



High Power Output  
Low LCOE 

Maximum Power  
455W+ 

# TWMNH

N-type Half-cell  
Bifacial Black Frame Module (48)

## 48HD435-455W

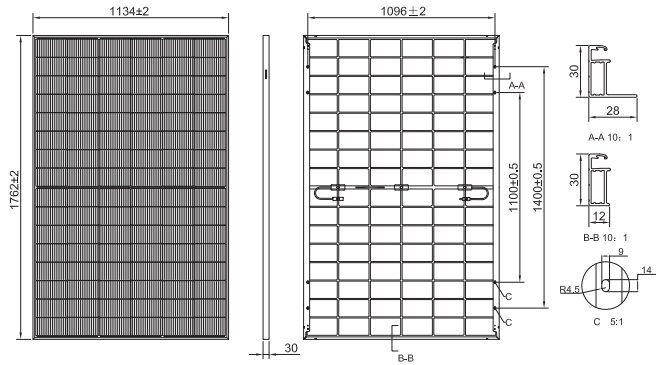


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**DRAWINGS (Unit: mm)**



**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, -1200mm, length can be customized
Wind/Snow Load	2400Pa/5400Pa
Packaging	36pcs per pallet, 936pcs per 40'HC

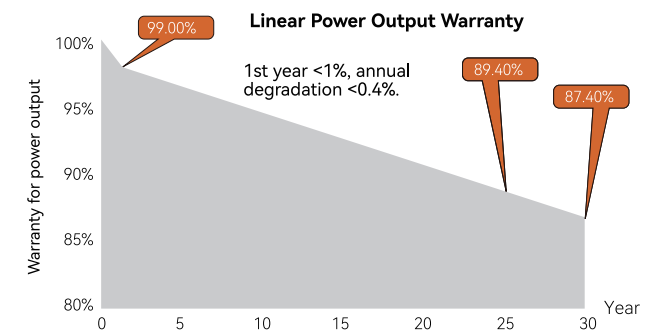
**ELECTRICAL CHARACTERISTICS (STC)**

Module Type: TWMNH-48HDXXX

Maximum Power: Pmax [W]	435	440	445	450	455
Open Circuit Voltage: Voc [V]	35.15	35.35	35.55	35.75	35.95
Short Circuit Current: Isc [A]	15.86	15.89	15.92	15.95	15.98
Voltage at Maximum Power: Vmp [V]	29.42	29.67	29.93	30.19	30.44
Current at Maximum Power: Imp [A]	14.79	14.83	14.87	14.91	14.95
Module Efficiency: η [%]	21.8	22.0	22.3	22.5	22.8

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

**WARRANTY**

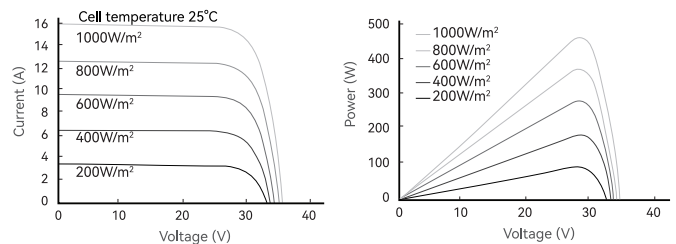


**ELECTRICAL CHARACTERISTICS (NMOT)**

Maximum Power: Pmax [W]	329	332	336	340	344
Open Circuit Voltage: Voc [V]	33.46	33.65	33.84	34.03	34.22
Short Circuit Current: Isc [A]	12.80	12.83	12.85	12.88	12.90
Voltage at Maximum Power: Vmp [V]	27.56	27.74	27.98	28.24	28.51
Current at Maximum Power: Imp [A]	11.94	11.97	12.01	12.04	12.07

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

**I-V CURVE**



**ELECTRICAL CHARACTERISTICS (Rear Power Gain)**

5%	Maximum Power: Pmax[W]	456	462	467	472	477
	Module Efficiency: η [%]	22.8	23.1	23.4	23.6	23.9
15%	Maximum Power: Pmax[W]	500	506	511	517	523
	Module Efficiency: η [%]	25.0	25.3	25.6	25.9	26.2
25%	Maximum Power: Pmax[W]	543	550	556	562	568
	Module Efficiency: η [%]	27.2	27.5	27.8	28.1	28.4

**TEMPERATURE PARAMETERS**

Temperature Coefficient (Pmax)	-0.28%/°C
Temperature Coefficient (Voc)	-0.24%/°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~+3%
Bifaciality	80±10%

**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)

