# First Solar Series 4™ PV Module

## ADVANCED THIN FILM SOLAR TECHNOLOGY

## INDUSTRY BENCHMARK SOLAR MODULES

As a global leader in PV energy, First Solar's advanced thin film solar modules have set the industry benchmark with over 8 gigawatts (GW) installed worldwide and a proven performance advantage over conventional crystalline silicon solar modules. Generating more energy than competing modules with the same power rating, First Solar's Series 4™ and Series 4A™ PV Modules deliver superior performance and reliability to our customers.

## PROVEN ENERGY YIELD ADVANTAGE

- Generates more energy than conventional crystalline silicon solar modules with the same power
- Superior temperature coefficient resulting in greater energy yield in typical field operating temperatures
- Superior spectral response resulting in a proven energy yield advantage in humid environments
- Anti-reflective coated glass (Series 4A™) enhances energy production

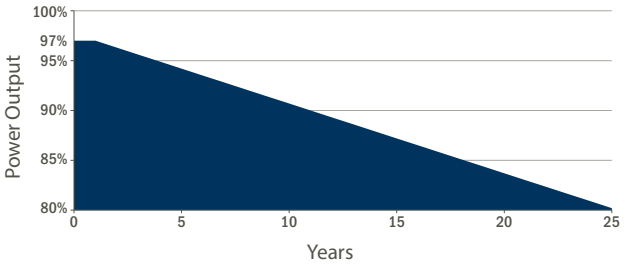
## ADVANCED PERFORMANCE & RELIABILITY

- Improved long-term power-output warranted for 25 years
- Compatible with advanced 1500V plant architectures
- Independently tested to pass accelerated life and stress tests beyond industry standards
- Highly predictable energy in all climates and applications
- Independently certified for reliable performance in high temperature, high humidity, extreme desert and coastal environments

## CERTIFICATIONS & TESTS

- Thresher Test[1], Long-Term Sequential Test[1], and PID-Free
- IEC 61646 1500V, IEC 61730 1500V, CE
- IEC 61701 Salt Mist Corrosion, IEC 60068-2-68 Dust and Sand Resistance
- ISO 9001:2008 and ISO 14001:2004
- UL 1703 and ULC 1703 Listed Class B Fire Rating (Class A Spread of Flame)
- CSI Eligible (CA-USA), FSEC (FL-USA), MCS (UK), CEC Listed (Australia), SII (Israel), InMetro (Brazil)[1]

## MODULE WARRANTY[2]




- 25-Year Linear Performance Warranty[3]
- 10-Year Limited Product Warranty

# FIRST SOLAR SERIES 4™ PV MODULE

## MECHANICAL DESCRIPTION

| | |
|---|---|
| Length | 1200mm |
| Width | 600mm |
| Weight | 12kg |
| Thickness | 6.8mm |
| Area | 0.72m$^2$ |
| Leadwire | 2.5mm$^2$, 610mm |
| Connectors | MC4[8] |
| Bypass Diode | None |
| Cell Type | Thin-film CdTe semiconductor, 216 active cells |
| Frame Material | None |
| Front Glass | 3.2mm heat strengthened<br>Series 4A™ includes anti-reflective coating |
| Back Glass | 3.2mm tempered |
| Encapsulation | Laminate material with edge seal |

## MODULE NUMBERS AND RATINGS AT STC [4,5]

| NOMINAL VALUES | | FS-4102-2 FS-4102A-2 | FS-4105-2 FS-4105A-2 | FS-4107-2 FS-4107A-2 | FS-4110-2 FS-4110A-2 | FS-4112-2 FS-4112A-2 |
|---|---|---|---|---|---|---|
| Nominal Power (± 5%) | $P_{MPP}$ (W) | 102.5 | 105.0 | 107.5 | 110.0 | 112.5 |
| Voltage at $P_{MAX}$ | $V_{MPP}$ (V) | 67.0 | 67.8 | 68.6 | 69.4 | 70.2 |
| Current at $P_{MAX}$ | $I_{MPP}$ (A) | 1.53 | 1.55 | 1.57 | 1.59 | 1.60 |
| Open Circuit Voltage | $V_{OC}$ (V) | 85.3 | 86.0 | 86.6 | 87.2 | 87.7 |
| Short Circuit Current | $I_{SC}$ (A) | 1.74 | 1.74 | 1.75 | 1.75 | 1.75 |
| Maximum System Voltage | $V_{SYS}$ (V) | 1500 [6] / (1000 UL) | | | | |
| Limiting Reverse Current | $I_R$ (A) | 4.0 | | | | |
| Maximum Series Fuse | $I_{CF}$ (A) | 4.0 | | | | |

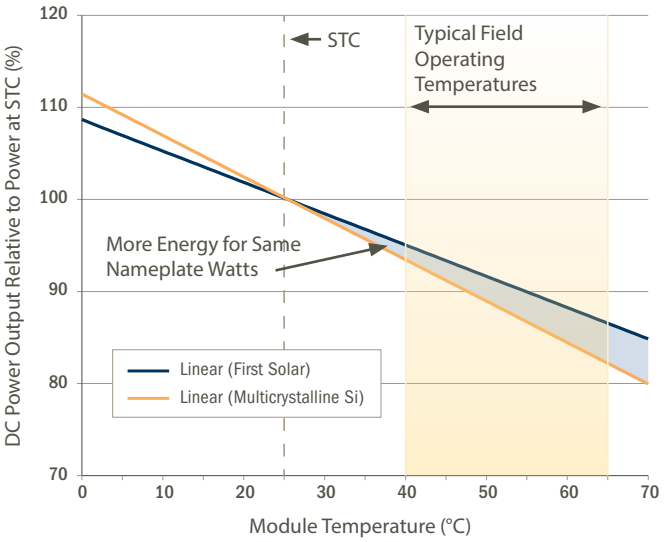
## MODULE NUMBERS AND RATINGS AT 800W/m$^2$, NOCT[7] 45°C, AM 1.5 [5]

| | | | | | | |
|---|---|---|---|---|---|---|
| Nominal Power (± 5%) | $P_{MPP}$ (W) | 76.4 | 78.3 | 80.1 | 82.0 | 83.9 |
| Voltage at $P_{MAX}$ | $V_{MPP}$ (V) | 62.1 | 62.6 | 63.1 | 64.1 | 65.0 |
| Current at $P_{MAX}$ | $I_{MPP}$ (A) | 1.23 | 1.25 | 1.27 | 1.28 | 1.29 |
| Open Circuit Voltage | $V_{OC}$ (V) | 80.4 | 81.0 | 81.6 | 82.1 | 82.6 |
| Short Circuit Current | $I_{SC}$ (A) | 1.40 | 1.40 | 1.41 | 1.41 | 1.41 |

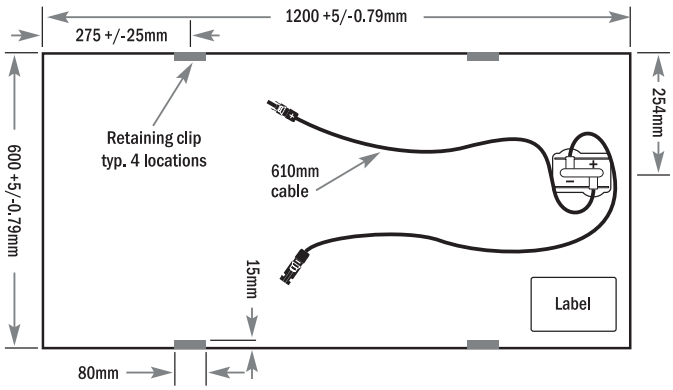
## TEMPERATURE CHARACTERISTICS

| | | |
|---|---|---|
| Module Operating Temperature Range | (°C) | -40 to +85 |
| Temperature Coefficient of $P_{MPP}$ | $T_K$ ($P_{MPP}$) | -0.34%/°C |
| Temperature Coefficient of $V_{OC}$ | $T_K$ ($V_{OC}$) | -0.29%/°C |
| Temperature Coefficient of $I_{SC}$ | $T_K$ ($I_{SC}$) | +0.04%/°C |

## SUPERIOR TEMPERATURE COEFFICIENT




## MECHANICAL DRAWING




## END-OF-LIFE RECYCLING

- Recycling services available through First Solar's industry-leading recycling program or customer-selected third party.

1 Testing Certifications pending.
2 Limited power output and product warranties subject to warranty terms and conditions.
3 Ensures 97% rated power in first year, -0.7%/year through year 25.
4 Standard Test Conditions (STC) 1000W/m$^2$, AM 1.5, 25°C
5 All ratings ±10%, unless specified otherwise. Specifications are subject to change.
6 Application Class A for 1000V (class II), Application Class B for 1500V (class 0)
7 Nominal Operating Cell Temperature: Module operation temperature at 800W/m$^2$ irradiance, 20°C air temperature, 1m/s wind speed.
8 Multi-Contact MC4 (PV-KST4/PV-KBT4)