



## ■ P-Type Solar Module

### KEY FEATURES



Excellent performance in low-light environments



High quality junction box and connector systems



100% inspection, to guarantee the reliability of solar systems



Lower temperature



Anti PID



Enhanced safety by excellent fire resistance



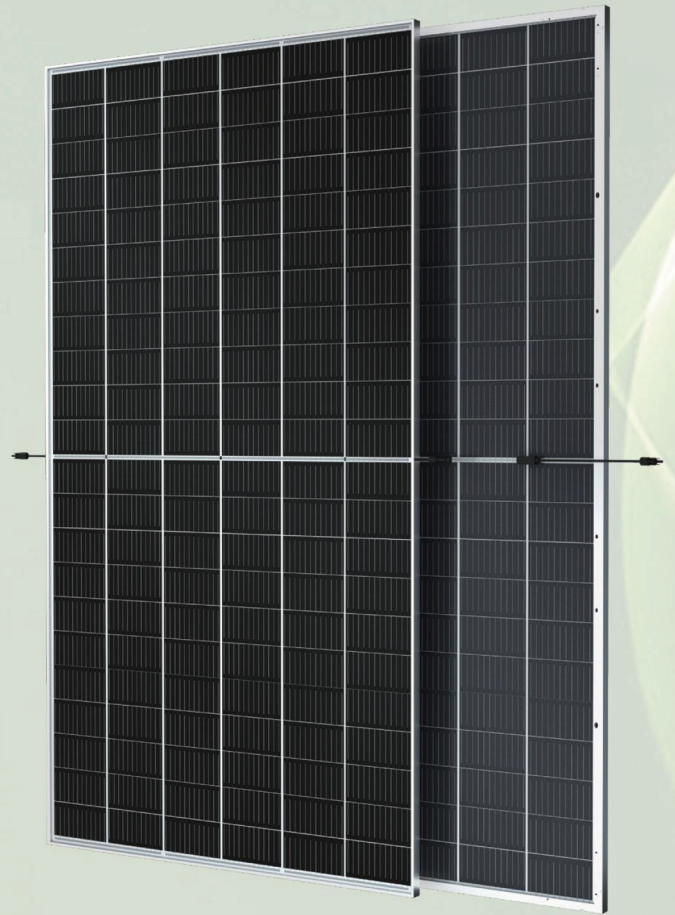
Perfect for sandy, snowy and high latitude regions



Lower operating temperature, more reliable



Cutcell, Less internal power loss, Less mismatch loss



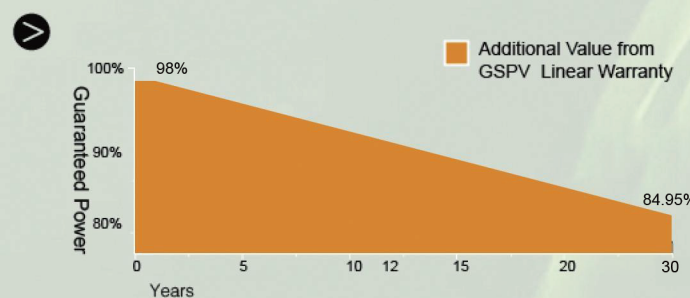
## GSPV-M12/132H-645W-665W 645~665 Watt

➤ 210mm 132 Cells PV Solar Module

**BLACK** \*BLACK FRAME/BLACK BACK-SHEET PRODUCTS ARE AVAILABLE UPON REQUEST

➤

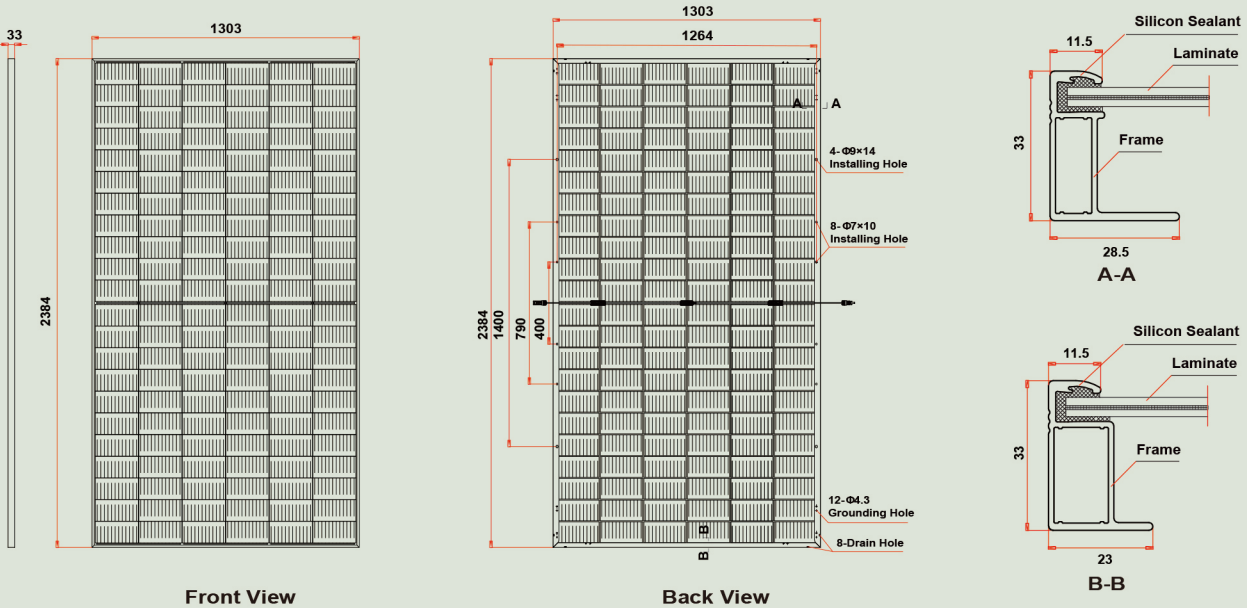
|                  |                       |                                  |  |
|------------------|-----------------------|----------------------------------|--|
| <b>12</b> years  | <b>30</b> years       | <b>0.45%</b>                     |  |
| Product Warranty | Linear Power Warranty | Annual Degradation over 30 years |  |



IEC61215  
IEC61730  
UL61215  
UL61730



## DIMENSIONS OF PV MODULE(mm)



## ELECTRICAL DATA (STC)

|                                      |        |       |       |       |       |
|--------------------------------------|--------|-------|-------|-------|-------|
| Peak Power Watts- $P_{MAX}$ (Wp)*    | 645    | 650   | 655   | 660   | 665   |
| Power Tolerance- $P_{MAX}$ (W)       | 0 ~ +5 |       |       |       |       |
| Maximum Power Voltage- $V_{MPP}$ (V) | 37.5   | 37.7  | 37.9  | 38.1  | 38.3  |
| Maximum Power Current- $I_{MPP}$ (A) | 17.23  | 17.27 | 17.31 | 17.35 | 17.39 |
| Open Circuit Voltage- $V_{oc}$ (V)   | 45.3   | 45.5  | 45.7  | 45.9  | 46.1  |
| Short Circuit Current- $I_{sc}$ (A)  | 18.31  | 18.35 | 18.40 | 18.45 | 18.50 |
| Module Efficiency $\eta_m$ (%)       | 20.8   | 20.9  | 21.1  | 21.2  | 21.4  |

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance: ±3%

## Electrical characteristics with different power bin(reference to 10% Irradiance ratio)

|   |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|
| Total Equivalent power - $P_{MAX}$ (Wp) | 690   | 696   | 701   | 706   | 712   |
| Maximum Power Voltage- $V_{MPP}$ (V)    | 37.5  | 37.7  | 37.9  | 38.1  | 38.3  |
| Maximum Power Current- $I_{MPP}$ (A)    | 18.44 | 18.48 | 18.52 | 18.56 | 18.60 |
| Open Circuit Voltage- $V_{oc}$ (V)      | 45.3  | 45.5  | 45.7  | 45.9  | 46.1  |
| Short Circuit Current- $I_{sc}$ (A)     | 19.59 | 19.63 | 19.69 | 19.74 | 19.79 |
| Irradiance ratio (rear/front)           | 10%   |       |       |       |       |

Power Bifaciality: 70±5%

## ELECTRICAL DATA (NOCT)

|                                      |       |       |       |       |       |
|--------------------------------------|-------|-------|-------|-------|-------|
| Maximum Power- $P_{MAX}$ (Wp)        | 488   | 492   | 495   | 499   | 504   |
| Maximum Power Voltage- $V_{MPP}$ (V) | 34.9  | 35.1  | 35.2  | 35.4  | 35.6  |
| Maximum Power Current- $I_{MPP}$ (A) | 13.98 | 14.01 | 14.05 | 14.10 | 14.16 |
| Open Circuit Voltage- $V_{oc}$ (V)   | 42.7  | 42.9  | 43.0  | 43.2  | 43.4  |
| Short Circuit Current- $I_{sc}$ (A)  | 14.75 | 14.79 | 14.83 | 14.87 | 14.91 |

NOCT Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

## MECHANICAL DATA

|                      |   |
|----------------------|---|
| Solar Cells          | Monocrystalline   |
| No. of cells         | 132 cells   |
| Module Dimensions    | 2384×1303×33 mm (93.86×51.30×1.30 inches)   |
| Weight               | 38.3 kg (84.4 lb)   |
| Front Glass          | 2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass  |
| Encapsulant material | POE/EVA   |
| Back Glass           | 2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)  |
| Frame                | 33mm(1.30 inches) Anodized Aluminium Alloy  |
| J-Box                | IP 68 rated   |
| Cables               | Photovoltaic Technology Cable 4.0mm2(0.006 inches2)<br>Portrait: 350/280 mm(13.78/11.02 inches)<br>Length can be customized |
| Connector            | MC4 EVO2 / TS4*   |

\*Please refer to regional datasheet for specified connector.

## TEMPERATURE RATINGS

|   |             |
|---|-------------|
| NOCT (Nominal Operating Cell Temperature) | 43°C (±2°C) |
| Temperature Coefficient of $P_{MAX}$      | -0.34%/°C   |
| Temperature Coefficient of $V_{oc}$       | -0.25%/°C   |
| Temperature Coefficient of $I_{sc}$       | 0.04%/°C    |

## MAXIMUM RATINGS

|                         |                                 |
|-------------------------|---------------------------------|
| Operational Temperature | -40~+85 °C                      |
| Maximum System Voltage  | 1500V DC (IEC)<br>1500V DC (UL) |
| Max Series Fuse Rating  | 35A                             |

## WARRANTY

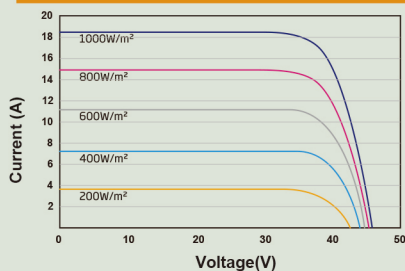
|                                      |
|--------------------------------------|
| 12 year Product Workmanship Warranty |
| 30 year Power Warranty               |
| 2% first year degradation            |
| 0.45% Annual Power Attenuation       |

(Please refer to product warranty for details)

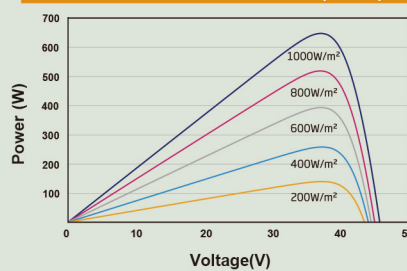
## PACKAGING

|  |
|--|
| Modules per box: 33 pieces             |
| Modules per 40' container : 594 pieces |

## I-V CURVES OF PV MODULE(650 W)



## P-V CURVES OF PV MODULE(650W)



## I-V CURVES OF PV MODULE(650 W)

