



PHOTOVOLTAIC SOLAR ENERGY POLYCRYSTALLINE MODULES - SI-ESF-M-SF-P-12W



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 squared, high-efficiency, polycrystalline silicon cells (the cells are made of several crystals 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.

RESISTANCE

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.

QUALITY

The photovoltaic modules from Solar Innova have passed several international certification requirements and continue to even improve on an already superior quality and performance of 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 our desire to continually offer better products.

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.





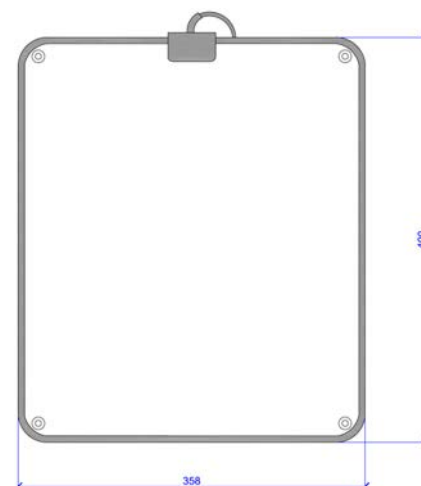
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ELECTRICAL CHARACTERISTICS

Maximum power (P _{mpp})	[Wp]	12
Tolerance	[Wp]	0 ~ + 0.3
Voltage at maximum power (V _{mpp})	[V]	15.30
Current at maximum power (I _{mpp})	[A]	0.78
Open circuit voltage (V _{oc})	[V]	19.30
Short circuit current (I _{sc})	[A]	0.86
Maximum system voltage (V _{syst})	[V]	715 (IEC)
Maximum series fuse	[A]	10
Form Factor	[%]	≥ 73

MECHANICAL CHARACTERISTICS

Height	mm	400
Width	mm	358
Thickness	mm	15
Weight	kg	1.06
Front	Material	High transmission tempered glass
Front-Thickness	mm	0.30
Cells	Type	Polycrystalline
Cells	Quantity	4 x 8
Cells-Size	mm	156 x 52
Cells-Serial connection	Quantity	32
Cells-Parallel connection	Quantity	1
Rear protection	Material	Aluminum foil
Encapsulation	Materials	TPT/EVA/Cells/EVA/Aluminum/TPT
Junction box	Type	IP-65
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	+ 0.055
Temperature coefficient of open circuit voltage β (V _{oc})	%/°C	- 0.347
Temperature coefficient of power γ (P _{mpp})	%/°C	- 0.48
Maximum power temperature coefficient (I _{mpp})	%/°C	+ 0.10
Voltage temperature coefficient of maximum power (V _{mpp})	%/°C	- 0.38
NOCT (Nominal Operating Cell Temperature)	°C	+ 47 ± 2

WARRANTIES

Manufacturing defects	Years	2
Performance	Minimal Rated Power	90 % at 5 years, 80 % at 10 years.
	%/Years	

