

# ES-A SERIES

photovoltaic panels

evergreensolar®

200, 205, 210 & 215 W

NOW CERTIFIED FOR COASTAL INSTALLATIONS

## MORE electricity

Our ES-A series panels have the best power tolerance in the industry (-0/+5W) and consistently deliver more electricity than competitors in field tests.

## LESS impact

String Ribbon® panels have the smallest carbon footprint and fastest energy payback of any silicon-based solar panel ever made.

### GUARANTEED POWER<sup>1</sup>

The minimum guaranteed power is the nameplate so you never get less power than you paid for.

### INDEPENDENTLY VERIFIED POWER<sup>2</sup>

Four independent test labs regularly check panel power so you get the power we promise.

### ANTI-REFLECTIVE GLASS

Delivering 2–3% more electricity compared to panels with standard glass.

### TEMPERATURE RATINGS OVER 90%<sup>3</sup>

Maintaining up to 4% higher output than most other crystalline silicon panels under hot conditions.

### HIGH RANKINGS IN FIELD TESTS<sup>4</sup>

Long-term Photon and TÜV field tests prove Evergreen panels produce more electricity (kWh/kW).



### SMALLEST CARBON FOOTPRINT<sup>5</sup>

Our String Ribbon® wafers are made with a fraction of the emissions resulting from making conventional silicon panels.

### 12-MONTH ENERGY PAYBACK<sup>5</sup>

Our panels begin generating truly clean electricity faster than any other silicon-based panel on the market.

### 100% CARDBOARD FREE REUSABLE PACKAGING

Reduces disposal costs and on-site manpower while eliminating tons of landfill.



<sup>1</sup> Guaranteed upon initial delivery of the panel to the customer, maximum power up to 4.99 W above nameplate rating; <sup>2</sup> Evergreen power testers calibrated by taking the straight average of test data from NREL, TÜV Rheinland PTL, TÜV Rheinland Cologne and Fraunhofer ISE; <sup>3</sup> Based on comparing PTC/STC ratings of major competing multi-crystalline silicon panel brands published by the California Energy Commission in May 2009; <sup>4</sup> 2008 Module Tests conducted by Photon and published in Photon International February 2009, TÜV Rheinland tests run from April to September 2008

<sup>5</sup> Evaluation completed by the Energy Research Foundation of the Netherlands (ECN), May 2009

STRING RIBBON® SOLAR PANELS OFFERING EXCEPTIONAL PERFORMANCE AND INDUSTRY-LEADING ENVIRONMENTAL CREDENTIALS. IN SHORT, MORE ELECTRICITY AND LESS IMPACT.

All Evergreen panels come with a 10 year workmanship and 25 year limited power warranty. For full details see the **Evergreen Solar Limited Warranty** available upon request or online. This product is certified to IEC 61215 Ed.2, IEC 61730 Class A, IEC 61701 (salt mist corrosion), cUL 1703, UL 4703, UL Fire Safety Class C, FSEC standards and UK MCS certificate # BBA 0046. **String Ribbon** is a registered trademark of Evergreen Solar, Inc. Evergreen Solar's wafer manufacturing technology is patented in the United States and other countries. Copyright © Evergreen Solar, Inc 2011.



# ELECTRICAL characteristics

## Standard Test Conditions (STC)<sup>1</sup>

	ES-A-200 -fa3*	ES-A-205 -fa3*	ES-A-210 -fa3*	ES-A-215 -fa3*	
$P_{mp}^2$	200	205	210	215	W
$P_{tolerance}$	-0/+4.99 (-0/+2.5)	-0/+4.99 (-0/+2.5)	-0/+4.99 (-0/+2.5)	-0/+4.99 (-0/+2.5)	W (%)
$P_{mp,max}$	204.99	209.99	214.99	219.99	W
$P_{mp,min}$	200.00	205.00	210.00	215.00	W
$\eta_{min}$	12.7	13.1	13.4	13.7	%
$V_{mp}$	18.1	18.2	18.3	18.4	V
$I_{mp}$	11.05	11.27	11.48	11.69	A
$V_{oc}$	22.6	22.7	22.8	22.9	V
$I_{sc}$	11.80	11.93	12.11	12.30	A

## Nominal Operating Cell Temperature Conditions (NOCT)<sup>3</sup>

	ES-A-200	ES-A-205	ES-A-210	ES-A-215	
$T_{NOCT}$	45.4	45.4	45.4	45.4	°C
$P_{max}$	146.4	150.1	153.8	157.4	W
$V_{mp}$	16.5	16.6	16.7	16.8	V
$I_{mp}$	8.87	9.04	9.21	9.37	A
$V_{oc}$	20.8	21.0	21.1	21.2	V
$I_{sc}$	9.44	9.57	9.76	9.95	A

## Low Irradiance

The typical relative reduction of module efficiency at an irradiance of 200W/m<sup>2</sup> both at 25°C cell temperature and spectrum AM 1.5 is 0%.

## Temperature Coefficients

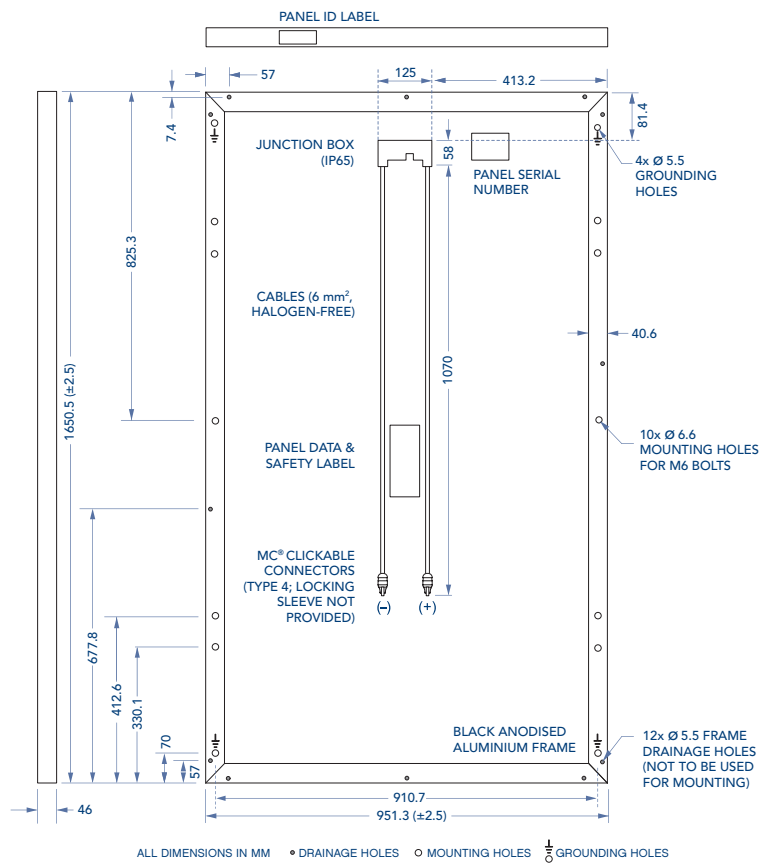
$\gamma P_{mp}$	-0.43	%/°C
$\beta V_{mp}$	-0.40	%/°C
$\alpha I_{mp}$	-0.03	%/°C
$\beta V_{oc}$	-0.31	%/°C
$\alpha I_{sc}$	+0.05	%/°C

## System Design

Maximum Reverse Current <sup>4</sup>	20 A
Maximum DC System Voltage (TÜV)	1000 V

<sup>1</sup> 1000 W/m<sup>2</sup>, 25°C cell temperature, AM 1.5 spectrum; <sup>2</sup> Maximum power point or rated power; <sup>3</sup> 800 W/m<sup>2</sup>, 20°C ambient temperature, 1 m/s wind speed, AM 1.5 spectrum; <sup>4</sup> Also known as Series Fuse Rating; <sup>5</sup> Cell color may vary due to our unique manufacturing process but does not affect the performance of the panel; <sup>6</sup> Per IEC 61215. When using Mounting Method A (offset mounting) with rails 330mm (+/-20mm) from each short side of the panel as described in the Mounting Guide for this product; <sup>7</sup> Per IEC 61215; \* f-framed, a-low voltage, 3-matt blue (textured) cells and black anodised frame

# MECHANICAL specifications



External Dimensions	1650.5 x 951.3 x 46 mm
Weight	18.8 kg
Solar Cells <sup>5</sup>	114 Multi-Crystalline Silicon String Ribbon® Cells
Frame	Black Anodised Aluminium—Doubled Walled
Front Cover	Anti-Reflective Tempered Solar Glass 3.2 mm Thickness
Encapsulant / Back Cover	EVA / TPE
Maximum Certified Snow Load <sup>6</sup>	5.4 kPa
Maximum Combined Wind & Snow Load <sup>6</sup>	3.8 kPa
Hailstone Impact Test <sup>7</sup>	Ø 25mm ice ball at 23 m/s (83 km/h)

Product packaged 28 per pallet and tested to International Safe Transit Association (ISTA) Standard 2B. All specifications in this product information sheet conform to EN 50380. See the [Evergreen Solar Safety, Installation and Operation Manual](#), [Mounting Guide](#) and [Inverter Selection Guide](#) for further information on approved installation and use of this product.

Due to continuous innovation, research and product improvement, the specifications in this product information sheet are subject to change without notice. No rights can be derived from this product information sheet and Evergreen Solar assumes no liability whatsoever connected to or resulting from the use of any information contained herein. MC® is a registered trademark of Multi-Contact AG.

## PARTNER



ELECTRICAL EQUIPMENT  
CHECK WITH YOUR INSTALLER

ES-A\_200\_205\_210\_215\_fa3\_EN; effective January 1<sup>st</sup> 2011 SM-0090 -RevD

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