SF190 | Poly

Hanwha Solar

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 5.4 kN/m^2 **
5. Long term responsibility: Free module recycling in PV Cycle member countries

* 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.

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Electrical Characteristics

Electrical Characteristics at Standard Test Conditions (STC)

Power Class	195 W	200 W	205 W	210 W	215 W	220 W
Maximum Power (P_{max})	195 W	200 W	205 W	210 W	215 W	220 W
Open Circuit Voltage (V_{oc})	32.7 V	32.8 V	32.9 V	33.0 V	33.1 V	33.2 V
Short Circuit Current (I_{sc})	8.06 A	8.24 A	8.35 A	8.48 A	8.54 A	8.68 A
Voltage at Maximum Power (V_{mpp})	26.8V	26.9V	27.0 V	27.1 V	27.2 V	27.3 V
Current at Maximum Power (I_{mpp})	7.28 A	7.44 A	7.60 A	7.75 A	7.91 A	8.06 A
Module Efficiency (%)	13.1 %	13.4 %	13.7 %	14.0 %	14.4 %	14.7 %
Cell Efficiency (%)	15.0 %	15.4 %	15.8 %	16.2 %	16.5 %	16.9 %

P_{max}, V_{oc}, I_{sc}, V_{mpp}, and I_{mpp} tested at STC defined as irradiance of 1000 W/m² 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	195 W	200 W	205 W	210 W	215 W	220 W
Maximum Power (P_{max})	142 W	148 W	150 W	152 W	156 W	160 W
Open Circuit Voltage (V_{oc})	30.6 V	30.9 V	31. 2V	31.4 V	31.6 V	31.8 V
Short Circuit Current (I_{sc})	6.54 A	6.76 A	6.80 A	6.82 A	6.91 A	7.02 A
Voltage at Maximum Power (V_{mpp})	23.6V	23.8V	23.9 V	24.2 V	24.5 V	24.8 V
Current at Maximum Power (I_{mpp})	6.02 A	6.22 A	6.30 A	6.35 A	6.37 A	6.45 A
Module Efficiency (%)	11.9 %	12.4 %	12.6 %	12.7 %	13.1 %	13.4 %
Cell Efficiency (%)	15.0 %	15.4 %	15.8 %	16.2 %	16.5 %	16.9 %

P_{max}, V_{oc}, I_{sc}, V_{mpp}, and I_{mpp} tested at NOCT defined as irradiance of 800 W/m²; 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	1000 V (IEC)
Series Fuse Rating	15 A
Maximum Reverse Current	Series fuse rating multiplied by 1.35

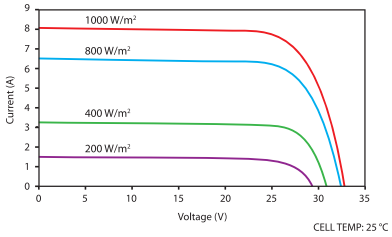
Nomenclature

Full product name:
SF190−27−1P*xxx*
xxx represents the power class

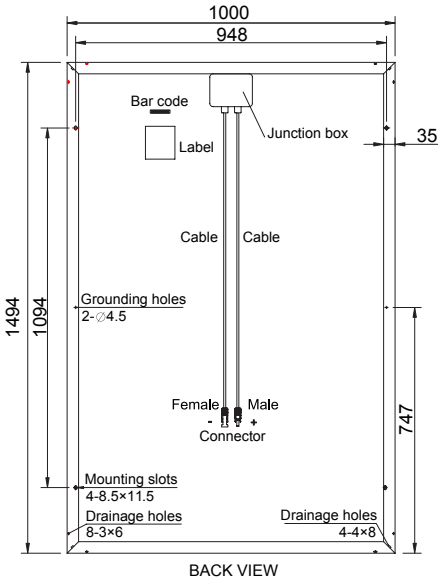
Performance at Low Irradiance:

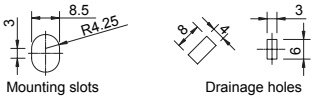
The typical relative change in module efficiency at an irradiance of 200 W/m² in relation to 1000 W/m² (both at 25 °C and AM 1.5 spectrum) is less than 5 %.

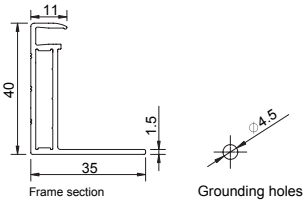
Various Irradiance Levels



Basic Design







Mechanical Characteristics

Dimensions	1494 mm × 1000 mm × 40 mm
Weight	17 kg
Frame	Aluminum alloy
Front	Tempered glass
Encapsulant	EVA
Back Cover	Composite sheet
Cell Technology	Polycrystalline
Cell Size	156 mm × 156 mm
Number of Cells (Pieces)	54 (6 × 9)
Junction Box	Protection class IP65 with bypass-diode
Output Cables	Solar cable: 4 mm²; length 900 mm
Connector	Linyang LY0706−2

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	2400 Pa / 5400 Pa

Packaging and Storage

Storage Temperature	− 40 °C to 85 °C
Packaging Configuration	24 pieces per pallet
Loading Capacity (40 ft. HQ Container)	720 pieces

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