



PHOTOVOLTAIC SOLAR ENERGY

MONOCRYSTALLINE MODULES - SI-ESF-M-M156-60



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.

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

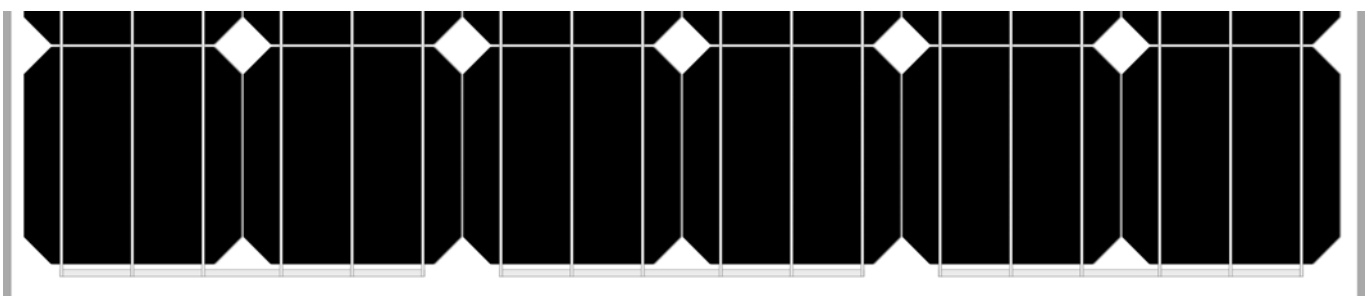
The photovoltaic modules from Solar Innova have passed several international certification requirements and continue to even improve on an already superior quality and performance of products of proven technologies. Quality is one of our core principles and the pursuit of quality is the engine of the 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.

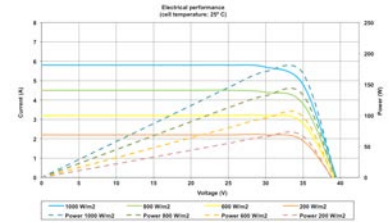




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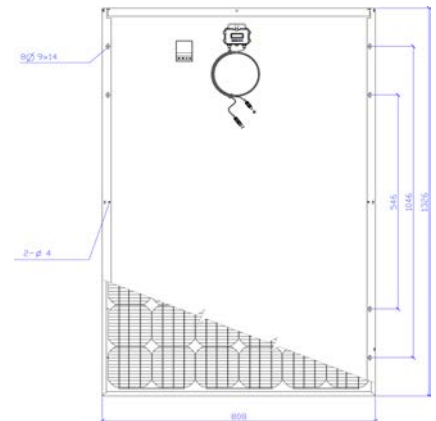
ELECTRICAL CHARACTERISTICS (STC)

| | | | |
|---|------|------------------------|-------|
| Maximum power (P_{mpp}) | [Wp] | 160 | 165 |
| Tolerance | [Wp] | 0 ~ + 5 | |
| Voltage at maximum power (V_{mpp}) | [V] | 30.5 | 30.67 |
| Current at maximum power (I_{mp}) | [A] | 5.26 | 5,38 |
| Open circuit voltage (V_{oc}) | [V] | 37.5 | 37.72 |
| Short circuit current (I_{sc}) | [A] | 5.68 | 5.7 |
| Maximum system Voltage (V_{sys}) | [V] | 600 (UL) / 1,000 (IEC) | |
| Maximum series fuse | [A] | 15 | |
| Form Factor | [%] | ≥ 73 | |



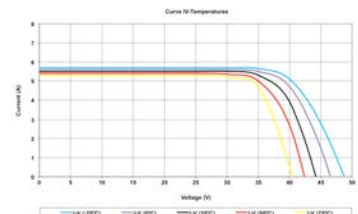
MECHANICAL CHARACTERISTICS

| | | |
|----------------------------------|-----------------|---|
| Height | mm | 1,326 |
| Width | mm | 808 |
| Thickness | mm | 35 |
| Weight | kg | 13.6 |
| Frame | Material | Anodized aluminum AL6063-T5 |
| Front | Material | High transmissivity toughened glass |
| Front-Thickness | mm | 3.2 ± 0.2 |
| Cells | Type | Monocrystalline |
| Cells-Units | Quantity | 6 x 10 |
| Cells-Size | mm | 125 x 125 |
| Cells-Serial connection | Quantity | 60 |
| 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_{mp}) | %/°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. |

