TGL2207–SM

2.0 – 6.5 GHz 100 Watt VPIN Limiter

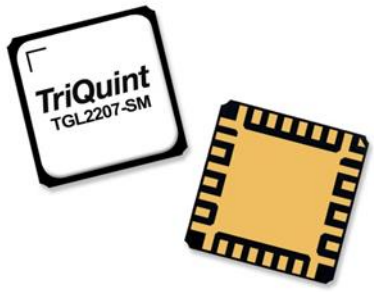
Product Overview

The Qorvo TGL2207-SM is a high power, wideband GaAs VPIN limiter capable of protecting sensitive receive channel components against high power incident signals. The TGL2207-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 TGL2207-SM operates from 2.0 to 6.5 GHz with low insertion loss of less than 1.0 dB. It can limit up to 100 W incident pulsed-power with a low flat leakage of less than 15.5 dBm.

The TGL2207-SM is offered in a 5 x 5 mm air-cavity QFN packaged limiter comprised of a ceramic base with a plastic epoxy-sealed lid. It is well suited for both commercial and defense related applications.

Lead-free and RoHS compliant.

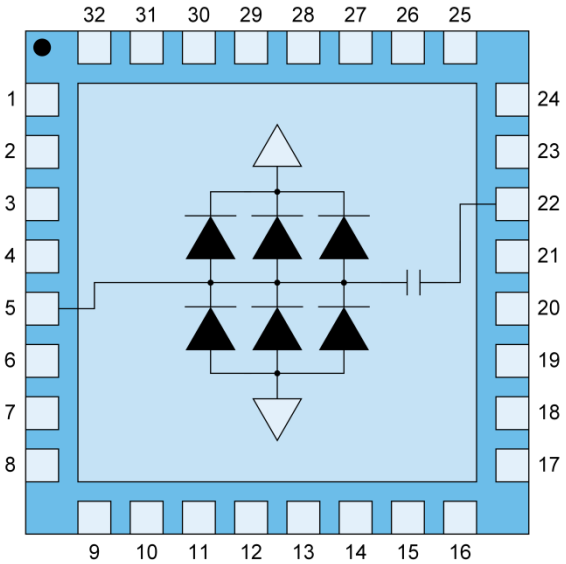


32 Pad 5 x 5 mm QFN Package

Key Features

- Frequency Range: 2.0 to 6.5 GHz
- Insertion Loss: < 1.0 dB
- Peak Power Handling: 100 W (pulsed)
- Flat Leakage: < 15.5 dBm
- Spike Leakage < 16.0 dBm
- Recovery Time: < 115 ns
- Passive (no DC bias required)
- Integrated DC Block on output
- Package Dimensions: 5.00 x 5.00 x 1.45 mm

Functional Block Diagram



Top View

Applications

- Receive Chain Protection
- Commercial and Military Radar

Ordering Information

Part	Description
TGL2207–SM	2.0–6.5 GHz 100W VPIN Limiter

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	70 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 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

Test conditions unless otherwise noted: 25 °C, Tuned EVB Results

Parameter	Min	Typical	Max	Units
Operational Frequency Range	2.0		6.5	GHz
Insertion Loss		< 1.0		dB
Input Return Loss		15		dB
Output Return Loss		15		dB
Flat Leakage Power at P_{IN} > 30 dBm		< 15.5		dBm
Pulse Recovery Time		< 115		ns
Spike Leakage		< 16.0		dBm
Insertion Loss Temperature Coefficient		0.003		dB/ °C

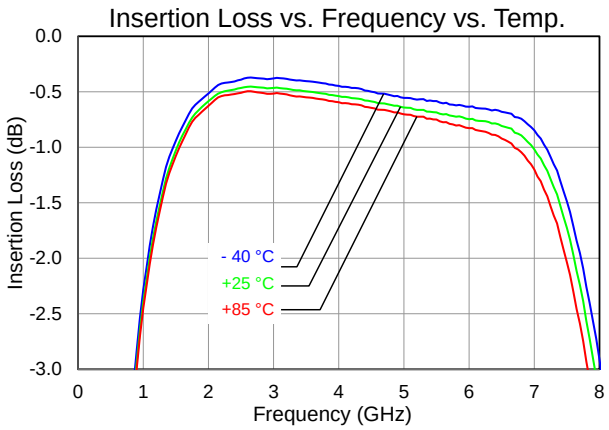
Thermal and Reliability Information

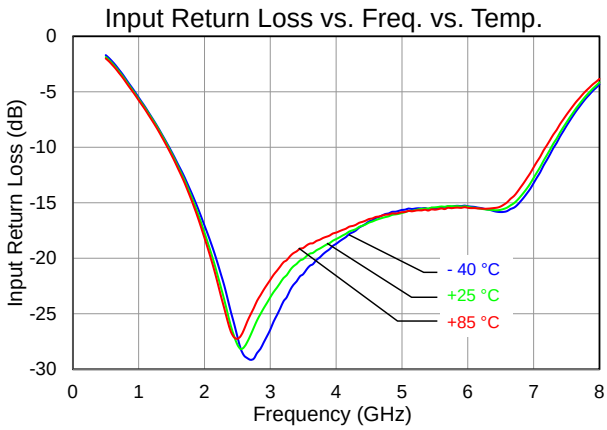
Parameter	Test Conditions	Value	Units
Incident Power (168 Hours RF Operational Life Test (1))	Frequency = 4.5 GHz, CW, 50 Ω, 25 °C	31	W
	Frequency = 4.5 GHz, Pulsed, PW=10 us, DC=10%, 50 Ω, 25 °C	100	W

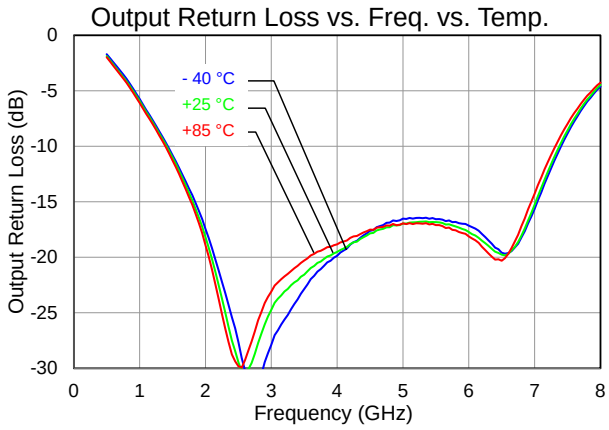
Notes:
1. Test terminated after 165 hours. Insertion Loss remained ≤ 1 dB for device under test.

Performance Plots – Small Signal – Tuned EVB Performance

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

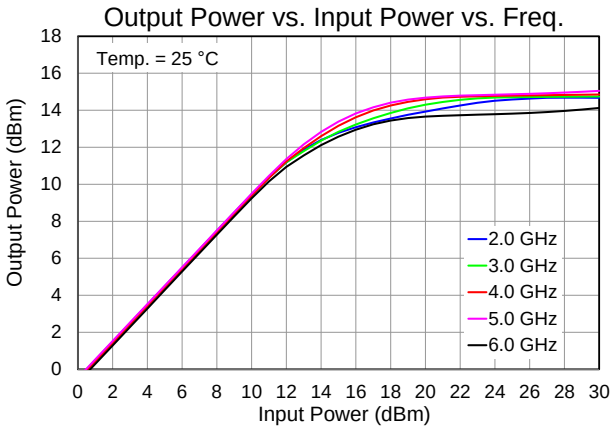


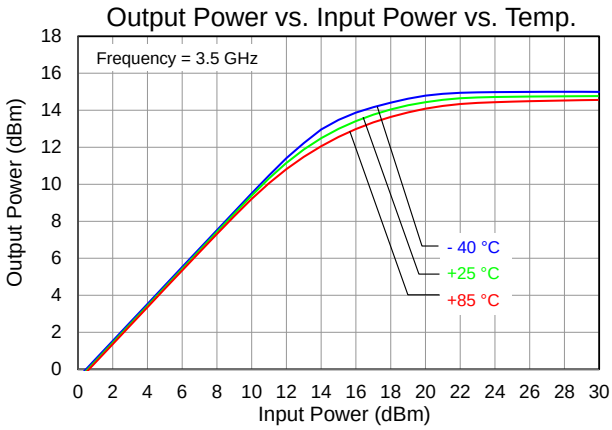


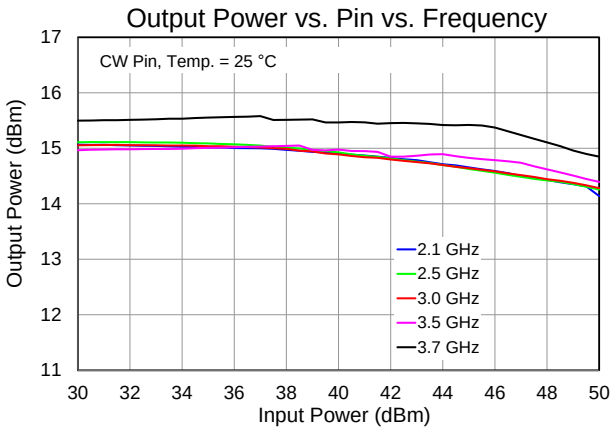


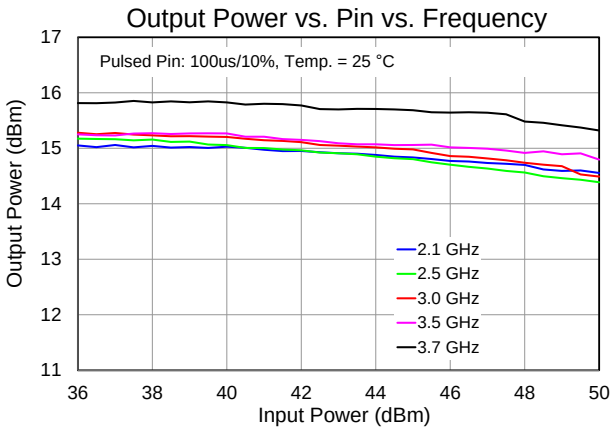
Performance Plots – Large Signal – Tuned EVB Performance

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

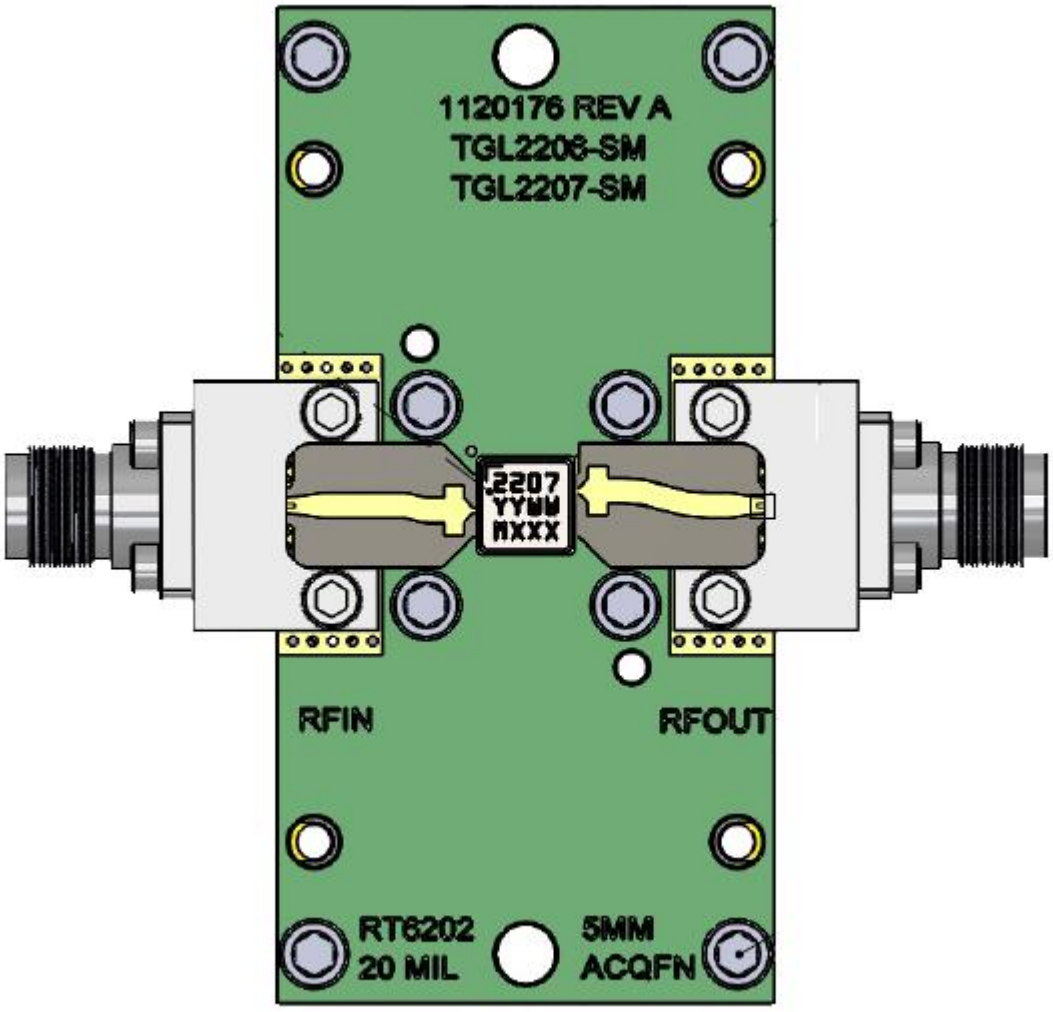








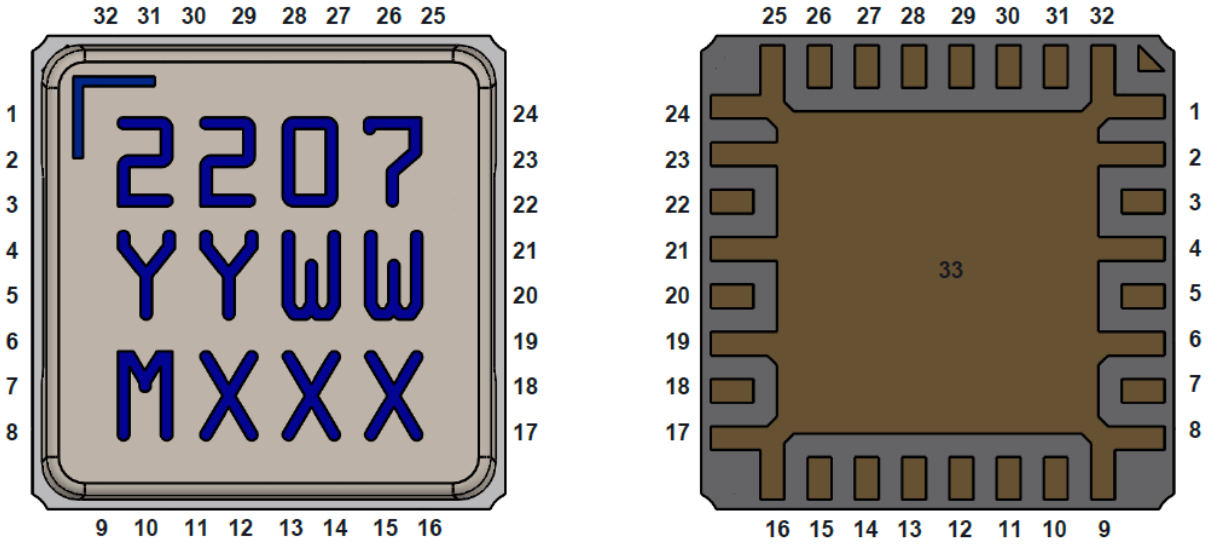
Application Information and Evaluation Board (EVB) Layout



RF layer is 0.020” thick Rogers RO6202, εr = 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.

The pad pattern shown has been developed and tested for optimized assembly at Qorvo Semiconductor. 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.

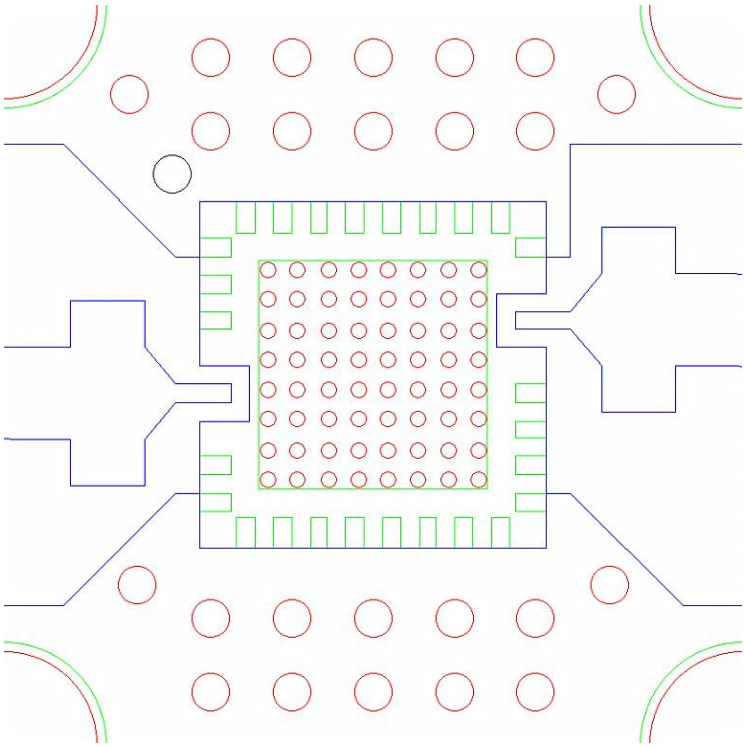
Pad Configuration and Description



Pad No.	Label	Description
1, 2, 4, 6, 8, 9, 16, 17, 19, 21, 23, 24, 25, 32	GND	On PCB, multiple vias should be employed under the center pad (33) to minimize inductance and thermal resistance; see page 7 for suggested mounting configuration.
3, 7, 10-15, 18, 20, 26-31	NC	No connection; may be grounded if desired
5	RF Input	RF Input, matched to 50 Ohms, not DC blocked
22	RF Output	RF Output, matched to 50 Ohms, DC blocked

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

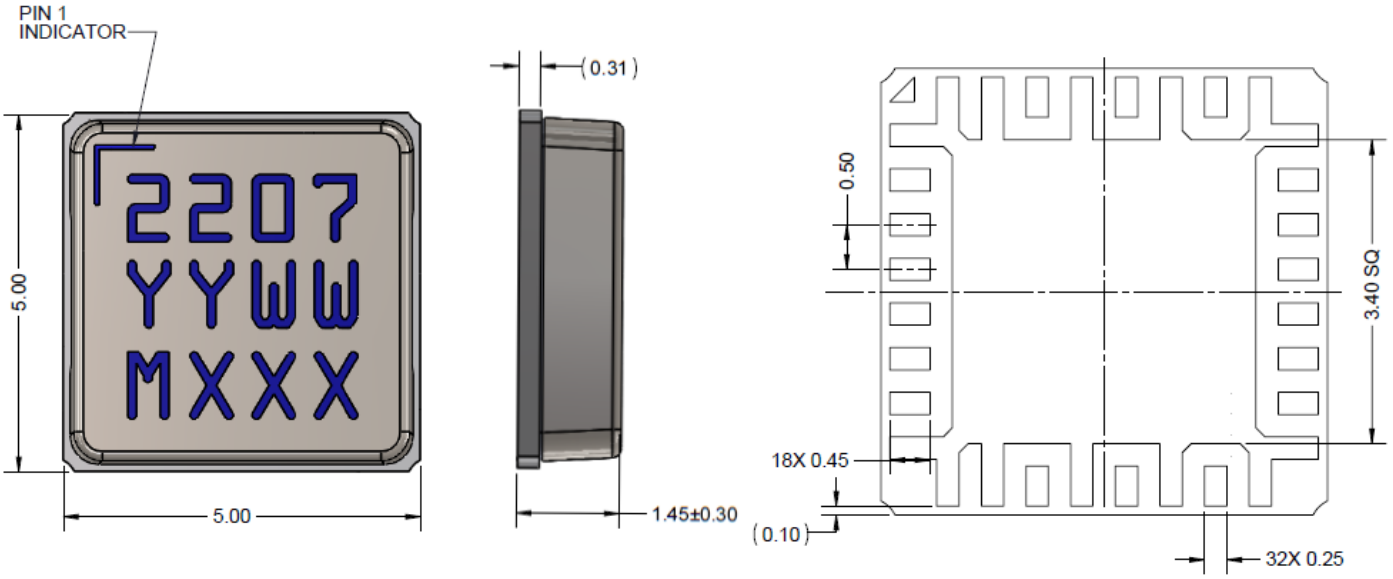
Evaluation Board PCB Mounting Detail



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 (8 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.

Package Marking and Dimensions



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
TOLERANCE IS +/- 0.25

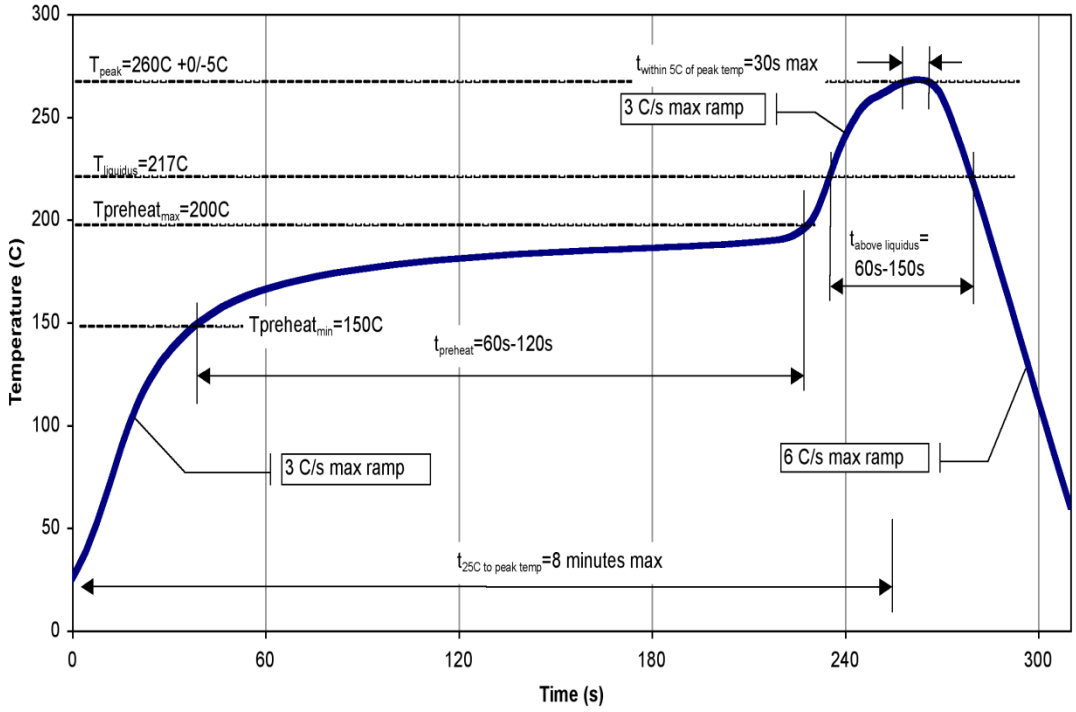
NOTES:

1. PACKAGE BASE: CERAMIC
2. PACKAGE LID: PLASTIC
3. ALL METALIZED FEATURES ARE GOLD PLATED
4. THE PART IS EPOXY SEALED
5. PART MARKING:
   2207: PART NUMBER
   YY: PART ASSY YEAR
   WW: PART ASSY WEEK
   MXXX: BATCH ID

Solderability

1. Compatible with the latest version of J-STD-020, Lead-free solder, 260° C.
2. The use of no-clean solder to avoid washing after soldering is recommended.
3. The package base is ceramic and the plating material on the leads is gold over nickel (Au-Ni).

Recommended Soldering Profile



Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	TBD	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	TBD	JEDEC JESD22-C101F
MSL – Moisture Sensitivity Level	TBD	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 ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Contact Information

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