Standard Operating Procedure (SOP): Solar Cell Soldering

1. Purpose

This SOP outlines the steps taken to handle and solder two SunPower solar cells together.

2. Scope

This SOP is for the solar array subsystem when manufacturing the array or anyone else who is involved in manufacturing the array.

3. Safety/ Hazards

- Soldering iron tip approaches 700 ºC, do not touch
- Solar cells are very fragile and brittle, be careful when handling or applying pressure
- Avoid breathing in the fumes from the leaded solder
- Close toed shoes
- Safety glasses
- Gloves

4. Control

1. Only 1 person necessary
2. When soldering, the hottest part of the iron is on the side of the tip

5. Procedure

1. Gather Chip Quik 0.5 mm leaded solder, 2 SunPower solar cells, soldering iron, solar cell soldering template, and an interconnect tab to connect the solar cells together.
2. Place 1 solar cell on the template within the guiding spacers. Take note of which side of the solar cell is being soldered. If there is a small plus on that side, it is the positive side and the other side is negative. The solder may splatter during the process and it is recommended to cover the open faces of the cells for their protection, leaving only the solder pads exposed.
3. Place 3 small dots of solder on the 3 solder pads of one side of the cell, making sure the solder touches the dots on the pads. These solder dots should be as flat as possible.
4. Grab an interconnect tab and position it on the solar cell so that the three prongs each rest on a solder dot. The straight edge of the interconnect tab should line up with the edge of the solar cell so that the metal body of the tab hangs over the edge of the solar cell but there is no air gap.
5. Put a small amount of solder onto the tip of the soldering iron.
6. With a gloved hand, hold the top and bottom prongs of the interconnect tab on the pads. Use the solder on the soldering iron to melt the existing middle solder dot and solder the middle prong to the solar cell.
7. Use more solder on the iron to melt the top solder dot and solder the top prong to the solar cell.
8. Repeat step 7 for the bottom prong.
9. Grab the second solar cell.
10. Repeat step 3 for the second solar cell. Make sure that the side that is being soldered is opposite to the other solar cell (i.e. if the interconnect tab was soldered to the positive side of the first solar cell, place the solder dots on the negative side of the second solar cell.
11. Position the second solar cell with the 3 solder dots underneath the interconnect tab prongs.
12. Repeat steps 5-8 for the second solar cell.

6. Definitions

- **SunPower solar cell**: square solar cell used for the solar array
- **Solar cell soldering template**: a large cardboard board with 3D printed spacers used to neatly align the solar cells as they are soldered
- **Interconnect tab**: the thin metallic tabs with 3 prongs on each side used to connect the solar cells together

7. References

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