

## Five Key Features

- 1 Guaranteed quality: 12 year product warranty, 25 year performance warranty \*
- 2 Predictable output: Positive power sorting of 0 to + 5 W
- 3 Innovative solutions: Anti-reflecting coating for high sunlight absorption
- 4 Robust design: Module certified to withstand high snow loads, up to 5400 Pa (113 psf) \*\*
- 5 Highly Bankable: Proven field performance with strong company financials

\* Please refer to Hanwha SolarOne Co., Ltd. Product Warranty for details.

\*\* Please refer to Hanwha SolarOne Co., Ltd. module Installation Guide.

### Quality and Environmental Certificates

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



### About Hanwha SolarOne Co., Ltd.

Hanwha SolarOne Co., Ltd. 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	225 W	230 W	235 W	240 W	245 W	250 W
Maximum Power ( $P_{max}$ )	225 W	230 W	235 W	240 W	245 W	250 W
Open Circuit Voltage ( $V_{oc}$ )	36.7 V	36.8 V	36.8 V	37.0 V	37.1 V	37.2 V
Short Circuit Current ( $I_{sc}$ )	8.18 A	8.34 A	8.44 A	8.54 A	8.64 A	8.74 A
Voltage at Maximum Power ( $V_{mpp}$ )	29.9 V	30.0 V	30.1 V	30.2 V	30.3 V	30.4 V
Current at Maximum Power ( $I_{mpp}$ )	7.53 A	7.67 A	7.81 A	7.95 A	8.08 A	8.22 A
Module Efficiency (%)	13.6 %	13.9 %	14.2 %	14.5 %	14.8 %	15.1 %
Cell Efficiency (%)	15.5 %	15.8 %	16.1 %	16.5 %	16.8 %	17.2 %

$P_{max}$ ,  $V_{oc}$ ,  $I_{sc}$ ,  $V_{mpp}$  and  $I_{mpp}$  tested at STC defined as irradiance of 1000 W/m<sup>2</sup> at AM 1.5 solar spectrum and temperature 25 ± 2 °C.  
Electrical Characteristics: Measurement tolerance of ± 3 %.

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

Power Class	225 W	230 W	235 W	240 W	245 W	250 W
Maximum Power ( $P_{max}$ )	163 W	167 W	170 W	174 W	178 W	182 W
Open Circuit Voltage ( $V_{oc}$ )	33.1 V	33.3 V	33.5 V	33.7 V	34.1 V	34.2 V
Short Circuit Current ( $I_{sc}$ )	6.50 A	6.66 A	6.74 A	6.84 A	6.99 A	7.07 A
Voltage at Maximum Power ( $V_{mpp}$ )	27.1 V	27.2 V	27.3 V	27.4 V	27.6 V	27.7 V
Current at Maximum Power ( $I_{mpp}$ )	6.02 A	6.14 A	6.23 A	6.35 A	6.46 A	6.58 A
Module Efficiency (%)	12.3 %	12.6 %	12.9 %	13.2 %	13.5 %	13.8 %
Cell Efficiency (%)	15.5 %	15.8 %	16.1 %	16.5 %	16.8 %	17.2 %

$P_{max}$ ,  $V_{oc}$ ,  $I_{sc}$ ,  $V_{mpp}$  and  $I_{mpp}$  tested at NOCT defined as irradiance of 800 W/m<sup>2</sup>; wind speed 1 m/s.  
Electrical Characteristics: Measurement tolerance of ± 3 %.

### Temperature Characteristics

Normal Operating Cell Temperature (NOCT)	45 °C ± 3 °C
Temperature Coefficients of P	- 0.45 %/°C
Temperature Coefficients of V	- 0.32 %/°C
Temperature Coefficients of I	+ 0.04 %/°C

### Maximum Ratings

Maximum System Voltage	600 V (UL)
Series Fuse Rating	15 A
Maximum Reverse Current	Series fuse rating multiplied by 1.35

## Mechanical Characteristics

Dimensions	1652 mm × 1000 mm × 45 mm (65.04 in × 39.37 in × 1.77 in)
Weight	21 kg (46.2 lbs)
Frame	Aluminum alloy
Front	Tempered 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 IP67 with bypass-diode
Output Cables	Solar cable: 4 mm <sup>2</sup> ; length 900 mm (35.4 in)

## System Design

Operating Temperature	- 40 °F to 185 °F
Hail Safety Impact Velocity	25 mm at 23 m/s
Fire Safety Classification (IEC 61730)	Class C
Static Load Wind / Snow	2400 Pa / 5400 Pa

## Packaging and Storage

Storage Temperature	- 40 °F to 185 °F
Packaging Configuration	22 pieces per pallet
Loading Capacity (40 ft. HQ Container)	572 pieces

### Nomenclature

Full product name:

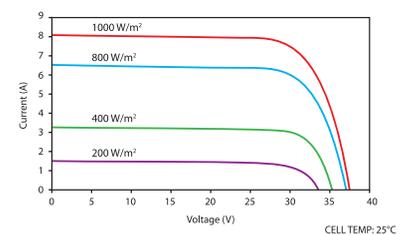
SF220-30-PxxxL

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 %.

Various Irradiance Levels



Basic Design

