

**HSL 60S**

4BB 60 Cell Poly Module

# Hanwha Solar



## Key Features

### Anti-PID

Qualified to Withstand PID (Potential Induced Degradation) \*

### Guaranteed Quality

12 Year Workmanship, 25 Year Linear Performance Warranty \*\*

### Predictable Output

Positive Power Sorting, 0 to +5 Watt

### Innovative Technology

4BB Cell, Improved Module Efficiency and Power

### Harsh Environment Resistance

Verified against Salt Mist and Ammonia Corrosion

### Better Performance

Improved Low Light Irradiance Performance and TCOE

### Efficient Logistics

Compact Design, Efficient Shipping, Easy Handling

\* PID test conditions : module charged -1000V with Al-foil covered surface, 25 °C, 168h

\*\* Please refer to Hanwha Solar Product Warranty for details

## Quality and Environmental Certificates

- ISO 9001 quality standards and ISO 14001 environmental standards
- OHSAS 18001 occupational health and safety standards
- IEC 61215 & IEC 61730 Application Class A certifications
- Conformity to CE



## About Hanwha Solar

Hanwha Solar is a vertically integrated manufacturer of photovoltaic modules designed to meet the needs of the global energy consumer.

- High reliability, guaranteed quality, and excellent cost-efficiency due to vertically integrated production and control of the supply chain
- Optimization of product performance and manufacturing processes through a strong commitment to research and development
- Global presence throughout Europe, North America and Asia, offering regional technical and sales support

# HSL 60S

## 4BB 60 Cell Poly Module

### Electrical Characteristics

#### Electrical Characteristics at Standard Test Conditions (STC)

Power Class	245 W	250 W	255 W	260 W	265 W	270 W
Maximum Power (P <sub>max</sub> )	245 W	250 W	255 W	260 W	265 W	270 W
Open Circuit Voltage (V <sub>oc</sub> )	37.4 V	37.6 V	37.8 V	38.1 V	38.3 V	38.5 V
Short Circuit Current (I <sub>sc</sub> )	8.62 A	8.72 A	8.86 A	8.98 A	9.12 A	9.22 A
Voltage at Maximum Power (V <sub>mpp</sub> )	30.2 V	30.5 V	30.7 V	30.9 V	31.1 V	31.2 V
Current at Maximum Power (I <sub>mp</sub> )	8.12 A	8.20 A	8.31 A	8.42 A	8.53 A	8.66 A
Module Efficiency (%)	14.7 %	15.0 %	15.3 %	15.6 %	15.9 %	16.2 %

P<sub>max</sub>, V<sub>oc</sub>, I<sub>sc</sub>, V<sub>mpp</sub> and I<sub>mp</sub> tested at Standard Testing Conditions (STC) defined as irradiance of 1000W/m<sup>2</sup> at AM 1.5 solar spectrum and a temperature of 25±2°C. Module power class have positive power sorting: 0 to +5W. Measurement tolerance: +/- 3% (P<sub>max</sub>)

#### Electrical Characteristics at Nominal Operating Cell Temperature (NOCT)

Power Class	245 W	250 W	255 W	260 W	265 W	270 W
Maximum Power (P <sub>max</sub> )	180 W	184 W	187 W	191 W	196 W	199 W
Open Circuit Voltage (V <sub>oc</sub> )	35.0 V	35.1 V	35.4 V	35.7 V	35.9 V	36.1 V
Short Circuit Current (I <sub>sc</sub> )	6.97 A	7.05 A	7.16 A	7.26 A	7.37 A	7.45 A
Voltage at Maximum Power (V <sub>mpp</sub> )	27.8 V	28.0 V	28.2 V	28.4 V	28.6 V	28.7 V
Current at Maximum Power (I <sub>mp</sub> )	6.48 A	6.54 A	6.64 A	6.73 A	6.84 A	6.92 A
Module Efficiency (%)	13.5 %	13.7 %	14.0 %	14.3 %	14.7 %	14.9 %

P<sub>max</sub>, V<sub>oc</sub>, I<sub>sc</sub>, V<sub>mpp</sub> and I<sub>mp</sub> tested at Nominal Operating Cell Temperature (NOCT) defined as irradiance of 800W/m<sup>2</sup>; 20°C; Wind speed 1m/s. Measurement tolerance: +/- 3% (P<sub>max</sub>)

#### Temperature Characteristics

Normal Operating Cell Temperature (NOCT)	45°C + / - 3°C
Temperature Coefficients of P <sub>max</sub>	-0.41 % / °C
Temperature Coefficients of V <sub>oc</sub>	-0.31 % / °C
Temperature Coefficients of I <sub>sc</sub>	+0.055% / °C

#### Maximum Ratings

Maximum System Voltage	1000 V (IEC)
Series Fuse Rating	15 A
Maximum Reverse Current	Series fuse rating multiplied by 1.35

### Mechanical Characteristics

Dimensions	1670mm × 1000mm × 32 mm
Weight	18.5±0.5kg
Frame	Aluminum-alloy
Front	3.2mm tempered glass with anti reflective coating
Encapsulant	EVA
Back Cover	Composite sheet
Cell Technology	4 busbar Polycrystalline
Cell Size	156 mm × 156 mm (6 in × 6 in)
Number of Cells (Pieces)	60 (6 × 10)
Junction Box	Protection class IP 67
Output Cables	Solar cable: 4 mm <sup>2</sup> ; length: 1000 mm
Connector	H4

### System Design

Operating Temperature	- 40 °C to 85 °C
Hail Safety Impact Velocity	25 mm at 23 m/s
Fire Safety Classification (IEC 61730)	Class C
Static Load Wind / Snow	4000/5400Pa

### Packaging and Storage

Storage Temperature	- 40 °C to 85 °C
Packaging Configuration	32 pieces per pallet
Loading Capacity (40 ft. HQ Container)	832 pieces

#### Nomenclature:

HSL 60 Poly: HSL60P6-PC-1-xxx  
 HSL 60 Black Poly: HSL60P6-PC-1-xxxB  
 xxx represents the power class

#### Performance at Low Irradiance:

The typical efficiency at 200 W/m<sup>2</sup> in relation to 1000 W/m<sup>2</sup>, (25°C, AM 1.5) is at least 97 % of STC efficiency.

Various Irradiance Levels

