SOLAR FRONTIER

Product Overview
SF145-S
SF150-S
SF155-S
SF160-S
SF165-S
SF170-S



Next Generation CIS

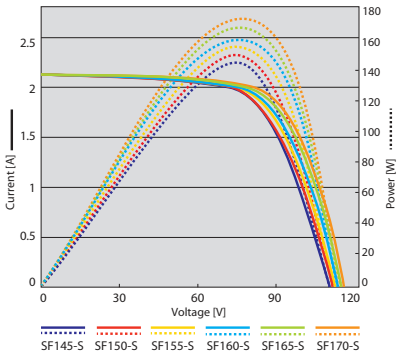
Solar Frontier's SF145–170 module series offers the highest conversion efficiency of any mass-produced thin-film module, up to 13.8 %. All modules are RoHS compliant and cadmium- and lead-free. Fewer production steps and raw materials also mean an industry-leading energy payback time of less than one year. SF145–170 modules are shipped in cardboard-free packaging and use recyclable corner pieces.

Product & Technology Highlights

- Highest efficiency mass-production thin-film module, up to 13.8 %
- World record 20.9 % achieved in laboratory
- Light Soaking Effect raises output after installation
- Good low-light behavior
- High shadow tolerance
- High temperature stability
- Based on proprietary R&D since 1978
- Cadmium and lead free

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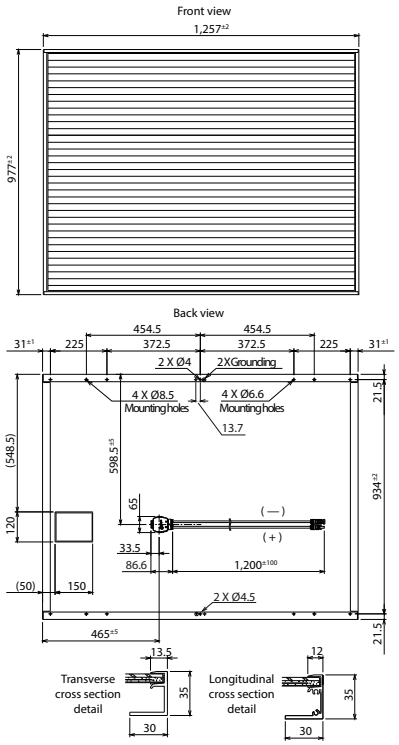
I-V Curve



Certificates and Guarantee

All new product classes are subject to immediate certification
Product guarantee: 5 years (extended garantee upon request)
Power output guarantee: 90 % for 10 years, 80 % for 25 years

Module Drawing



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STC Characteristics

		SF145-S	SF150-S	SF155-S	SF160-S	SF165-S	SF170-S
Nominal power	Pmax	145 W	150 W	155 W	160 W	165 W	170 W
Module efficiency	%	11.8 %	12.2 %	12.6 %	13.0 %	13.4 %	13.8 %
Power tolerance		+5 W/ 0 W					
Open circuit voltage	Voc	107.0 V	108.0 V	109.0 V	110.0 V	110.0 V	112.0 V
Short circuit current	Isc	2.20 A	2.20 A	2.20 A	2.20 A	2.20 A	2.20 A
Voltage at nominal power	Vmpp	81.0 V	81.5 V	82.5 V	84.0 V	85.5 V	87.5 V
Current at nominal power	Impp	1.80 A	1.85 A	1.88 A	1.91 A	1.93 A	1.95 A

Standard Test Conditions (STC): 1,000 W/m² irradiance, module temperature 25 °C, air mass 1.5. Isc and Voc are ±10 % tolerance of STC rated values. Module output may rise due to the Light Soaking Effect. Subject to simulator measurement uncertainty (using best-in-class AAA solar simulator and applying Solar Frontier preconditioning requirements): +10 %/ -5 %.

NOCT Characteristics

		SF145-S	SF150-S	SF155-S	SF160-S	SF165-S	SF170-S
Nominal power	Pmax	108 W	111 W	115 W	119 W	123 W	126 W
Open circuit voltage	Voc	97.4 V	98.3 V	99.2 V	100.0 V	100.0 V	102.0 V
Short circuit current	Isc	1.76 A	1.76 A	1.76 A	1.76 A	1.76 A	1.76 A
Voltage at nominal power	Vmpp	76.0 V	76.4 V	77.4 V	78.8 V	80.2 V	82.1 V
Current at nominal power	Impp	1.43 A	1.47 A	1.49 A	1.51 A	1.53 A	1.55 A

Nominal Operating Cell Temperature Conditions: Module operating temperature at 800 W/m² irradiance, air temperature 20 °C, wind speed 1 m/s and open circuit condition.

Performance at Low Irradiance

Efficiency reduction of maximum power from an irradiance of 1,000 W/m² to 200 W/m² at 25 °C is typically 2.0 %. The standard deviation for the reduction of efficiency is 1.9 %.

Temperature Characteristics

NOCT		47 °C
Temperature coefficient of Isc	α	+0.01 %/K
Temperature coefficient of Voc	β	-0.30 %/K
Temperature coefficient of Pmax	δ	-0.31 %/K

Mechanical Characteristics

Dimensions (L x W x H)	1,257 x 977 x 35 mm (49.5 x 38.5 x 1.4 in.)
Weight	20 kg (44.1 lbs)
Application class (IEC 61730)	Class A
Fire rating (IEC 61730)	Class C
Safety class (IEC 61140)	II
Snow/wind load*	2,400 Pa (IEC 61646) / 1,600 Pa design load (UL 1703)
Cell type	CIS glass substrate (cadmium free)
Front cover	Clear tempered glass, 3.2 mm
Encapsulant	EVA
Back sheet	Weatherproof plastic film (color: black & silver)
Frame	Anodized aluminum alloy (color: black)
Edge sealant	Butyl rubber
Junction box	Protection rating: IP67 (with bypass diode)
Adhesive	Silicone
Output cables (conductor)	2.5 mm² / AWG14 (halogen free)
Cable lengths (symmetrical)	1,200 mm (47.2 in.)
Connectors	MC4 compatible
Packing information	25 modules/pallet • 36 pallets/40' container (900 modules)

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www.solar-frontier.com

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