



TGL2205-SM

2-6 GHz 100 Watt VPIN Limiter

Product Overview

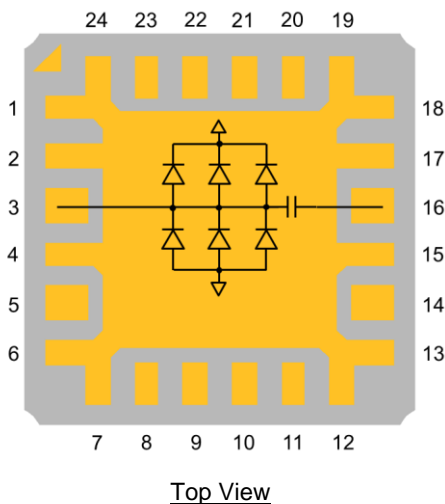
The Qorvo TGL2205-SM is a high power, wideband GaAs VPIN limiter capable of protecting sensitive receive channel components against high power incident signals. The TGL2205-SM does not require DC bias, and achieves a low insertion loss all in a small form factor. These features allow for simple integration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

The TGL2205-SM operates from 2-6 GHz with low insertion loss of less than 0.6 dB. It can limit up to 100 W incident pulsed-power with a low flat leakage of less than 16.5 dBm.

The TGL2205-SM is offered as a packaged limiter, and is well suited for both commercial and defense related applications.

Lead-free and RoHS compliant.

Functional Block Diagram



24 Pad 4 x 4 mm Air Cavity QFN Package

Key Features

- Frequency Range: 2 to 6 GHz
- Insertion Loss: < 0.6 dB
- Peak Power Handling: 100 W
- Flat Leakage: < 16.5 dBm
- Spike Leakage < 17 dBm
- Passive (no DC bias required)
- Integrated DC Blocks on the output
- Recovery time < 115 ns
- Package Dimensions: 4.00 x 4.00 x 1.47 mm

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

Applications

- Receive Chain Protection
- Commercial and Military Radar

Ordering Information

Part	Description
1095765	2-6 GHz 100W VPIN Limiter
1095768	TGL2205-SM, EVAL BOARD
TGL2205-SMTR7	250 Piece 7" Reel

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 s max)	260 °C
Storage Temperature	-40 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				
Operating 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

Parameter	Conditions ⁽¹⁾	Min	Typ.	Max	Units
Operational Frequency Range		2		6	GHz
Insertion Loss			< 0.6		dB
Input Return Loss			12		dB
Output Return Loss			12		dB
Flat Leakage Power at P _{IN} > 30 dBm			< 16.5		dBm
Pulse Recovery Time			< 115		ns
Spike Leakage			< 17		dBm
Insertion Loss Temperature Coefficient			0.003		dB/ °C

Notes:

1. Test conditions unless otherwise noted: Temp = +25 °C, Tuned EVB Results.

Thermal and Reliability Information

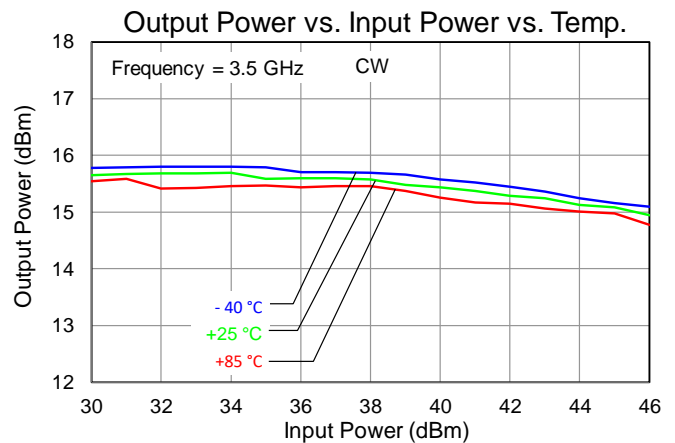
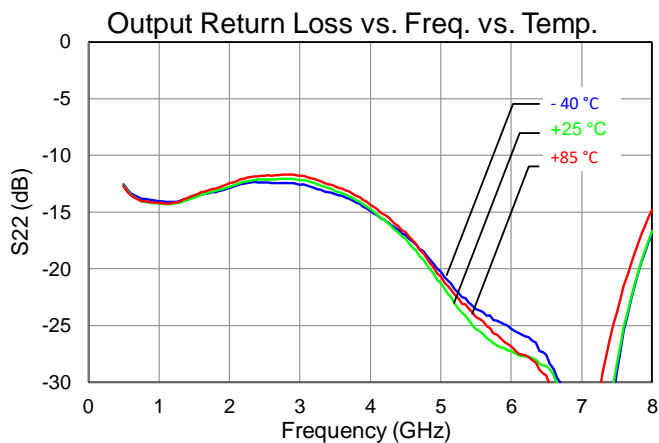
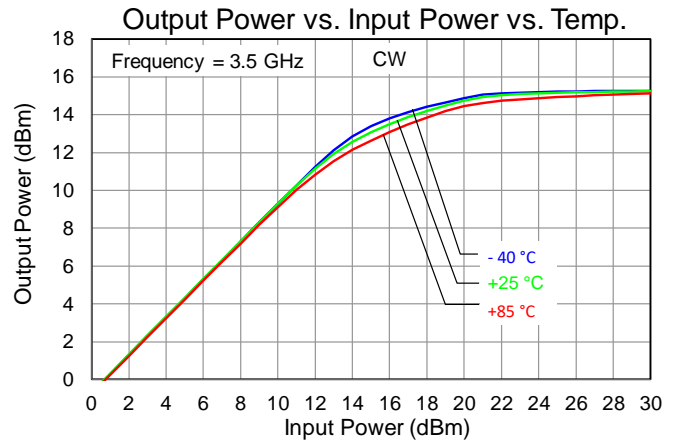
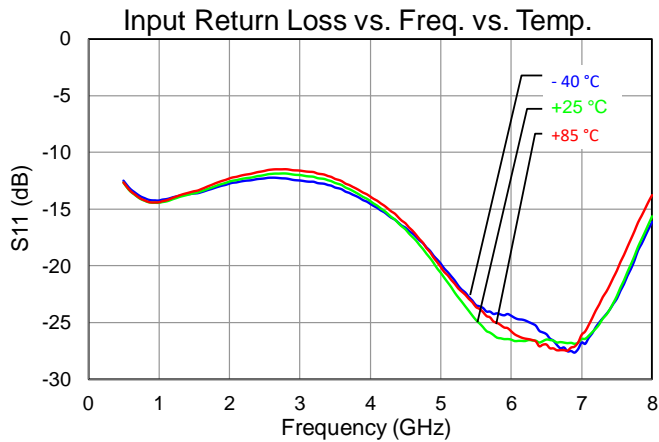
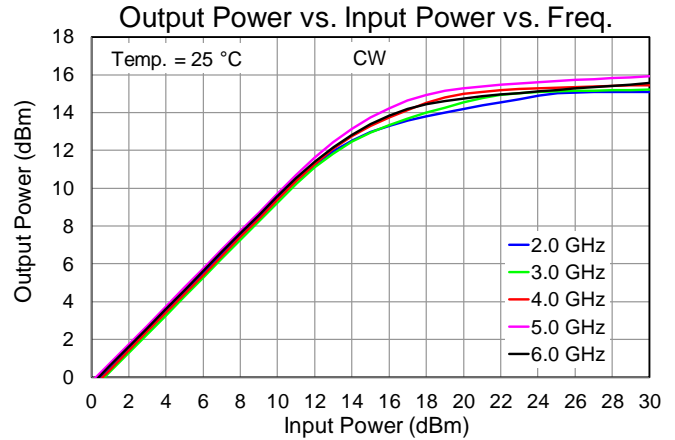
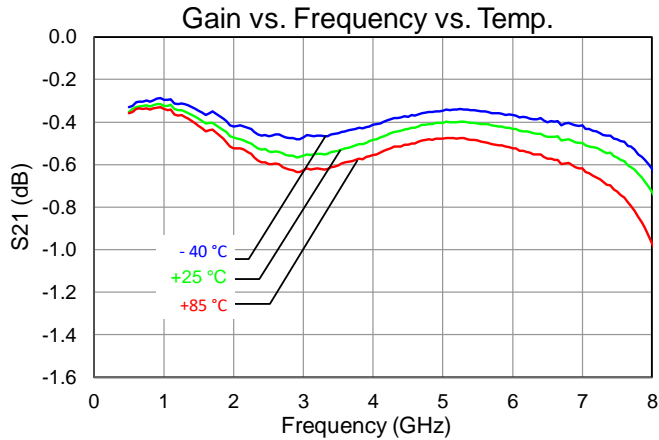
Parameter	Test Conditions	Value	Units
Incident Power (RF Operational Life Test ⁽¹⁾)	4.5 GHz, CW, 50 Ω, 25 °C	31	W
	4.5 GHz, Pulsed, PW=10 μs, DC=10%, 50 Ω, 25 °C	100	W

Notes:

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

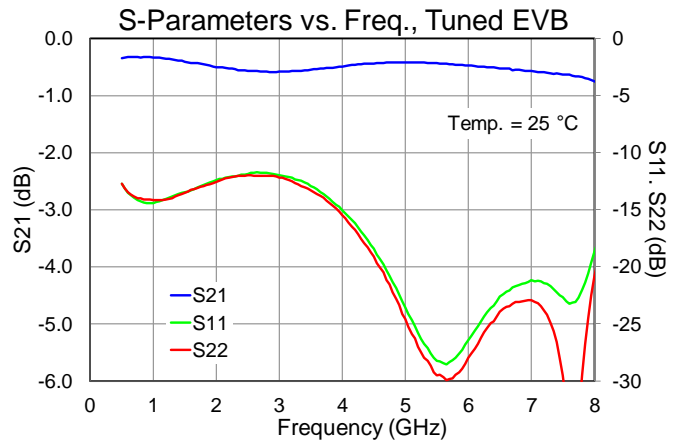
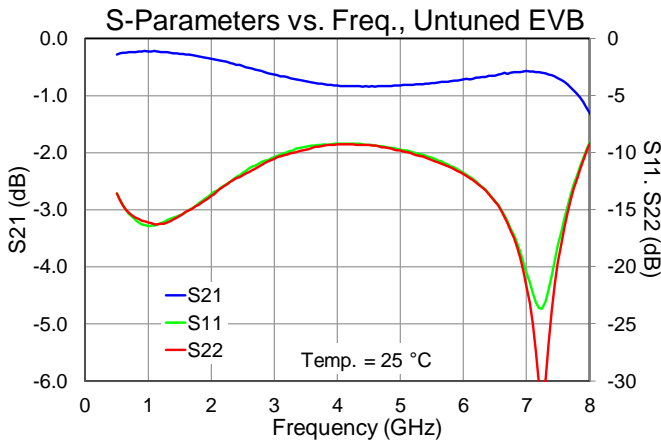
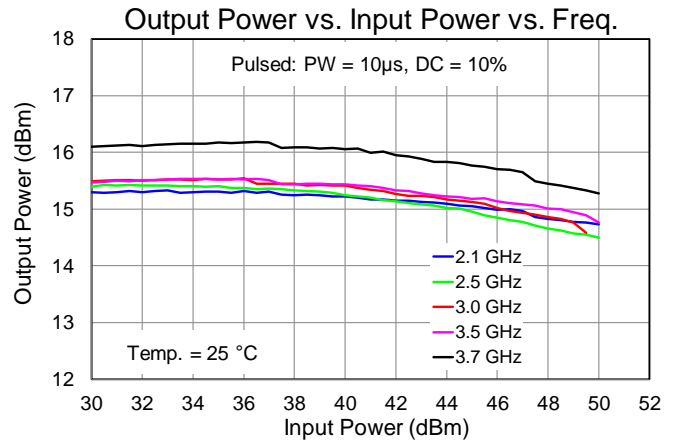
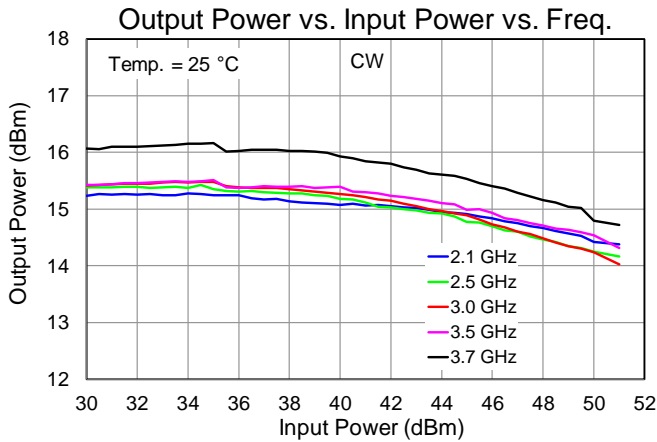
Performance Plots – Small & Large Signal

Test conditions unless otherwise noted: CW Power, Temp.=+25 °C, Tuned EVB Performance

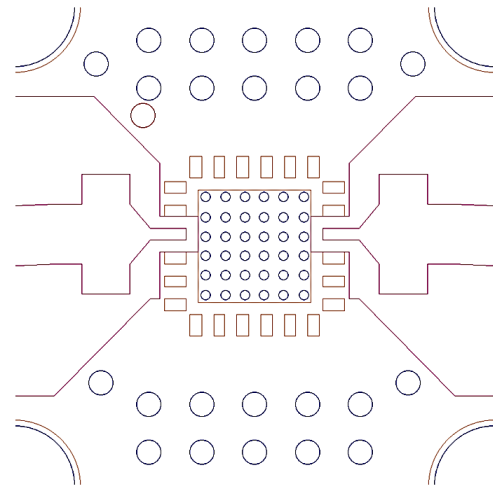
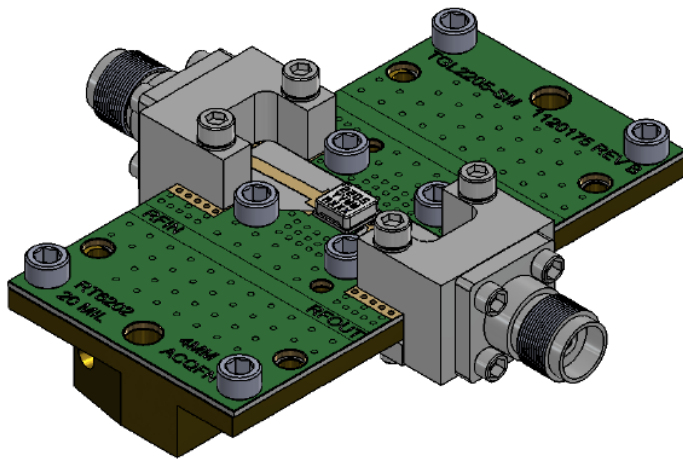


Performance Plots – Small & Large Signal

Test conditions unless otherwise noted: CW power, Temp.=+25 °C, Tuned EVB Performance



Evaluation Board (EVB) & Mounting Detail

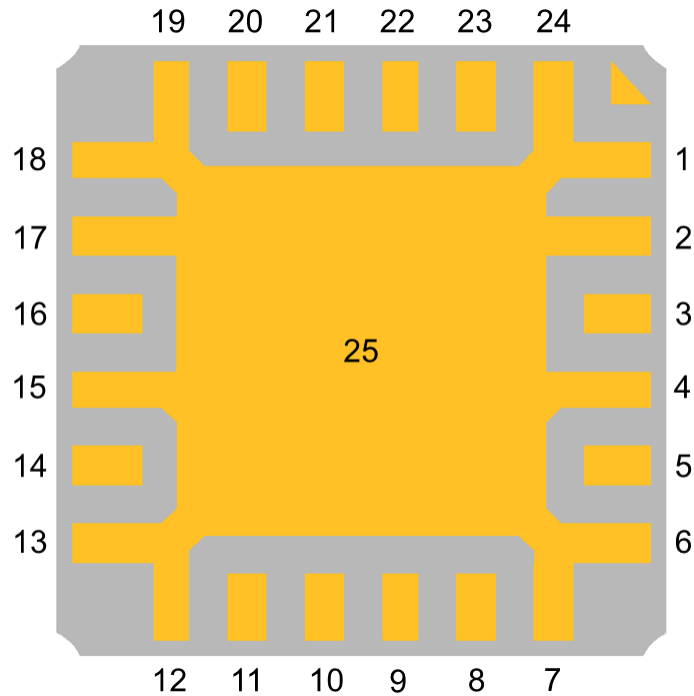


Mounting Detail

Notes:

1. RF layer is 0.020" thick Rogers RO6202, $\epsilon_r = 2.94$. Metal layers are 1-oz copper. Microstrip 50 Ω line width is 0.050". The microstrip line taper at the connector interface is optimized for the Southwest Microwave end-launch connector 1092-02A-5.
2. The pad pattern shown has been developed and tested for optimized assembly at Qorvo. 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.
3. Ground / thermal vias under the DUT are critical for the proper performance of this device.
4. The EVB shown herein utilizes copper filled vias (8 mil diameter) under the DUT to maximize heat transfer away from the DUT under large signal conditions.
5. Thermal dissipation is low for normal non-limiting operation.

Pad Configuration and Description

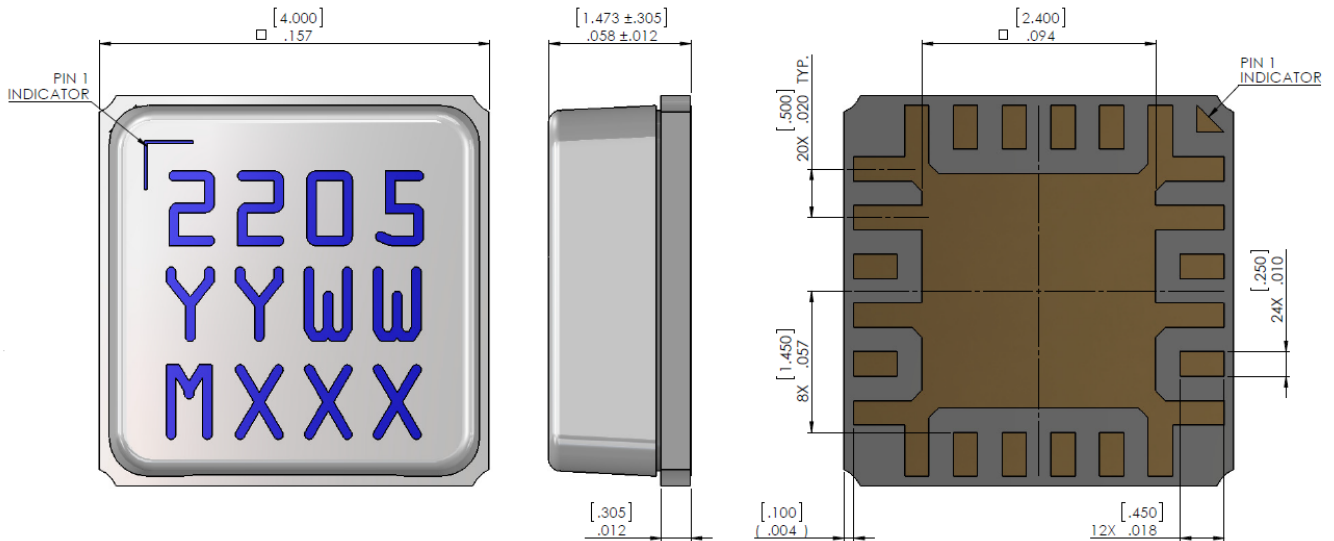


Bottom View

Pad No.	Label	Description
1,2,4,6,7,12,13,15,17-19,24,25	GND	On PCB, multiple copper-filled vias should be employed under the center pad to minimize inductance and thermal resistance. See page 5 for suggested mounting configuration
3	RF Input	RF Input, matched to 50 Ohms, not DC blocked
5,8-11,14,20-23	NC	No connection; may be grounded if desired
16	RF Output	RF Output, matched to 50 Ohms, DC blocked

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

Mechanical Information & Package Marking



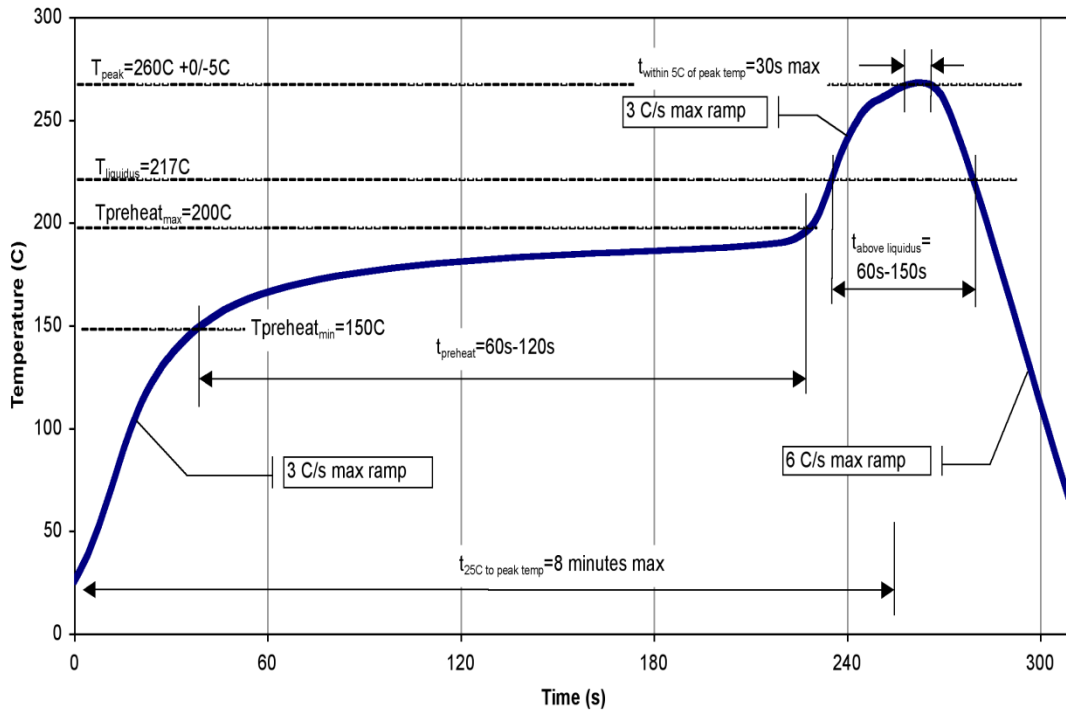
- NOTES:
- MATERIAL:
 - PACKAGE BASE: CERAMIC
 - PACKAGE LID: PLASTIC
 - ALL METALIZED FEATURES ARE GOLD PLATED.
 - PART IS EPOXY SEALED.
 - PART MARKING:
 - 2205 - PART NUMBER
 - YY - PART NUMBER YEAR
 - WW - PART ASSEMBLY WEEK
 - MXXX - BATCH ID

Dimensions are in millimeter. Tolerances are +/- 0.127 mm

Assembly Notes

- Compatible with lead-free soldering process with 260°C peak reflow temperature.
- This package is non-hermetic, and therefore cannot be subjected to aqueous washing. The use of no-clean solder to avoid washing after soldering is recommended
- Solder rework not recommended.
- Contact plating: Ni-Au

Recommended Soldering Profile



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 2	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C3	JEDEC JESD22-C101
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:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notice

The information contained herein is believed to be reliable; however, Qorvo makes no warranties regarding the information contained herein and assumes no responsibility or liability whatsoever for the use of the information contained herein. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for Qorvo products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information. **THIS INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

Without limiting the generality of the foregoing, Qorvo products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.

Copyright 2020 © Qorvo, Inc. | Qorvo is a registered trademark of Qorvo, Inc.