

NEW

## ES-A SERIES photovoltaic panels



### 190 & 195 W Best power tolerance available

A range of high quality String Ribbon™ solar panels offering exceptional performance, cost effective installation and industry-leading environmental credentials made with our revolutionary wafer technology.

- **No power below nameplate**  
Never pay for power you're not getting
- **Get up to 5W more than nameplate\***  
For enhanced field performance
- **Industry's lowest voltage per watt rating**  
Delivers the most cost-effective installs
- **UL4703 certified cables**  
For use with the highest efficiency transformer-less inverters
- **New extended length cables**  
Eliminates home-run wiring
- **New lockable connectors\*\***  
Complies with the latest codes for accessible arrays
- **Most extensive range of mounting options**  
Allows installs virtually anywhere and anyhow
- **Smallest carbon footprint of any manufacturer**  
For the greenest of the green
- **100% cardboard-free packaging**  
Minimizes job site waste and disposal costs
- **5 year workmanship and 25 year power warranty \*\*\***



Born in the USA

\*Maximum power up to 4.99 W above nameplate rating; \*\*Locking sleeve not supplied with the panel.

\*\*\*For full details see the **Evergreen Solar Limited Warranty** available on request or online.

This product is designed to meet UL 1703, UL 4703, UL Fire Safety Class C, IEC 61215 Ed.2 and IEC 61730 Class A standards.

String Ribbon is a patented technology and registered trademark of Evergreen Solar, Inc.

## Electrical Characteristics

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

	ES-A-190 -fa2*	ES-A-195 -fa2*	
$P_{mp}^2$	190	195	W
$P_{tolerance}$	-0/+4.99	-0/+4.99	W
$P_{mp, max}$	194.99	199.99	W
$P_{mp, min}$	190.00	195.00	W
$\eta_{min}$	12.1	12.4	%
$P_{ptc}^3$	171.3	175.9	W
$V_{mp}$	17.4	17.8	V
$I_{mp}$	10.92	10.96	A
$V_{oc}$	22.0	22.3	V
$I_{sc}$	11.80	11.90	A

### Nominal Operating Cell Temperature Conditions (NOCT)<sup>4</sup>

	44.8	44.8	°C
$T_{NOCT}$			
$P_{max}$	139.1	142.7	W
$V_{mp}$	16.3	16.5	V
$I_{mp}$	8.54	8.65	A
$V_{oc}$	20.0	20.3	V
$I_{sc}$	9.44	9.52	A

<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> At PV-USA Test Conditions: 1000 W/m<sup>2</sup>, 20°C ambient temperature, 1 m/s wind speed

<sup>4</sup> 800 W/m<sup>2</sup>, 20°C ambient temperature, 1 m/s wind speed, AM 1.5 spectrum

\* f-framed, a-low voltage, 2-matt blue (textured) cells

### 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%.

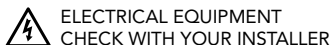
### Temperature Coefficients

$\alpha P_{mp}$	-0.45	%/°C
$\alpha V_{mp}$	-0.43	%/°C
$\alpha I_{mp}$	-0.02	%/°C
$\alpha V_{oc}$	-0.32	%/°C
$\alpha I_{sc}$	-0.003	%/°C

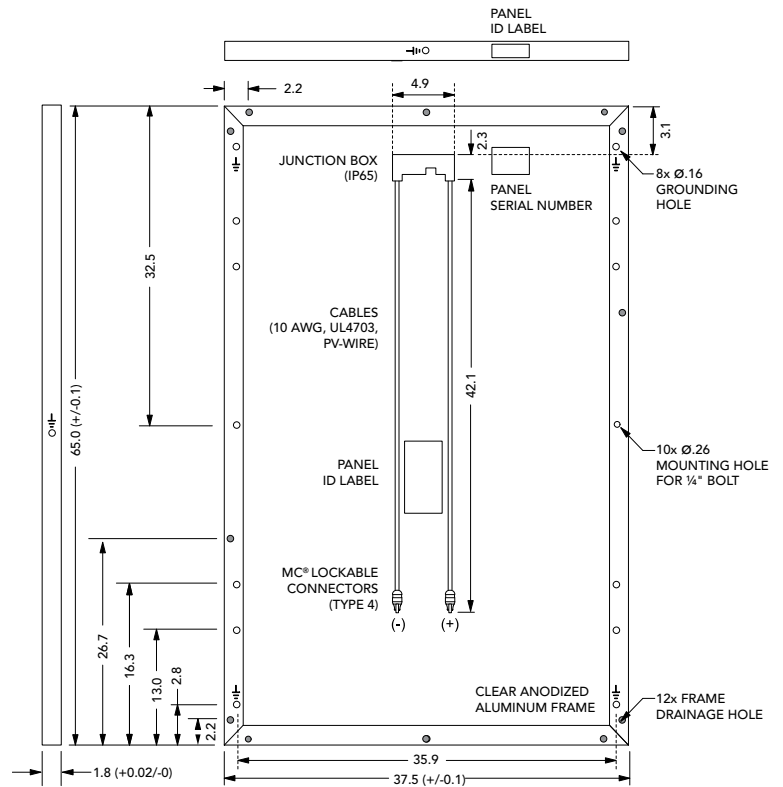
### System Design

Series Fuse Rating <sup>5</sup>	20 A
Maximum System Voltage (UL)	600 V

<sup>5</sup> Also known as Maximum Reverse Current.



## Mechanical Specifications



All dimensions in inches; panel weight 41 lbs

Product constructed with 114 poly-crystalline silicon solar cells, anti-reflective tempered solar glass, EVA encapsulant, polymer back-skin and a double-walled anodized aluminum frame. Product packaging tested to International Safe Transit Association (ISTA) Standard 2B. All specifications in this product information sheet conform to EN50380. See the **Evergreen Solar Safety, Installation and Operation Manual and Mounting Design 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.

### Partner:

ES-A\_190\_195\_US\_010908; effective September 1<sup>st</sup> 2008