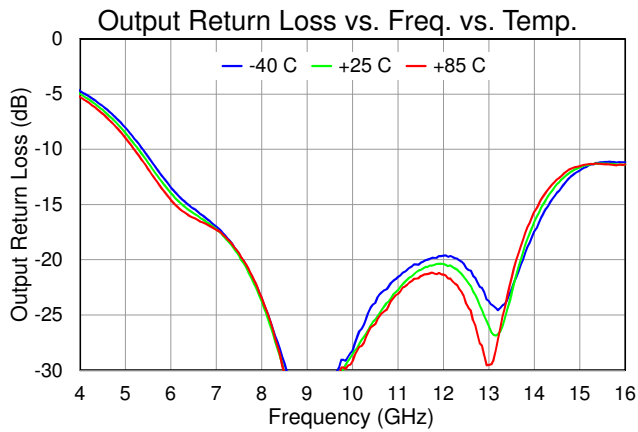
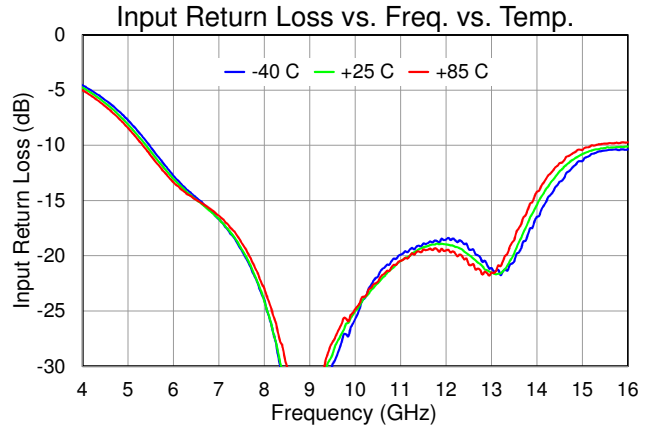
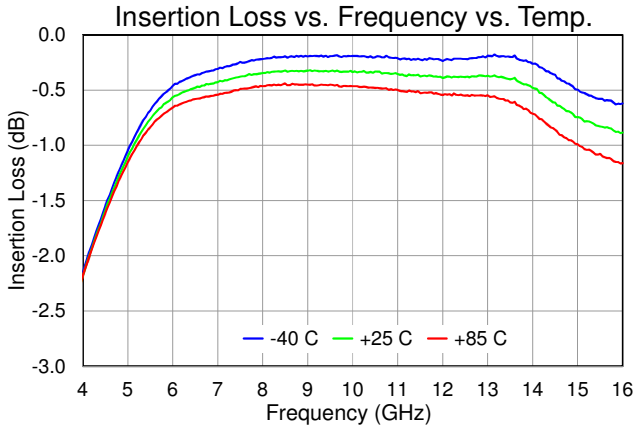
| Parameter | Test Conditions | Value | Units |
|--|---|-------|-------|
| Incident Power (RF Operational Life Test ⁽¹⁾) | 10 GHz Pulsed, PW=100 us, DC=10%, 50 Ω, 25 °C | 50 | W |

Notes:

1. Test terminated after 100 hours.

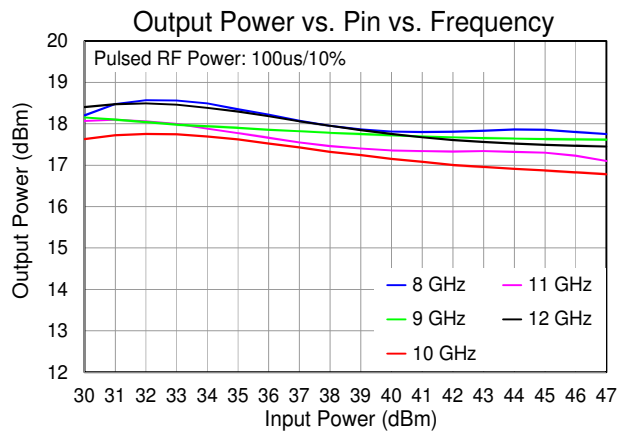
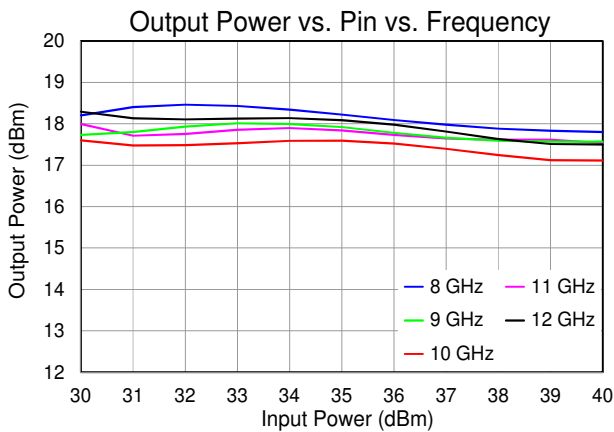
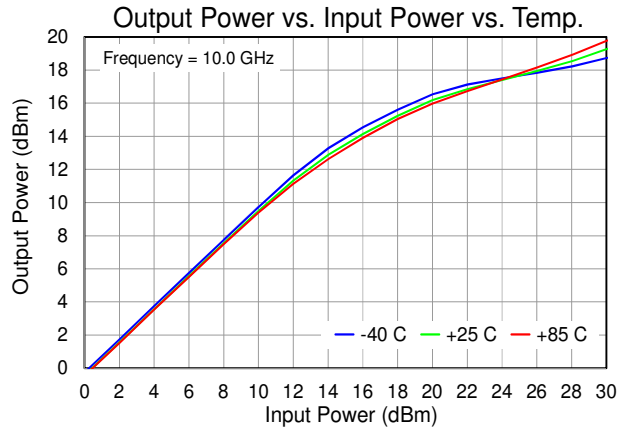
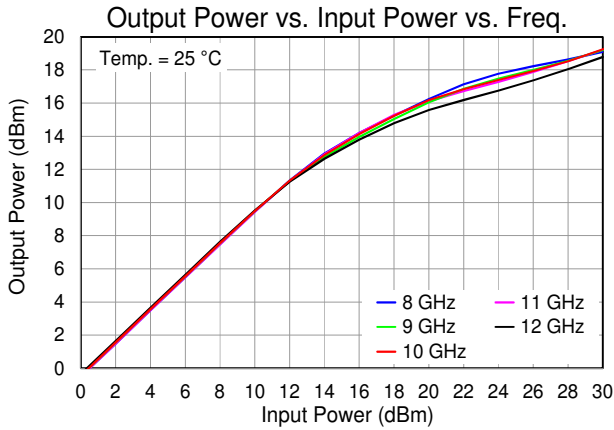
Typical Performance: Small Signal

Test conditions unless otherwise noted: 25 °C

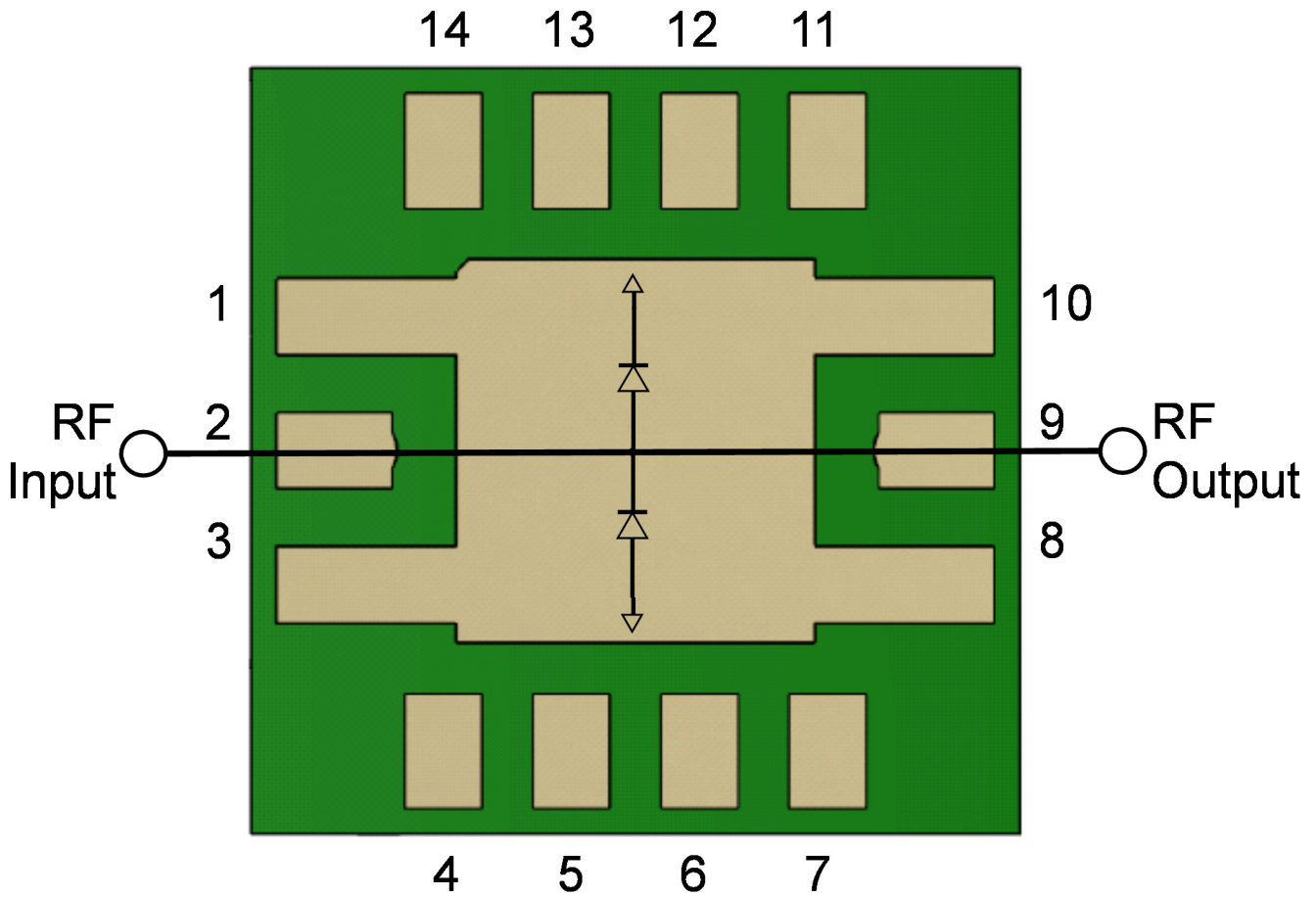


Typical Performance: Large Signal

Test conditions unless otherwise noted: 25 °C, CW Input Power



Applications Circuit

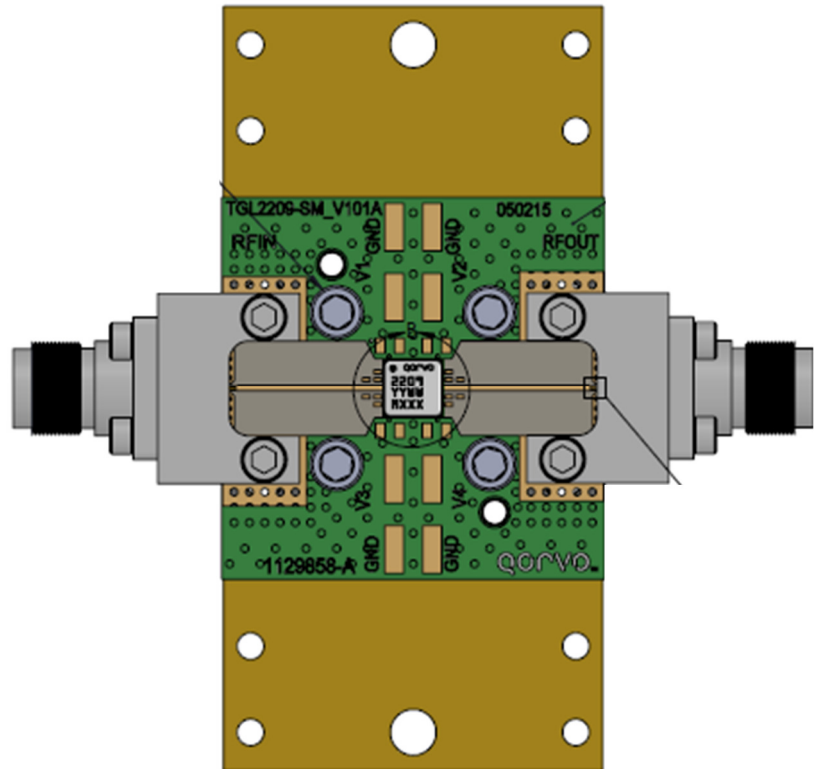


Applications Information – Evaluation Board (EVB)

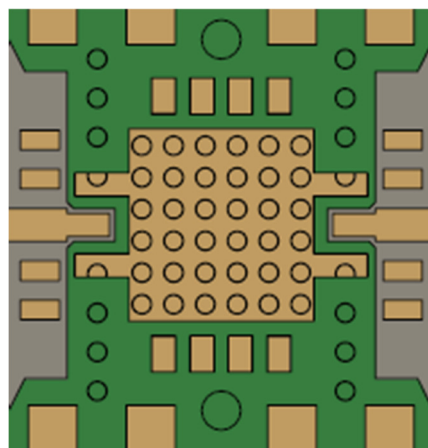
EVB Layout

RF layer is 0.008" thick Rogers RO4003C, $\epsilon_r=3.38$. Metal layers are 0.5-oz copper. The microstrip line taper at the connector interface is optimized for the Southwest Microwave end-launch connector 1092-01A-5.

The pad pattern shown has been developed and tested for optimized assembly at TriQuint Semiconductor. The PCB land pattern has been developed to accommodate lead and package tolerances. Since surface mount processes vary from company to company, careful process development is recommended.

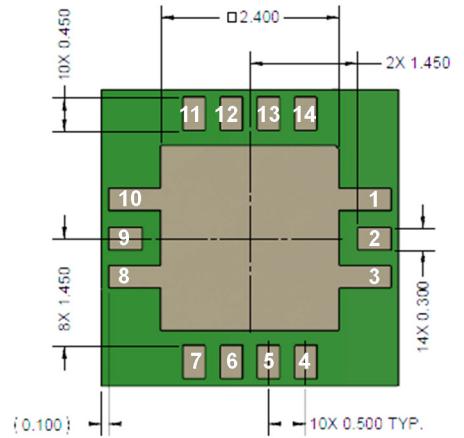
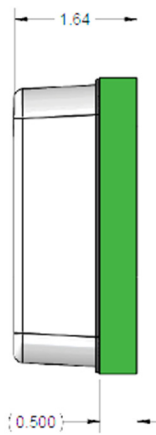
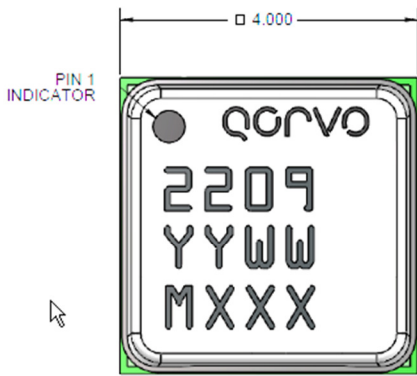


EVB Package Mounting Detail



Note: Multiple copper-filled vias should be employed under die to minimize inductance and thermal resistance.

Mechanical Drawing and Pad Description

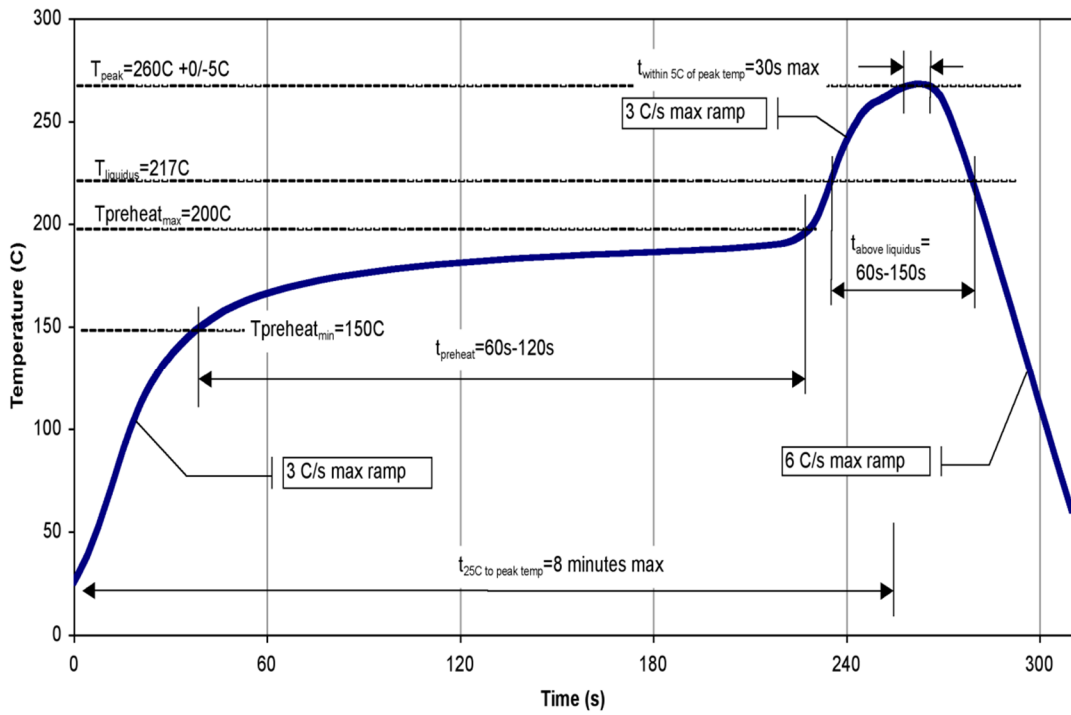


Units: millimeters
 Tolerances:
 .xx = ± 0.25
 .xxx = ± 0.100
 PART MARKING:
 2209: PART NUMBER
 YY: PART ASSY YEAR
 WW: PART ASSY WEEK
 MXXX: BATCH ID

| Package Pad | Symbol | Description |
|-----------------|-----------|--|
| 1, 3, 8, 10, 15 | GND | On PCB, multiple copper-filled vias should be employed under the center pad (15) to minimize inductance and thermal resistance |
| 2 | RF Input | RF Input, matched to 50 Ohms, not DC blocked |
| 4-7, 11-14 | NC | No connection |
| 9 | RF Output | RF Output, matched to 50 Ohms, not DC blocked |

NOTE: The RF Input and Output ports are not interchangeable.

Recommended Soldering Temperature Profile



Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating: TBD
Value: TBD
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ECCN

US Department of Commerce: EAR99

Solderability

Compatible with both lead-free (260 °C maximum reflow temperature) and tin/lead (245 °C maximum reflow temperature) soldering processes.

RoHS-Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

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, and information about TriQuint:

Web: www.triquint.com Tel: +1.972.994.8465
Email: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

For technical questions and application information: Email: info-products@tqs.com

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