



## Key Feature Set

- 1 Robust Design: Module withstands up to 7.000 Pa (>690 kg/m<sup>2</sup>) Snow / 4.000 Pa (>210 km/h) Wind loads \*
- 2 Anti-PID: Modules are qualified to withstand PID related degradation \*\*
- 3 Guaranteed Quality: 12 Year Workmanship and 25 Years linear Performance Warranty \*\*\*
- 4 Predictable Output: Positive Power Sorting of 0 to +5 Watt
- 5 Higher Yield: Module Current Sorting provides up to 2.5% more Energy
- 6 Innovative Solution: Anti-Reflection Glass with Self-Clean hydrophobic Layer
- 7 Harsh Environment: Verified against Salt Mist and Ammonia Corrosion (IEC 61701 and IEC 62716)
- 8 Weak Light: Excellent Performance even under low Irradiation

\* Please refer to Hanwha Solar Module Installation Guide

\*\* Test conditions: Module negatively charged with 1000 Volts at 25°C for 168 hours with Al-Foil coverage

\*\*\* 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 (low Voltage Directive and EMI), fire tested class E (EN 13501-1)



## 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

# Electrical Characteristics

## Electrical Characteristics at Standard Test Conditions (STC)

Power Class	235 W	240 W	245 W	250 W	255 W
Maximum Power ( $P_{max}$ )	235 W	240 W	245 W	250 W	255 W
Open Circuit Voltage ( $V_{oc}$ )	36.7 V	37.0 V	37.4 V	37.7 V	38.0 V
Short Circuit Current ( $I_{sc}$ )	8.53 A	8.63 A	8.70 A	8.79 A	8.89 A
Voltage at Maximum Power ( $V_{mpp}$ )	29.2 V	29.6 V	30.1 V	30.4 V	30.8 V
Current at Maximum Power ( $I_{mpp}$ )	8.05 A	8.11 A	8.15 A	8.23 A	8.29 A
Module Efficiency (%)	14.5 %	14.8 %	15.1 %	15.5 %	15.8 %

$P_{max}$ ,  $V_{oc}$ ,  $I_{sc}$ ,  $V_{mpp}$  and  $I_{mpp}$  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% ( $P_{max}$ )

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

Power Class	235 W	240 W	245 W	250 W	255 W
Maximum Power ( $P_{max}$ )	172 W	175 W	179 W	183 W	186 W
Open Circuit Voltage ( $V_{oc}$ )	34.4 V	34.6 V	34.8 V	35.0 V	35.2 V
Short Circuit Current ( $I_{sc}$ )	6.89 A	6.97 A	7.05 A	7.13 A	7.22 A
Voltage at Maximum Power ( $V_{mpp}$ )	26.5 V	26.8 V	27.3 V	27.6 V	27.9 V
Current at Maximum Power ( $I_{mpp}$ )	6.50 A	6.53 A	6.56 A	6.64 A	6.67 A
Module Efficiency (%)	13.3 %	13.5 %	13.8 %	14.2 %	14.4 %

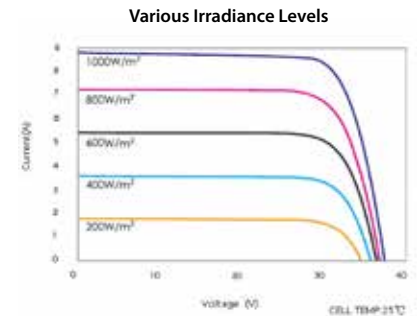
$P_{max}$ ,  $V_{oc}$ ,  $I_{sc}$ ,  $V_{mpp}$  and  $I_{mpp}$  tested at Normal Operating Cell Temperature (NOCT, 45±3°C) defined as Irradiance of 800W/m<sup>2</sup>; Ambient temperature 20°C; Wind speed 1m/s. Measurement tolerance: ±3% ( $P_{max}$ )

### Nomenclature:

HSL60P6-PB-1-xxx  
xxx represents the power class

### Performance at Low Irradiance:

The typical relative change in module efficiency at an irradiance of 200 W/m<sup>2</sup> in relation to 1000 W/m<sup>2</sup> (both at 25 °C and AM 1.5 spectrum) is less than 5 %.



### Temperature Characteristics

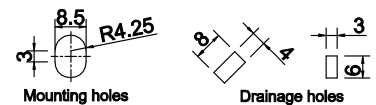
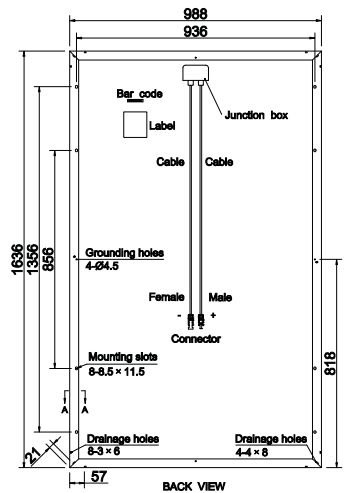
Normal Operating Cell Temperature (NOCT)	45±3°C
Temperature Coefficients of P	-0.43 %/°C
Temperature Coefficients of V	-0.31 %/°C
Temperature Coefficients of I	+0.05%/°C

### 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	1636 mm × 988 mm × 40 mm
Weight	19±0.5kg
Frame	Aluminum-alloy, anodized
Front	3 mm tempered anti-reflection glass
Encapsulant	EVA
Back Cover	Composite sheet
Cell Technology	Polycrystalline
Cell Size	156 mm × 156 mm (6 in × 6 in)
Number of Cells (Pieces)	60 (6 × 10)
Junction Box	Protection class IP 67; 3 sets of diodes
Output Cables	Solar cable: 4 mm <sup>2</sup> ; length: 1000 mm
Connector	Amphenol 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 Pa / 7000 Pa

## Packaging and Storage

Storage Temperature	-40 °C to 85 °C
Packaging Configuration	24 pieces per pallet
Loading Capacity (40 ft. HQ Container)	672 pieces

