Sweat Soldering Assembly Process for Printed Circuit Boards
OVERALL DESIGN
The objective of this application note is to provide users of Wolfspeed RF transistors a guide on the assembly process used by Wolfspeed to assemble RF application fixtures. The process consists of using a sweat soldering process to reliably attach a bare PCB to heat sink without producing air gaps/voids which could result in poor electrical grounding.

TOOLS, MATERIAL AND EQUIPMENT LIST
Below is a list of suggested equipment that is used to assemble the test fixtures at Wolfspeed. Similar equipment can be substituted where applicable.

• Kester EM907 solder paste
• Utility knife or equivalent sharp edge
• Razor
• Press plate
• Polyester wipes
• 3/32 Screwdriver
• Soldering iron
• Solder wick
• 4-40 screws

PROCESS
Before beginning the assembly process, it is important during the design and layout of PCB that alignment holes are included on both the PCB and heat sink. These will later be used during the assembly to make sure good contact is made between the two at the desired location. A press plate should also be manufactured (which is re-useable) to be used to apply pressure to the PCB and heat sink to remove excess solder as illustrated in the steps below.

1. Apply a thin layer of Kester EM907 solder paste to the heatsink where the PCB will be attached. A razor or sharp edge should be used to make sure the paste is applied evenly across the plate as shown in Figure 1.
2. Place PCB on heat sink making sure it is oriented correctly and alignment holes match. Place the press plate on top of the PCB and hand tighten together using 4-40 screws as shown in Figure 2. Remove any excessolder on the sides using polyester wipes.

3. Place mated fixture on hotplate with the screw side up. Heat hotplate up to 260°C or higher to allow the solder to start flowing.

4. Once the solder starts to flow begin to tighten the screws slowly allowing for the excess solder to be pushed through the side of the PCB. This will help remove voids. Wipe any solder around the mated unit using polyester wipes.

5. Remove the mated unit from the hotplate and allow it to cool down slightly. Once it has cooled slightly but still warm, remove the screws holding it together. Use a utility knife to carefully remove the press plate from PCB as shown in Figure 3.
6. Once apart use a soldering iron and soldering wick to clean up any paste or solder that flowed off the traces as shown on Figure 4. The finished product will look like Figure 5 after any additional machining is complete.