Photovoltaic Characterization

Design Challenge

nPoints
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Learn It!

As we progress further into the age of renewable energy, there are continued efforts to provide more power with less of an impact. One of the best examples of achieving this is with solar energy. Harvesting the power of the sun requires little more than a series of photocells, the circuitry to convert it to an AC signal or step up or down the DC signal or storage capacitors for later use. Using solar cells we are able to power a range of things from small appliances to houses. As technology improves, the implementation of solar energy harvesting will continue to improve but first we must understand solar cells. How much power can we get from solar cells? Can we characterize the efficiency of a solar cell at different light intensities? What inefficiencies should we be aware of that contribute to acquire less energy? When placing solar cells as panels a few things must be considered before the actual implementation. Of these, one of the most important is how much sun is the area getting, and just as important is across what band of frequencies does this solar cell perform best?

"As technology improves, the implementation of solar energy harvesting will continue to improve"

Build It!

Photovoltaic Characteristics Challenge

Design a test to show the I-V curve of a solar cell for different intensities of light. The test should apply a voltage and read back a current from the solar cell.

Add on to your test a means of deriving the Spectral Response of your Solar cell to different frequencies of light. This will involve blinking an array of LEDs at specific time intervals in order to pull the effect of each LED out of the frequency spectrum data of the Solar Cell.

Test both characterization experiments with a known photovoltaic sensor to prove accuracy then test the unknown solar cell.
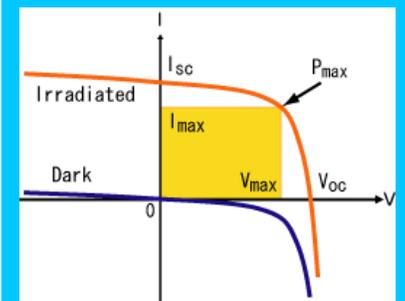

Figure 1 Solar cell I-V curve with max power point labeled