



TGL2927-SM

2 – 4 GHz 200 Watt VPIN Limiter

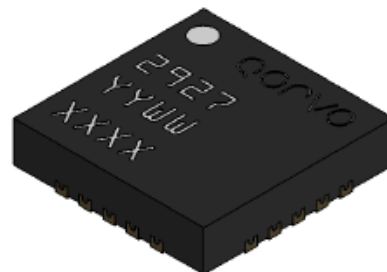
Product Overview

Qorvo's 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 < 0.6 dB 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.



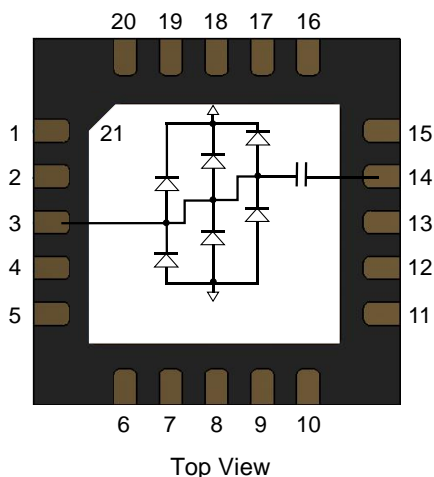
20 Pad 4 x 4 mm QFN Package

Key Features

- Frequency Range: 2 to 4 GHz
- Insertion Loss: 0.5 dB
- Peak Power Handling: 200 W (pulsed)
- Flat Leakage: 15 dBm
- Spike Leakage: < 1 dB
- Recovery Time: < 20 nS
- Passive (no DC bias required)
- Integrated DC Block on output
- Package Dimensions: 4 x 4 x 0.85 mm

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

Functional Block Diagram



Applications

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

Ordering Information

Part	Description
TGL2927-SM	200W S-Band VPIN Limiter
TGL2927-SM_EVB	200W S-Band VPIN Limiter Evaluation Board

Absolute Maximum Ratings

Parameter	Rating
Incident Power, Pulsed (500 us / 15%), 50 Ω , 25 °C	54.0 dBm
Incident Power, Pulsed (500 us / 15%), 50 Ω , 85 °C	50.5 dBm
Mounting Temperature (30 s max)	260 °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.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
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.

Electrical Specifications ⁽¹⁾

Parameter	Conditions	Min	Typ	Max	Units
Operational Frequency Range		2		4.0	GHz
Insertion Loss	2.0 – 4.0 GHz	0.2	0.50	0.85	dB
Input Return Loss		10	15		dB
Output Return Loss		11	15		dB
Flat Leakage Power	@ P _{IN} > 30 dBm		15	20	dBm
Spike Leakage			< 1.0		dB
Pulse Recovery Time			< 20		nS
Insertion Loss Temperature Coefficient			0.001		dB/ °C

Notes:

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

Thermal and Reliability Information

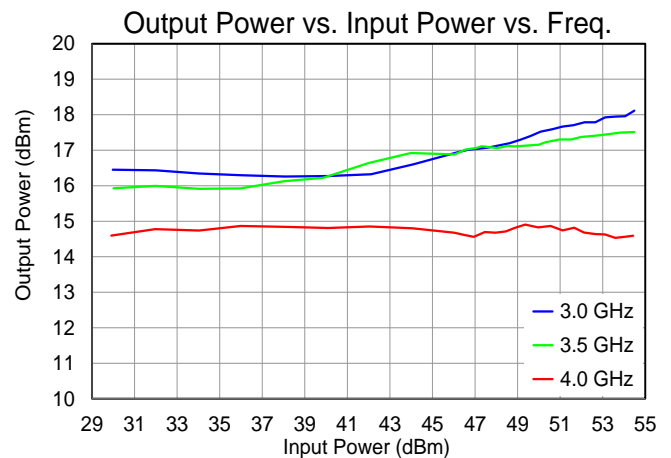
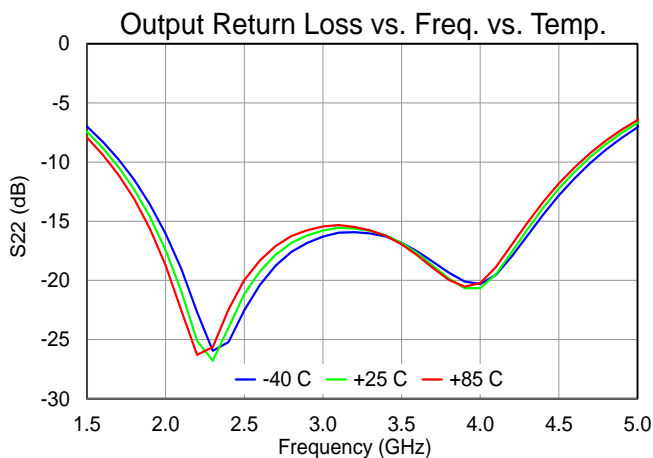
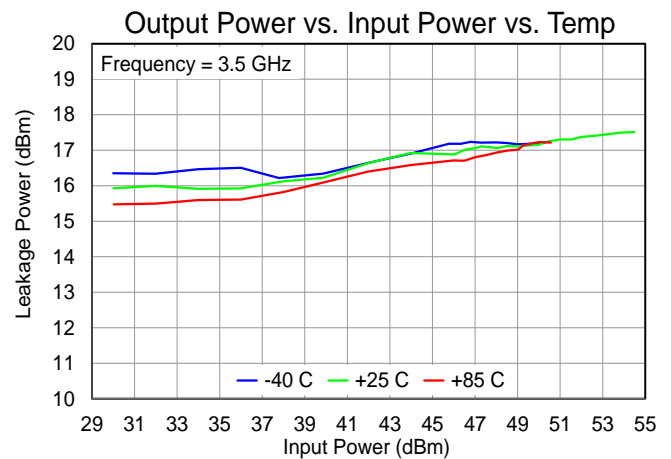
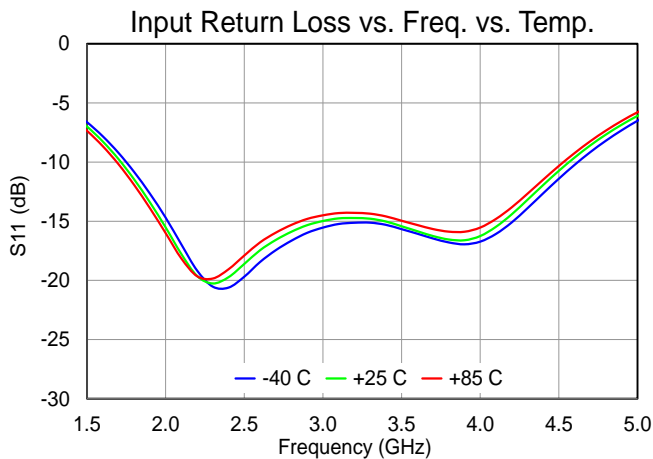
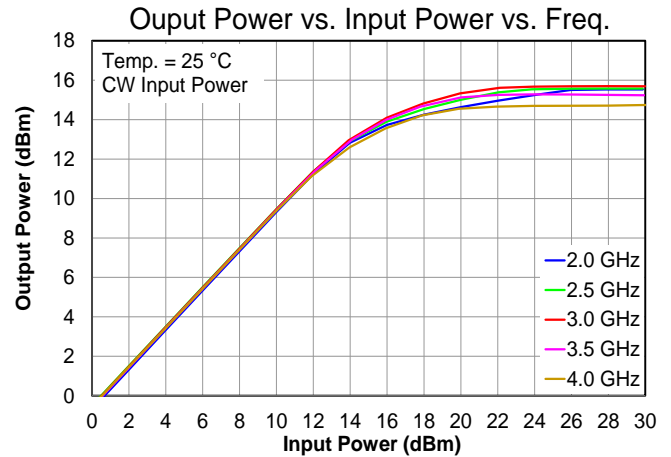
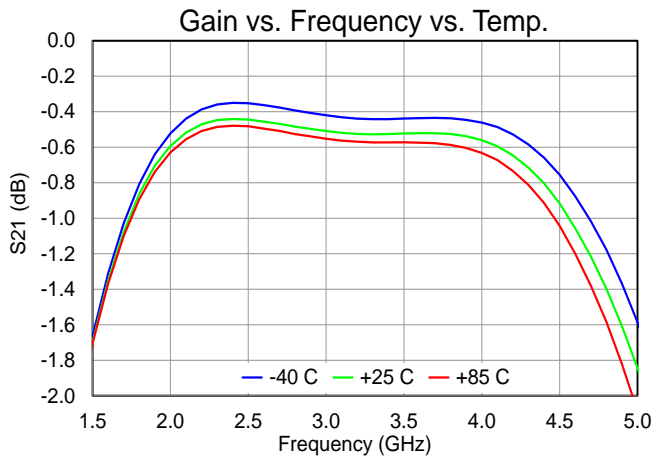
Parameter	Test Conditions	Value	Units
Incident Power (RF Operational Life Test 168 Hours ⁽¹⁾)	Frequency = 3.3 GHz, Pulsed, PW = 100 us, DC = 10%, 50 Ω , 25 °C	200	W

Notes:

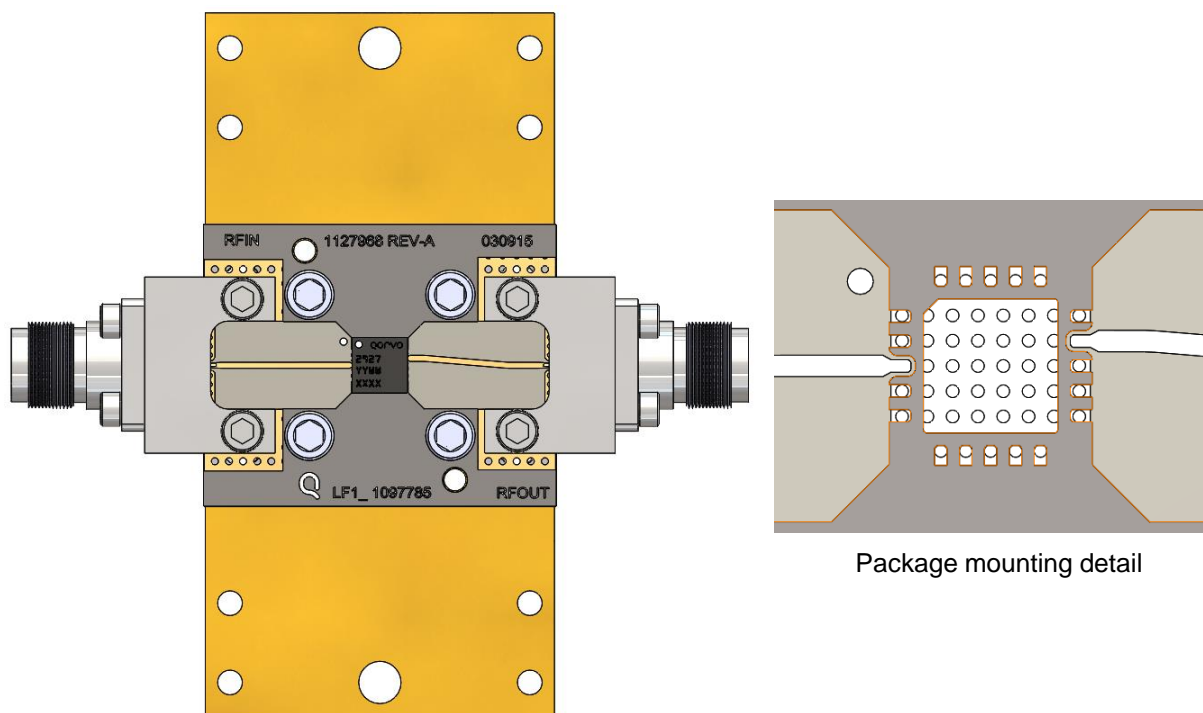
- Test was terminated at 168 hours. Insertion Loss remained \leq 1 dB for device under test.

Performance Plots

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



Evaluation Board (EVB) and Mounting Detail



RF Layer is 0.010" 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 Southwest Microwave end launch connector 1092-02A-5.

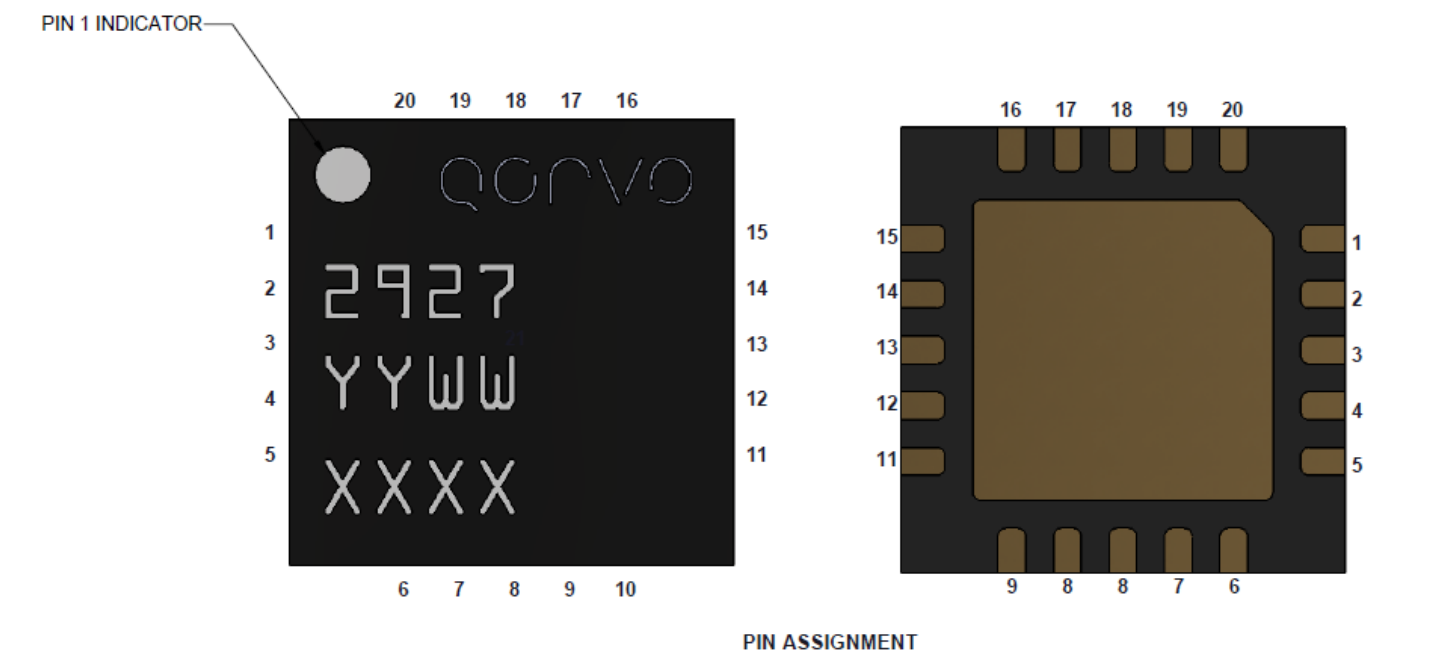
The trace pattern shown has been developed and tested for optimized assembly at Qorvo. The PCB land pattern has been developed to accommodate lead tolerances. Since processes vary from company to company, careful process development is recommended.

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.

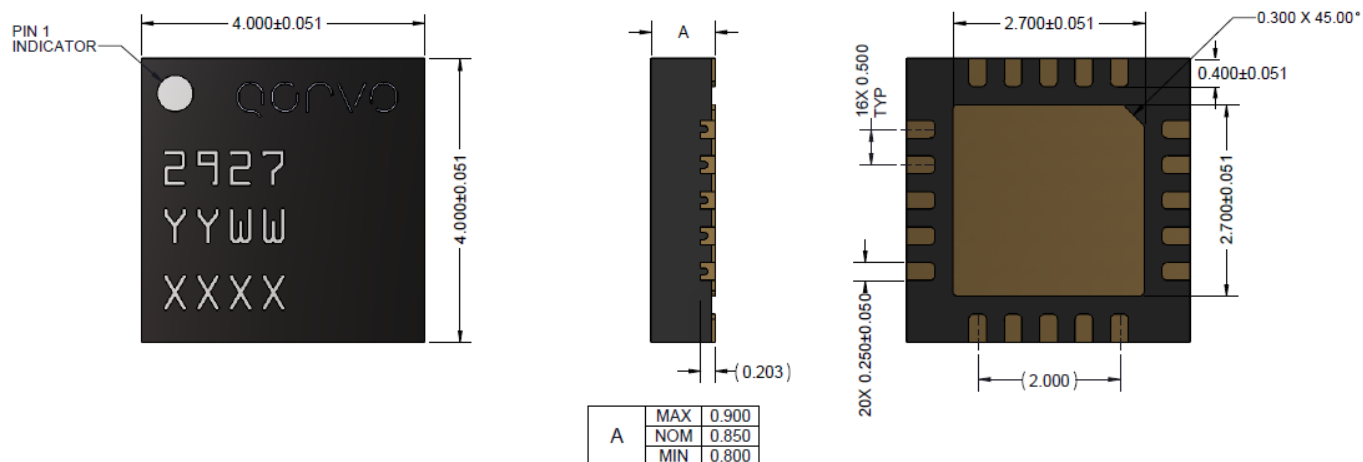
Pad Configuration and Description



Pad No.	Label	Description
1, 2, 4 - 13, 15 - 20	NC	No connection. Recommend connecting to ground at EVB level may improve performance
3	RF Input	RF Input, matched to 50 Ohms, DC coupled
14	RF Output	RF Input, matched to 50 Ohms, DC blocked
21	GND	On PCB, multiple copper-filled vias should be employed under the center pad to minimize inductance and thermal resistance

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

Package Marking and Dimensions



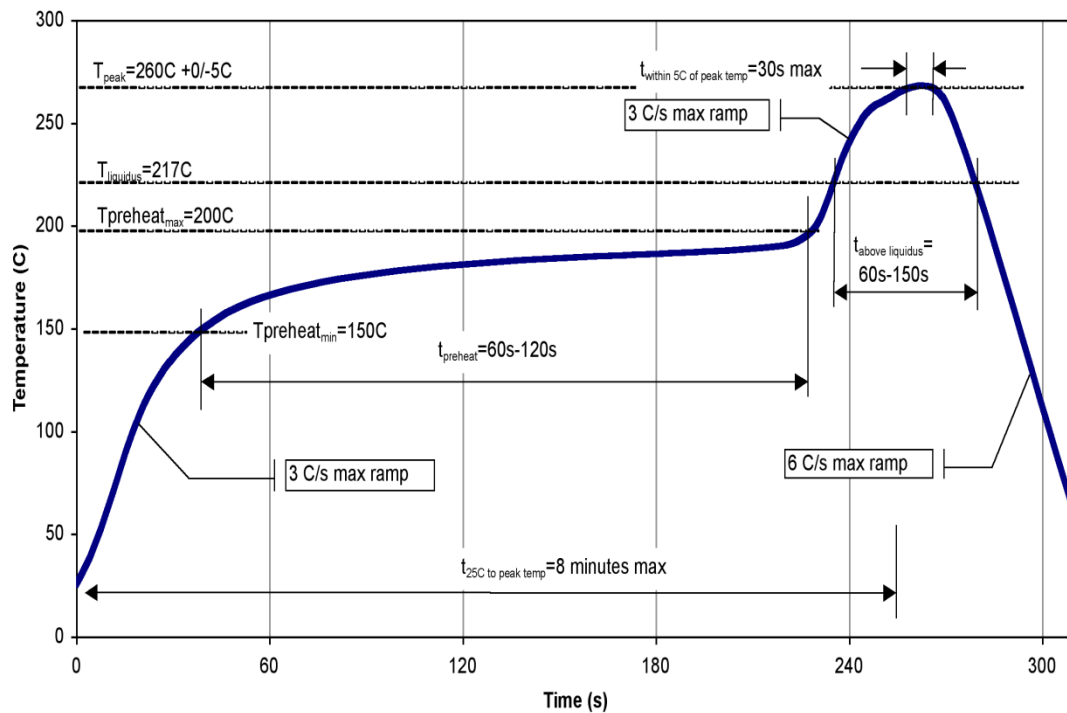
Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. Package Lead are Gold Plated
3. Part is Mold Encapsulated
4. Part Marking:
2927: Part Number
YY: Part Assembly Year
WW: Part Assembly Week
XXXX: Batch ID

Solderability

1. Compatible with the latest version of J-STD-020, Lead-free solder, 260° C, and tin/lead (245°C max. reflow temp.) soldering processes.
2. The use of no-clean solder to avoid washing after soldering is recommended.
3. Contact plating: Ni-Pd-Au.

Recommended Soldering Profile



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1C	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C3	JEDEC JESD22-C101F
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!
ESD-Sensitive Device

RoHS Compliance

This part is compliant with 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:

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