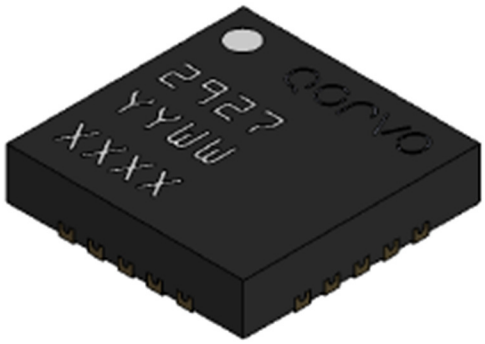
TGL2927-SM

2 – 4 GHz 200 Watt VPIN Limiter

Applications

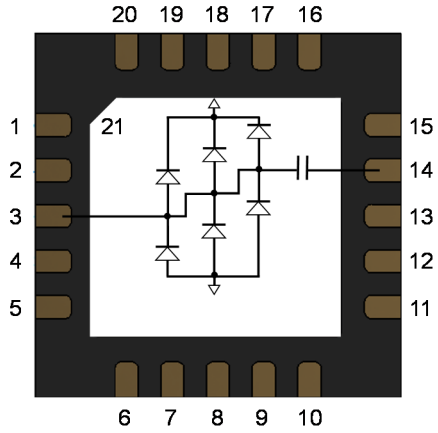
- Receive Chain Protection
- Commercial and Military Radar
- Communications
- Electronic Warfare



Product Features

- Frequency Range: 2 to 4 GHz
- Insertion Loss: < 0.6 dB
- Peak Power Handling: 200 W (pulsed)
- Flat Leakage: < 18 dBm
- Passive (no DC bias required)
- Integrated DC Block on output
- Package Dimensions: 4.0 mm x 4.0 mm x 0.85 mm

Functional Block Diagram



General Description

The Qorvo TGL2927-SM is a high-power receive protection circuit (limiter) operating from 2-4 GHz. Capable of withstanding up to 200 W incident power levels, the TGL2927-SM allows < 18 dBm flat leakage to pass through and contributes < 0. 6dB in insertion loss.

Using Qorvo's passive GaAs VPIN technology, the TGL2927-SM does not require bias and is offered in a small 4 x 4 (mm) plastic overmold package. This simplifies system integration while maximizing performance and protection.

The TGL2927-SM is ideal for commercial and military radar applications where protecting sensitive receive components from damage is critical.

Lead-free and RoHS compliant.

Evaluation Boards available on request.

Pad Configuration

Pad Number	Symbol
3	RF Input
14	RF Output
1, 2, 4-13, 15-20	No Connection
21 (slug)	GND

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

Ordering Information

Part	ECCN	Description
TGL2927-SM	EAR99	200W S-Band VPIN Limiter
TGL2927-SM_EVB	EAR99	200 W S-Band VPIN Limiter Eval. Board

Absolute Maximum Ratings

Parameter	Value
Incident Power, Pulsed (500 us / 15%), 50Ω, 25 ℃	54.0
Incident Power, Pulsed (500 us / 15%), 50Ω, 85 ℃	50.5
Mounting Temperature (30 sec.)	260 ℃
Storage Temperature	-55 to 150 ℃

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 ℃, S-Parameters CW, Power Pulse Parameters: PW = 500 us, Duty Cycle = 15%

Parameter	Min	Typical	Max	Units
Operational Frequency Range	2		4	GHz
Insertion Loss (2.0 – 4.0 GHz)		< 0.6		dB
Insertion Loss (4.0 – 4.5 GHz)		< 0.9		dB
Input Return Loss		15		dB
Output Return Loss		15		dB
Flat Leakage Power at P_{IN} > 30 dBm		< 18		dBm
Insertion Loss Temperature Coefficient		-0.001		dB/℃

Thermal and Reliability Information

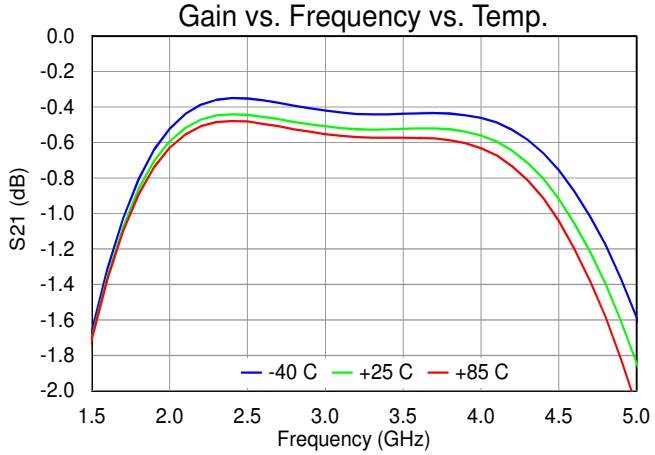
Parameter	Test Conditions	Value	Units
Incident Power (RF Operational Life Test 168 Hours [1])	Frequency = 3.3 GHz, Pulsed, PW = 100 us, DC = 10%, 50Ω, 25 ℃	200	W

Notes:
1. Test was terminated at 168 hours. Insertion Loss remained ≤ 1 dB for device under test.

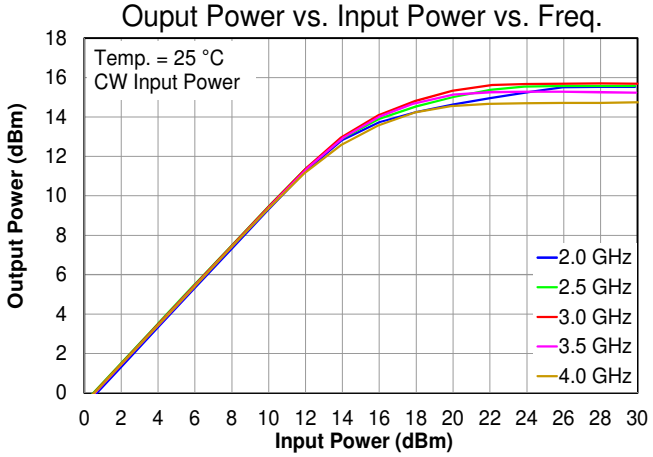
Typical Performance

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

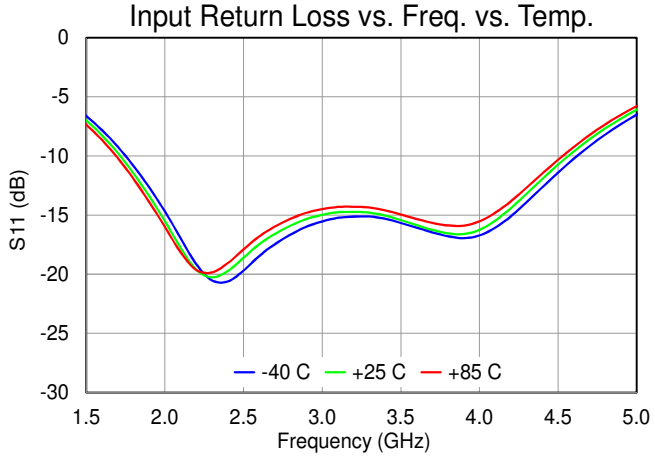
Gain vs. Frequency vs. Temp.



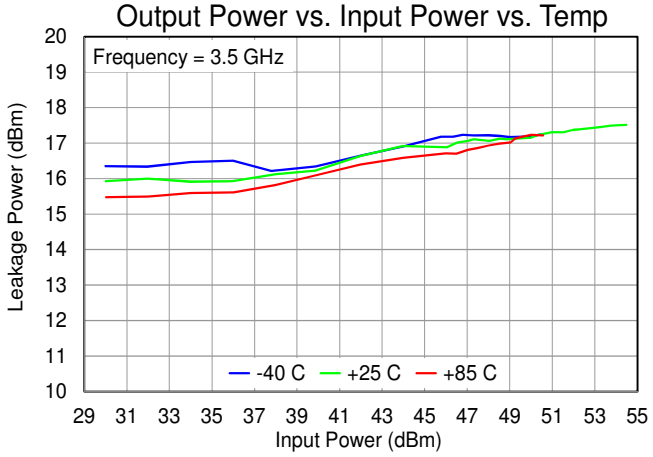
Ouput Power vs. Input Power vs. Freq.



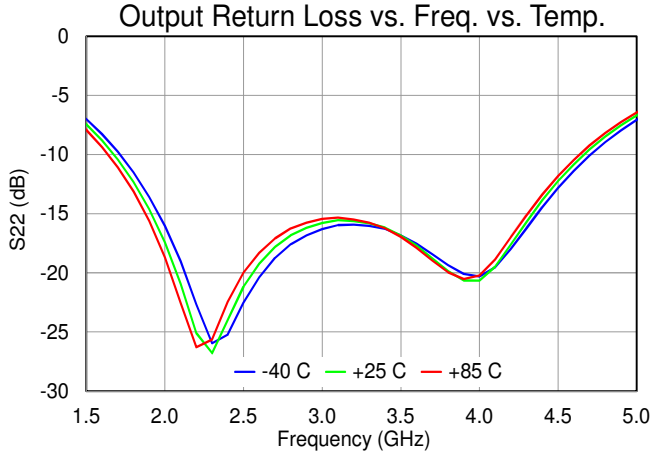
Input Return Loss vs. Freq. vs. Temp.



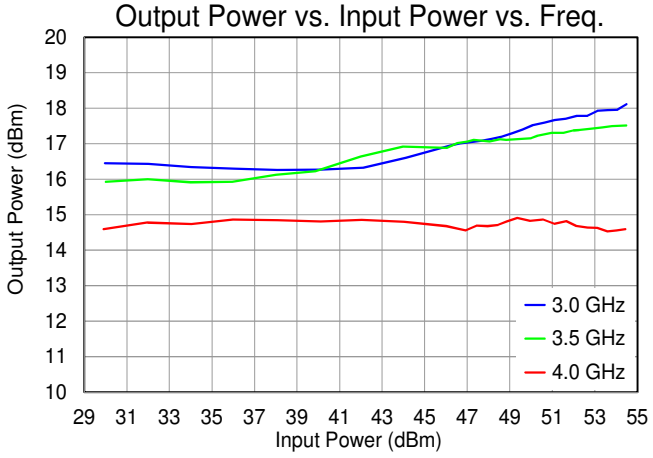
Output Power vs. Input Power vs. Temp



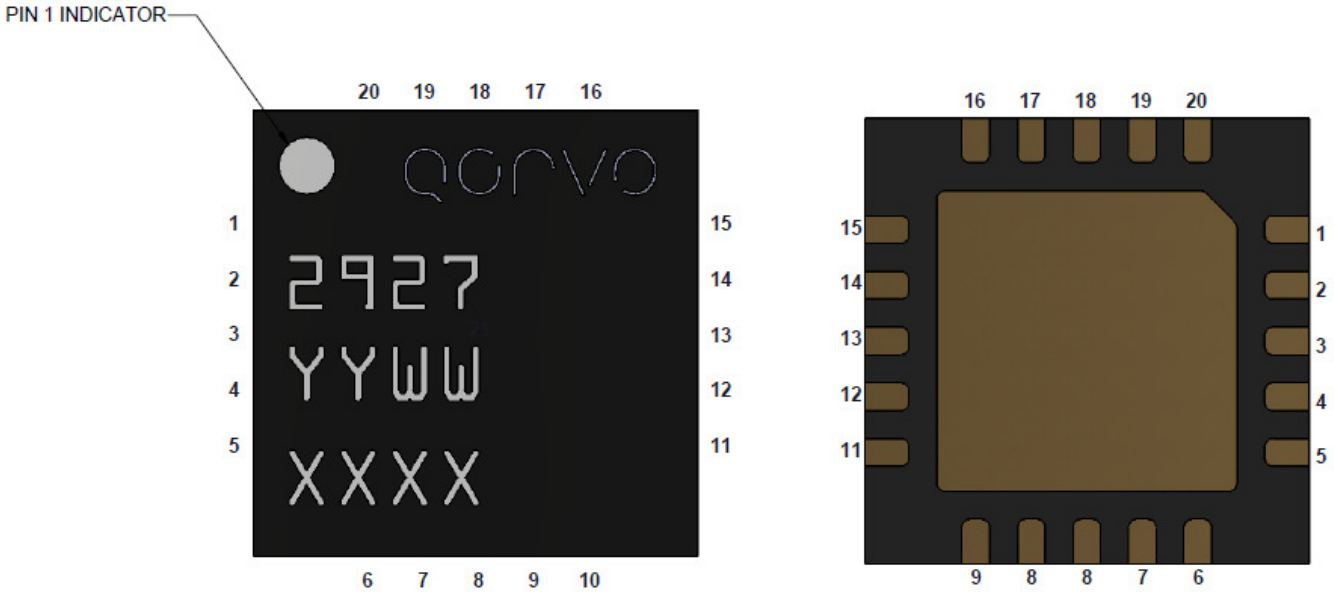
Output Return Loss vs. Freq. vs. Temp.



Output Power vs. Input Power vs. Freq.



Pad Description

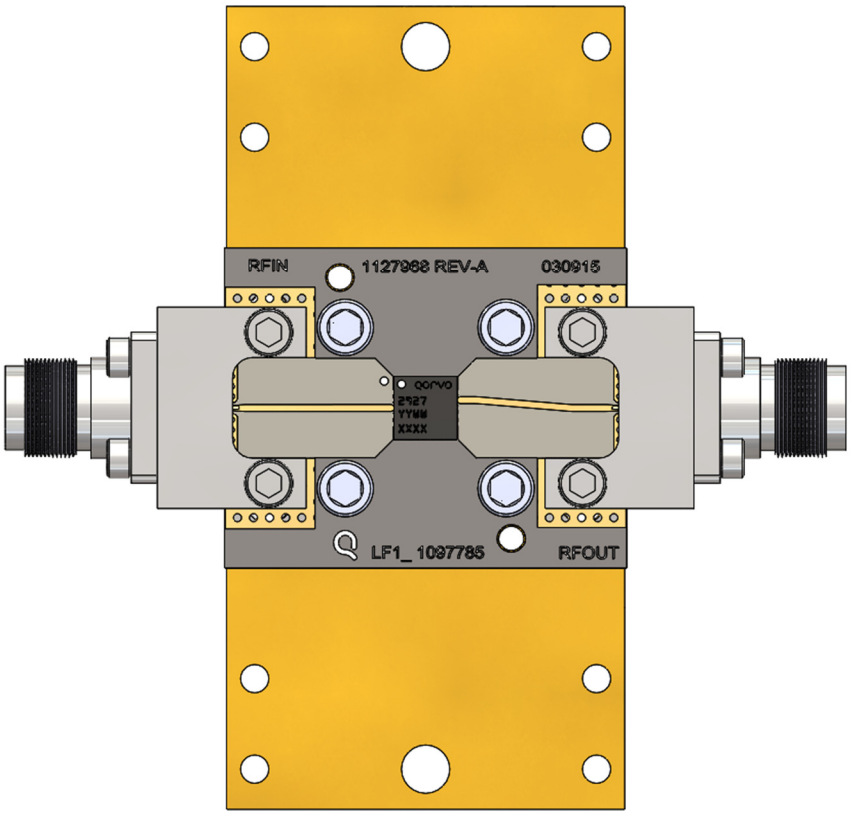


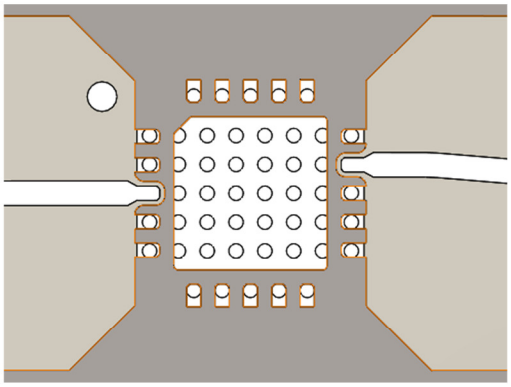
PIN ASSIGNMENT

Pad No.	Symbol	Description
1, 2, 4 – 13, 15 – 20	No Connection	No connection. Recommend connecting to GND at EVB level
3	RF Input	RF Input; matched to 50 Ω; DC coupled
14	RF Output	RF Output; matched to 50 Ω; DC blocked
21 (slug)	GND	On PCB, multiple vias should be employed under the center pad (21) to minimize inductance and thermal resistance; see page 5 for suggested mounting configuration.

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

Evaluation Board and Mounting Detail





Package mounting detail

RF Layer is 0.010" thick Rogers Corp. RO4003C, ε_r = 3.38. Metal layers are 0.5 oz. copper. The microstrip line at the connector interface is optimized for the Southwest Microwave end launch connector 1092-02A-5.

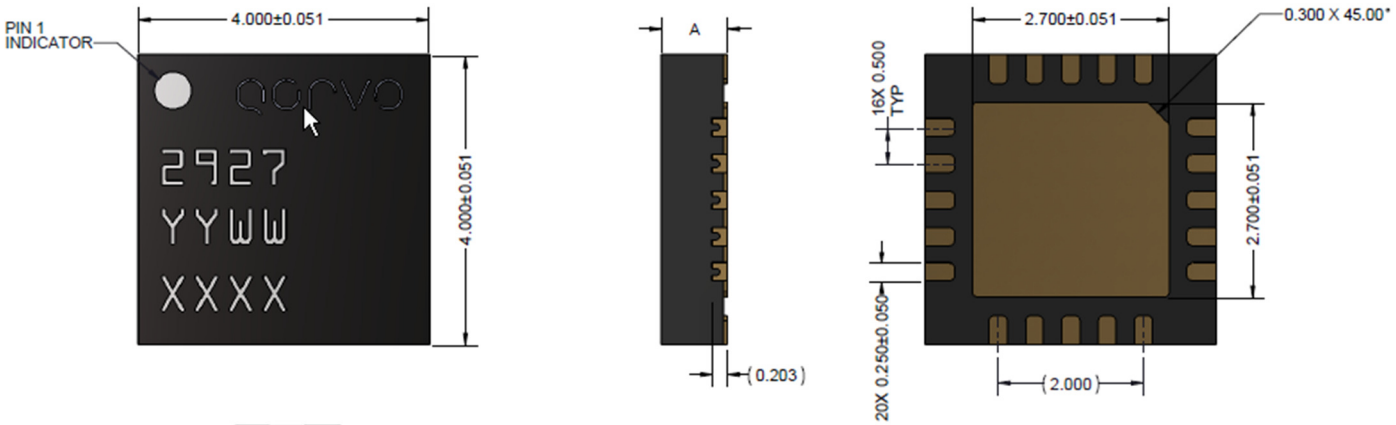
The trace pattern shown has been developed and tested for optimized assembly at TriQuint Semiconductor. The PCB land pattern has been developed to accommodate lead tolerances. Since processes vary from company to company, careful process development is recommended.

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.

Mechanical Information



A	MAX	0.900
	NOM	0.850
	MIN	0.800

Units: inches

Tolerances: unless specified

.xx = ± 0.05

.xxx = ± 0.127

Materials:

Lid: Plastic

Plating: All metalized features are NiPdAu plated

Part is lead-free/PoHS-compliant; mold encapsulated

Marking:

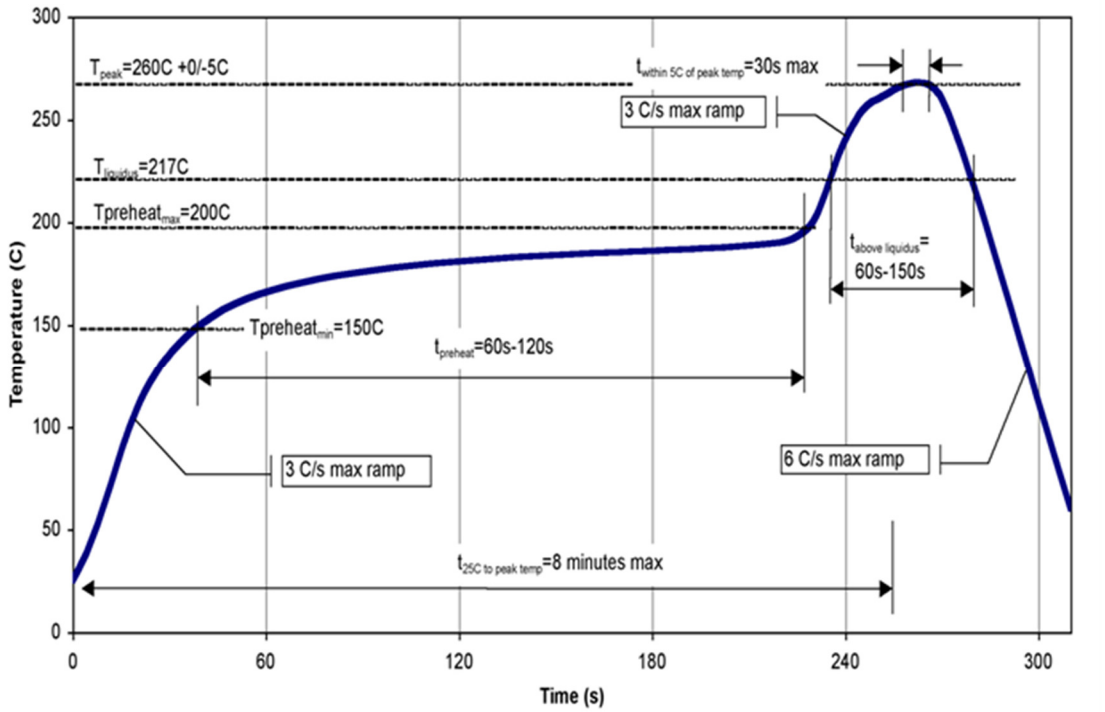
2927: Part number

YY: Part Assembly year

WW: Part Assembly week

XXXX: Batch ID

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

MSL Rating

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

ECCN

U.S. Department of Commerce: EAR99

Solderability

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

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

RoHS Compatibility

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Contact Information

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

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

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