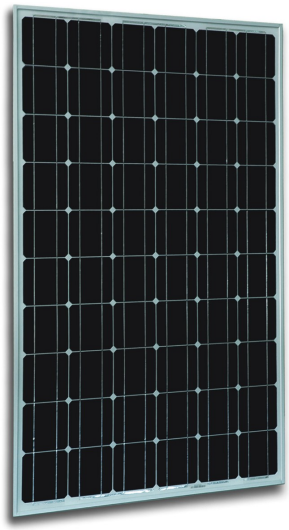
PHOTOVOLTAIC SOLAR ENERGY
MONOCRYSTALINE MODULES - SI-ESF-M-M240-265W



These PV modules using monocrystalline silicon cells pseudosquared high efficiency (the cells are made of a single crystal of high purity silicon) to transform the energy of sunlight into electrical energy of current. Each cell is electrically rated to optimize the behavior of the module.

The cell circuit is laminated using EVA (Ethylene-Vinyl Acetate) as a encapsulant in a combination of a tempered glass on its front and a plastic polymer (Tedlar) on the back which provides complete protection and sealed against environmental agents and electrical insulation.

The junction boxes with IP-65, are made from high temperature resistant plastics and containing terminals, connection terminals and the protection diodes (by-pass).

Its performance is excellent over the entire range of light spectrum, with particularly high yields in low light situations or cloudiness to direct sunlight (diffuse radiation).

The compact, anodized aluminum frame provides an optimal relationship-weight moment of inertia, to obtain greater rigidity and resistance to twisting and bending. It has several holes to attach the module to the support structure and ground if necessary.

The design of these modules makes their integration in both industrial and residential buildings (one of the most emerging sectors in the photovoltaic market), and other infrastructure, simple and aesthetic.

WARRANTIES

Our manufacturing plants have been prepared in accordance with the ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007.

We have a quality control divided into three elements:

- Regular inspections allow us to guarantee the quality of the raw material.
- Quality control in the process of our manufacturing procedures.
- Quality control of finished products, we conduct through inspections and tests of reliability and performance.

The photovoltaic modules Solar Innova have passed several international certification requirements and continue to improve the quality and performance of our products of proven technologies. Quality is one of our core principles and the pursuit of quality is the engine of the company's future, in their desire to continually offer better products.

Our PV modules are certified by internationally recognized laboratories (ZDHY, SGS, BRE Global, TÜV Rheinland Germany, TÜV Rheinland North America), and are proof of our strict adherence to international safety standards, long term performance and overall quality of products (ISO, CE, IEC, EN, MCS, UL).

SOLAR INNOVA

Import Sun Pv™

PHOTOVOLTAIC SOLAR ENERGY
MONOCRYSTALINE MODULES - SI-ESF-M-M240-265W

ELECTRICAL CHARACTERISTICS							
Maximum power (Pmpp)	Watts	240	245	255	260	265	255
Tolerance	%	0 ~ +3					
Voltage at maximum power (Vmpp)	Volts	30.38	30.38	30.57	30.62	30.81	30.57
Current at maximum power (Impp)	Amperes	7.90	8.07	8.34	8.49	8.60	8.34
Open circuit voltage (Voc)	Volts	37.50	37.50	37.74	37.80	38.04	37.74
Short circuit current (Isc)	Amperes	8.50	8.54	8.71	8.79	8.97	8.71
Maximum system Voltage (Vsyst)	Volts	600 (UL) / 1000 (IEC)					
Diodes (By-pass)	Quantity	3					
Maximum series fuse	Amperes	15					
Module-Efficiency	%	14.62	14.92	15.23	15.53	15.84	16.14
Form Factor	%	≥ 73					
Protection	Grade	IP-65					

MECHANICAL CHARACTERISTICS		
Height	mm.	1655
Width	mm.	992
Thickness	mm.	45
Structure	Material	Anodized aluminum AL6063-T5, minim 15 µm
Weight	Kg.	20
Front	Material	High transmissivity toughened glass
Front-Thickness	mm.	3.2 ± 0.2
Cells	Type	Monocrystalline
Cells	Quantity	6 x 10 = 60
Cells-Size	mm.	156 x 156
Cells-Serial connection	Quantity	60
Cells-Parallel connection	Quantity	1
Encapsulation	Materials	Glass/EVA/Cells/EVA/TPT
Junction box	Type	IP-65 – TÜV-IEC/EN 61215
Junction box	Isolation	Versus humidity and inclement weather
Cables	Type	Polarized and symmetric in length
Cables-Length	mm.	900
Cables-Section of copper	mm^2	4
Cables	Features	Low contact resistance Minimal losses for voltage drop
Connectors	Type	Compatible Type III and Type IV

THERMAL CHARACTERISTICS		
Temperature coefficient of short circuit current α (Icc)	%/º C	+ 0.028
Temperature coefficient of open circuit voltage β (Voc)	%/º C	- 0.347
Temperature coefficient of power γ (Pmpp)	%/º C	- 0.471
Maximum power temperature coefficient (Impp)	%/º C	+ 0.10
Voltage temperature coefficient of maximum power (Vmpp)	%/º C	- 0.38
NOCT (Nominal Operating Cell Temperature)	º C	+ 47 ± 2

TOLERANCES		
Working temperature	º C	- 40 ~ + 85
Dielectric Isolation Voltage	Volts	3000
Mechanical load capacity	$Kg./m^2$	< 550
Relative humidity	%	0 ~ 100
Impact resistance (ice ball of Ø 25.4 mm.) over 11 points	m/s	23
Wind resistance	m/s	60
Mechanical load test pressure and tension for 3 cycles (1cycle = 1 hour)	Pa	5400
Mechanical load-bearing capacity	$Kg./m^2$	551 (5400 Pa) IEC
	$Lbs./ft^2$	75.2 (3600 Pa) UL
The maximum bending point was obtained in the middle of the module with four anchor points in the frame. The maximum bending point was obtained by applying a pressure of 5400 Pa, being 15 mm. The maximum bending point was obtained by applying a tension of 5400 Pa, being 25 mm.		

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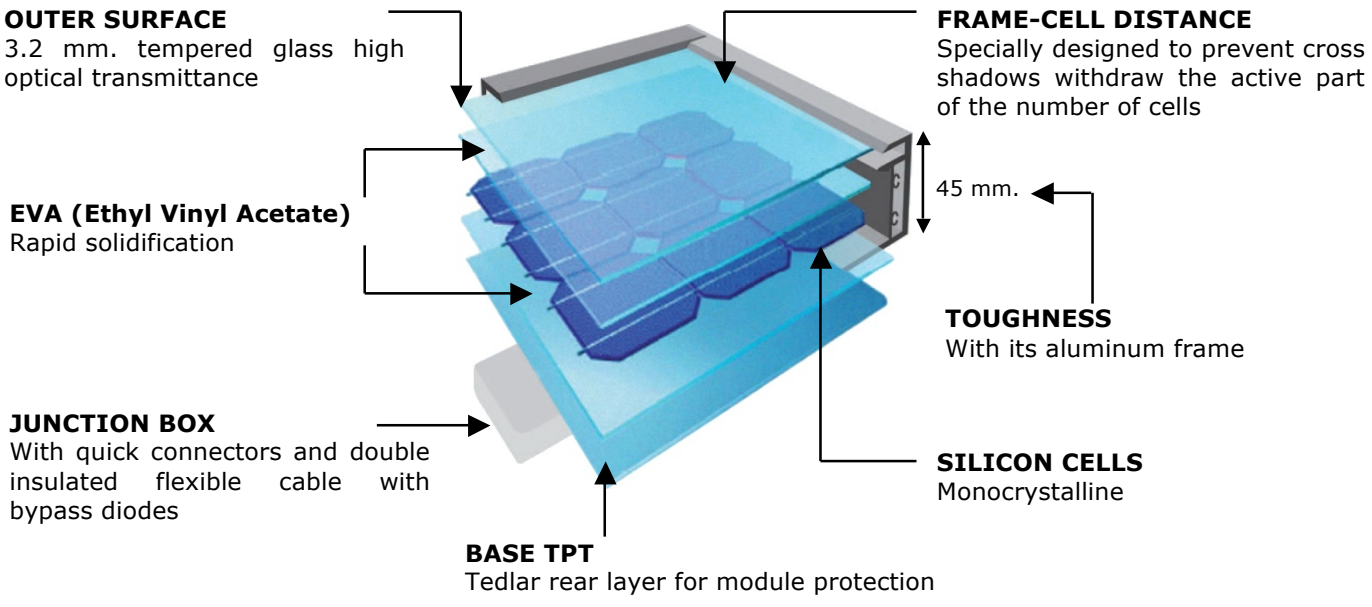
WARRANTIES		
Manufacturing defects	Years	12
Performance	Minimal Rated Power %/Years	90 % at 12 years, 80 % at 25 years.

MEASUREMENTS PERFORMED IN ACCORDANCE WITH ASTM STANDARD TEST METHODS E1036, CORRECTED TO STANDARD TEST CONDITIONS (STC)		
Air quality/Spectral distribution	AM	1,5 ASTM G173-03e1 (2008)
Luminous intensity/Radiation	W/m^2	1000
Cell temperature	º C	25

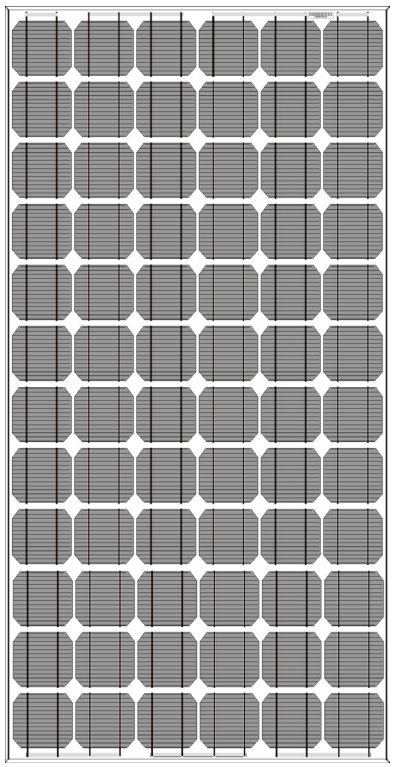
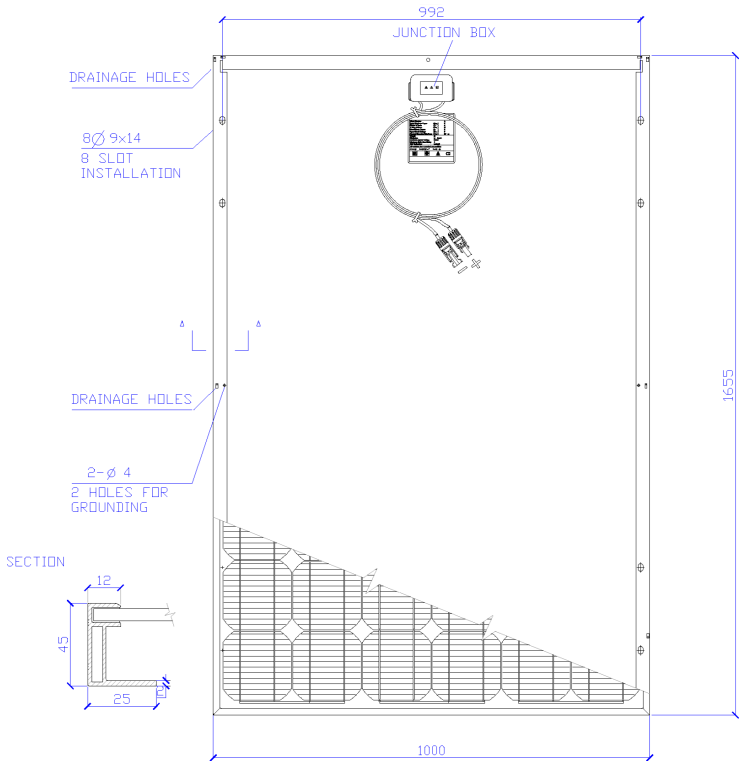
STRUCTURAL CHARACTERISTICS	
Cells	High efficiency cells with anti-reflective layer of Silicon Nitride.
Electric conductors	Flat Copper (Cu) bath in a Tin (Sn) and Silver (Ag) alloy, which improves weldability.
Welds	Cell and drivers in installments for stress relief.
Laminate	Composed of ultra-clear tempered glass on the front and rear, EVA encapsulant thermostable embedding cells and electrical insulation on the back formed by a compound of tedlar and polyester.
Junction box	Hoses and quick connectors with anti-error. Include bypass diodes, interchangeables thanks to the wiring system has no welds, all electrical contacts are made by pressure, thus avoiding the possibility of cold welding.

CHARACTERISTICS OF WORK
- The power of solar cells varies in the output of the production process. The different power specifications of these modules reflect this dispersion.
- Cells during the early months of light exposure, may experience a degradation photonics could decrease the value of the maximum power the module up to 3 %.
- The cells, in normal operating conditions, reach a temperature above the standard measurement conditions of the laboratory. The NOCT is a quantitative measure of the increase. NOCT measurement is performed under the following conditions: radiation of 0.8 kW/m^2, temperature 20º C and wind speed of 1 m/s.
- The electrical data reflect typical values of the modules and laminates as measured at the output terminals at the end of the manufacturing process.

CONSTRUCTION DETAILS



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FRONT FORWARD	FRONT REAR
	

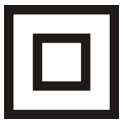
CERTIFICATES

















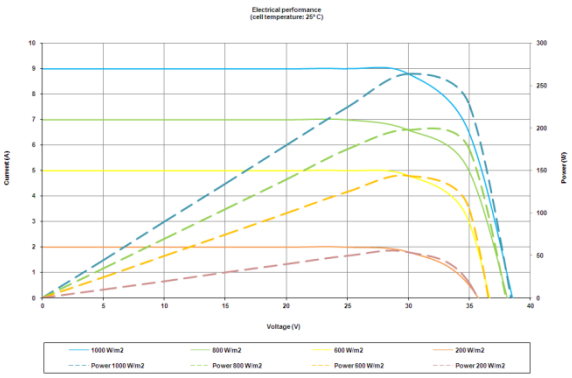


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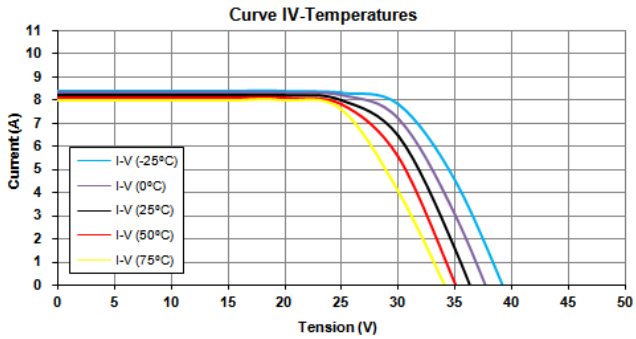
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PERFORMANCE

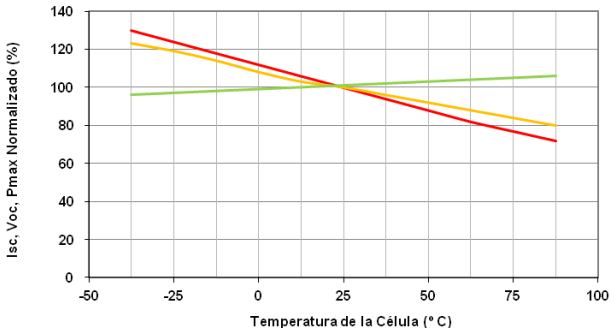
CURVES IV-IRRADIANCE



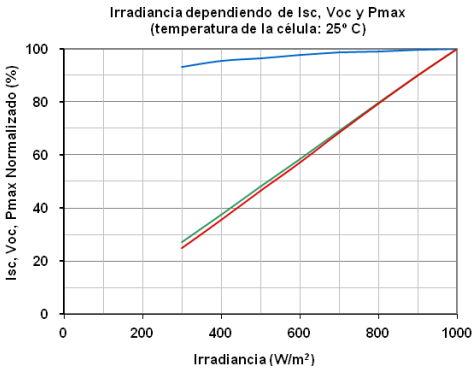
CURVES IV-TEMPERATURE



TEMPERATURE



IRRADIANCE



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PACKAGING AND TRANSPORT		
Panel	Size	1655 x 992 x 45 mm.
	Weight	20 Kg.
Box (each big pallet add 16 pieces Solar modules by 8 boxes)	Size	1700 x 1130 x 2150 mm.
	Weight pallet (Empty)	120 Kg.
	Panels	38 units (20'FT), 22 units (40'FT)
	Weight pallet (Gross)	880 Kg.
Container 20' HQ	Panels	228 units
	Boxes	6 units
	Weight (Panels)	5280 Kg.
Container 40' HQ	Panels	572 units
	Boxes	26 units
	Size	1700 x 1130 x 1150 mm.
	Weight	26 units x 560 Kg. = 14560 Kg.





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