

## Solar Energy South Africa

# What is the function of the resistor on the photovoltaic panel



## Overview

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How do parasitic resistances affect the efficiency of solar cells?

Resistive effects in solar cells reduce the efficiency of the solar cell by dissipating power in the resistances. The most common parasitic resistances are series resistance and shunt resistance. The inclusion of the series and shunt resistance on the solar cell model is shown in the figure below.

What causes series resistance in a solar cell?

Series resistance in a solar cell has three causes: firstly, the movement of current through the emitter and base of the solar cell; secondly, the contact resistance between the metal contact and the silicon; and finally the resistance of the top and rear metal contacts.

How do photovoltaic panels work?

These free electrons generate an electrical current when they are captured. Photovoltaic panels are made up of several groups of photoelectric cells connected to each other. Each group of solar cells forms a network of photovoltaic cells connected in a series of electrical circuits to increase the output voltage.

What is a common unit for solar cell resistance?

Since the value of resistance will depend on the area of the solar cell, when comparing the series resistance of solar cells which may have different areas, a common unit for resistance is in  $\Omega\text{cm}^2$ . This area-normalized resistance results from replacing current with current density in Ohm's law as shown below:.

What is parasitic series and shunt resistance in a solar cell?

Parasitic series and shunt resistances in a solar cell circuit. In most cases and for typical values of shunt and series resistance, the key impact of parasitic resistance is to reduce the fill factor. Both the magnitude and impact of series

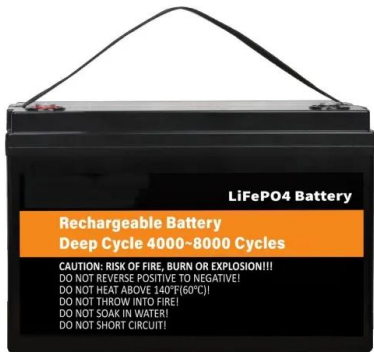
and shunt resistance depend on the geometry of the solar cell, at the operating point of the solar cell.

What is a photovoltaic panel?

The photovoltaic panel is a solar system that utilizes solar cells or solar photovoltaic arrays to turn directly the solar irradiance into electrical power. In other words, photons of light are absorbed in photovoltaic arrays and thus electrons are released in the panel.

## What is the function of the resistor on the photovoltaic panel

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### Why does the value of shunt resistor need to be very high for ...

In the circuit equivalent of a solar cell, shunt resistor is described as "The irregular polycrystalline lattice grain boundaries that resist to the flow of electrical current in the ...

## Solar Cell: Working Principle & Construction (Diagrams ...

Solar Cell Definition: A solar cell (also known as a photovoltaic cell) is an electrical device that transforms light energy directly into electrical energy using the photovoltaic effect. Working Principle: The working of solar ...



### Photovoltaic cells: structure and basic operation

If we connect a photovoltaic solar cell to an electrical circuit with resistance (consumption) and at the same time it receives solar radiation, an electrical potential difference will occur between its contacts. This voltage will ...

## [Effect of parasitic Resistances](#)

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resistance. The inclusion of the series and shunt  
...



### Shunt Resistance

The effect of shunt resistance on fill factor in a solar cell. The area of the solar cell is 1 cm<sup>2</sup>, the cell series resistance is zero, temperature is 300 K, and I<sub>0</sub> is 1 x 10<sup>-12</sup> A/cm<sup>2</sup>. Click on the graph for numerical data. An estimate for the value ...

## UNDERSTANDING THE EFFECT OF SERIES RESISTANCE FOR SOLAR PV ...

However, the series resistance, controlled by the top contact design and emitter resistance, needs to be carefully designed for each type and size of solar cell structure in order to optimise solar ...

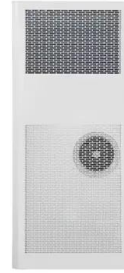


## Utilization of MOSFET transistor as an electronic load to trace I-V ...

To understand the electrical behavior of a photovoltaic panel, it is necessary to know the characteristic  $I_{pv} = f(V_{pv})$ . The best way to by using a variable resistor in series with the PV ...

## Lambert W-function simplified expressions for photovoltaic

function is also included. After that, the intervals of the variable where this function needs to be evaluated are analyzed by using solar cells/panels data obtained from the available literature. ...



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