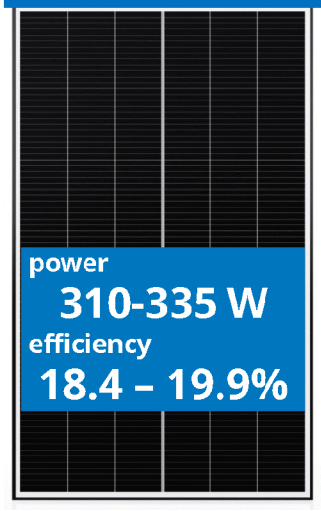
SunPower is Different, and Better

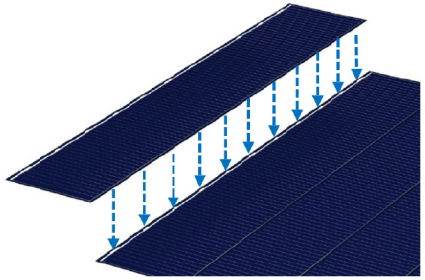
Robust shingled cells and advanced encapsulant are highly resistant to thermal stresses, humidity, and PID

Unique parallel circuitry mitigates hotspots and increases energy production in shade or soiling

Minimal whitespace and no ribbons maximize efficiency, lowering balance of systems costs and increasing flexibility

SunPower® Performance Series





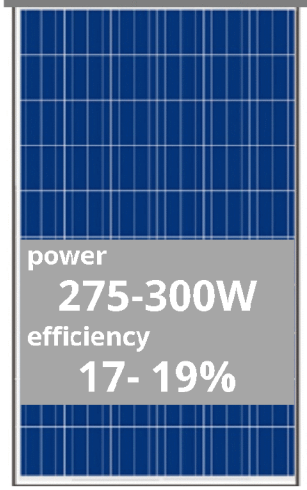
P-Series panels use shingled cells with flexible and redundant electrical connections, ensuring reliable performance high stress

Conventional ribbons and low quality encapsulants drive failure modes in the field[1]

Serial wiring means that one shaded or cracked cell drops power by 33%

Shiny metal ribbons block incoming light, lowering efficiency

Conventional Tier 1 Residential Panel[2]

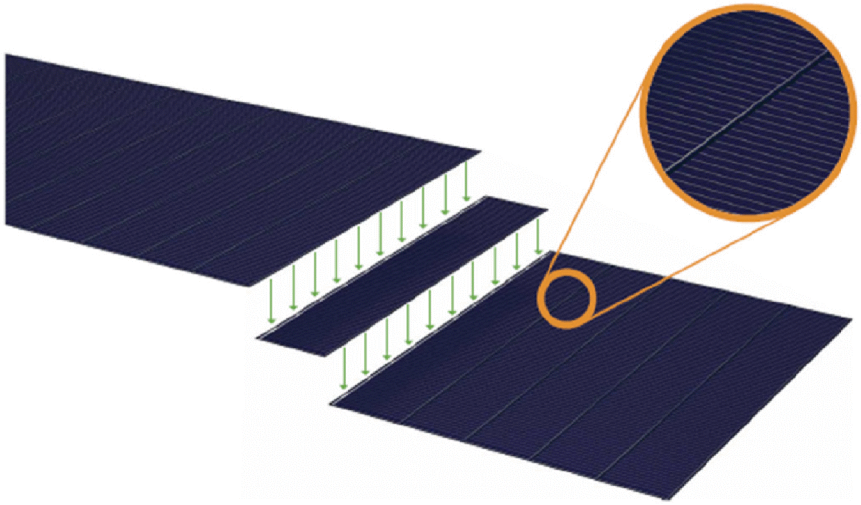


Conventional panels connect cells with soldered ribbons - these fatigue, causing hotspots and power loss

[1] TUV Quality Monitor, 2015.
[2] Definitions generally used throughcut presentaticn: "Conventional Panel" is a 260W panel, 16% efficient, approx. 1.6 m2, made with Conventional Cells. "Conventional Cells" are silicon cells that have many thin metal lines on the front and interconnect ribbons soldered along the front and back.

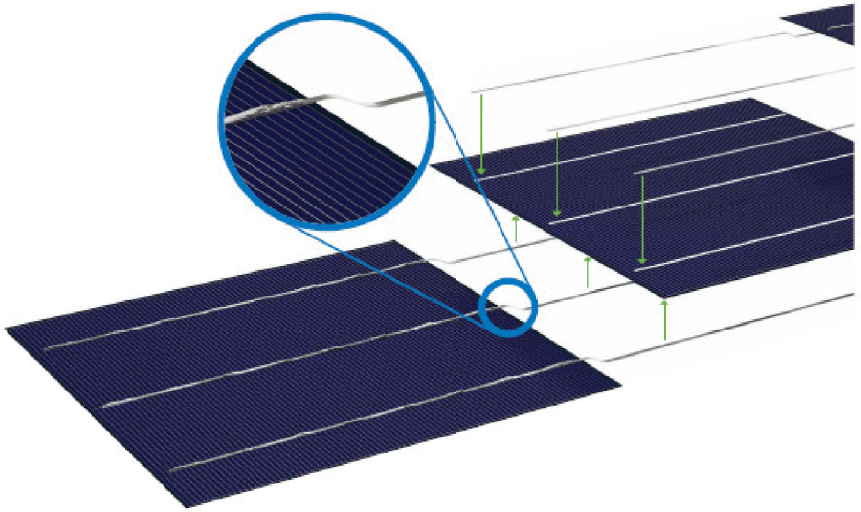
Shingled Cell vs. Conventional Cell

Shingled Solar Cells



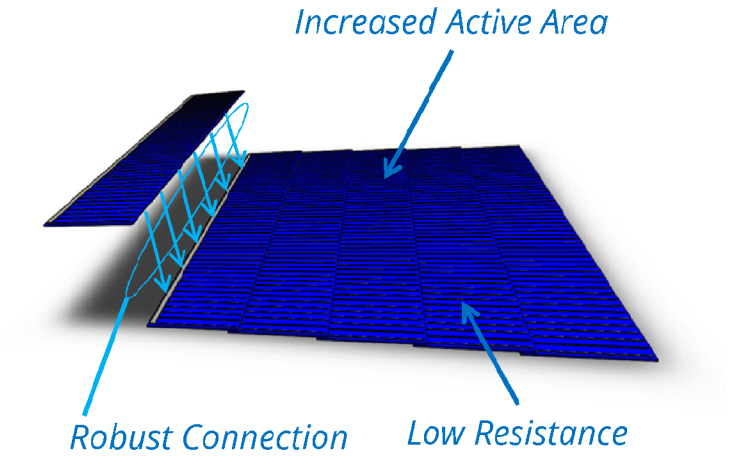
1. Thin screen-printed metal lines on the front of the cells are protected from corrosion by SunPower's specially engineered encapsulant
2. No soldered ribbons along the length of the cell – one of the major failure modes of using traditional cells has been designed out of the panel.
3. Cells are connected across their length, creating many redundant paths for electricity, and no single point of failure.

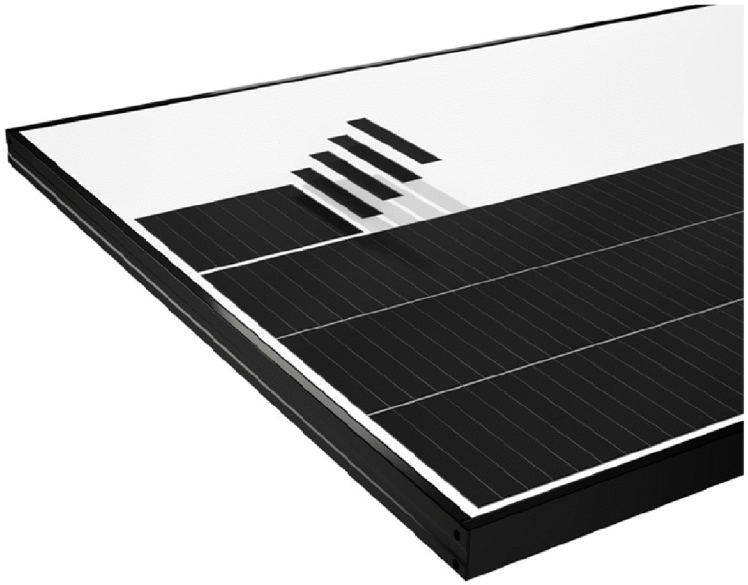
Conventional Solar Cell



1. High-stress solder joints between the long copper ribbons and crystal solar cell
   - As the panels get hot in the day and cold at night the copper expands but the silicon cell does not.
   - Over time, this repeated stress causes cells to crack and solder bonds to break.
2. Single points of failure on copper ribbons between cells.
3. Very thin screen-printed metal lines on the front of the cell are susceptible to corrosion over time

Shingled Cells Provide Excellent Strength

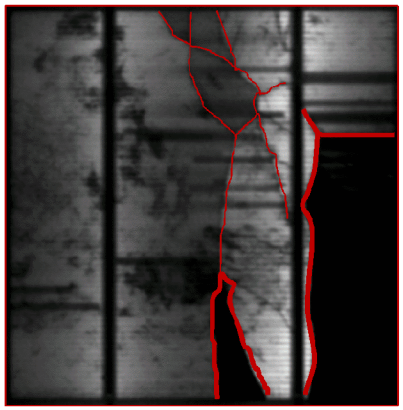




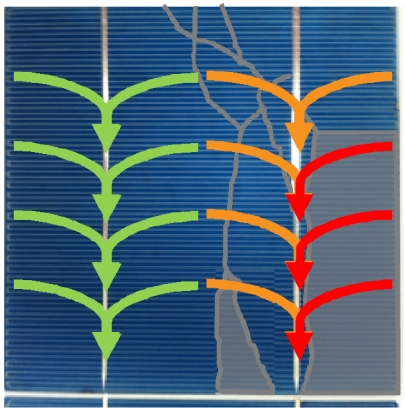
Shingled cells provide flexible and redundant electrical connections

Cell Cracking in P-Series

Conventional Cell[1]

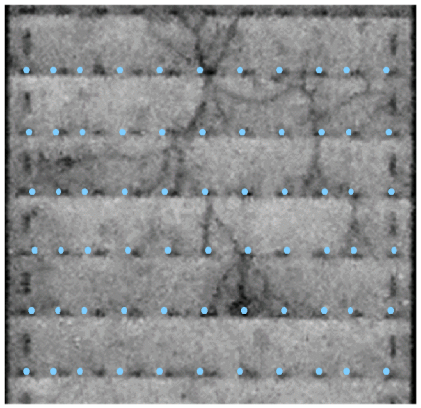


Cracks propagate until they encounter a ribbon or the edge of the cell

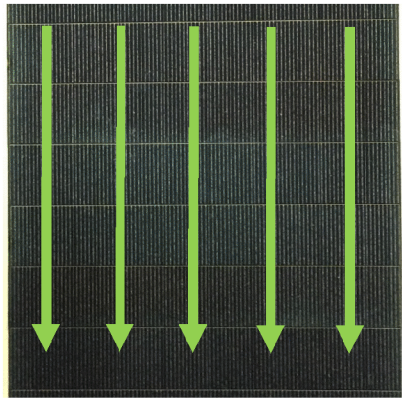


Current flows along silver lines to the ribbon so cracks prevent current from reaching the ribbon

SunPower® Performance Series



Short cell length, 1 inch, limits crack propagation, mitigating isolation of cracked cell areas



Highly redundant conductive adhesive connections act as a "mesh" to contain cracks and maintain current flow

Redundant connections limit power loss from cracks in P-Series

[1] Kontges, et. al. "Performance and Reliability of Photovoltaic Systems, Subtask 3.2: Review of Failures of Photovoltaic Modules." 20´4.