



TWMNH

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

48HD435-455W

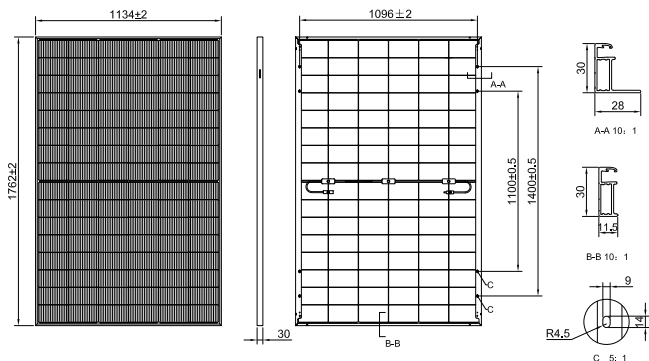


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Drawings (Unit: mm)



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/m², Cell Temperature 25°C, AM=1.5

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/m², Ambient Temperature 20°C, AM=1.5, Wind Speed 1m/s

Electrical characteristics with different rear side 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 rating

| | |
|---------------------------------|------------|
| Temperature Coefficient of Pmax | -0.28%/°C |
| Temperature Coefficient of Voc | -0.24%/°C |
| Temperature Coefficient of Isc | +0.046%/°C |
| NMOT | 45±2°C |

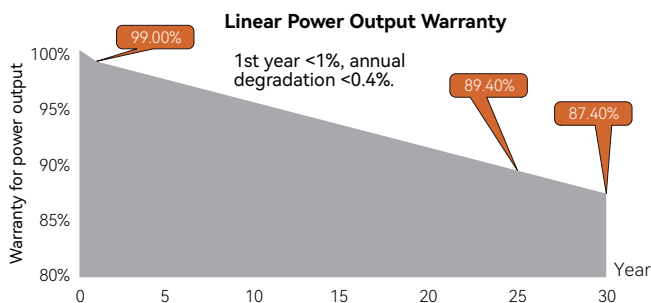
Operating Parameters

| | |
|----------------------------|-------------|
| Operating Temperature | -40°C~+85°C |
| Maximum System Voltage | 1500V DC |
| Maximum Series Fuse Rating | 30A |
| Power Output Tolerance | 0~+3% |
| Bifaciality | 80±10% |

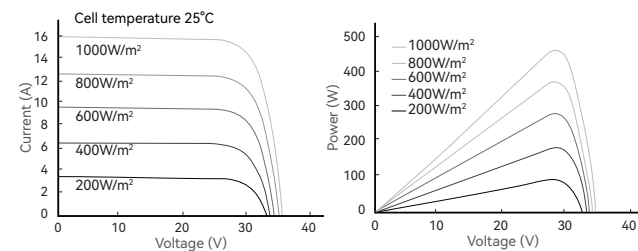
Mechanical Parameters

| | |
|------------------|---|
| Cell Type | TNC (N Type Monocrystalline Cell) |
| Cell Orientation | 96[6×16] |
| Dimensions | 1762±2×1134±2×30mm |
| Weight | 24.0kg |
| Front Glass | 2.0mm AR coated heat strengthened glass |
| Rear Glass | 2.0mm heat strengthened glass |
| Frame | Anodized aluminum alloy black frame |
| Junction Box | IP68, 3 diodes |
| Cable | 4.0mm ² |
| Cable length | ±1200mm, length can be customized |
| Wind/Snow load | 2400Pa/5400Pa |
| Packaging | 36pcs per pallet, 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 61215/61730, IEC 62804(PID), IEC 61701(Salt), IEC 62716 (Ammonia), IEC 60068-2-68(Sand)

