# First Solar® FS Series 3™ PV Module

| MECHANICAL DESCRIPTION | |
|---|---|
| Length | 1200mm |
| Width | 600mm |
| Weight | 12kg |
| Thickness | 6.8mm |
| Area | $0.72m^2$ |
| Leadwire | $4.0mm^2$, 610mm |
| Connectors | MC4 type connector |
| Bypass Diode | None |
| Cell Type | CdS/CdTe semiconductor, 154 active cells |
| Frame Material | None |
| Cover Type | 3.2mm heat strengthened front glass laminated to 3.2mm tempered back glass |
| Encapsulation | Laminate material with edge seal |

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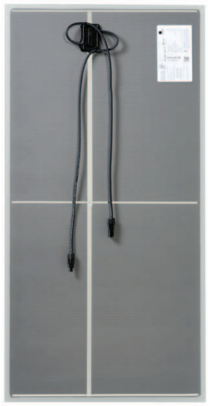
First Solar® FS Series 3™ PV Modules represent the latest advancements in thin film solar module technology. The Series 3 modules are IEC 61646 and IEC 61730 certified for use in systems up to 1000 VDC, and meet the requirements of Safety Class II. First Solar provides cost effective thin film module solutions to leading solar project developers and system integrators for large scale, grid-connected solar power plants. First Solar Global Technical Service provides technical support and comprehensive product documentation to support the design, installation, and long term operations of high performance PV systems

## High Performance PV System Solutions

**Key Features:**

- Produces high energy output across a wide range of climatic conditions with excellent temperature response coefficient
- Proven to perform as predicted with a high Performance Ratio (PR)
- Frameless laminate is robust, cost-effective and recyclable, and does not require module grounding
- Manufactured in highly automated, state-of-the-art facilities certified to ISO 9001:2008 and ISO 14001:2004 quality and environmental management standards



**Warranty:**

- Material and workmanship warranty for ten (10) years and a power output warranty of 90% of the nominal output power rating ($P_{MPP}$+/- 5%) during the first ten (10) years and 80% during twenty-five (25) years subject to the warranty terms and conditions.
- Modules are life cycle managed with a collection and recycling program, providing module owners with no cost, prefunded, end-of-life take back, and recycling of the modules.

For applications in North America please refer to the NA datasheet (PD-5-401-03 NA).

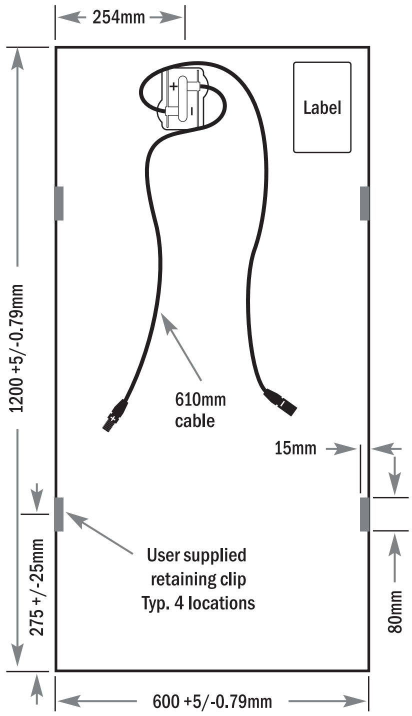
## Electrical Specifications

| MODEL NUMBERS AND RATINGS AT STC[1]* | | | | | | |
|---|---|---|---|---|---|---|
| Nominal Values | | FS-380 | FS-382 | FS-385 | FS-387 | FS-390 |
| Nominal Power(+/-5%) | $P_{MPP}$(W) | 80.0 | 82.5 | 85.0 | 87.5 | 90.0 |
| Voltage at $P_{MAX}$ | $V_{MPP}$(V) | 48.5 | 48.3 | 48.5 | 49.2 | 49.2 |
| Current at $P_{MAX}$ | $I_{MPP}$(A) | 1.65 | 1.71 | 1.76 | 1.78 | 1.83 |
| Open Circuit Voltage | $V_{OC}$(V) | 60.8 | 60.8 | 61.0 | 61.0 | 61.0 |
| Short Circuit Current | $I_{SC}$(A) | 1.88 | 1.94 | 1.98 | 1.98 | 2.04 |
| Maximum System Voltage | $V_{SYS}$(V) | | | 1000 | | |
| Limiting Reverse Current | $I_R$(A) | | | 3.5 | | |
| Maximum Series Fuse | $I_{CF}$(A) | | | 3.5 | | |

| TEMPERATURE CHARACTERISTICS | | |
|---|---|---|
| Nominal Values | | |
| Temperature Coefficient of $P_{MPP}$ | $T_K(P_{MPP})$ | -0.25%/°C |
| Temperature Coefficient of $V_{OC}$, high temp (>25°C) | $T_K(V_{OC,\ high\ temp})$ | -0.27%/°C |
| Temperature Coefficient of $V_{OC}$, low temp (-40°C to + 25°C) | $T_K(V_{OC,\ low\ temp})$ | -0.20%/°C |
| Temperature Coefficient of $I_{SC}$ | $T_K(I_{SC})$ | +0.04%/°C |

| MODEL NUMBERS AND RATINGS AT 800W/m², NOCT[2] 45°C, AM 1.5* | | | | | | |
|---|---|---|---|---|---|---|
| Nominal Values | | FS-380 | FS-382 | FS-385 | FS-387 | FS-390 |
| Nominal Power(+/-5%) | $P_{MPP}$(W) | 60.0 | 61.9 | 63.8 | 65.6 | 67.5 |
| Voltage at $P_{MAX}$ | $V_{MPP}$(V) | 45.5 | 45.3 | 45.5 | 46.2 | 46.2 |
| Current at $P_{MAX}$ | $I_{MPP}$(A) | 1.32 | 1.37 | 1.41 | 1.42 | 1.46 |
| Open Circuit Voltage | $V_{OC}$(V) | 56.5 | 56.5 | 56.7 | 56.7 | 56.7 |
| Short Circuit Current | $I_{SC}$(A) | 1.54 | 1.59 | 1.62 | 1.62 | 1.67 |

## Mechanical Drawing




*All ratings +/-10%, unless specified otherwise. Specifications are subject to change.

[1]Standard Test Conditions (STC) 1000W/m², AM 1.5, 25°C

[2]Nominal Operating Cell Temperature: Module operation temperature at 800W/ m² irradiance, 20°C air temperature, 1m/s wind speed.

## Reliability and Safety

Tested by leading international institutes and certified for reliability and safety.

- Certified to IEC 61646
- Certified to IEC 61730
- Certified to IEC 61701 Salt Mist Corrosion Test
- CE Marking
- Safety Class II @ 1000 V
- MCS Certification

## About First Solar

First Solar is a leading manufacturer of photovoltaic (PV) solar modules, and a premier provider of solar solutions. By continually driving down manufacturing costs, First Solar is delivering an economically and environmentally viable alternative to peaking fossil-fuel generation. From raw material sourcing through end-of-life collection and recycling, First Solar is focused on creating value-driven renewable energy solutions that protect and enhance the environment.