

TNOC 2.0

N-type Half-cell Bifacial Dual glass Black Frame and Transparent Module (48) TWMNH-48HD



High light transmittance, suitable for carports and balcony scenarios



Compact size and lightweight, hassle-free operation and low maintenance



Increased power, lower transportation cost



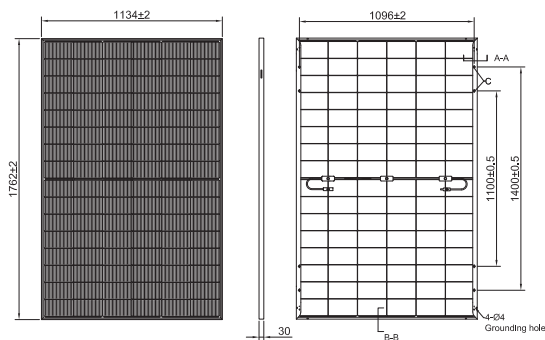
Integrated design, perfectly blending with architectural aesthetics

440-465W



TWMNH N-type Half-cell Bifacial Dual glass Black Frame and Transparent Module (48)

Drawings (Unit: mm)



Electrical Characteristics (STC)

Module type:	TWMNH-48 HD440	TWMNH-48 HD445	TWMNH-48 HD450	TWMNH-48 HD455	TWMNH-48 HD460	TWMNH-48 HD465
Maximum Power: Pmax [W]	440	445	450	455	460	465
Open Circuit Voltage: Voc [V]	35.35	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	15.89	15.92	15.95	15.98	16.05	16.12
Voltage at Maximum Power: Vmp [V]	29.67	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	14.83	14.87	14.91	14.95	14.99	15.03
Module Efficiency: η [%]	22.02	22.27	22.52	22.77	23.02	23.27

* STC: Irradiance 1000W/m², Cell temperature 25°C, AM=1.5, Power measurement tolerance: ±3%, Voc measurement tolerance: ±5%, Isc measurement tolerance: ±5%

Electrical Characteristics (BNPI)

Maximum Power: Pmax [W]	485.7	491.5	496.9	502.3	507.9	513.3
Open Circuit Voltage: Voc [V]	35.35	35.55	35.75	35.95	36.15	36.35
Short Circuit Current: Isc [A]	17.54	17.57	17.61	17.64	17.72	17.80
Voltage at Maximum Power: Vmp [V]	29.67	29.93	30.19	30.44	30.69	30.94
Current at Maximum Power: Imp [A]	16.37	16.42	16.46	16.50	16.55	16.59

* BNPI: Front side irradiance 1000W/m², Rear side irradiance 135W/m², Cell Temperature=25°C, AM=1.5 Power measurement tolerance: ±3%, Voc measurement tolerance: ±5%, Isc measurement tolerance: ±5%

Electrical Characteristics (BSI)

Short Circuit Current: Isc [A]	19.56	19.60	19.63	19.67	19.76	19.84
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* BSI: Front side irradiance 1000W/m², Rear side irradiance 300W/m², Cell Temperature=25°C, AM=1.5 Isc measurement tolerance: ±5%

Electrical characteristics with different rear side power gain

	5%	15%	25%
Maximum Power: Pmax[W]	462	506	550
Module Efficiency: η [%]	23.12	25.32	27.53
Maximum Power: Pmax[W]	467	511	556
Module Efficiency: η [%]	23.37	25.57	27.83
Maximum Power: Pmax[W]	472	517	562
Module Efficiency: η [%]	23.62	25.87	28.13
Maximum Power: Pmax[W]	477	523	568
Module Efficiency: η [%]	23.87	26.17	28.43
Maximum Power: Pmax[W]	483	529	575
Module Efficiency: η [%]	24.17	26.48	28.78
Maximum Power: Pmax[W]	488	534	581
Module Efficiency: η [%]	24.42	26.73	29.08

Temperature Rating

Temperature Coefficient of Pmax	-0.28%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	+0.046%/°C

Operating Parameters

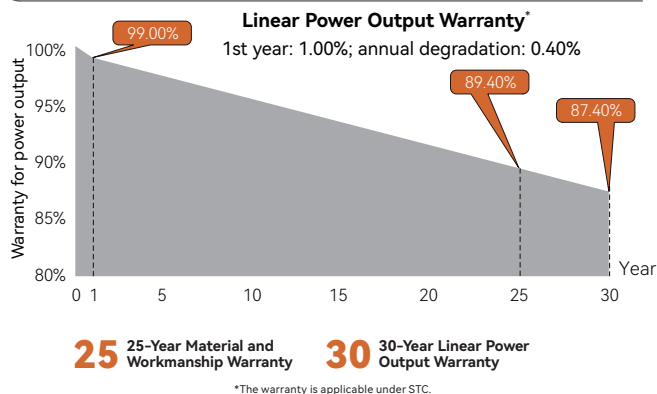
Operating Temperature*	[T ₉₈] ≤ 70°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Output Tolerance	0~+3%
Bifaciality coefficient of Pmax	80±10%
Bifaciality coefficient of Voc	98±5%
Bifaciality coefficient of Isc	80±10%
Fire Class Rating	Class C

*The module operating temperature can reach up to 85°C for short term.

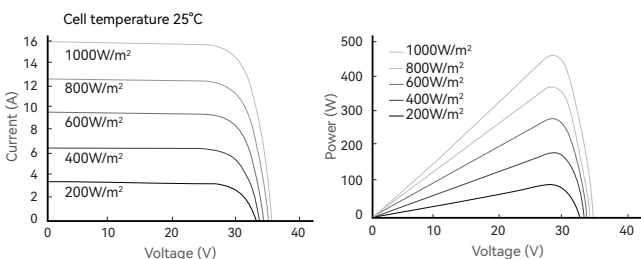
Mechanical Parameters

Cell Type	TNC
Cell Orientation	96[6×16]
Dimension	1762±2×1134±2×30mm
Weight	22.8 kg
Front Glass	2.0 mm AR coating semi tempered glass
Rear Glass	2.0 mm semi tempered glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3 diodes
Cable	4.0 mm ²
Cable Length	+1200mm,-1200mm,length can be customized
Connector	TW-PVCON-01,TW-PVCON-02(Tongwei Solar) PV-KST4-EVO2/xy_UR, PV-KBT4-EVO2/xy_UR(Staubli) PV-KST4-EVO2A/xy, PV-KBT4-EVO2A/xy(Staubli) PV-ZH202B(Zhejiang Zhonghuan Sunter)
Maximum Static Test Load	5400Pa (positive) / 2400Pa (negative)
Packaging (Per pallet)	36 pcs
Packaging	936 pcs per 40'HC

Warranty



Curve



Certifications

Quality Management System and Product Certification

ISO 9001: 2015 / Quality Management System
ISO 14001: 2015 / Environmental Management System
ISO 45001: 2018 / Occupational Health and Safety Management System
ISO 50001: 2018 / Energy Management System
IEC 62941: 2019 / Quality System for PV Module Manufacturing
IEC 61215 (2021) / IEC 61730 (2023), IEC TS 62804,
IEC 61701, IEC 62716, IEC 60068-2-68



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