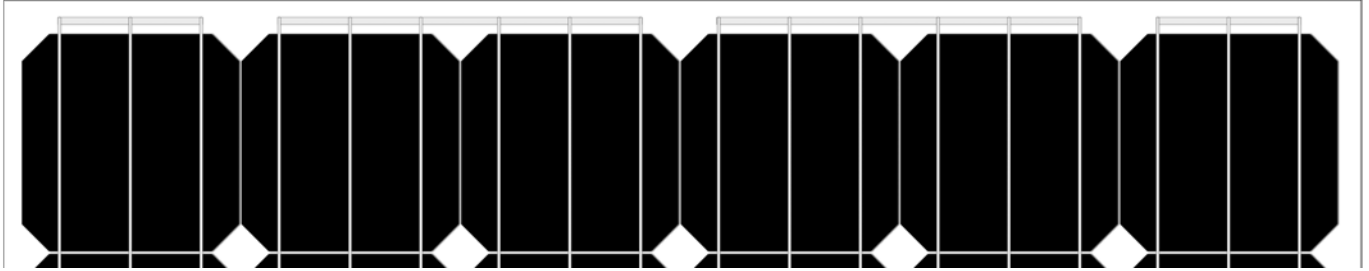




PHOTOVOLTAIC SOLAR ENERGY

MONOCRYSTALLINE MODULES - SI-ESF-M-BIPV-SM-M156-54



ABOUT SOLAR INNOVA

Solar Innova uses the latest materials to manufacture photovoltaic modules. This ensures that we can control our quality strictly in raw materials and production processes, offering our customers a durable and sustainable performance products backed by our 25 year limited power warranty.

PERFORMANCE

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

ARCHITECTURAL INTEGRATION

The "architectural integration of photovoltaic modules", also called "Solar Architecture" or "BIPV" (Building Integrated Photovoltaics) is defined as the installation of these PV modules have a dual function; Energy and architectural (cladding, fencing or shading) and also replace conventional construction or are constituent elements of architectural composition elements. The line of frameless PV modules Solar Innova was developed considering engineers and architects to provide them with

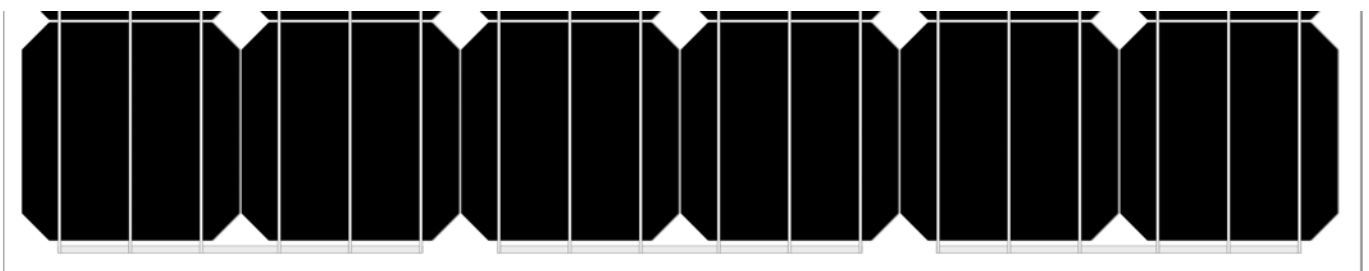
modules that integrate functional and aesthetically in facades and roofs, serving simultaneously as architectural building material and power generator.

CERTIFICATES

Our manufacturing plants have been prepared in accordance with:

- ✓ ISO 9001:2008, in terms of Quality Systems and Business.
- ✓ ISO 14001:2004, in terms of Environmental Management Systems.
- ✓ OHSAS 18001:2007, in terms of Management Systems Health and Safety.

Our PV modules are certified by internationally recognized laboratories and are proof of our strict adherence to international safety standards, long term performance and overall quality of products.

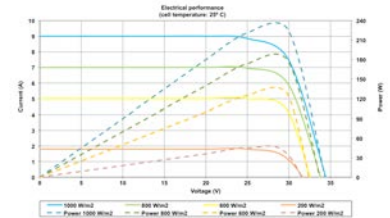




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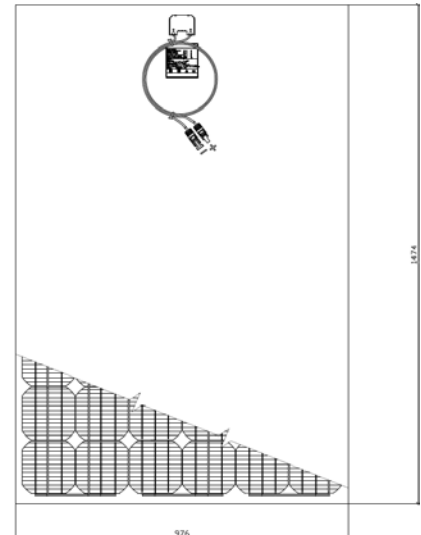
ELECTRICAL CHARACTERISTICS (STC)

Maximum power (P_{mpp})	[Wp]	225	230
Tolerance	[Wp]	0 ~ + 5	
Voltage at maximum power (V_{mpp})	[V]	27.51	27.1
Current at maximum power (I_{mpp})	[A]	8.18	8.33
Open circuit voltage (V_{oc})	[V]	33.84	33.96
Short circuit current (I_{sc})	[A]	8.83	9.54
Maximum system voltage (V_{syst})	[V]	600 (UL) / 1,000 (IEC)	
Maximum series fuse	[A]	15	
Form Factor	[%]	≥ 73	



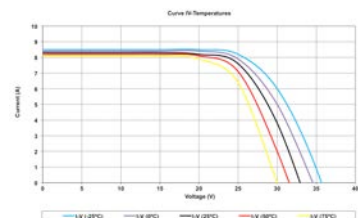
MECHANICAL CHARACTERISTICS

Height	mm	1,474
Width	mm	976
Thickness	mm	30
Weight	kg	17
Front	Material	High transmissivity toughened glass
Front-Thickness	mm	4 ± 0.2
Cells	Type	Monocrystalline
Cells	Quantity	6 x 9
Cells-Size	mm	156 x 156
Cells-Serial connection	Quantity	54
Cells-Parallel connection	Quantity	1
Encapsulation	Materials	Glass/EVA/Cells/EVA/TPT
Junction box	Type	IP67
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	MC4



THERMAL CHARACTERISTICS

Temperature coefficient of short circuit current α (I_{sc})	%/°C	+ 0.0814
Temperature coefficient of open circuit voltage β (V_{oc})	%/°C	- 0.3910
Temperature coefficient of maximum power γ (P_{mpp})	%/°C	- 0.5141
Temperature coefficient of current at maximum power (I_{mpp})	%/°C	+ 0.10
Temperature coefficient of voltage at maximum power (V_{mpp})	%/°C	- 0.38
NOCT (Nominal Operating Cell Temperature)	°C	+ 47 ± 2



WARRANTIES

Manufacturing defects	Years	12
Performance	Minimal Rated Power	90 % at 10 years,
	%/Years	80 % at 25 years.

