CHG EnSOL

CHG ENSOL Efficient PV Module

N-TOPCon Technology

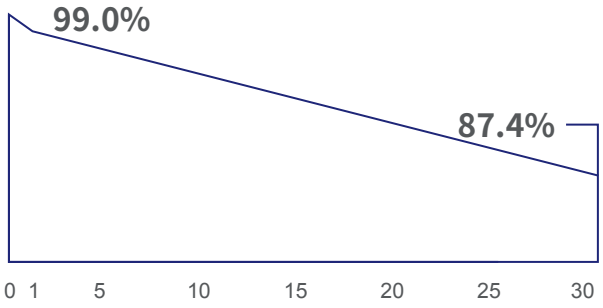
CHGMN48D2

N-type Mono Double Glass
Bifacial All Black PV Module

435-460W

460W	23.1%	0~+5W
Maximum Power Output	Maximum Module Efficiency	Positive power tolerance

CHGMN48D2 Linear performance warranty



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

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

1.0%	0.4%	15 Year	30 Year
1st year degradation	2-30th annual degradation	material and workmanship warranty	linear warranty

Electrical Properties | STC*

Peak Power (Pmax/W)	435	440	445	450	455	460
MPP Voltage (Vmp/V)	29.59	29.75	29.98	30.17	30.37	30.56
MPP Current (Imp/A)	14.70	14.77	14.84	14.91	14.98	15.05
Open Circuit Voltage (Voc/V)	35.32	35.52	35.72	35.92	36.12	36.32
Short Circuit Current (Isc/A)	15.57	15.62	15.67	15.72	15.77	15.82
Module Efficiency (%)	22.0	22.3	22.5	22.8	23.0	23.3

*STC (Standard Test Conditions): Irradiance 1000 W/m^2, cell Temperature 25°C, AM 1.5

Electrical Properties | NMOT*

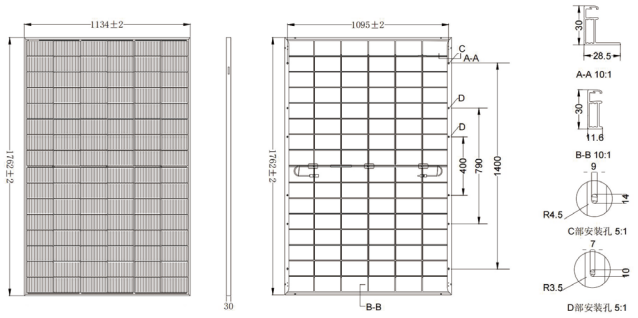
Peak Power (Pmax/W)	482	487	493	499	504	510
MPP Voltage (Vmp/V)	29.61	29.80	30.00	30.19	30.38	30.58
MPP Current (Imp/A)	16.28	16.34	16.44	16.53	16.59	16.68
Open Circuit Voltage (Voc/V)	35.34	35.54	35.74	35.94	36.14	36.34
Short Circuit Current (Isc/A)	17.24	17.27	17.35	17.42	17.45	17.53

*BNPI: Irradiance: front 1000w/m^2, rear 135W/m^2, 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 1x4.0mm^2, +300mm/-300mm or Customized Length

Engineering Drawings (unit: mm)

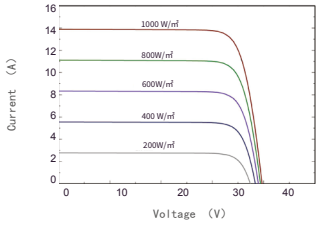


For specific dimensions and tolerance ranges, please refer to the corresponding component drawings.

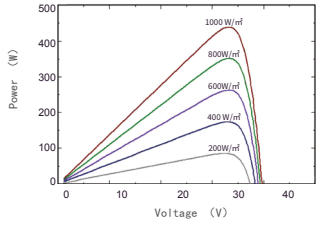
Temperature Coefficient

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

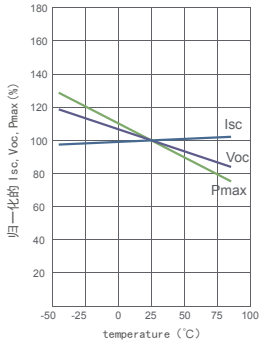
Characteristic Curves: CHGMN48D2



Current and voltage curves under different irradiations



Power and voltage curves under different irradiations



Temperature Curves of Isc, Voc, Pmax under Different Temperatures

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 36pcs/pallet, 1152pcs/17.5m flatcar