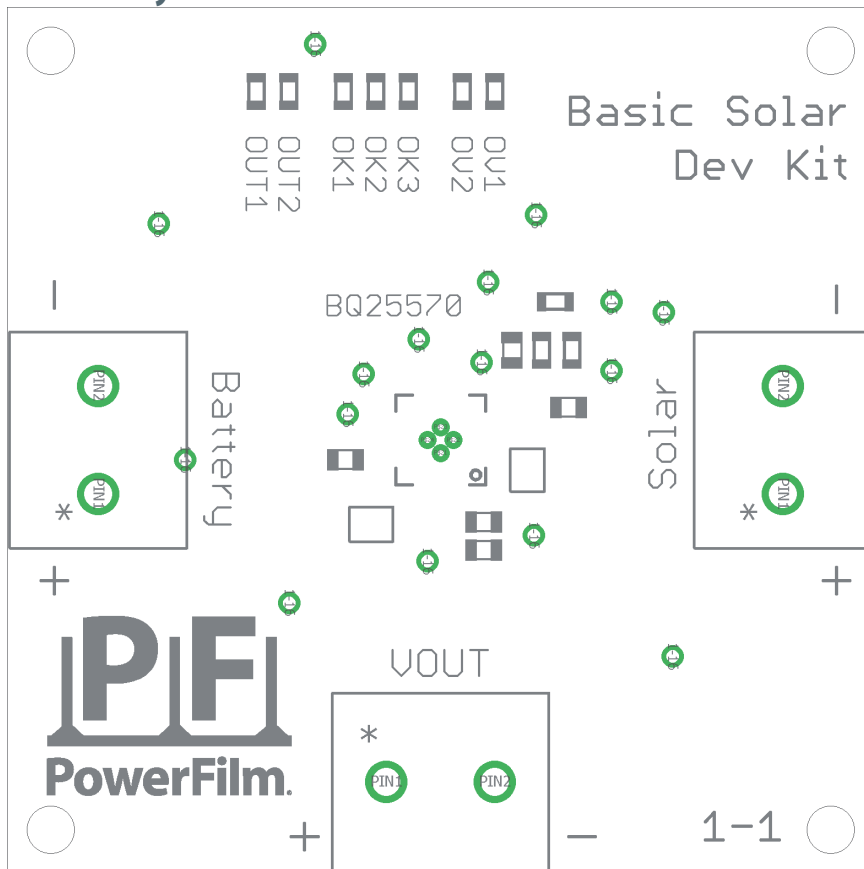# PowerFilm®
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Solar Development Kit Customization Guide

The Solar Development Kit can be tailored to power a broad range of low power electronics. By adjusting the values of several resistors, the output voltage or battery charging scheme can be aligned with a target battery chemistry or device operating voltage.

Board Layout

Materials and Tools Needed:

- Soldering Iron(s) and rosin core solder
- Tweezers
- 0805 or 1206 SMT resistors with desired values

Step 1. Determine Resistor Values

Use the formulas below to determine which resistors need to be changed and what the new value should be. A large selection of surface mount resistors can be found at online electronics parts retailers such as Digi-Key or Mouser. All resistors are labeled as seen in the diagram above or on the PCB itself.

Output Voltage

The resistors labeled R_OUT1 and R_OUT2 set the output voltage provided at the Vout+- terminal based on the following formula.

$VOUT = 1.21 * (R\_OUT2 + R\_OUT1)/R\_OUT1$

For best performance, the sum of R_OUT1 and R_OUT2 should be as close too but not greater than 13Mohms.

NOTE: VOUT cannot be set higher than battery termination voltage (VBAT_OV).

Battery Charge Termination Voltage

The resistors labeled R_OV1 and R_OV2 set the battery charge termination voltage based on the following formula.

$VBAT\_OV = 1.815 * (1 + R\_OV2/R\_OV1)$

For best performance, the sum of R_ OV2 and R_ ROV1 should be as close too but not greater than 13Mohms.

NOTE: The maximum recommended battery termination voltage is 5.5V.

Battery Under Voltage Cutoff and Hysteresis

The resistors labeled R_OK1, R_OK2, and R_OK3 set the minimum battery voltage before the load (VOUT) is disconnected and the desired level of hysteresis until the load is re-connected. These levels are based on the following formula.

$VBAT\_MIN = 1.21 * (1 + R\_OK2/R\_OK1)$

$VBAT\_MIN\_HYST = 1.21 * (1 + (R\_OK2+R\_OK3)/R\_OK1)$

For best performance, the sum of R_ OK1, R_ OK2 and R_ OK3 should be as close too but not greater than 13Mohms.

NOTE: VBAT_MIN cannot be less than 2V, or greater than VBAT_OV.

Step 2. Remove Current Resistors

Remove resistors to be changed using a soldering iron or heat gun. Two soldering irons can be used to flow both sides of the resistor at once to easily lift it off the PCB. Use rosin core solder as needed.

Step 3. Mount New Resistors

Make sure pads are clean and relatively flat. Use rosin core solder as needed. Use tweezers to place resistors on the pads. Tacking one side down with a soldering iron will hold the resistor in place. Reflow the resistor onto the pad. Make sure solder has flowed throughout the entire pad and up onto the contact of the resistor. Use rosin core solder as needed.