CIS Photovoltaic Module

EU/ASIA-PACIFIC Edition

Solar Frontier

CIS Photovoltaic Module

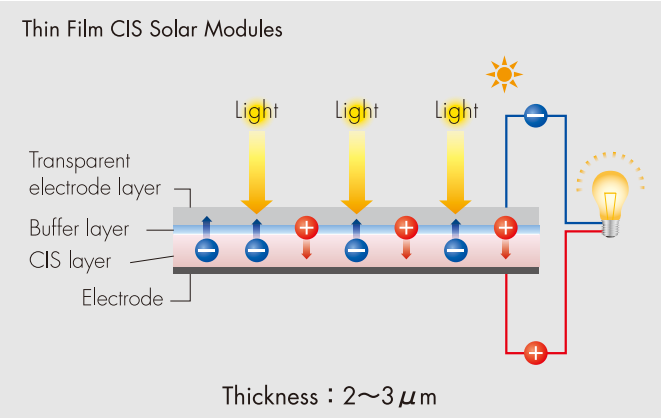
What is CIS?

CIS stands for the elements Copper **(C)** , Indium **(I)** , and Selenium **(S)** that are used in our thin film solar modules. CIS modules have numerous advantages over conventional crystalline silicon solar modules.

C ···**Copper**
I ···**Indium**
S ···**Selenium**

CIS is 100 times thinner and non-toxic.

CIS modules are better for the environment. At 2~3 micrometers thick versus 200~300 micrometers of typical crystalline modules, CIS uses less natural resources. As a cadmium-free, non-toxic product, CIS fully complies with european RoHS (Restriction of Hazardous Substances) regulations.



CIS is the Energy Payback Time (EPT) leader.

EPT is the amount of time required in operation to recover the energy spent in producing the modules themselves. Simply put, CIS modules require less energy to produce—60% less than the current industry standard crystalline silicon.

EPT comparison with crystalline silicon, amorphous silicon, and CIS PV modules

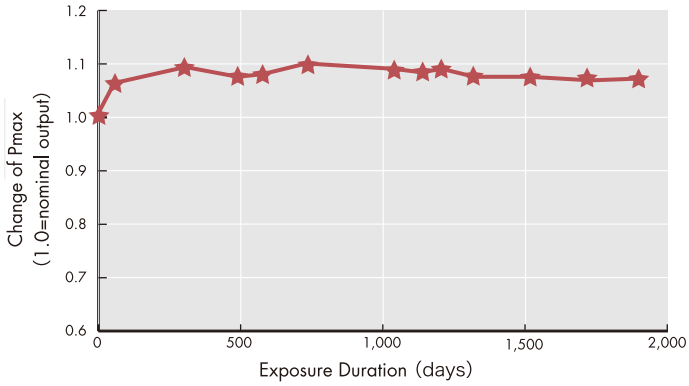
Crystalline Silicon	Amorphous Silicon	CIS
1.5	1.1	**0.9**

100MW production case (unit:years)

Source : New Energy and Industrial Technology Development Organization(NEDO)

CIS alone benefits from "light soaking."

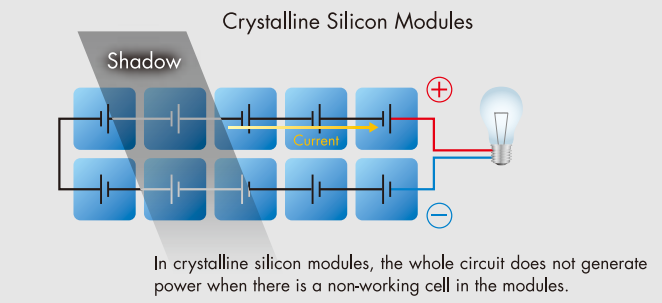
Independent tests consistently confirm up to 10% increased output over the factory rating once CIS modules are installed. This is due to unique chemical properties in our CIS that are superior to other technologies.

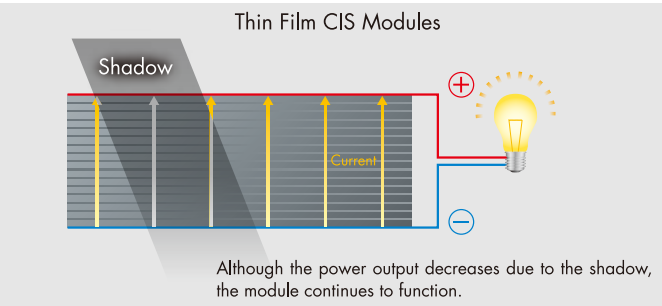


Source : Showa Shell Solar K.K. Atsugi Research Center

Continuous operation with shadows.

CIS modules have more stable power output even when part of the surface of the module is covered by shadow. This is because of electrical characteristics of the circuit. Crystalline silicon modules would entirely stop generating power under the same conditions.





CIS has advanced performance and aesthetics.

The deep colour of CIS module cells contributes to the better light-absorbing performance compared to crystalline silicon solar modules. Most agree that the uniform dark colour simply looks better.


Thin Film CIS Solar Modules


Crystalline Silicon Solar Modules

Electrical Performance at Standard Testing Conditions (STC) *1

		Unit	SF70-EX-B	SF75-EX-B	SF77H-EX-B	SF80-EX-B	SF82H-EX-B	SF85-EX-B	SF87H-EX-B	SF90-EX-B
Maximum power	Pmax	W	70	75	77.5	80	82.5	85	87.5	90
Tolerance of Pmax			+7%/−5%							
Open circuit voltage:	Voc	V	54	55.5	56	56.5	57	57.5	59.0	59.8
Short circuit current:	Isc	A	2.2	2.2	2.23	2.26	2.26	2.3	2.3	2.3
Voltage at maximum power	Vmpp	V	37.5	40.5	40.8	41	41.7	42.5	43.8	45
Current at maximum power	Impp	A	1.85	1.85	1.9	1.95	1.98	2.00	2.00	2.00
Maximum system voltage			1000V DC							
Maximum reverse current			7A							
Performance at low irradiance*2			2% reduction							

Note*1 Standard Test Conditions (STC) :1,000W/m² irradiance module, temperature 25°C and a spectral distribution of irradiance according to air mass 1.5.

Note*2 Efficiency reduction of maximum output from an irradiance of 1,000W/m² to 200W/m² at 25°C is typically 2%.

Electrical Data at Nominal Operating Cell Temperature Condition (20°C ambient Tmp, 800W/m², 1m/sec wind)

		Unit	SF70-EX-B	SF75-EX-B	SF77H-EX-B	SF80-EX-B	SF82H-EX-B	SF85-EX-B	SF87H-EX-B	SF90-EX-B
Maximum power	Pmax	W	51	54.6	56.4	58.3	60.1	61.9	63.7	65.5
Open circuit voltage	Voc	V	48.4	49.8	50.2	50.7	51.1	51.6	52.9	53.7
Short circuit current	Isc	A	1.74	1.74	1.76	1.78	1.78	1.82	1.82	1.82
Voltage at maximum power	Vmpp	V	35.5	38.3	38.5	38.7	39.4	40.1	41.3	42.5
Current at maximum power	Impp	A	1.44	1.44	1.48	1.52	1.54	1.55	1.55	1.55

Temperature Coefficients

Maximum power	Pmax	− 0.35%/K
Open circuit voltage	Voc	− 0.29%/K
Short circuit current	Isc	+ 0.03%/K
NOCT	47°C	

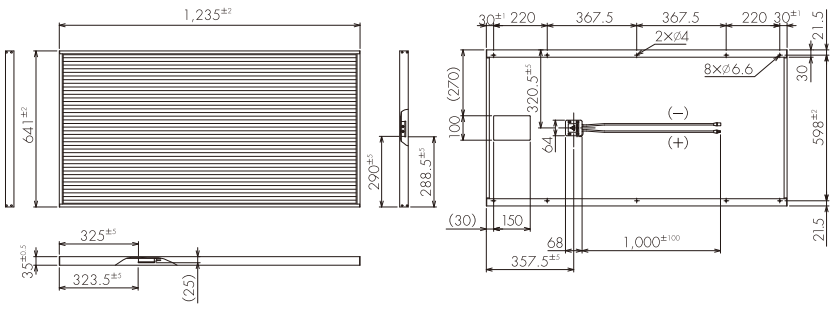
Certifications / Manufacturer's Warranty

IEC 61646
IEC 61730
ISO 9001 certified factories

We offer industry standard and competitive warranties.

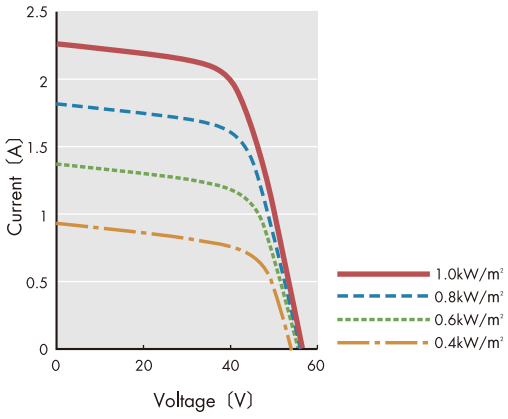
Mechanical Characteristics

Dimensions	1235mm × 641mm × 35mm
Weight	12.4Kg
Output cables	JB(IP67) with bypass diode, cable 2.5mm², length 1m(+ −), MC4 connector
Snow and wind load	2400Pa
Module operating temperature	− 40°C~85°C

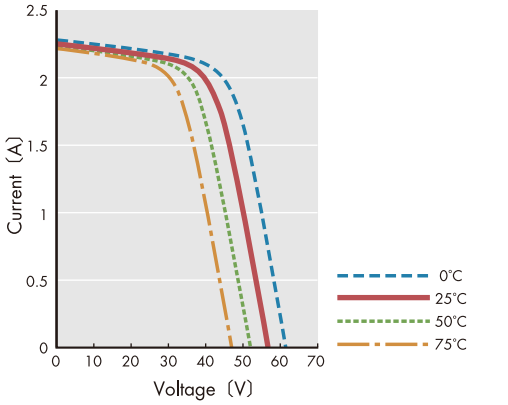


Electrical Characteristics

Characteristics by solar radiation intensity
(SF80-EX-B AM1.5 25°C)



Characteristics by temperature
(SF80-EX-B AM1.5 1000W/m²)



The data presented on this brochure is nominal and subject to change without notice.

EU/ASIA-PACIFIC Edition
2010-05

Installation Examples

Utility


La Rioja, Spain

Saudi Arabia


Yamanashi, Japan

Commercial


Parking Lot, Japan


Building, Japan


Container Yard, Japan

Residential


Munich,Germany


Tournon sor Rhône, France


Tochigi, Japan

Company Profile

Headquartered in Tokyo, Japan, Solar Frontier is committed to the superior potential of CIS technology to set the world's standard for converting sunlight into usable energy. Based on more than 30 years of research and development, we are committed to leading the world in developing the full potential of CIS with an investment now exceeding $1 billion. This makes Solar Frontier the world's largest manufacturer of CIS solar panels, at more than 1GW of annual production capacity, primarily at our 1GW plant in Miyazaki, Japan.

SOLAR FRONTIER

Solar Frontier

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