

## Product Data Sheet

**SF140-L**

**SF145-L**

**SF150-L**

**SF155-L**



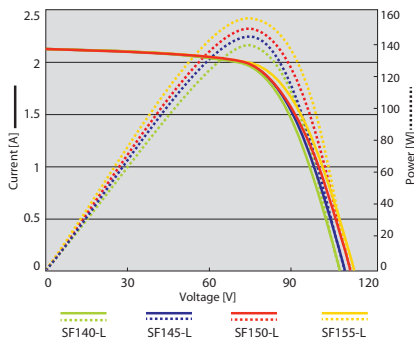
### Next Generation CIS

Solar Frontier's new SF140–155 module series offers the highest conversion efficiency of any mass-produced thin-film module, up to 12.6%. The modules feature the light-soaking effect unique to Solar Frontier's CIS technology, which provides higher output than initially specified. 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. SF140–155 modules are shipped in virtually cardboard-free packaging and use recyclable corner pieces.

### Product & Technology Highlights

- Highest efficiency mass-production thin-film module, up to 12.6%
- World record 17.2% achieved in laboratory (30 cm x 30 cm module)
- Up to 10% extra kWh/kWp vs crystalline modules
- Light soaking effect boosts output after installation
- Over 100 MW delivered since 2007
- Based on proprietary R&D since 1978
- Cadmium and lead free
- PTC/STC rating over 90%

### I-V Curve

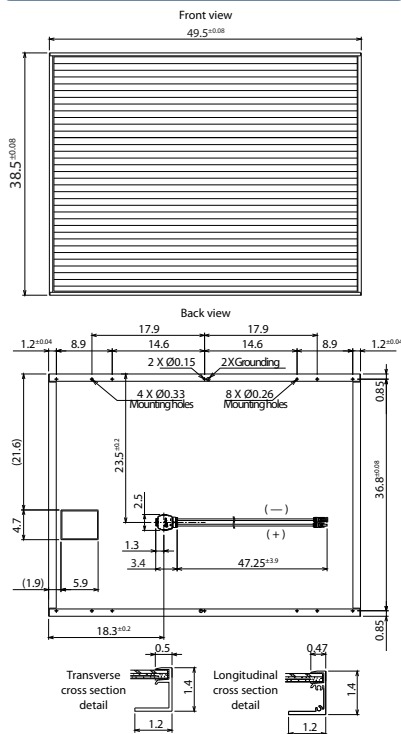


### Certificates and Compliance\*



\*IEC/TUV/UL certifications for SF155-L modules are pending.

### Module Drawing



### Contact Information

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### STC Characteristics

		SF140-L	SF145-L	SF150-L	SF155-L
Maximum power	P <sub>max</sub>	140 W	145 W	150 W	155 W
Module efficiency	%	11.4%	11.8%	12.2%	12.6%
Tolerance of P <sub>max</sub>		+10%/-5%			
Factory binning		±2.5 W	±2.5 W	±2.5 W	±2.5 W
Open circuit voltage	V <sub>oc</sub>	109.0 V	110.0 V	110.0 V	108.0 V
Short circuit current	I <sub>sc</sub>	2.10 A	2.10 A	2.10 A	2.20 A
Voltage at maximum power	V <sub>mpp</sub>	77.0 V	78.0 V	79.0 V	80.0 V
Current at maximum power	I <sub>mpp</sub>	1.82 A	1.86 A	1.90 A	1.95 A

Standard Test Conditions (STC): 1,000 W/m<sup>2</sup> irradiance, module temperature 25 °C (77 °F), air mass 1.5. I<sub>sc</sub> and V<sub>oc</sub> are ±10% tolerance of STC rated values. Module output may rise after light soaking due to its unique characteristics.

### NOCT Characteristics

		SF140-L	SF145-L	SF150-L	SF155-L
Maximum power	P <sub>max</sub>	102 W	106 W	109 W	113 W
Open circuit voltage	V <sub>oc</sub>	97.8 V	98.7 V	98.7 V	96.9 V
Short circuit current	I <sub>sc</sub>	1.66 A	1.66 A	1.66 A	1.74 A
Voltage at maximum power	V <sub>mpp</sub>	72.7 V	73.6 V	74.5 V	75.5 V
Current at maximum power	I <sub>mpp</sub>	1.41 A	1.44 A	1.47 A	1.50 A

Nominal Operating Cell Temperature Conditions: Module operating temperature at 800 W/m<sup>2</sup> irradiance, air temperature 20 °C (68 °F), 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/m<sup>2</sup> to 200 W/m<sup>2</sup> at 25 °C (77 °F) is typically 3.0%. The standard deviation for the reduction of efficiency is 2.6%.

### Temperature Characteristics

NOCT		47 °C (116 °F)
Temperature coefficient of I <sub>sc</sub>	α	+0.01%/K
Temperature coefficient of V <sub>oc</sub>	β	-0.30%/K
Temperature coefficient of P <sub>max</sub>	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)	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: IP 67 (with bypass diode)	
Adhesive	Silicone	
Output cables (conductor)	2.5 mm <sup>2</sup> / 14 AWG (halogen free)	
Cable lengths (symmetrical)	1,200 mm (47.2 in.)	
Packing information	25 panels/pallet • 36 pallets/40' container (900 panels)	

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