

RF565 Package Mounting

Mechanical Mounting and PCB Considerations

Introduction

This document provides application information for mounting the RF565 package to a metallic baseplate, as well as the requirements placed on the circuit board for intended operation. For optimal RF performance, as well as to achieve the advertised Median Lifetime, consistent and optimal heat removal from the base of the package is required. The application note covers mechanical mounting and PCB considerations for thermal management and reliable operation of the component.

Cavity Design Considerations

The recessed pocket must conform with the necessary tolerance stack for the package as shown in product outline drawing. The pocket depth should ensure that 0 – 15mils of spacing exists between the PCB and the lead underside (Un-dipped), as shown in Figure 1. The flatness of the heatsink must be well controlled and should have a surface finish no rougher than 32 micro inches. The heatsink and the back of the flange surfaces should be free of debris/contaminants. Ensure that the device mounting holes are fully deburred.

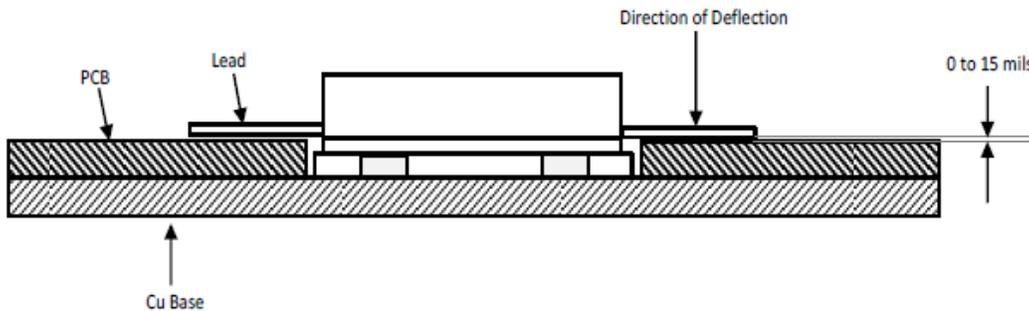


Figure 1. Pocket depth of the cavity to ensure 0 – 15 mils spacing between lead underside and PCB top.

Board Design Considerations

To provide optimal stress relief to the leads to form a reliable joint, certain recommendations are provided for the board design. The solder must be pulled back from the edge of copper pad, as shown in Figure 2 by distance A (20 mils nominal). There should be no solder on top of the lead between the solder joint and package (left side of solder joint in picture shown in Figure 2). A visible gap should also exist between the PCB substrate and the package, and should be inspected to be free of contaminants, as shown by distance B (5–10mils).

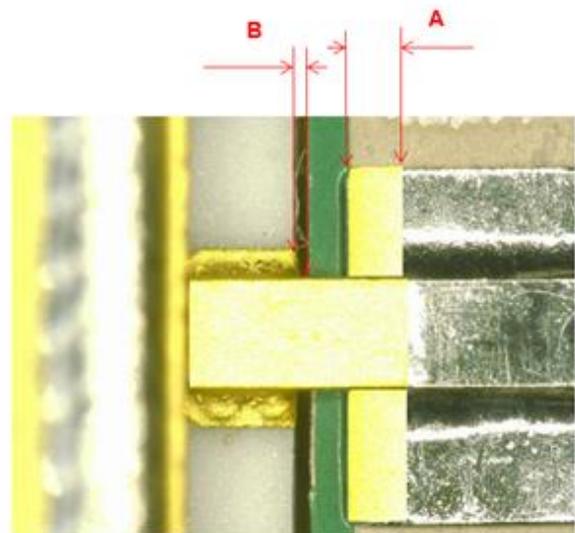


Figure 2. Distances A and B showing recommended solder pullback and gap between device and PCB.

The last requirement stems from the fact that there is metallization under the lead to provide mechanical stability and improved lead adhesion, and this places further pullback requirements on any inner copper layers that the PCB might have. Figure 3 to the right shows that. The pad size onto which the leads are soldered should extend out beyond the length and width of the lead by a minimum of 10 mils.

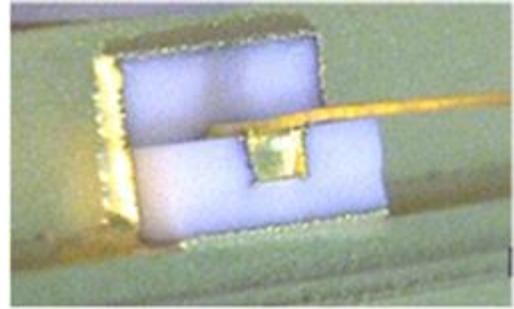


Figure 3. Metallization under the lead.

Thermal Interface Guidelines

A thermal interface material must be used to help ensure good thermal contact with no voiding between the package and the board level heat sink. Qorvo recommends the use of Indium shims or Indium Corporation's Heat Spring® thermal interface material (P/N: 85533) between the package and baseplate for effective heat transfer away from the device. This is a 4-mil thick corrugated shim which is made from Indalloy® 4, an alloy with 99.99% indium content. This material provides thermal conductivity of 83.7 W/m.K at 0 °C and conforms to the surface irregularities of both mating surfaces, owing to its compressible nature. Thermal grease/solder can be used but caution needs to be taken to insure void free attach.

Package Mounting Instructions

After the placement of thermal interface in the baseplate cavity, the part can be placed in the recess. The part must be centered in the cavity so as to provide equal gap between the package and PCB on both input and output side of the device. The flange is to be mounted using 4x #2-56 socket head cap screws with washers. Screw the flange in position with four screws in the order of top left, bottom right, top right and bottom left. Avoid providing excessive torque while mounting the device to prevent bowing to the package and/or possible damage to the flange.

Lead Soldering Recommendations

Gold within the solder joint should not exceed a percentage by volume where gold embrittlement can occur – Qorvo recommendation is less than 4%. Recommended solder attach method is to print Sn/Pb or SAC305 solder using a 0.006" thick stainless steel stencil. The lead tips can be pre-dip into a solder pot of Sn/Pb solder paste to avoid embrittlement.

Reflow Profile Recommendation

- Preheat the board to 150 °C and hold for 1 minute until stabilized.
- The correct temperature profile is achieved based upon a clear understanding of total mass of the assembly used to determine the belt speed, peak temperature of the reflow furnace.
- Maximum time above liquidus temperature should be no greater than 90 seconds, typically 30 to 60 seconds.
- Maximum time above 150 °C should be no greater than 5 minutes.

Typical solder reflow profile for Sn/Pb solder:

- Ramp up time 25 °C to 100 °C = 100 seconds.
- 100 °C to 225 °C = 100 seconds.
- 225 °C Peak temperature hold 30 to 60 second.
- Ramp down time from 225 °C to 50 °C 100 seconds.
- Total profile time @ 350 seconds.

Additional Information

For information on ESD, Soldering Profiles, Packaging Standards, Handling and Assembly, please contact Qorvo for general guidelines.

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

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