



TWMNH

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

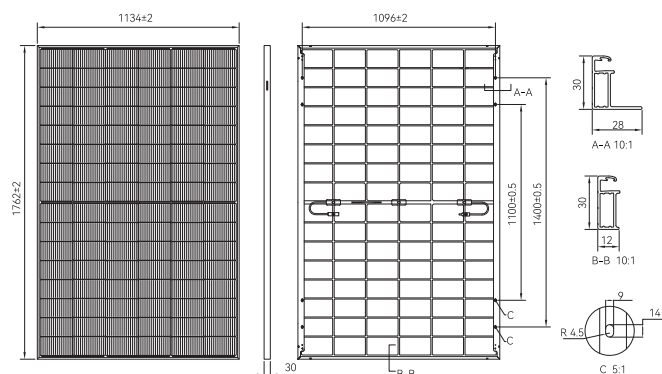
48HD435-455W

Tongwei Co.,Ltd.
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DRAWINGS (Unit: mm)



ELECTRICAL CHARACTERISTICS (STC)

Model type: TWMNH-48HDXXX

Maximum Power: P _{max} [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: V _{mp} [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/m², Cell Temperature 25°C, AM=1.5, Power measurement tolerance: ±3%

ELECTRICAL CHARACTERISTICS (BNPI)

Maximum Power: P _{max} [W]	480.4	485.7	491.5	496.9	502.3
Open Circuit Voltage: Voc [V]	35.15	35.35	35.55	35.75	35.95
Short Circuit Current: Isc [A]	17.51	17.54	17.57	17.61	17.64
Voltage at Maximum Power: V _{mp} [V]	29.42	29.67	29.93	30.19	30.44
Current at Maximum Power: Imp [A]	16.33	16.37	16.42	16.46	16.50

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

ELECTRICAL CHARACTERISTICS (NMOT)

Maximum Power: P _{max} [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: V _{mp} [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/m², Ambient Temperature 20°C, AM=1.5, Wind Speed 1m/s

TEMPERATURE RATING

Temperature Coefficient of P _{max}	-0.28%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	+0.046%/°C
NMOT	45±2°C

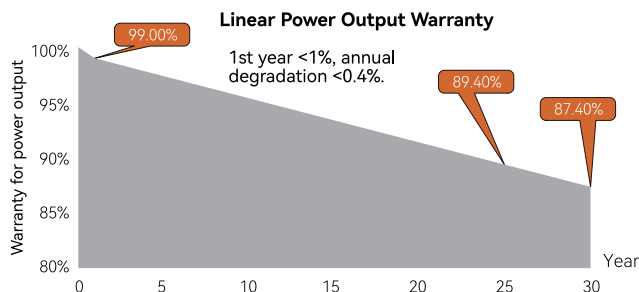
OPERATING PARAMETERS

Operating Temperature	-40°C~+70°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Selection Tolerance	0~+3%
Bifaciality coefficient of P _{max}	80±10%
Bifaciality coefficient of Voc	98±5%
Bifaciality coefficient of Isc	80±10%
Fire Class Rating	Class C

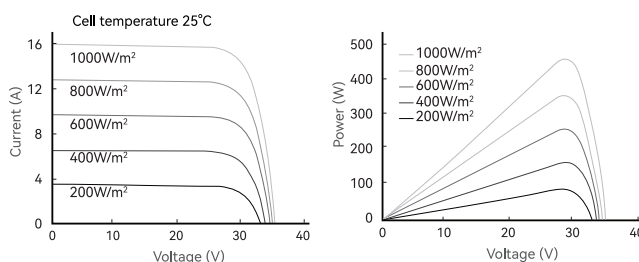
MECHANICAL PARAMETERS

Cell Type	TNC (N Type Monocrystalline Cell)
Cell Orientation	96[6×16]
Dimensions	1762±2×1134±2×30mm
Weight	20.9kg
Front Glass	1.6mm AR coated heat strengthened glass
Rear Glass	1.6mm heat strengthened glass
Frame	Anodized aluminum alloy black frame
Junction Box	IP68, 3diodes
Cable	4.0mm ²
Cable length	+1200mm, -1200mm, length can be customized
Connector	TW-PVCON-01(Tongwei Solar) PV-KST4-EVO2/xy_UR, PV-KBT4-EVO2/xy_UR(Stäubli) PV-KST4-EVO2A/xy, PV-KBT4-EVO2A/xy(Stäubli) PV-ZH202B(Zhonghuan), PV-JK03M2/xy(Jinko)
Wind/Snow load	2400Pa/5400Pa
Per pallet	36pcs
Packaging	936pcs per 40'HC

WARRANTY



I-V CURVE



CERTIFICATIONS

Quality Management System and Product Certification

ISO 9001: 2015 / Quality management systems
ISO 14001: 2015 / Environmental management systems
ISO 45001: 2018 / Occupational health and safety management systems
ISO 50001: 2018 / Energy management systems
IEC 62941: 2019 / Quality system for PV module manufacturing
IEC 61215(2021) / IEC 61730(2023)

