

## G12R-48-TNC Half Cell Bifacial Module(Black frame)

### Product Feature



High Power Output  
Low LCOE



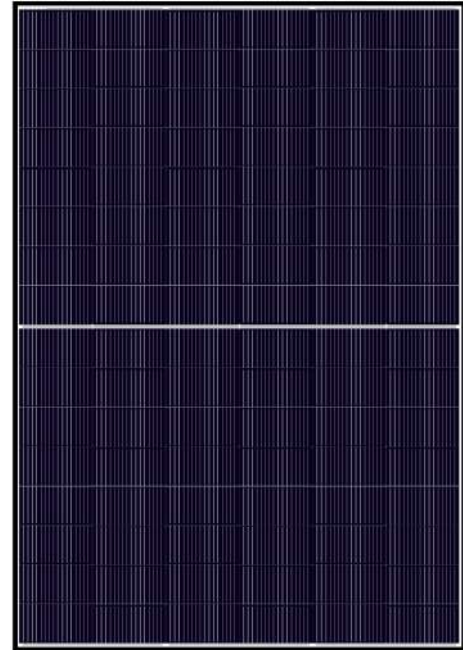
Maximum Power  
up to 450W+



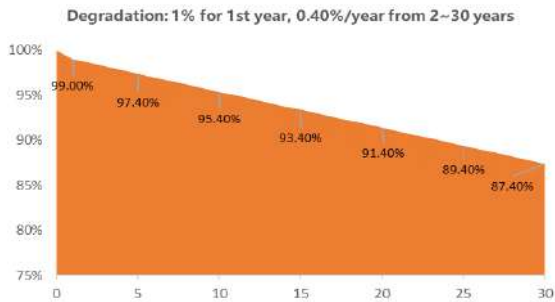
High Reliability



Low Degradation



### Linear Warranty



Warranty for Material and



Warranty for Linear

### Management System Certification

- ISO9001: 2015/Quality Management System
- ISO14001: 2015/Environmental Management System
- ISO45001: 2018/Occupational Health and Safety Management System
- IEC62941: 2019/Quality system for PV module manufacturing

### Product Certification



### Electrical Characteristics (STC)

Model type: TWMNH-48HD\*\*\*

Maximum Power: Pmax [W]	435	440	445	450
Open Circuit Voltage: Voc [V]	34.49	34.67	34.85	35.03
Short Circuit Current: Isc [A]	15.90	15.95	16.00	16.05
Voltage at Maximum Power: Vmp [V]	29.54	29.72	29.90	30.08
Current at Maximum Power: Imp [A]	14.73	14.81	14.89	14.97
Module Efficiency: η [%]	21.8	22.0	22.3	22.5

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, AM=1.5, Test Uncertainty: ±3%

### Electrical Characteristics (BNPI)

Maximum Power: Pmax [W]	480.4	485.9	491.5	497.1
Open Circuit Voltage: Voc [V]	34.49	34.67	34.85	35.03
Short Circuit Current: Isc [A]	17.55	17.61	17.66	17.72
Voltage at Maximum Power: Vmp [V]	29.54	29.72	29.90	30.08
Current at Maximum Power: Imp [A]	16.26	16.35	16.44	16.53

BNPI: Front side Irradiance 1000W/m<sup>2</sup>, Back side irradiance 135W/m<sup>2</sup>, Cell Temperature=25°C, AM=1.5, Test Uncertainty: ±3%

### Electrical Characteristics (NMOT)

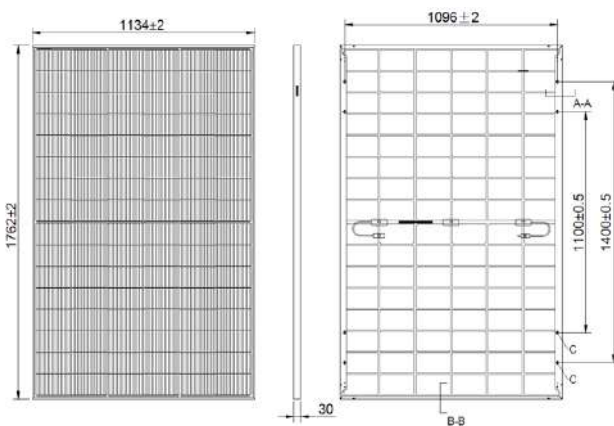
Maximum Power: Pmax [W]	327	331	335	338
Open Circuit Voltage: Voc [V]	32.77	32.94	33.11	33.28
Short Circuit Current: Isc [A]	12.84	12.88	12.92	12.96
Voltage at Maximum Power: Vmp [V]	27.51	27.68	27.88	27.96
Current at Maximum Power: Imp [A]	11.89	11.96	12.02	12.09

NMOT: Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, AM=1.5, Wind Speed 1m/s

### Mechanical Parameters

Cell Type	TNC
Cell Orientation	96[6×16]
Dimensions	1762±2×1134±2×30mm
Weight	20.9 kg
Front Glass	1.6 mm AR coated heat strengthened glass
Rear Glass	1.6 mm heat strengthened glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3 diodes
Cable	4.0 mm <sup>2</sup>
Cable length	+1200mm,-1200mm,length can be customized
Wind/Snow load	2400Pa/5400Pa
Per pallet	36 pcs
Packaging	936 pcs per 40'HC,1008 pcs per 13m flatbed trailer,1296 pcs per 17.5m flatbed trailer
Fire class rating	Class C

### Drawing(Unit:mm)

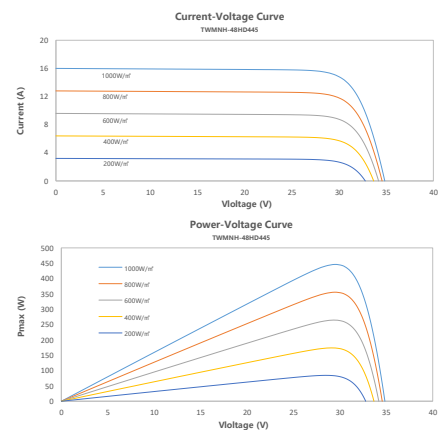


### Temperature rating

Temperature Coefficient of Pmax	-0.29%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Isc	+0.046%/°C
NMOT	45±2°C

### Operating Parameters

Operating Temperature	-40°C~+85°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Output Tolerance	0~+3%
Bifaciality coefficient of Pmax	80±10%
Bifaciality coefficient of Voc	98±5%
Bifaciality coefficient of Isc	80±10%



**Statement:** With technological process and product update, there maybe deviation between the technical parameters of Tongwei's module products and the technical parameters contained in the specification, and Tongwei has the right to adjust the technical parameters at any time without notifying the customer, the final interpretation of the technical specification is vested in Tongwei.

## Cable Type

Changshu JHOSIN Communication Technology Co., Ltd.

Jiangsu Tongling Electric Co., Ltd.

Ningbo Kibor Wire & Cable Co., Ltd.

QC Solar (Suzhou) Corporation

Suzhou Baohing Electric Wire & Cable Manufacturer Co., Ltd.

Suzhou Xietong Photovoltaic Technology Co., Ltd.

SUZHOU YONGHAO CABLE CO LTD

Tongwei Solar (Hefei) Co., Ltd.

Trina Solar Co., Ltd.

Wuxi Xinhongye Wire & Cable Co., LTD.

Zhejiang Chuangyuan Photovoltaic Technology Co.,Ltd.

Zhejiang Jiaming Tianheyuan Photovoltaics Technology Co., Ltd.

Zhejiang Renhe Photovoltaic Technology Co., Ltd.

Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.

Jiangxi Jinko PV Material Co., Ltd.

Jiangxi Hejia Technology Co., Ltd.

YushanXinzhan Industrial Co., Ltd.

DONGGUAN XINBEISEN WIRE AND CABLE CO LTD

Jiangxi Han Guang Cable Co., Ltd.

RUIXU INDUSTRY CO., LTD.

## Connector type

05-8, Zhejiang Renhe Photovoltaic Technology Co., Ltd.

BIGabc4efgh, Trina Solar Co., Ltd.

H4Cabcdef, Amphenol Technology (Shenzhen) Co., Ltd.

H4CFC4DMS,H4CMC4DMS, Amphenol Technology (Shenzhen) Co., Ltd.

HQC4, Hanwha Q CELLS (Qidong) Co., Ltd

PV4-S1yx, Tyco Electronics (Shanghai) Co., Ltd.

PV4-S1yx, Tyco Electronics Austria GmbH

PV-CF-C-2,5-4-SETxxxx, PV-CM-C-2,5-4-SETxxxx, Phoenix Contact GmbH & Co.KG

PV-CO02-xy, SUZHOU UKT NEW ENERGY TECHNOLOGY CO., LTD

PV-CY03L, Zhejiang Chuangyuan Photovoltaic Technology Co.,Ltd.

PV-CY20L, Zhejiang Chuangyuan Photovoltaic Technology Co.,Ltd.

PV-JK03M-2, Jiangxi Jinko PV Material Co., Ltd.

PV-JK03M-2/xy, Jiangxi Jinko PV Material Co., Ltd.

PV-JM601A, Zhejiang Jiaming Tianheyuan Photovoltaics Technology Co., Ltd.

PV-JM608, Zhejiang Jiaming Tianheyuan Photovoltaics Technology Co., Ltd.

PV-KST4-EVO2/xy\_UR , PV-KBT4-EVO2/xy\_UR, Stäubli Electrical Connectors AG

PV-KST4-EVO2A/xy, PV-KBT4 EVO2A/xy, Stäubli Electrical Connectors AG

PV-MH5, Ningbo Minghe New Energy Technology Co., Ltd.

PV-XT101.1, Suzhou Xietong Photovoltaic Technology Co., Ltd.

PV-ZH202B, Zhejiang Zhonghuan Sunter PV Technology Co., Ltd.

QC4.10-cds, QC Solar (Suzhou) Corporation

RHC2xyz, Zhejiang Renhe Photovoltaic Technology Co., Ltd.

TL-CABLE01S-F, TL-CABLE01S, Jiangsu Tongling Electric Co., Ltd.

TS4, Trina Solar Co., Ltd.

TS4-xz, Trina Solar Co., Ltd.

TW-PVCON-01, Tongwei Solar (Hefei) Co., Ltd.

UTXCFabcd, UTXCMabcd, Amphenol Technology (Shenzhen) Co., Ltd.

Z4S-abcd, Zerun Co., LTD.