

# Shell Solar

## Shell PowerMax™ solar modules for off-grid markets

1<sup>st</sup> edition 2005

### General

Shell PowerMax™ is a range of high performance solar products – with designs created specifically for off-grid applications.

The Shell PowerMax™ Plus 50 product contains 2 parallel strings with in total 72 125mmx41.5mm multi-crystalline silicon solar cells, which can generate a peak power of 50 watts at 17 volts.

### Qualifications and Certificates

The Shell PowerMax™ Plus 50 solar module meets the following requirement:

**IEC61215 Ed. 1**

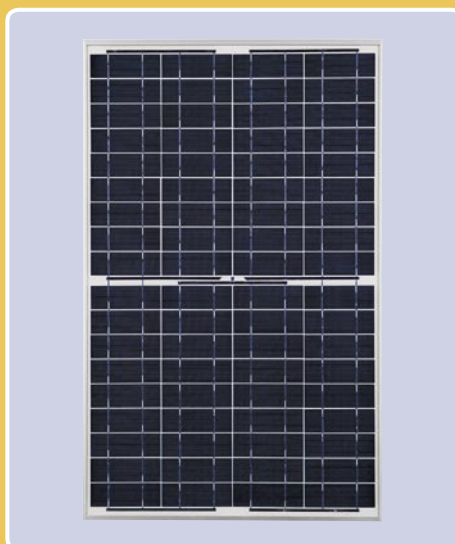


### Limited Warranties\*

- Peak Power for 10 years (category B)
- 2 year workmanship warranty

\* See Shell Solar Limited Warranty for PV-Modules

### Shell PowerMax™ Plus 50



**ELECTRICAL EQUIPMENT,  
CHECK WITH YOUR INSTALLER**

Due to continuous research and product improvement, the specifications in this Product Brochure are subject to change without notice. Specifications can vary slightly. For installation and operation instructions, please see the applicable manuals. No rights can be derived from this Product Brochure and Shell Solar assumes no liability whatsoever connected to or resulting from the use of any information contained herein.

References in this Product Brochure to 'Shell Solar' are to companies and other organizational entities within the Royal Dutch/Shell Group of Companies that are engaged in the photovoltaic solar energy business. Shell Solar has its principal office in Amsterdam, The Netherlands.

### The Shell PowerMax™ advantage

#### Exceptional Performance

- High efficiency crystalline silicon cell technology; enhanced by TOPS and new silicon nitride anti-reflection coatings.
- One of the industry's leading energy yields in a wide variety of climates.
- Products rated on fully stabilized initial power so you get the power you pay for.

#### Proven Reliability

- Module design proven over 30 years of field operations with reliability in excess of 99.9%.
- Extended limited power warranties backed by a company you can trust.
- IEC 61215 certification.

#### Easy to Install

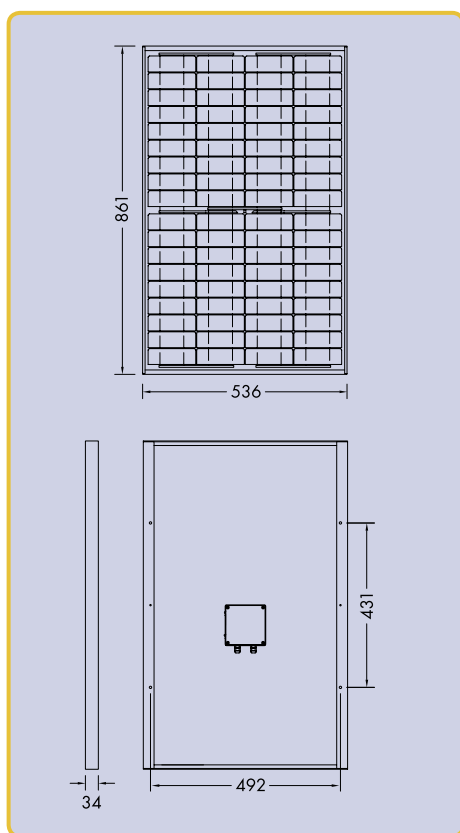
- Field-accessible junction box.
- 4 mounting holes per product; 2 grounding holes.



# Shell PowerMax™ Plus 50 Photovoltaic Solar Module

## Mechanical Specifications

A torsion and corrosion-resistant anodised aluminium frame ensures dependable performance, even under harsh weather conditions. Pre-drilled mounting holes are provided for ease of installation.



Outside dimensions (mm)	861 x 536
Thickness (mm)	34
Weight (kg)	5.5

For installation instructions, please refer to the Shell Solar Installation and Safety Instructions.

## Electrical Characteristics

### Data at Standard Test Conditions (STC)

STC: irradiance level 1000W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature 25°C.

Rated power	$P_r$	50W
Peak power*	$P_{mpp}^*$	50W
Maximum system voltage	$V_{sys}$	120V
Peak power voltage	$V_{mpp}$	17V
Peak power current	$I_{mpp}$	3.00A
Open circuit voltage	$V_{oc}$	21.5V
Short circuit current	$I_{sc}$	3.26A
Minimum peak power	$P_{mpp\ min}$	45W
*Tolerance on Peak Power		+/-10%

### Typical Data at Nominal Operating Cell Temperature (NOCT) conditions

NOCT: irradiance level 800W/m<sup>2</sup>, spectrum AM 1.5, wind velocity 1m/s,  $T_{amb}$  20°C.

Temperature	$T_{NOCT}$	44 °C
Mpp power	$P_{mpp}$	38 W
Mpp voltage	$V_{mpp}$	15.6 V
Open circuit voltage	$V_{oc}$	19.6 V
Short circuit current	$I_{sc}$	2.7 A

### Typical data at low irradiance

The relative reduction of module efficiency at an irradiance of 200W/m<sup>2</sup> in relation to 1000W/m<sup>2</sup> both at 25°C cell temperature and AM 1.5 spectrum is 8%.

### Temperature coefficients

$\alpha P_{mpp}$	-0.49 %/°C
$\alpha V_{mpp}$	-75.5 mV/°C
$\alpha I_{sc}$	3.2 mA/°C
$\alpha V_{oc}$	-73.4 mV/°C

Maximum system voltage: 120 Vdc

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V1/PowerMax/Off-Grid 12V/50/Int/04/05

