



# TWMND

N-type Half-cell  
Monofacial Black Frame Module (60)

## 60HS470-490W

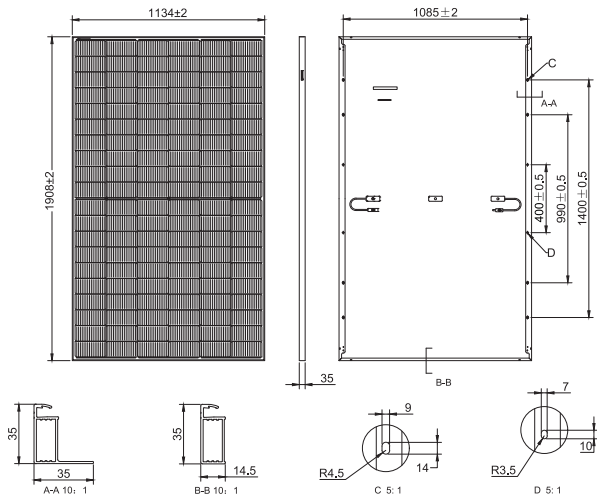


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**DRAWINGS (Unit: mm)**



**ELECTRICAL CHARACTERISTICS (STC)**

| Module Type: TWMND-60HSXXX        | 470   | 475   | 480   | 485   | 490   |
|-----------------------------------|-------|-------|-------|-------|-------|
| Maximum Power: Pmax [W]           | 470   | 475   | 480   | 485   | 490   |
| Open Circuit Voltage: Voc [V]     | 43.34 | 43.51 | 43.68 | 43.85 | 44.02 |
| Short Circuit Current: Isc [A]    | 13.55 | 13.60 | 13.65 | 13.70 | 13.75 |
| Voltage at Maximum Power: Vmp [V] | 36.79 | 36.96 | 37.13 | 37.30 | 37.47 |
| Current at Maximum Power: Imp [A] | 12.78 | 12.85 | 12.93 | 13.00 | 13.07 |
| Module Efficiency: η [%]          | 21.7  | 22.0  | 22.2  | 22.4  | 22.6  |

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

**ELECTRICAL CHARACTERISTICS (NMOT)**

|                                   |       |       |       |       |       |
|-----------------------------------|-------|-------|-------|-------|-------|
| Maximum Power: Pmax [W]           | 355.7 | 359.5 | 363.3 | 367.0 | 370.8 |
| Open Circuit Voltage: Voc [V]     | 41.22 | 41.38 | 41.54 | 41.71 | 41.87 |
| Short Circuit Current: Isc [A]    | 10.67 | 10.71 | 10.74 | 10.78 | 10.82 |
| Voltage at Maximum Power: Vmp [V] | 35.41 | 35.58 | 35.74 | 35.90 | 36.07 |
| Current at Maximum Power: Imp [A] | 10.03 | 10.09 | 10.15 | 10.20 | 10.26 |

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

**TEMPERATURE PARAMETERS**

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

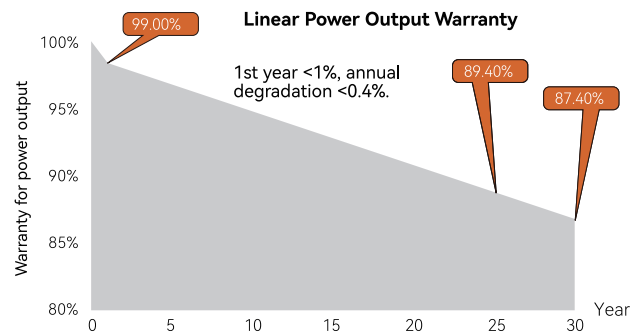
**MAXIMUM RATINGS**

|                            |             |
|----------------------------|-------------|
| Operational Temperature    | -40°C~+85°C |
| Maximum System Voltage     | 1500V DC    |
| Maximum Series Fuse Rating | 25A         |
| Power Output Tolerance     | 0~+5W       |

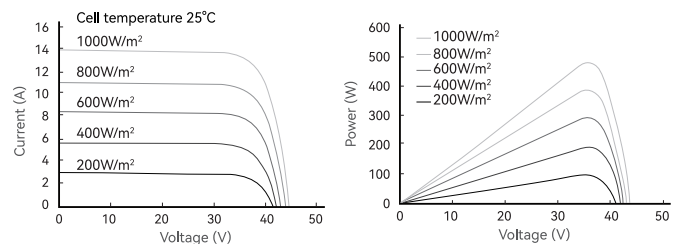
**MECHANICAL PARAMETERS**

|                  |   |
|------------------|---|
| Cells            | TNC (N Type Monocrystalline Cell)           |
| Cell Orientation | 120[6×20]                                   |
| Dimension        | 1908±2×1134±2×35mm                          |
| Weight           | 23.2kg                                      |
| Front Glass      | 3.2mm high transmittance, AR tempered glass |
| Backsheet        | White                                       |
| 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        | 31pcs per pallet, 744pcs per 40'HC          |

**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)

