

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.
- 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

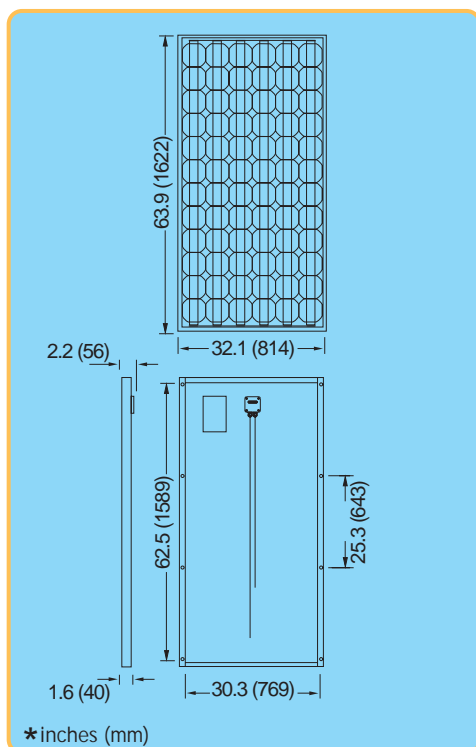
- Pre-assembled cables and Multi-Contact® plugs.
- 12 mounting holes per product; 4 grounding holes.
- 20A series fuse rating



Shell PowerMax™ Ultra 175-PC/165-PC

Mechanical Specifications

A torsion and corrosion-resistant anodized aluminium 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) | 38 |
| 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/m², spectrum AM 1.5 and cell temperature 25°C

| | Shell PowerMax™ | Ultra165-PC | Ultra 175-PC |
|-------------------------|-----------------|-------------|--------------|
| Rated power | P_r | 165W | 175W |
| Peak power | P_{mpp}^* | 165W | 175W |
| Module efficiency | η | 12.5% | 13.3% |
| Maximum system voltage | V_{sys} | 600V | 600V |
| Peak power voltage | V_{mpp} | 35.0V | 35.4V |
| Peak power current | I_{mpp} | 4.72A | 4.95A |
| Open circuit voltage | V_{oc} | 44.5V | 44.6V |
| Short circuit current | I_{sc} | 5.40A | 5.43A |
| Series fuse rating | I_{fuse} | 20A | 20A |
| Minimum peak power | $P_{mpp\ min}$ | 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/m², spectrum AM 1.5, wind velocity 1m/s, T_{amb} 20°C

| | | 45.5°C | 45.5°C |
|-----------------------|------------|--------|--------|
| Temperature | T_{noct} | 45.5°C | 45.5°C |
| Peak power | P_{mpp} | 120W | 125W |
| Peak power voltage | V_{mpp} | 29.8V | 29.8V |
| Open circuit voltage | V_{oc} | 30.8V | 30.8V |
| Short circuit current | I_{sc} | 4.35A | 4.37A |

Temperature coefficients

| | | -0.43 | -0.43 |
|------------------|-------|-------|-------|
| αP_{mpp} | %/°C | -0.43 | -0.43 |
| αV_{mpp} | mV/°C | -145 | -145 |
| αI_{sc} | mA/°C | 0.8 | 0.8 |
| αV_{oc} | mV/°C | -145 | -145 |

Typical data at low irradiance

The relative reduction of module efficiency at an irradiance of 200W/m² in relation to 1000W/m² both at 25°C cell temperature and AM 1.5 spectrum is 8%.

For further information on all Shell Solar products contact:

Shell Solar

4650 Adohr Lane, Camarillo CA 93012
805-482-6800 Fax 805-388-6395
www.shell.com/solar

V1/Power-Max/Grid-Connected/US/06/04

