TGL2217-SM

0.1 – 20 GHz 10 Watt VPIN Limiter

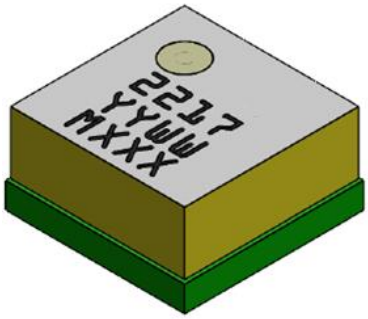
Product Overview

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.



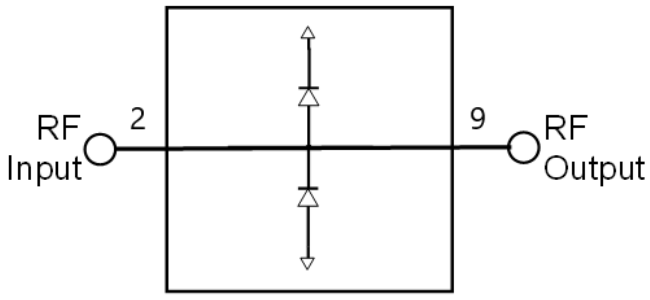
14 Pad 3.5 x 3.5 mm Air Cavity QFN Package

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 1.640 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-SMTR7	0.1–20.0 GHz 10W VPIN Limiter 500 Piece 7" Reel
TGL2217-SMEVB01	Evaluation Board

Absolute Maximum Ratings

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

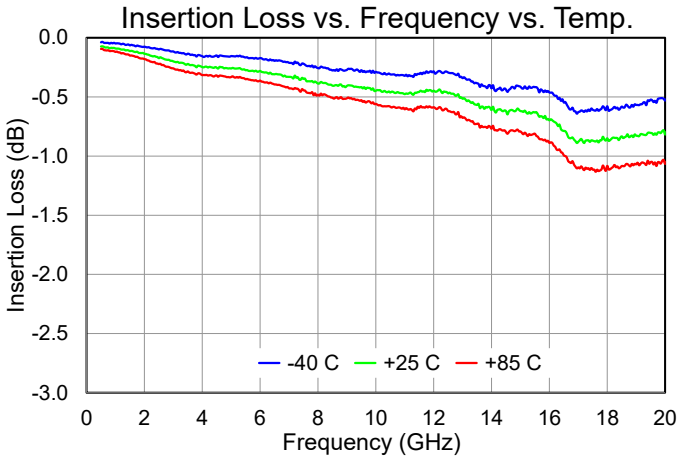
Thermal and Reliability Information

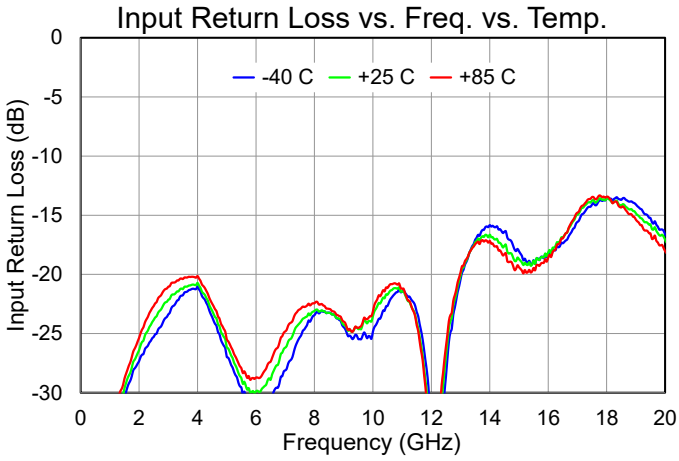
Parameter	Test Conditions	Value	Units
Incident Power (1) (RF Operational Life Test)	Frequency = 10 GHz, RF Pulsed, PW=100 µs, DC=10%, 50 Ω, 25°C	10	W

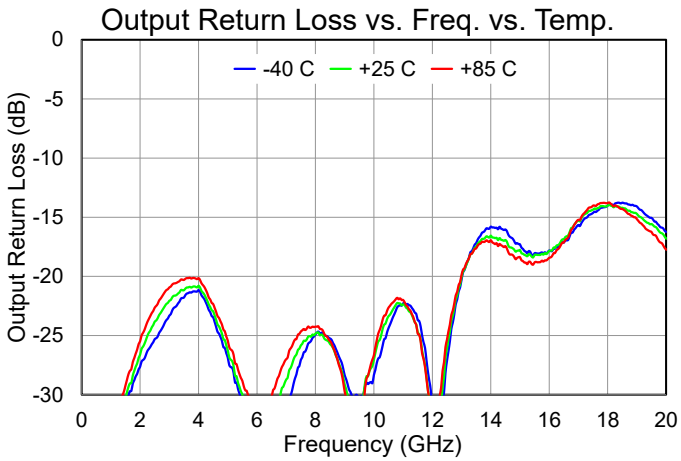
Notes:
1. Test was terminated after 168 hours. Insertion Loss remained ≤ 1 dB for device under test.

Performance Plots – Small Signal

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

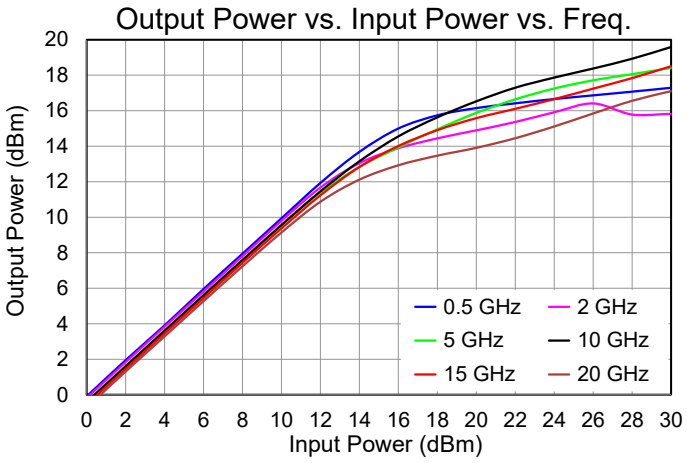


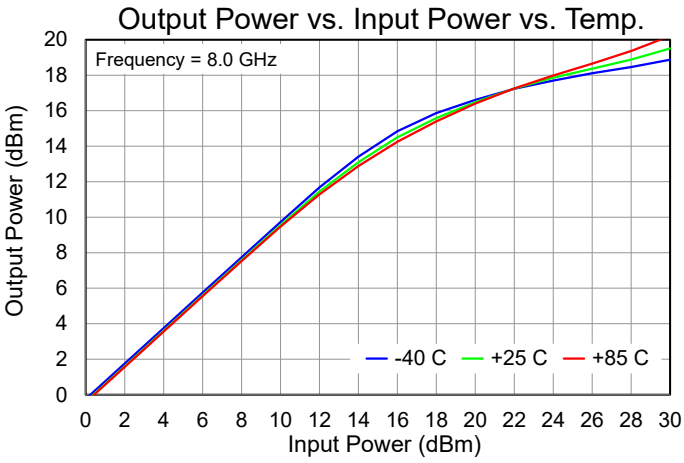


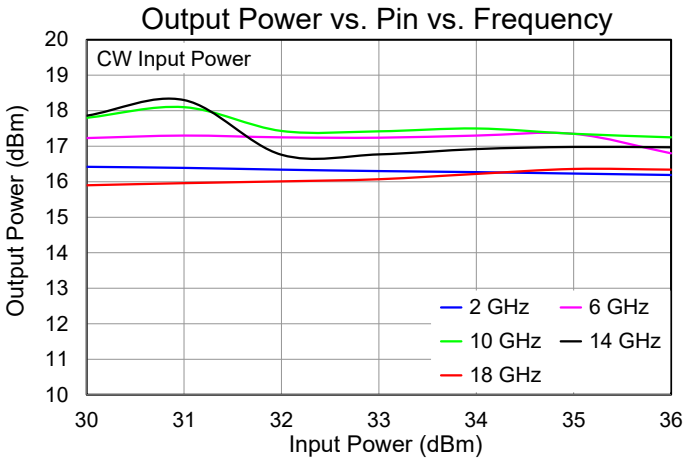


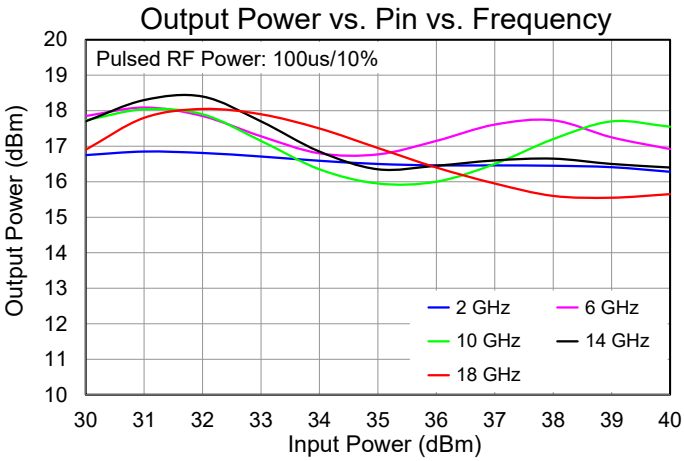
Performance Plots – Large Signal

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

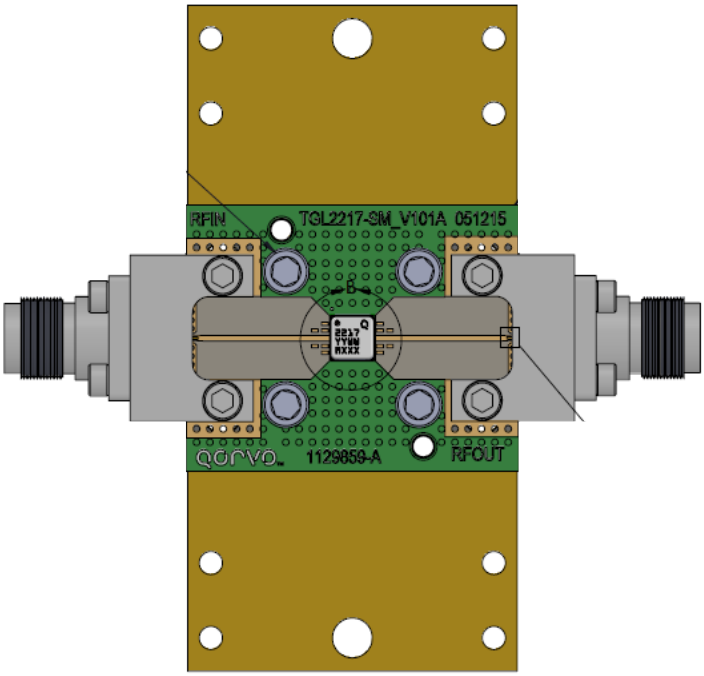








Application Circuit and Evaluation Board (EVB)



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

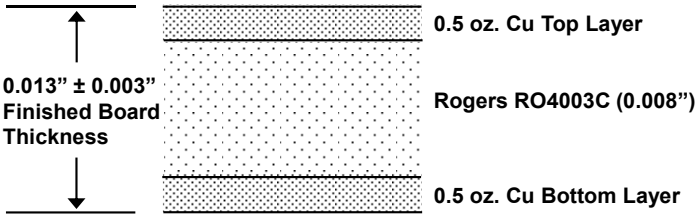
Bill of Material – EVB

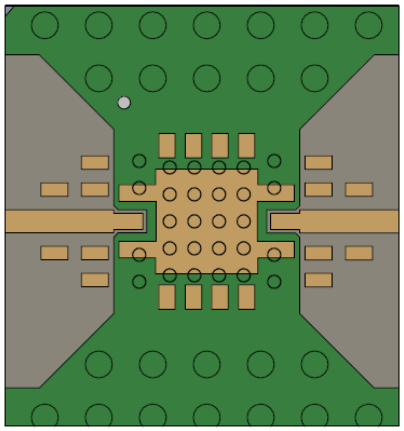
Ref. Des.	Value	Description	Manuf.	Part Number
n/a	n/a	Printed Circuit Board	Qorvo	
U1	n/a	0.1 – 20 GHz 50 W VPIN Limiter	Qorvo	TGL2217-SM
J1, J2	n/a	2.92 mm End Launch Connector	Southwest Microwave	1092-01A-5

Evaluation Board PCB Information and Mounting Detail

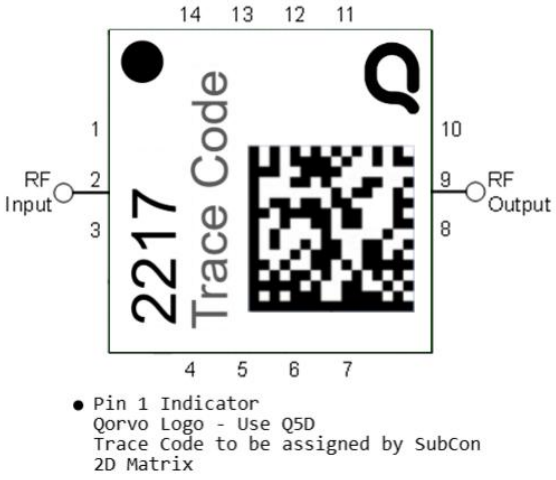
EVB PC Board Layout

PCB Material Stack-up





Pad Configuration, Description and Marking

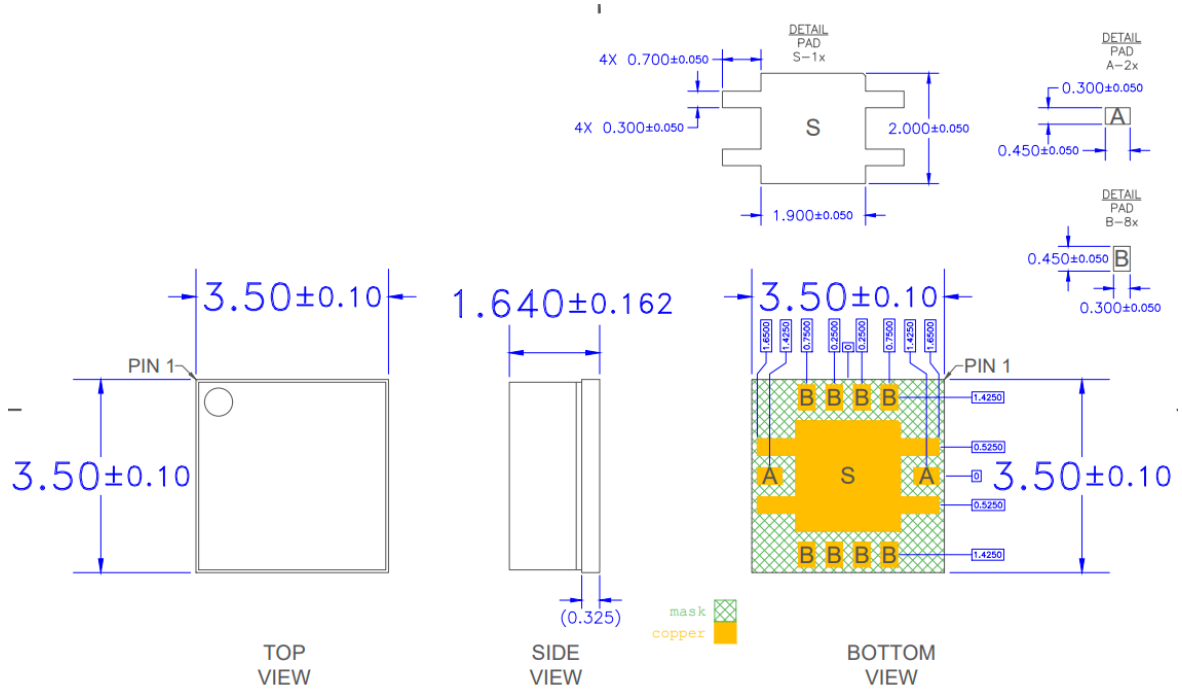


Top View

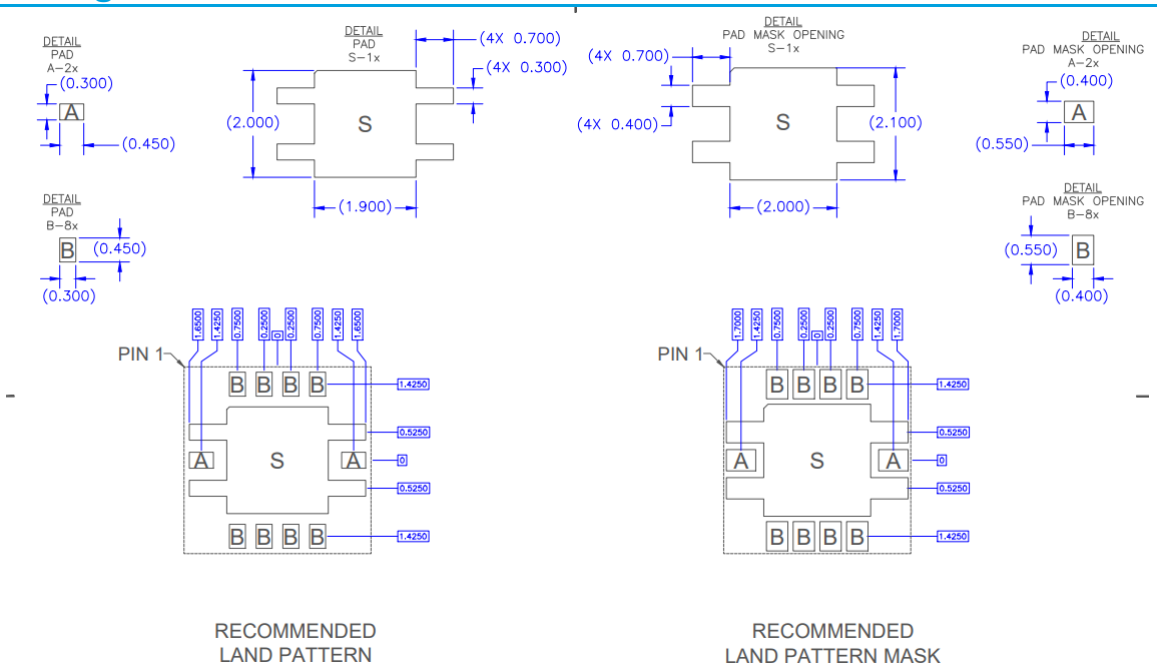
Pad No.	Label	Description
1, 3, 8, 10	GND	On PCB, multiple copper-filled vias should be employed under the center pad to minimize inductance and thermal resistance
2	RF Input	RF Input, matched to 50 Ohms, not DC blocked
4–7, 11–14	NC	No connection: connecting to ground may improve performance
9	RF Output	RF Output, matched to 50 Ohms, not DC blocked

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

Mechanical Information



PCB Mounting Pattern



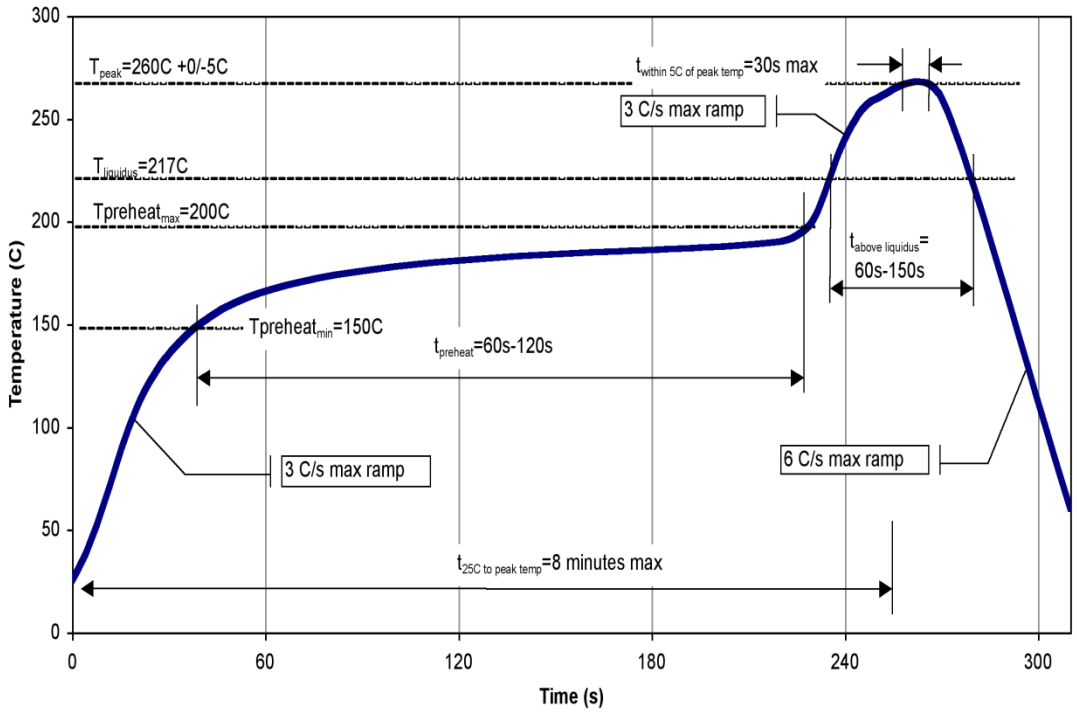
Notes:

1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the Qorvo evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

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
- 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 ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free

Contact Information

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

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