

Product Overview

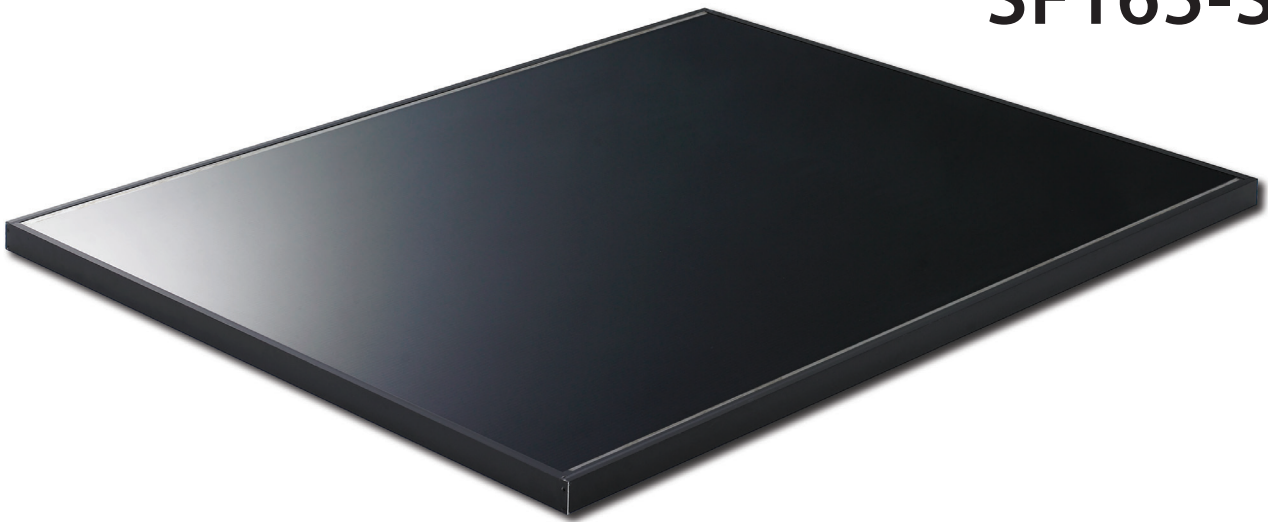
SF145-S

SF150-S

SF155-S

SF160-S

SF165-S



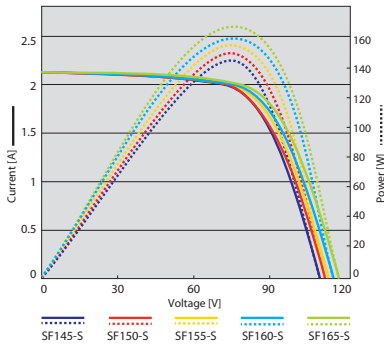
Next Generation CIS

Solar Frontier's SF145-165 module series offers the highest conversion efficiency of any mass-produced thin-film module, up to 13.4 %. 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. SF145-165 modules are shipped in cardboard-free packaging and use recyclable corner pieces.

Product & Technology Highlights

- Highest efficiency mass-production thin-film module, up to 13.4 %
- World record 19.7 % 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

I-V Curve

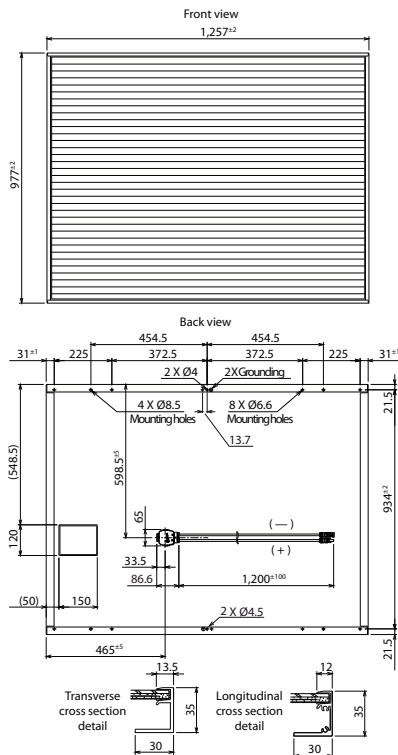


Certificates and Guarantee



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

Module Drawing



Contact Information

Solar Frontier Europe

Grünwald bei München, Germany
 Tel: +49 89 92 86 142 0

Solar Frontier Italy

Bari, Italy | Tel: +39 080 89 66 984

Solar Frontier K.K. (Headquarter)

Tokyo, Japan | Tel: +81 3 5531 5626

Solar Frontier Middle East

Al Khobar, Kingdom of Saudi-Arabia
 Tel: +966 3882 0260

Solar Frontier Americas

Santa Clara, CA, USA | Tel: +1 408 916 4150

www.solar-frontier.com
www.solar-frontier.eu

STC Characteristics

		SF145-S	SF150-S	SF155-S	SF160-S	SF165-S
Nominal power	Pmax	145 W	150 W	155 W	160 W	165 W
Module efficiency	%	11.8 %	12.2 %	12.6 %	13.0 %	13.4 %
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
Short circuit current	Isc	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
Current at nominal power	Imp	1.80 A	1.85 A	1.88 A	1.91 A	1.93 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
Nominal power	Pmax	108 W	111 W	115 W	119 W	123 W
Open circuit voltage	Voc	97.4 V	98.3 V	99.2 V	100.0 V	100.0 V
Short circuit current	Isc	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
Current at nominal power	Imp	1.43 A	1.47 A	1.49 A	1.51 A	1.53 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 mm ² / 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)	

* UL: 1.5 x design load is applied to the module, i.e. 2,400 Pa (50.1 lbs/ft²) is applied to meet the 1,600 Pa UL design load standard.