



# TGL2217-SM

## 0.1 – 20 GHz 10 Watt VPIN Limiter

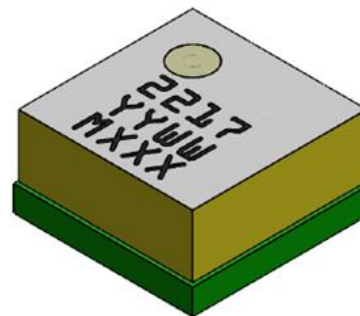
### Product Overview

Qorvo's TGL2217-SM is a packaged high power, wideband GaAs VPIN limiter capable of protecting sensitive receive channel components against high power incident signals. The TGL2217-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 TGL2217-SM operates from 0.1–20.0 GHz with low insertion loss of less than 0.9 dB. Receive protection is rated up to 10 W incident pulsed power with a low flat leakage of less than 18.5 dBm.

The TGL2217-SM is offered in a small 3.5 x 3.5 mm QFN package for simple board level assembly. Fully matched to 50 ohms on both RF ports, it is well suited for both commercial and defense related applications.

Lead-free and RoHS compliant.



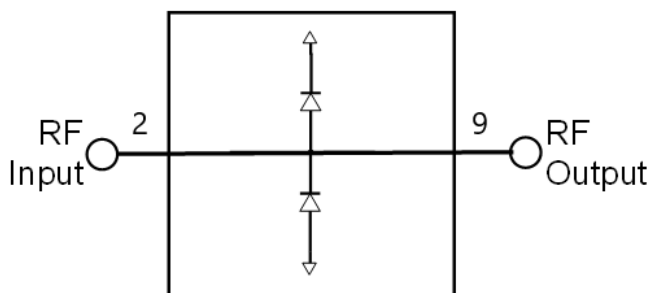
14 Pad 3.5 x 3.5 mm Air Cavity QFN Package

### Key Features

- Frequency Range: 0.1 to 20.0 GHz
- Insertion Loss: < 0.9 dB
- Peak Power Handling: 10 W (pulsed)
- Flat Leakage: < 18.5 dBm
- Spike Leakage < 20.5 dBm
- Recovery Time < 40 nS
- Passive (no DC bias required)
- QFN Package Dimensions: 3.50 x 3.50 x 1.715 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
- Electronic Warfare
- Communications

### Ordering Information

Part	Description
TGL2217-SM	0.1–20.0 GHz 10W VPIN Limiter
TGL2217-SMEVB01	0.1–20.0 GHz 10W VPIN Limiter Evaluation Board

## Absolute Maximum Ratings

Parameter	Rating
Incident Power, Pulsed, 50 $\Omega$ , 85 °C	40 dBm
Incident Power, CW, 50 $\Omega$ , 25 °C	36 dBm
Incident Power, CW, 50 $\Omega$ , 85 °C	33 dBm
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
Operating Temperature Range	-40	+25	+85	°C
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	Conditions <sup>(1)</sup>	Min	Typ	Max	Units
Operational Frequency Range		0.1		20.0	GHz
Insertion Loss	0.5 GHz		0.08	0.3	dB
	5 GHz		0.27	0.5	
	10 GHz		0.45	0.8	
	15 GHz		0.64	1.1	
	20 GHz		0.83	1.2	
Input Return Loss	0.5 GHz		39		dB
	5 GHz		26		
	10 GHz		24		
	15GHz		19		
	20 GHz		17		
Output Return Loss	0.5 GHz		40		dB
	5 GHz		26		
	10 GHz		27		
	15 GHz		18		
	20 GHz		17		
Flat Leakage Power at $P_{IN} > 30$ dBm, (CW)	2 GHz		16.7		dBm
	10 GHz		17.7		
	18 GHz		16.9		
Pulse Recovery Time			< 40		nS
Spike Leakage			20.5		dBm
Insertion Loss Temperature Coefficient			0.002		dB/ °C

## Thermal and Reliability Information

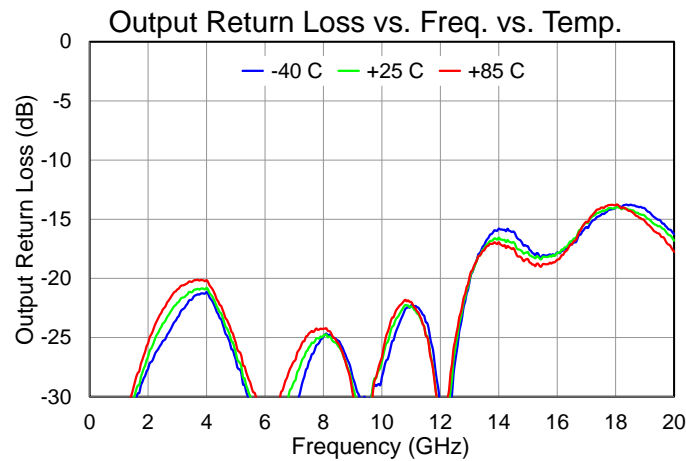
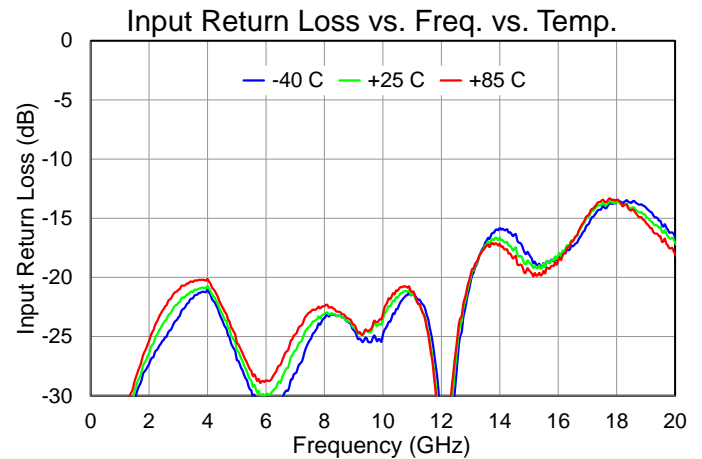
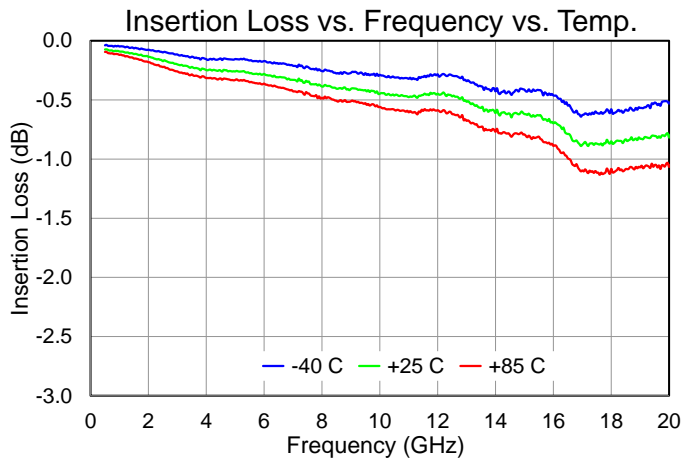
Parameter	Test Conditions	Value	Units
Incident Power <sup>(1)</sup> (RF Operational Life Test)	Frequency = 10 GHz, RF Pulsed, PW=100 $\mu$ s, DC=10%, 50 $\Omega$ , 25°C	10	W

Notes:

1. Test terminated after 168 hours. Insertion Loss remained  $\leq 1$  dB for device under test.

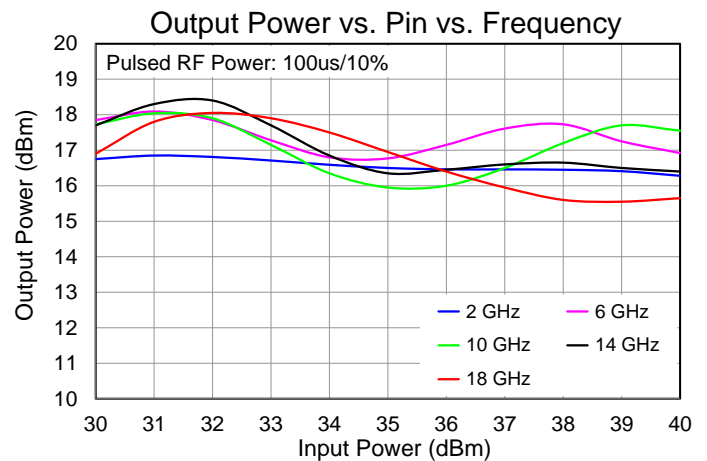
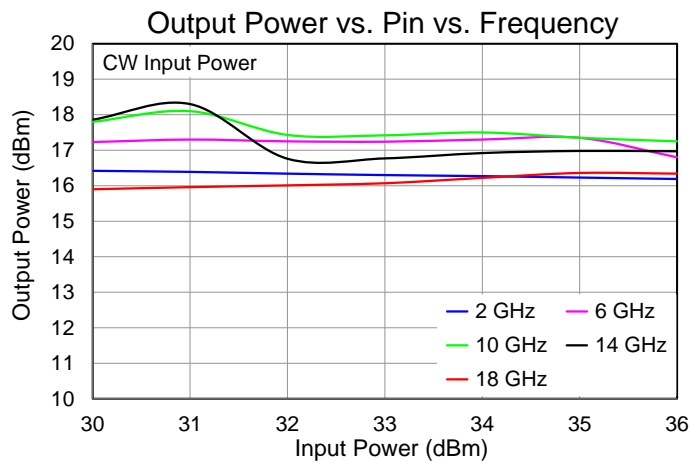
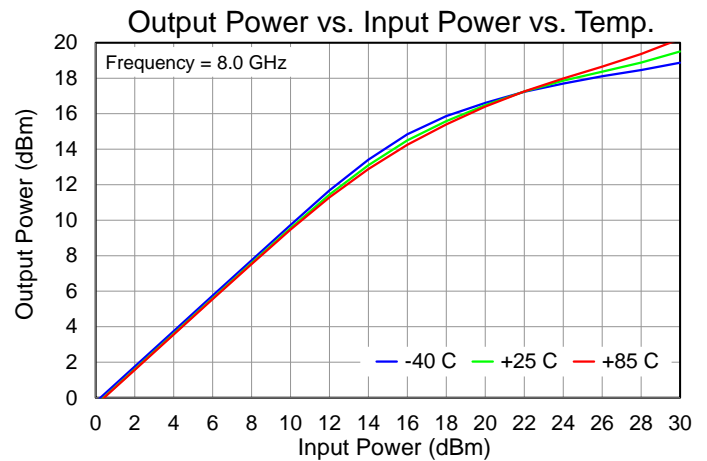
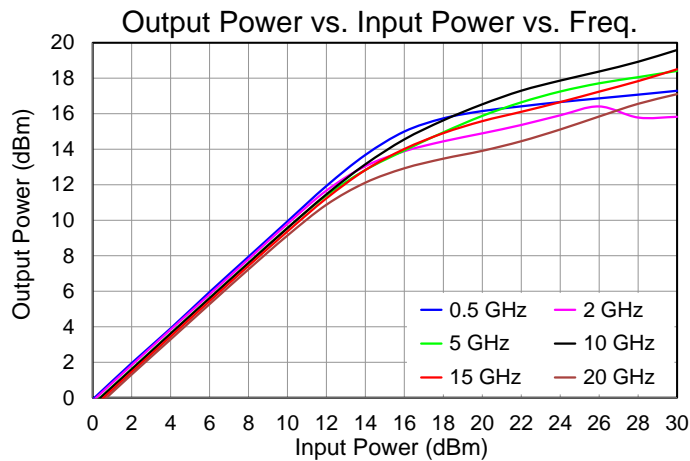
## Performance Plots – Small Signal

Test conditions unless otherwise noted: Temp.=+25 °C



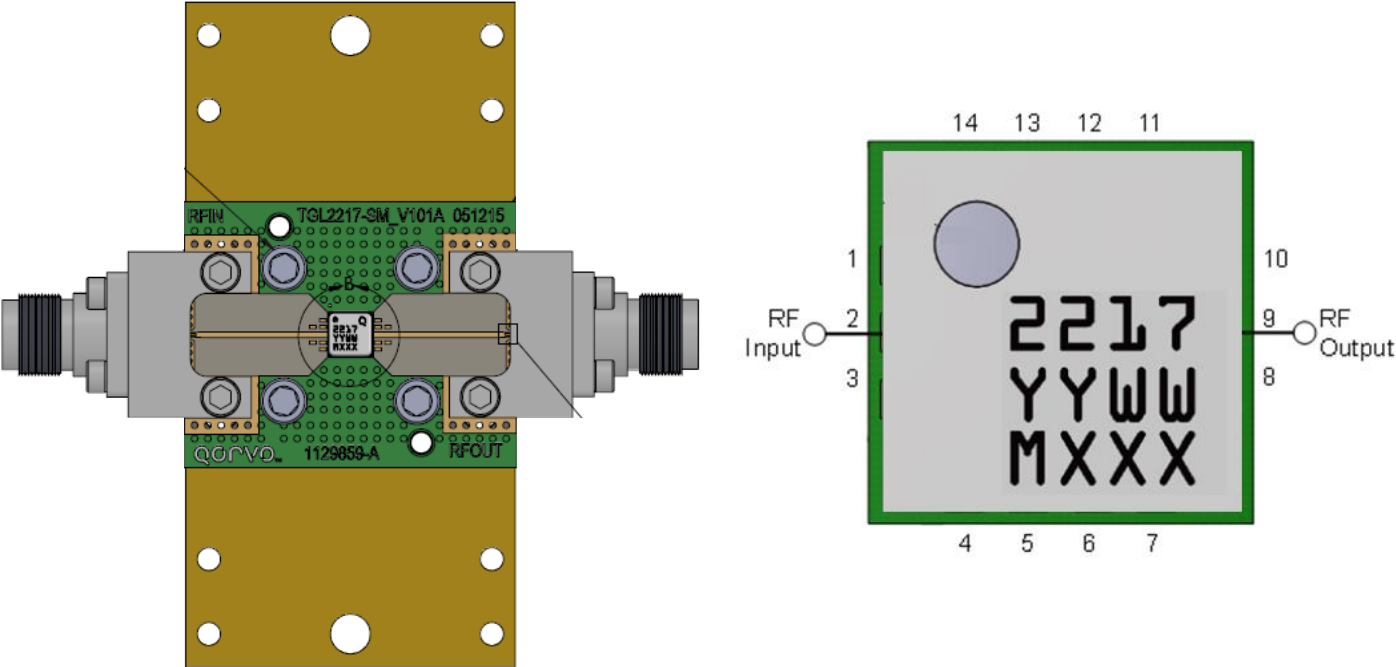
## Performance Plots – Large Signal

Test conditions unless otherwise noted: Temp.=+25 °C





Application Circuit and Evaluation Board (EVB)



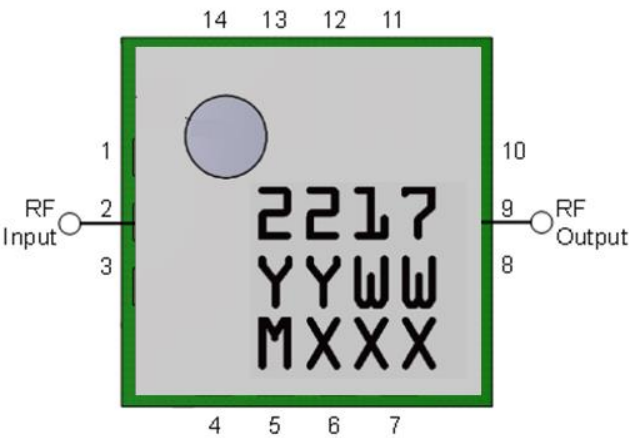
Notes:

1. See Evaluation Board PCB Information for material and stack up.

Bill of Material – EVB

Ref. Des.	Value	Description	Manuf.	Part Number
n/a	n/a	Printed Circuit Board	Qorvo	
U1	n/a	0.1 – 20 GHz 50 W VPIN Limiter	Qorvo	TGL2217-SM
J1, J2	n/a	2.92 mm End Launch Connector	Southwest Microwave	1092-01A-5

Pad Configuration and Description



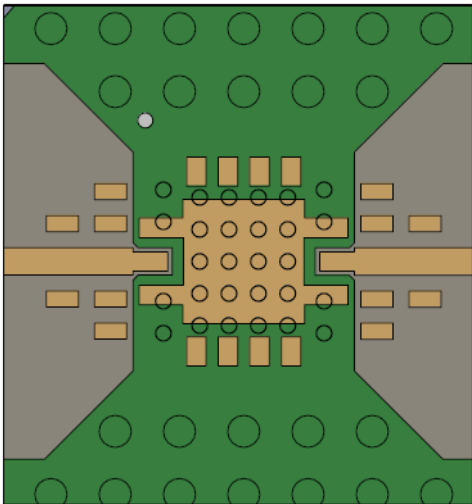
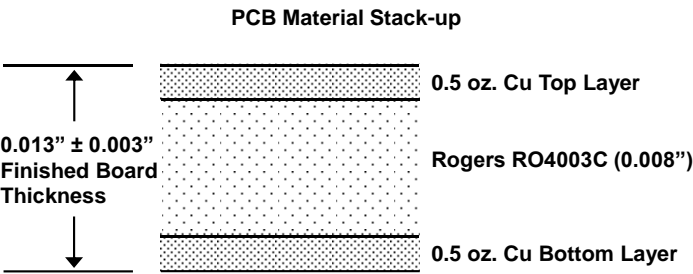
Top View

Pad No.	Label	Description
1, 3, 8, 10	GND	On PCB, multiple copper-filled vias should be employed under the center pad 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; connecting to ground may improve performance
9	RF Output	RF Output, matched to 50 Ohms, not DC blocked

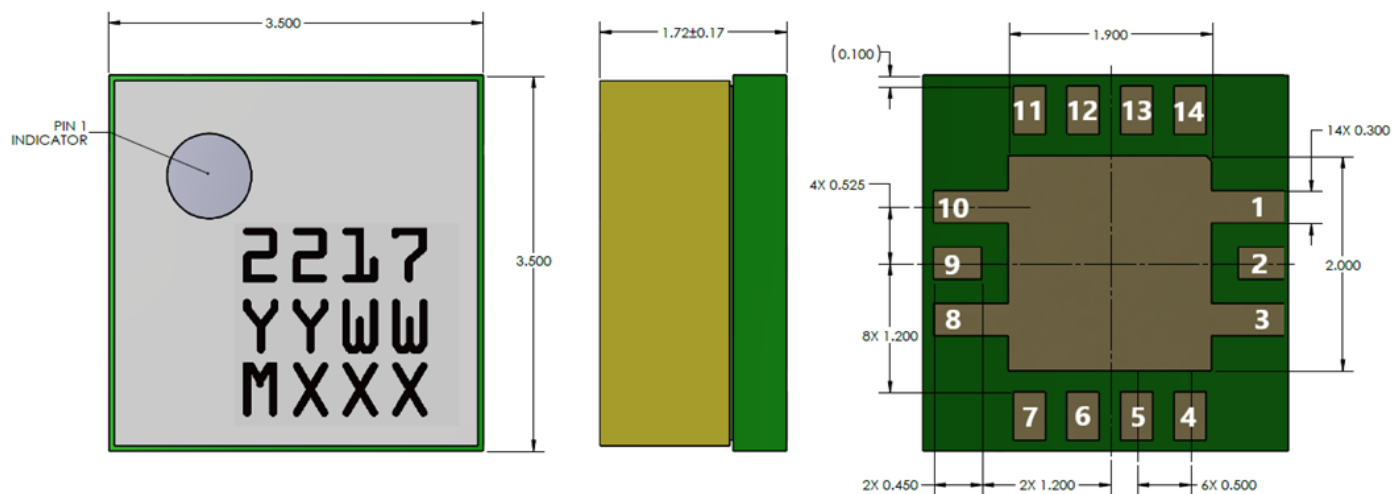
NOTE: The RF Input and RF Output ports are not interchangeable.

Evaluation Board PCB Information and Mounting Detail

EVB PC Board Layout



## Package Marking and Dimensions



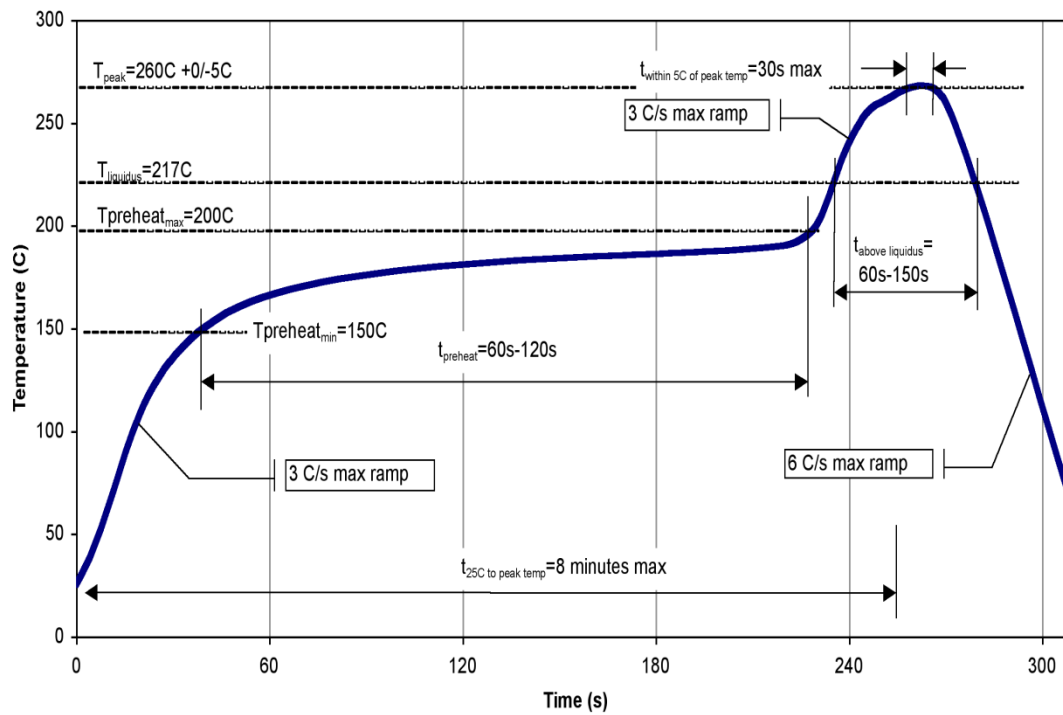
### Notes:

1. All dimensions are in millimeters. Angles are in degrees.  
Tolerances: XX =  $\pm .25$   
XXX =  $\pm .100$
2. Package Base: Laminate
3. Package Lid: FR4
4. All Metalized Features Are Gold Plated.
5. The Part Is Epoxy Sealed
6. Part Marking:  
2217: Part Number  
YY: Part assembly Year  
WW: Part Assembly Week  
MXXX: Batch ID

## 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 3B	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
- Antimony Free
- TBBP-A (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free

## Contact Information

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

Web: [www.qorvo.com](http://www.qorvo.com)

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Email: [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

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