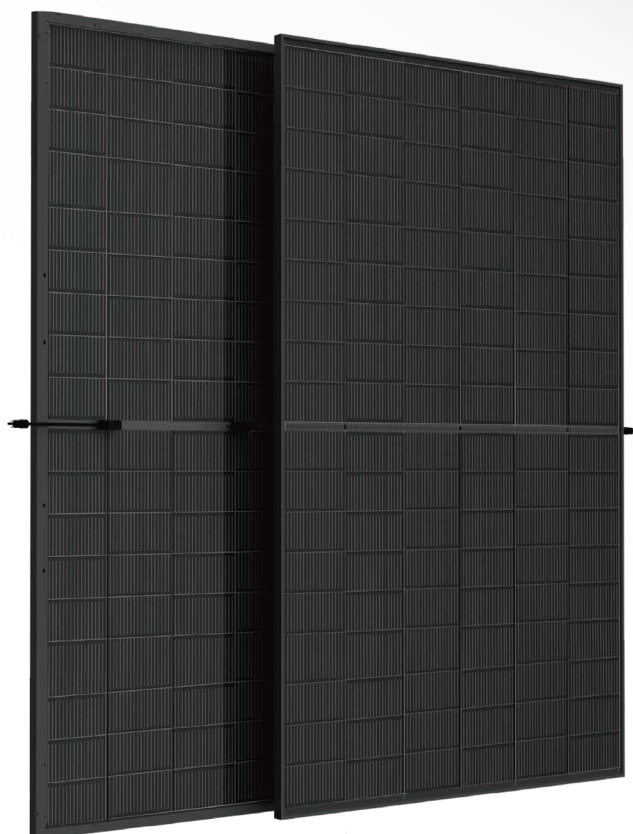
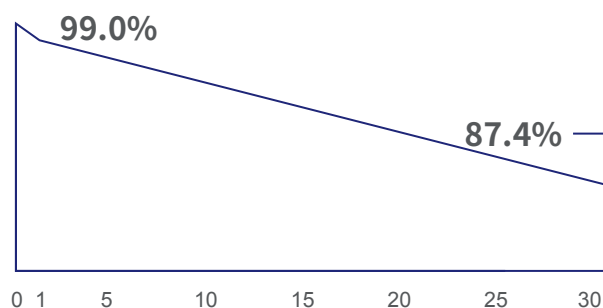




CHGMN48D2 Linear performance warranty



IEC61215(2016), IEC61730(2016)  
 ISO14001: 2015 Environment Management System  
 ISO9001: 2015: Quality Management System  
 ISO45001: 2018: Occupational health and safety management systems

## CHG ENSOL Efficient PV Module

### N-TOPCon Technology

### CHGMN48D2

N-type Mono High Efficiency  
 Double Glass Bifacial PV Module

# 440-465W

**465W**

Maximum  
Power Output

**23.27%**

Maximum  
Module Efficiency

**0~+5W**

Positive power  
tolerance



#### Excellent Power Output

Ultra efficient N-type cell technology, the module with higher power and better reliability



#### Excellent Temperature Coefficient

The product has excellent temperature coefficient, outstanding outdoor power generation performance and longer lifespan



#### Ultra-multi-busbar Technology

The rearside of the module effectively utilizes the reflected and scattered light in the environment, the high rearside power gain can reduce the LCOE



#### No LeTID/LID

While achieving efficiency gains in N-type photovoltaic cells, virtually no LID loss



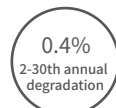
#### Excellent Irradiance Response

Superior weak-light power generation performance in environments such as early morning, evening, and cloudy conditions.



#### Aesthetic Appearance

96pcs half cells, all black appearance



Electrical Properties | STC\*

|                               |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| Peak Power (Pmax/W)           | 440   | 445   | 450   | 455   | 460   | 465   |
| MPP Voltage (Vmp/V)           | 29.79 | 29.98 | 30.17 | 30.37 | 30.56 | 30.75 |
| MPP Current (Imp/A)           | 14.77 | 14.84 | 14.91 | 14.98 | 15.05 | 15.12 |
| Open Circuit Voltage (Voc/V)  | 35.52 | 35.72 | 35.92 | 36.12 | 36.32 | 36.52 |
| Short Circuit Current (Isc/A) | 15.62 | 15.67 | 15.72 | 15.77 | 15.82 | 15.86 |
| Module Efficiency (%)         | 22.02 | 22.27 | 22.52 | 22.77 | 23.02 | 23.27 |

\*STC (Standard Test Conditions): Irradiance 1000 W/m², cell Temperature 25°C, AM 1.5

Mechanical Properties

|                    |                                                  |
|--------------------|--------------------------------------------------|
| Cell Type          | n-type half cell                                 |
| Number of Cells    | 96pcs(2*48)                                      |
| Module Dimension   | 1762mm*1134mm*30mm                               |
| Weight             | 23.7kg                                           |
| Front / Rear Glass | 2.0mm/2.0mm                                      |
| Frame              | Anodized Aluminum Alloy                          |
| Junction Box       | IP68                                             |
| Output cables      | TUV 1x4.0mm², +300mm/-300mm or Customized Length |

Temperature Coefficient

|                                      |              |
|--------------------------------------|--------------|
| Temperature coefficients of Pmax     | -0.29% / °C  |
| Temperature coefficients of Voc      | -0.25% / °C  |
| Temperature coefficients of Isc      | +0.045% / °C |
| Nominal Module Operating Temperature | 42±2 °C      |

Operating Properties

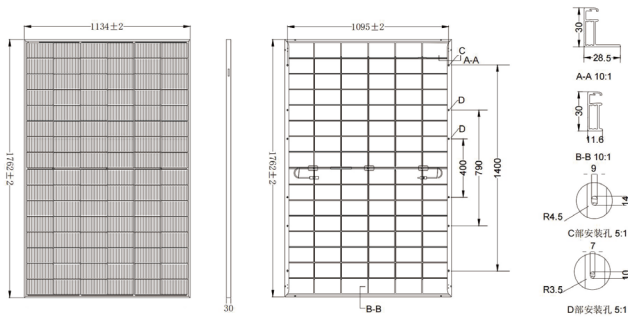
|                                |                                                                          |
|--------------------------------|--------------------------------------------------------------------------|
| Operating Temperature (°C)     | -40°C~+85°C                                                              |
| Maximum System Voltage (V)     | 1500V DC (IEC)                                                           |
| Maximum Series Fuse Rating (A) | 25A                                                                      |
| Power Tolerance                | 0~+5W                                                                    |
| Bifaciality                    | 80%±5%                                                                   |
| Static load                    | Snow load 5400Pa, Wind load 2400Pa                                       |
| Packaging Configuration        | 36pcs/pallet, 1008pcs/13m flatcar<br>36pcs/pallet, 1152pcs/17.5m flatcar |

Electrical Properties | BNPI\*

|                               |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| Peak Power (Pmax/W)           | 487   | 493   | 499   | 504   | 510   | 515   |
| MPP Voltage (Vmp/V)           | 29.80 | 30.00 | 30.19 | 30.38 | 30.58 | 30.76 |
| MPP Current (Imp/A)           | 16.34 | 16.44 | 16.53 | 16.59 | 16.68 | 16.77 |
| Open Circuit Voltage (Voc/V)  | 35.54 | 35.74 | 35.94 | 36.14 | 36.34 | 36.54 |
| Short Circuit Current (Isc/A) | 17.27 | 17.35 | 17.42 | 17.45 | 17.53 | 17.56 |

\*Bifacial Test Conditions (BNPI): Front-side irradiance 1000W/m², back-side irradiance 135W/m², temperature 25°C, AM1.5

Engineering Drawings (unit: mm)



For specific dimensions and tolerance ranges, please refer to the corresponding component drawings.

Characteristic Curves: CHGMN48D2

