



High Power Output  
Low LCOE

Maximum Power  
450W+

# TWMNH

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

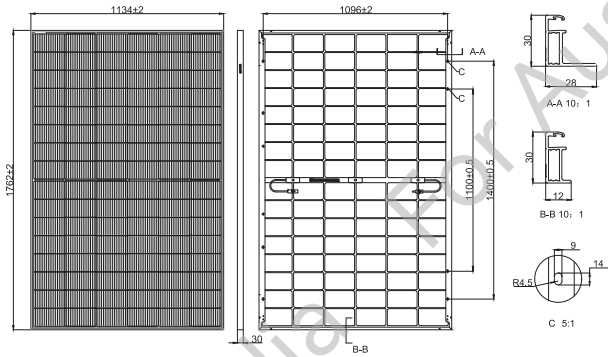
## 48HC430-450W

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**DRAWINGS (Unit: mm)**



**MECHANICAL PARAMETERS**

|                  |   |
|------------------|---|
| Cells            | TNC (N Type Monocrystalline Cell)           |
| Cell Orientation | 96[6X16]                                    |
| Dimension        | 1762±2X1134±2X30mm                          |
| 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     | +400mm, -200mm, 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  |

**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 |

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

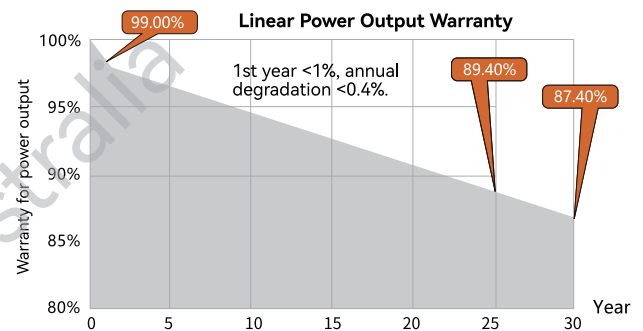
**TEMPERATURE PARAMETERS**

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

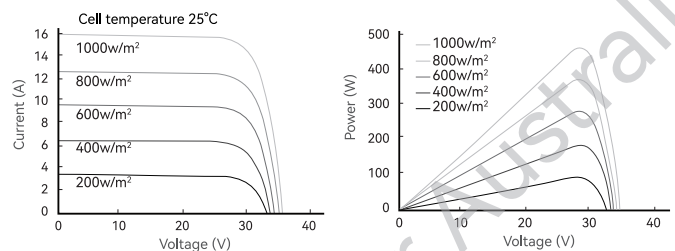
**MAXIMUM RATINGS**

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

**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 50001:2011 / energy management system
- IEC TS 62941—2016 / PV industry quality management system
- IEC 61215/61730, IEC 62804(PID), IEC 61701(Salt), IEC 62716 (Ammonia), IEC 60068-2-68(Sand)



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Declaration: With the technical progress and product updates, there exists a deviation between the technical parameter of the TW Solar's future products and the technical parameter in this specification. The TW Solar reserves the right to adjust the technical parameter at any time without notifying the customers. TW Solar reserves the final right of interpretation. (20231215)