

# Shell Solar

## Shell PowerMax™ solar modules for grid-connected markets\*

1st edition 2004

### General

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

Shell PowerMax™ Ultra 175-PC and 165-PC products contain 72 series connected 125mm x 125mm mono-crystalline solar cells, which can generate a peak power of 175 and 165 watts at 35.4 and 35V respectively.

### Qualifications and Certificates

The Shell PowerMax™ Ultra 175-PC and 165-PC products meet the following requirements:

- IEC 61215
- UL - Listing 1703



All Shell Solar modules are produced in ISO 9001 certified factories.

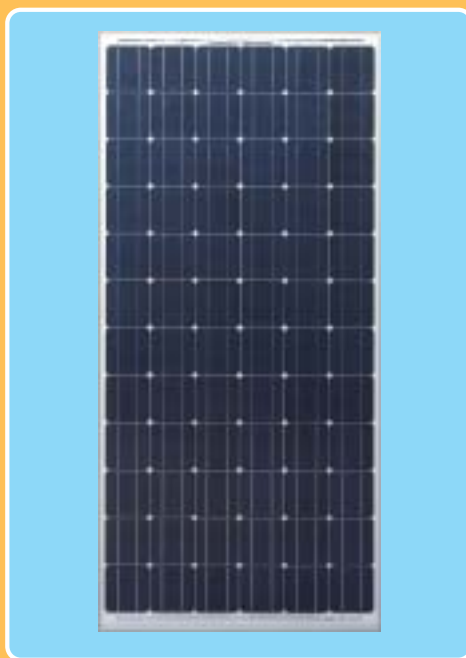
### Limited Warranties

- Peak Power for 25 years
- Product workmanship 2 years

\*See Shell Solar Limited Warranty for PV-Modules

\*North America only

### Shell PowerMax™ Ultra 175-PC/165-PC



**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.
- Improved performance coefficients result in higher PTC ratings.
- 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 field failure rates less than 0.1%.
- Extended limited power warranties backed by a company you can trust.
- IEC 61215 and UL 1703 certifications.

#### Safety by Design

- Suitable for high snow and wind loads.
- UL fire safety class C.

#### Easy to Install

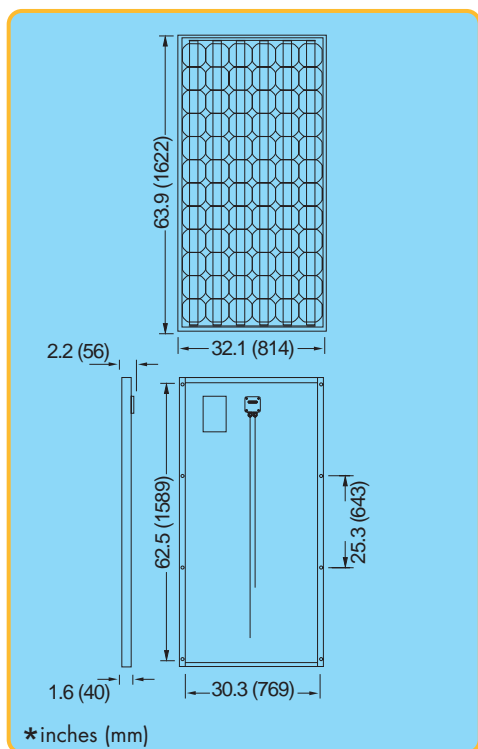
- Pre-assembled cables and Multi-Contact® plugs.
- 12 mounting holes per product; 4 grounding holes.
- 20A series fuse rating



# Shell PowerMax™ Ultra 175-PC/165-PC

## Mechanical Specifications

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



Outside dimensions (in)	63.9 x 32.1
Thickness (inc. junction box) (in)	2.2
Thickness (exc. junction box) (in)	1.6
Weight (lbs)	40
Junction box type	ProCharger™ IP54
Cable length – male /+ female (in)	51/39
Cable cross-section (AWG)	12

For ease of installation the junction box includes pre-mounted male and female cables and Multi-Contact® plugs. The junction box allows for easy field replacement of diodes and cable assemblies.

## 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

	Shell PowerMax™	Ultra165-PC	Ultra 175-PC
Rated power	P <sub>r</sub>	165W	175W
Peak power	P <sub>mpp</sub> *	165W	175W
Module efficiency	η	12.5%	13.3%
Maximum system voltage	V <sub>sys</sub>	600V	600V
Peak power voltage	V <sub>mpp</sub>	35.0V	35.4V
Peak power current	I <sub>mpp</sub>	4.72A	4.95A
Open circuit voltage	V <sub>oc</sub>	44.5V	44.6V
Short circuit current	I <sub>sc</sub>	5.40A	5.43A
Series fuse rating	I <sub>fuse</sub>	20A	20A
Minimum peak power	P <sub>mpp min</sub>	156.75W	166.25W
Tolerance on peak power	%	+/- 5	+/- 5

\*The abbreviation 'mpp' stands for Maximum Power Point.

### 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<sub>amb</sub> 20°C

		45.5°C	45.5°C
Temperature	T <sub>noct</sub>	45.5°C	45.5°C
Peak power	P <sub>mpp</sub>	120W	127W
Peak power voltage	V <sub>mpp</sub>	31.6V	32.2V
Open circuit voltage	V <sub>oc</sub>	40.0V	40.4V
Short circuit current	I <sub>sc</sub>	4.20A	4.25A

### Temperature coefficients

		-0.43	-0.43
α P <sub>mpp</sub>	%/°C	-0.43	-0.43
α V <sub>mpp</sub>	mV/°C	-145	-145
α I <sub>sc</sub>	mA/°C	0.8	0.8
α V <sub>oc</sub>	mV/°C	-145	-145

### 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%.

For further information on all Shell Solar products contact:

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