



High Power Output  
Low LCOE

Maximum Power  
450W+

# TWMNH

N-type Half-cell  
Bifacial Full-black Module (48)

## 48HC430-450W



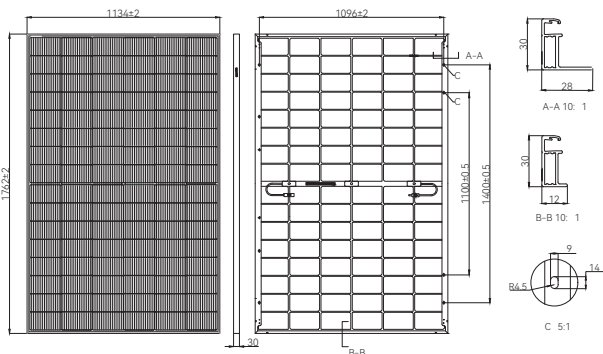
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**DRAWINGS (Unit: mm)**



**MECHANICAL PARAMETERS**

Cells	TNC (N Type Monocrystalline Cell)
Cell Orientation	96[6×16]
Dimension	1762±2×1134±2×30mm
Weight	20.9kg
Front Glass	1.6mm high transmittance, AR tempered glass
Rear Glass	1.6mm semi-tempered glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3 diodes
Output Cable	4.0mm <sup>2</sup>
Cable Length	±1200mm, length can be customized
Wind/Snow Load	2400Pa/5400Pa
Packaging	36pcs per pallet, 936pcs per 40'HC

**ELECTRICAL CHARACTERISTICS (STC)**

Module Type: TWMNH-48HCXXX

Maximum Power: Pmax [W]	430	435	440	445	450
Open Circuit Voltage: Voc [V]	34.31	34.49	34.67	34.85	35.03
Short Circuit Current: Isc [A]	15.85	15.90	15.95	16.00	16.05
Voltage at Maximum Power: Vmp [V]	29.36	29.54	29.72	29.90	30.08
Current at Maximum Power: Imp [A]	14.65	14.73	14.81	14.89	14.97
Module Efficiency: η [%]	21.5	21.8	22.0	22.3	22.5

\* STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass1.5, Measuring Tolerance: ±3%

**ELECTRICAL CHARACTERISTICS (NMOT)**

Maximum Power: Pmax [W]	323	327	331	335	338
Open Circuit Voltage: Voc [V]	32.59	32.77	32.94	33.11	33.28
Short Circuit Current: Isc [A]	12.80	12.84	12.88	12.92	12.96
Voltage at Maximum Power: Vmp [V]	27.31	27.51	27.68	27.88	27.96
Current at Maximum Power: Imp [A]	11.83	11.89	11.96	12.02	12.09

\* NMOT: Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, Air Mass1.5, Wind Speed 1m/s

**ELECTRICAL CHARACTERISTICS (Rear Power Gain)**

5%	Maximum Power: Pmax[W]	451	456	462	467	472
	Module Efficiency: η [%]	22.6	22.8	23.1	23.4	23.6
15%	Maximum Power: Pmax[W]	494	500	506	511	517
	Module Efficiency: η [%]	24.7	25.0	25.3	25.6	25.9
25%	Maximum Power: Pmax[W]	537	543	550	556	562
	Module Efficiency: η [%]	26.9	27.2	27.5	27.8	28.1

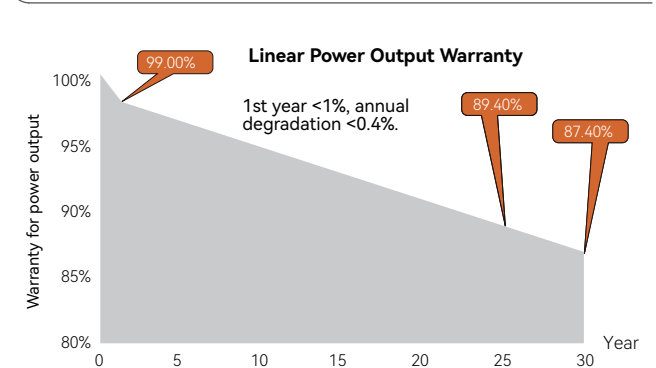
**TEMPERATURE PARAMETERS**

Temperature Coefficient (Pmax)	-0.30%/°C
Temperature Coefficient (Voc)	-0.25%/°C
Temperature Coefficient (Isc)	+0.046%/°C
NMOT	45±2°C

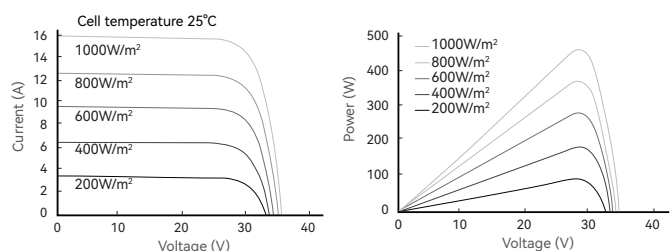
**MAXIMUM RATINGS**

Operational Temperature	-40°C~+85°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Output Tolerance	0~+5W
Maximum Bifaciality	80±10%

**WARRANTY**



**I-V CURVE**



**CERTIFICATIONS**

**Quality Management System and Product Certification**

- ISO 9001: 2015/Quality management system
- ISO 14001: 2015/Environmental management system
- ISO 45001: 2018/Occupation health safety management system
- ISO 50001: 2018/Energy management system
- IEC 62941: 2019/Quality system for PV module manufacturing
- IEC 61215/61730, IEC 62804(PID), IEC 61701(Salt), IEC 62716 (Ammonia), IEC 60068-2-68(Sand)

