

# Hand Soldering Surface Mount VCSEL Array to PCB

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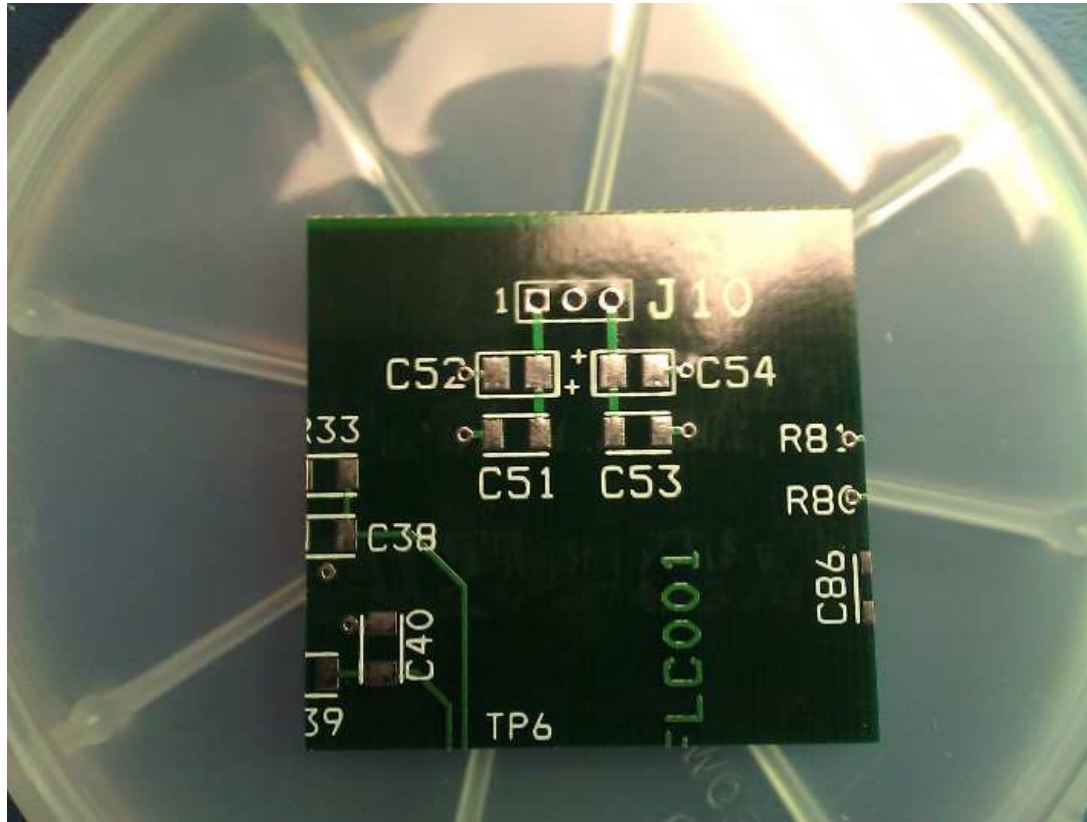
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Note: The information contained within this document is only intended to be a guide for soldering VCSEL surface mount arrays by hand for testing or research purposes. It is not intended to be a guide for soldering in an assembly manufacturing process.

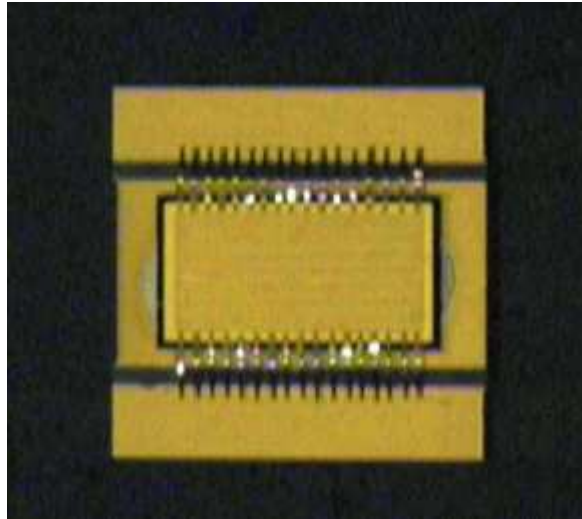


The purpose of this presentation is to provide a step-by-step example of how to hand solder the VCSEL device to a Printed Circuit Board (PCB). This example is to provide basic guidelines. Certain aspects may differ depending on your specific setup (size of soldering iron, size of PCB, etc). Use caution when performing the soldering process as the VCSEL laser can be damaged by excessive heat.

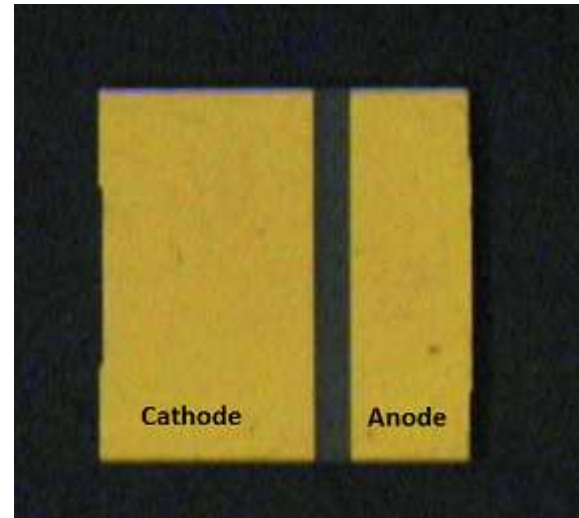
The person who is performing this process should already have good soldering skills, and experience with soldering small components on a PCB. This guide is not meant as an instruction to learn how to solder. Please perform the soldering in a well lighted and well ventilated area. Safety should be the highest priority when performing this process. Princeton Optronics is not responsible for any damage or injury occurring during this process.



1. This PCB will be used to demonstrate the hand-soldering technique. We use pads **C54**. The pads are not exact match for the VCSEL array but are good for demonstration purposes.



VCSEL Top View



VCSEL Bottom View

2. The above photos show a standard VCSEL-on-submount device. The underside of the VCSEL device has two electrical pads to connect to the anode and the cathode of the VCSEL. As some devices may have different electrical pad layouts to what is pictured, always consult the product data sheet or contact Princeton Optronics if unsure.



3. The solder that will be used in this example is a 44 rosin core Sn63Pb37 eutectic solder.



4. The soldering Iron is set to 700 °F (370 °C) as shown on the left dial of the soldering iron controller. This high temperature is necessary to increase the temperature of the local solder pad with minimal dispersion of the heat.

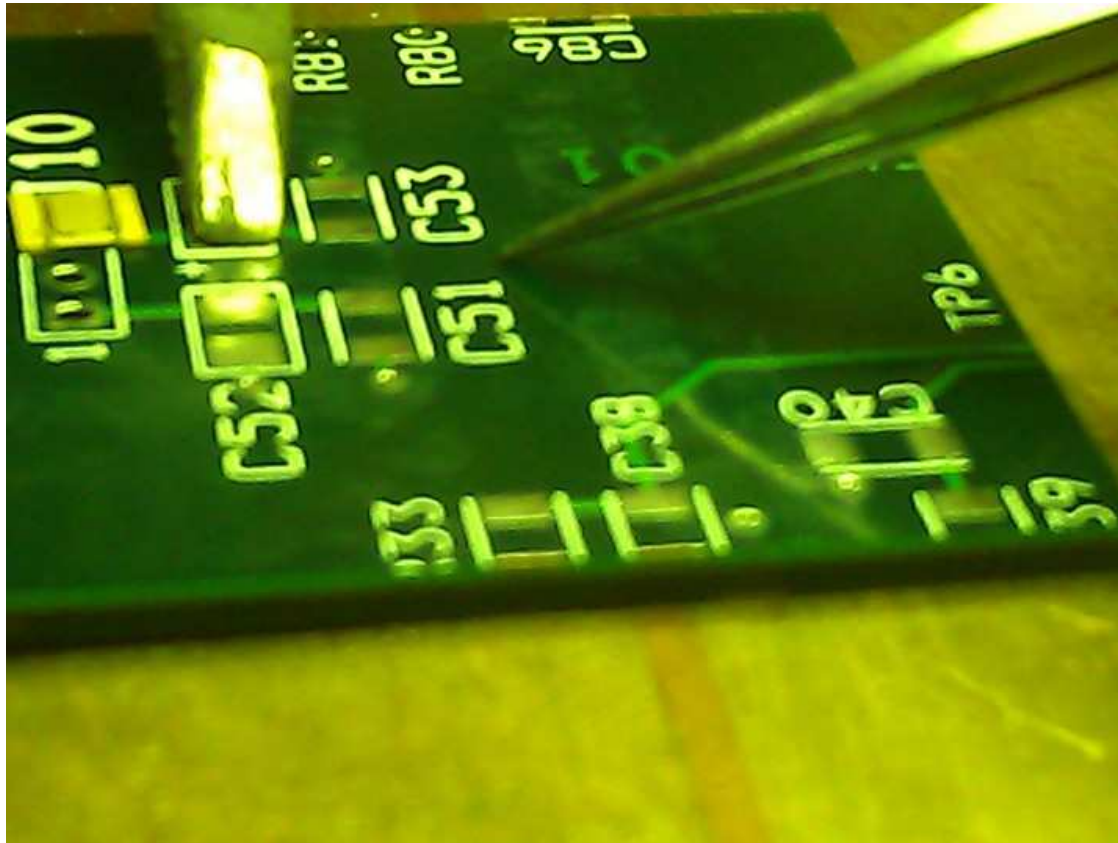


5. A small heating plate is used for work surface. The temperature is set to  $100 \pm 10$  °C. Elevating the temperature of the PCB solder pads will assist the solder to reach melting point.

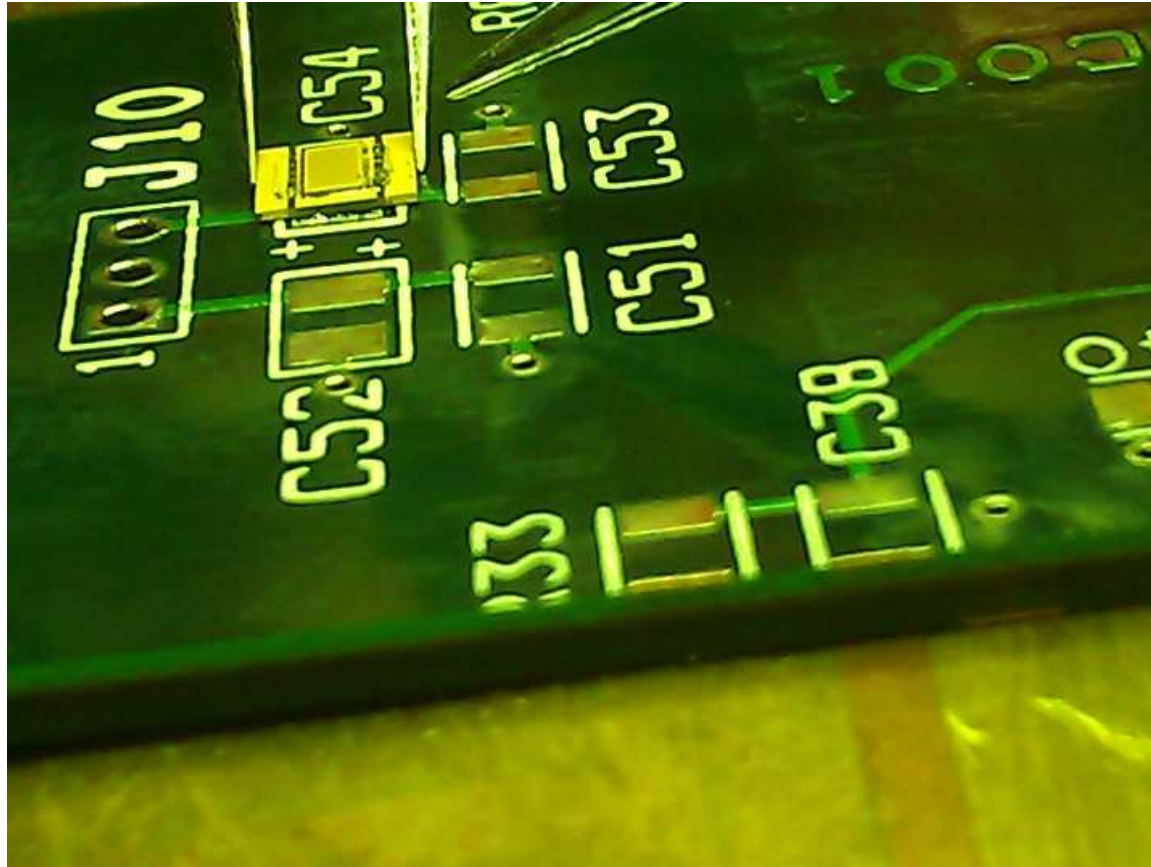


6. Place the PCB on the heating plate. Wait a few minutes for the PCB to warm up.

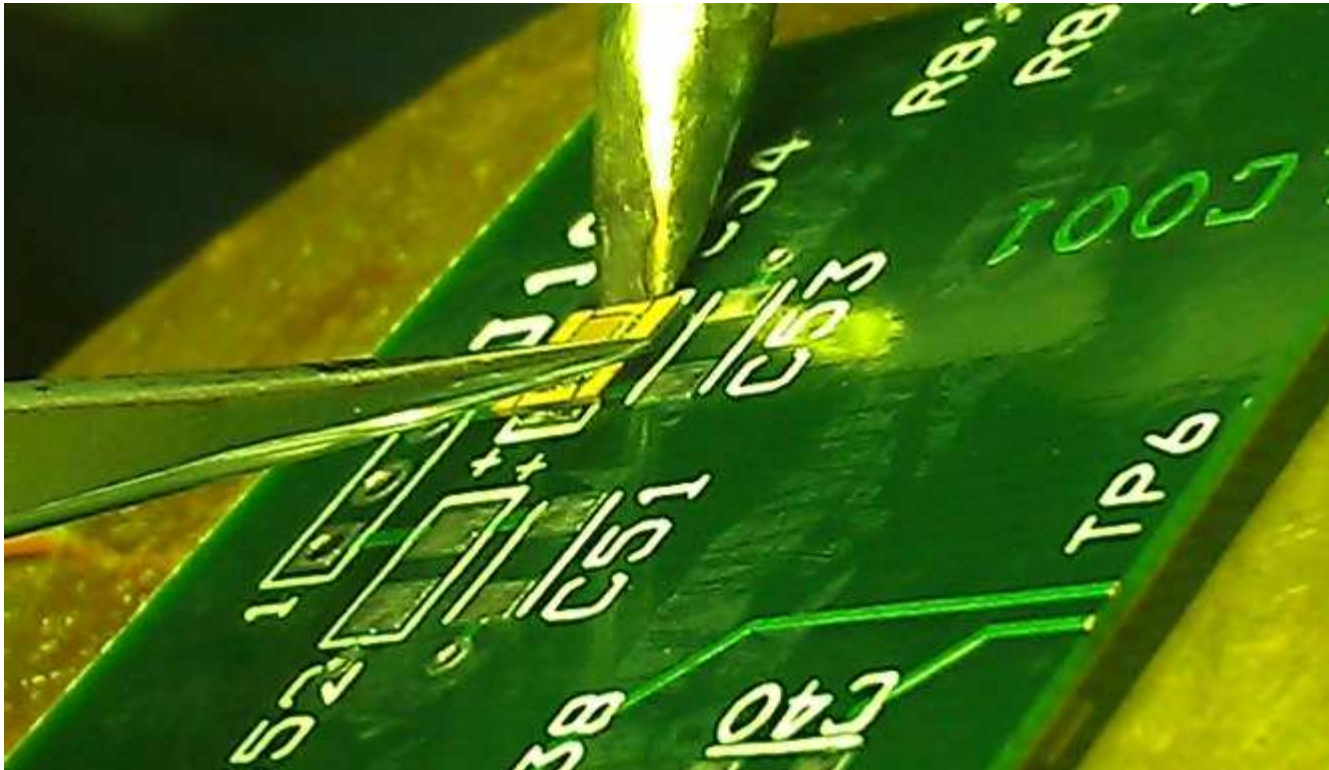




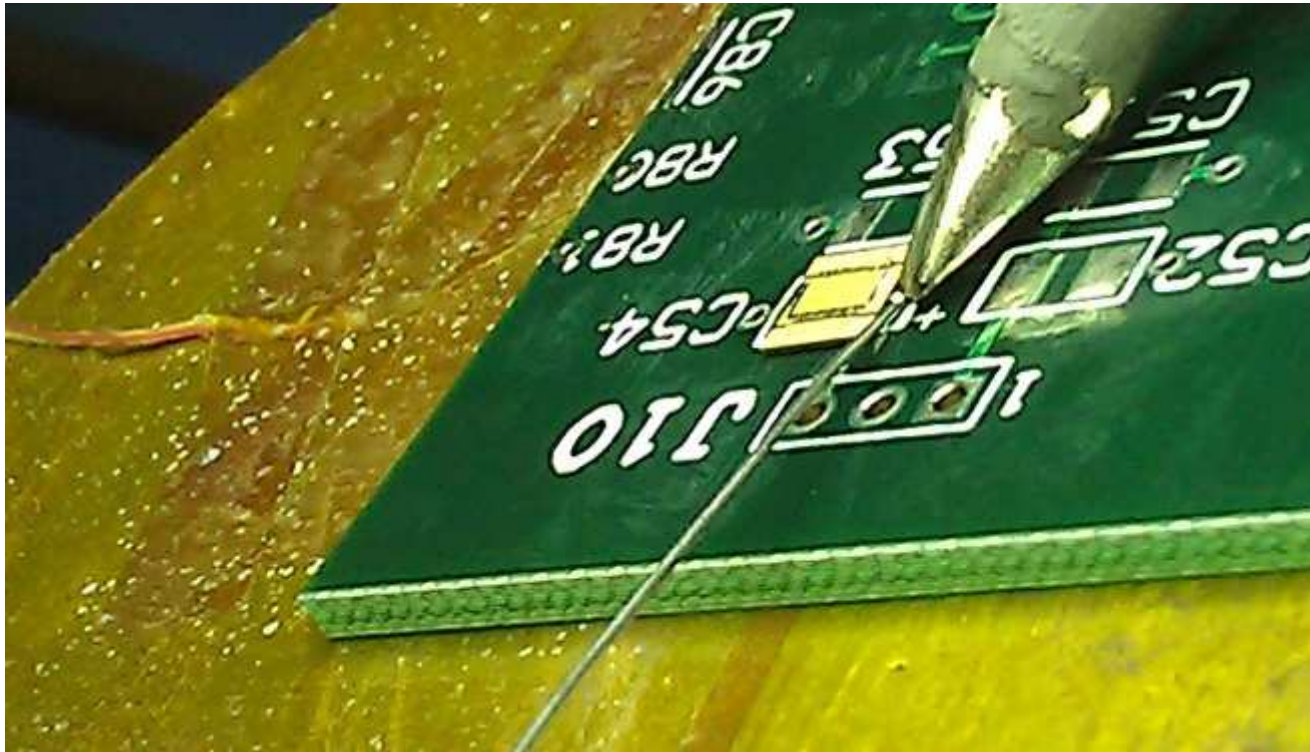
7. Flow a small amount of solder onto two pads. Make sure the solder flows over the entire pad surface.



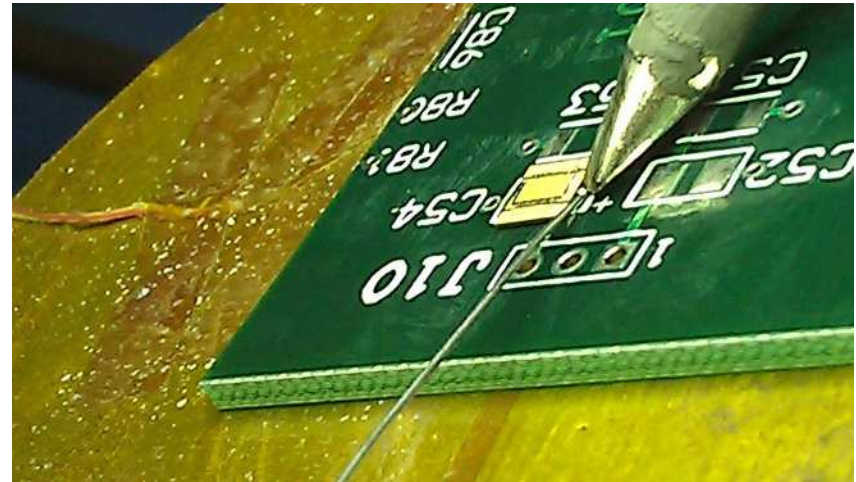
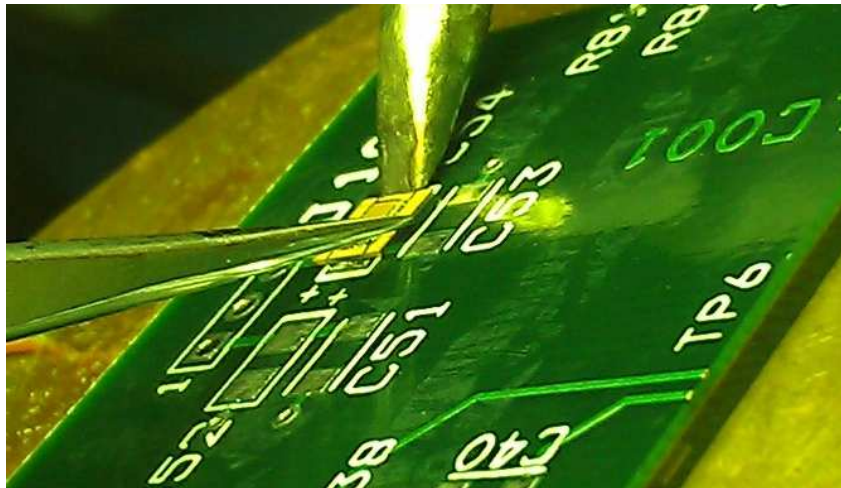
8. Carefully place the VCSEL device with its cathode/anode aligned with the PCB pads.



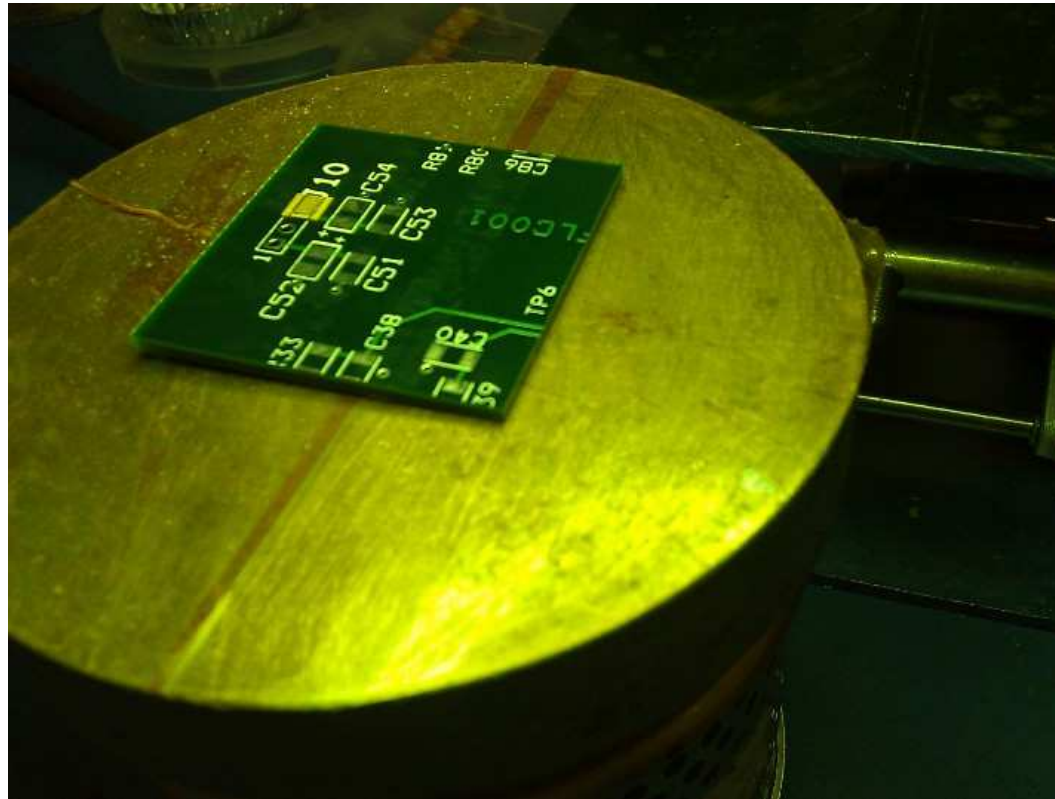
9. Touch soldering iron to PCB pad for approximately 5 seconds while gently pressing VCSEL onto pads. The VCSEL will now be partially attached to pad. Do not leave the soldering iron for more than 5 seconds to prevent damage to the VCSEL device.



10. Touch soldering iron to PCB pad for 5 seconds once more. During the 5 seconds, flow a small amount of solder along VCSEL/pad edge. Do not leave the soldering iron for more than 5 seconds to prevent damage to the VCSEL device. Do not touch actual VCSEL with iron.



4. Repeat the steps 9, and 10 for the other pad.



11. The process is complete. Carefully, remove PCB from heating plate. Let PCB and VCSEL cool to room temperature before testing.