

### Applications

- Receiver Channel Protection
- Commercial and Military Radar

### Product Features

- Frequency Range: 2 – 20 GHz
- Insertion Loss < 1.0 dB
- Return Loss > 12 dB
- Flat Leakage < 18 dBm
- Input Power CW Survivability up to 5W
- Integrated DC Block on both input and output
- Package Dimensions: 3.0 x 3.0 x 1.35 mm

### General Description

TriQuint's TGL2208-SM is a packaged dual stage Limiter fabricated on TriQuint's proven GaAs VPIN process. Operating over 2 to 20 GHz, the TGL2208-SM has < 1dB of insertion loss under small signal operation and flat leakage of < 18 dBm under large signal input.

The TGL2208-SM is suitable for a variety of systems that require input protection for sensitive receive channel components.

The TGL2208-SM is available in a low-cost, surface mount 14 lead 3x3 AIN QFN package base with air cavity Liquid Crystal Polymer (LCP) lid. TGL2208-SM is ideally suited to support both commercial and defense related applications.

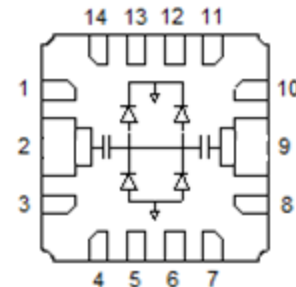
Lead-free and RoHS compliant.

Evaluation Boards are available upon request.



QFN 3x3mm 14L

### Functional Block Diagram



### Pad Configuration

Pad No.	Symbol
1, 3, 8, 10	GND
2	RF IN/OUT
4 – 7, 11 - 14	N/C
9	RF OUT/IN

### Ordering Information

Part	ECCN	Description
TGL2208-SM	EAR99	2- 20 GHz VPIN Limiter

### Absolute Maximum Ratings

Parameter	Value
RF Input Power, CW, 50 $\Omega$ , T = 25 °C (P <sub>IN</sub> )	37 dBm
Mounting Temperature (30 Seconds)	260 °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	Value
Passive - no bias	

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

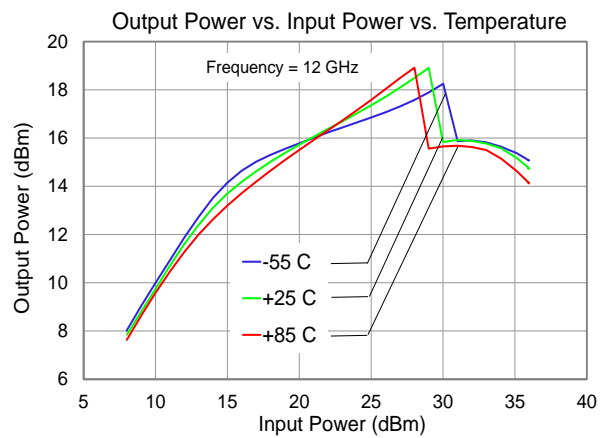
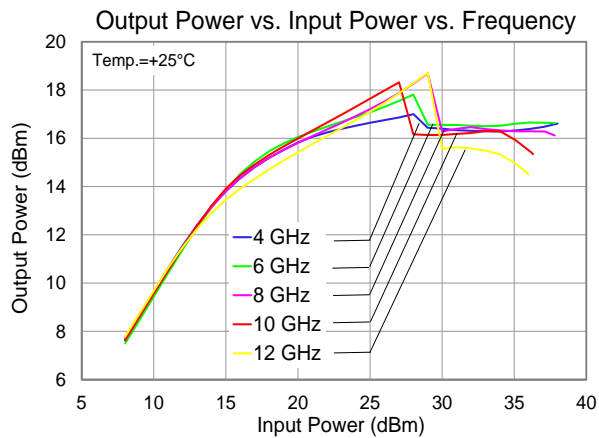
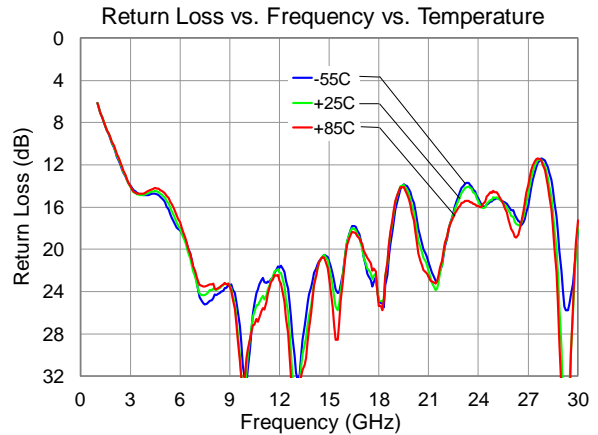
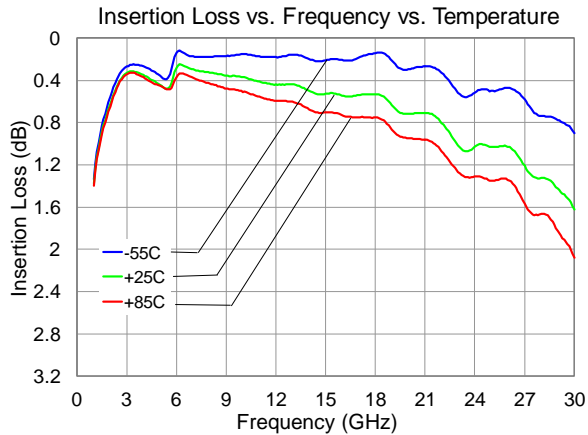
### Electrical Specifications

Test conditions unless otherwise noted: 25 °C

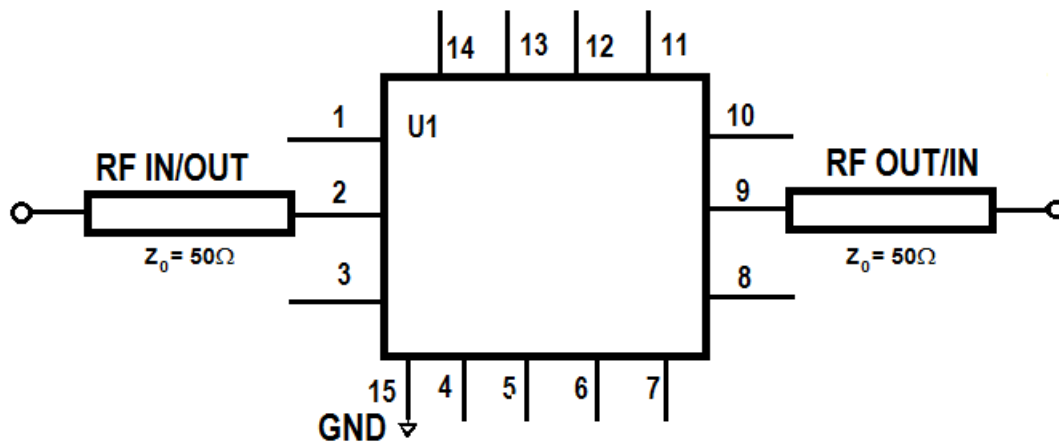
Parameter	Min	Typical	Max	Units
Operational Frequency Range	2		20	GHz
Insertion Loss		0.5		dB
Input Return Loss		15		dB
Output Return Loss		15		dB
Flat Leakage Power @ Pin > 27dBm		18		dBm
Insertion Loss Temperature Coefficient		0.003		dB/°C

**Typical Performance**

Conditions unless otherwise specified: Passive – No Bias



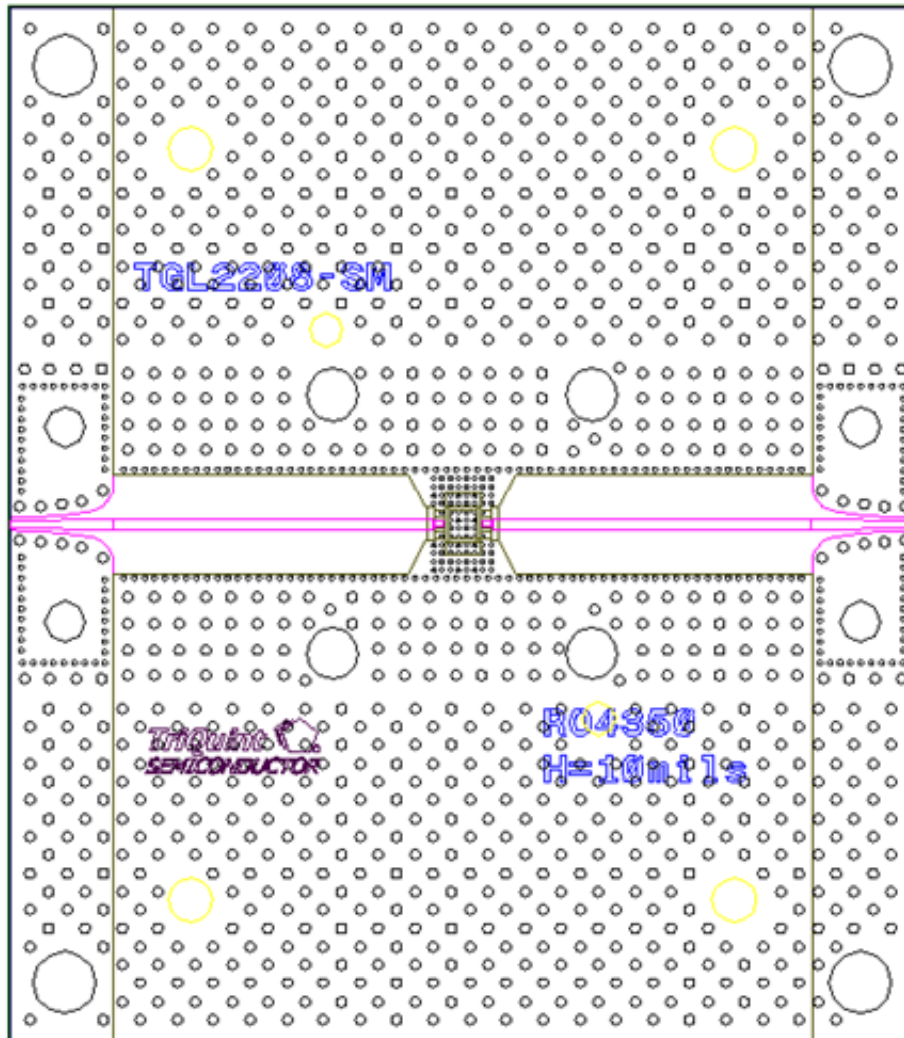
**Application Circuit**



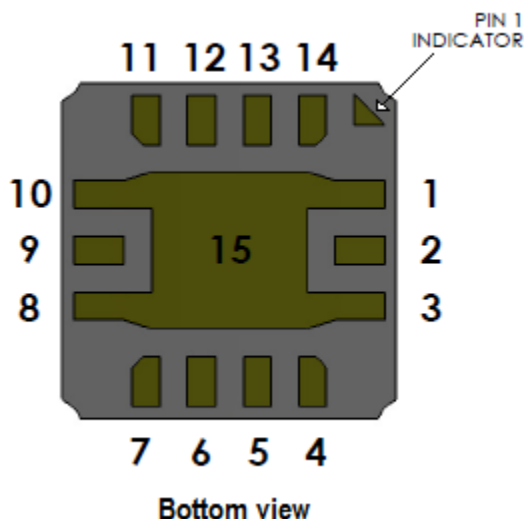
Notes: A heat sink is recommended for high power operation (RF input > 1 W)

**Recommended Board Layout Assembly**

Top RF layer is 0.010" thick Rogers RO4350



**Pin Layout**

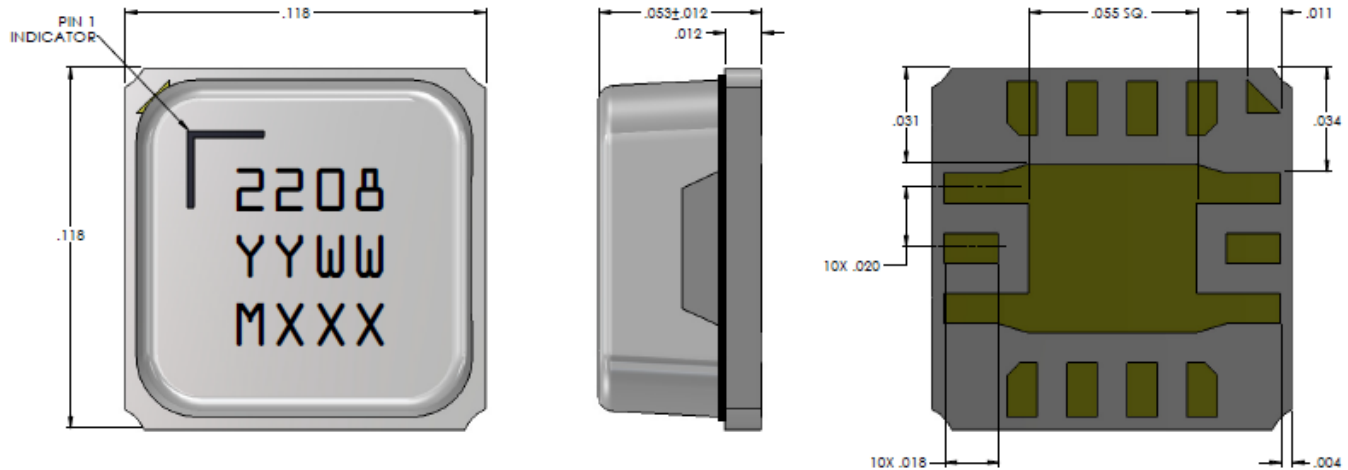


**Pin Description**

Pin	Symbol	Description
1, 3, 8, 10	GND	Pins 1,3,8 and 10 are connected to 15 (backside paddle) inside package.
2	RF IN/OUT	Input or Output, matched to 50 ohms
4 – 7, 11 - 14	N/C	No internal connection; must be grounded or left open on PCB
9	RF OUT	Output or Input, matched to 50 ohms
15	GND	On PCB, multiple vias should be employed under Pin 15 to minimize inductance and thermal resistance; see page 7 for suggested mounting configuration.

**Mechanical Information**

All dimensions are in inches. Unless specified otherwise, tolerances:  $\pm 0.005$  in.

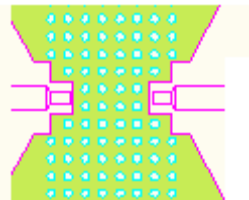


Marking: Part number – TGL2208  
Year/week code – YYWW  
Batch ID – MXXX

Package Materials:  
Base Aluminum Nitride (AlN)  
Lid Liquid Crystal Polymer (LCP)

Contact Pin Plating:  
Electroless Gold (Au) 0.5 – 1.5  $\mu$ m  
over  
Electroless Nickel (Ni) 2.0  $\mu$ m min.

**PCB Mounting Pattern**



The pad pattern shown above has been developed and tested for optimized assembly at TriQuint. 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.

Ground / thermal vias are critical for the proper performance of this device. Vias should use a 0.008 in. diameter drill, and they are solid filled, copper plated shut.

### 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

#### MSL Rating

Level 3 at +260 °C convection reflow  
 The part is rated Moisture Sensitivity Level 3 at 260°C per JEDEC standard IPC/JEDEC J-STD-020.

#### ECCN

US Department of Commerce: EAR99

#### Solderability

Compatible with the latest version of J-STD-020, Lead free solder, 260°C

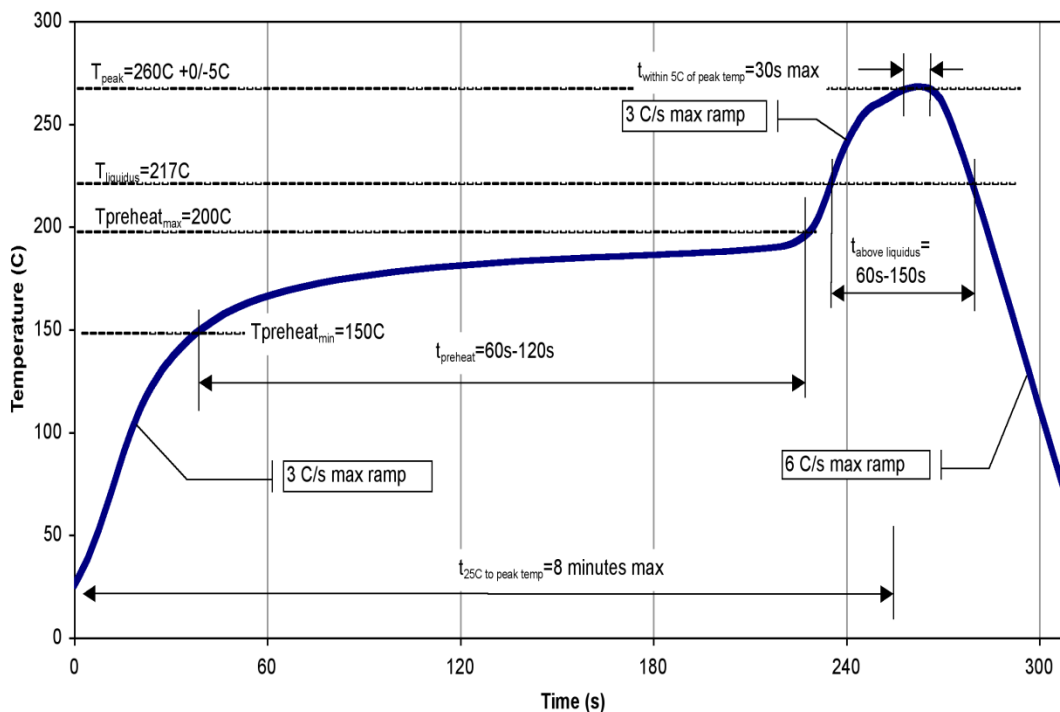
#### RoHS Compliance

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 (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free
- SVHC Free

### Recommended Soldering Temperature Profile





## Contact Information

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