



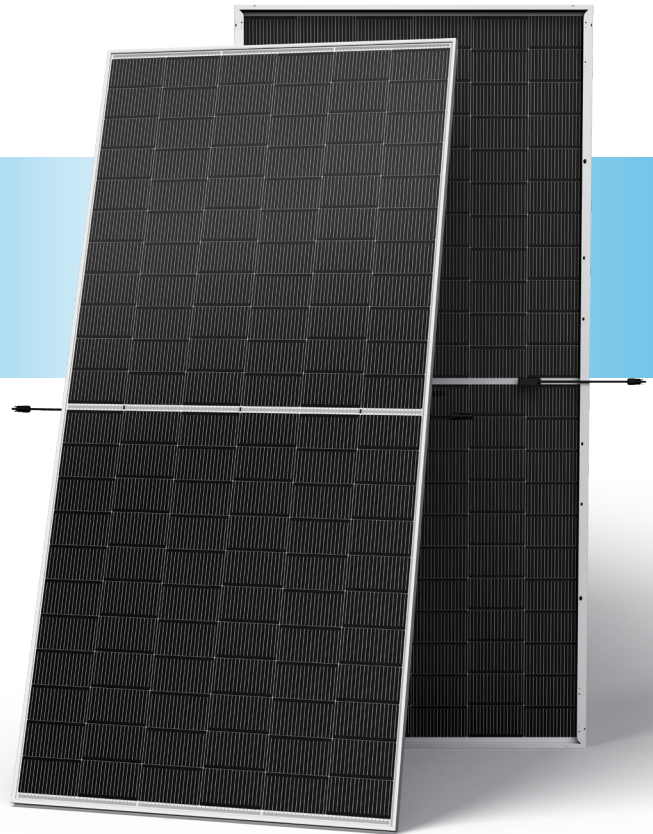
N-type i-TOPCon

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-NEG19RC.20 625-650W

650_W / MAXIMUM POWER OUTPUT

24.1% / MAXIMUM EFFICIENCY



High customer value

- Best partner of 1P tracker, with highest utilization of tracker length
- Low voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 1%~5%
- Standardized module size with higher container space utilization effectively reduces the freight cost
- Excellent compatibility with existing mainstream system components
- Certified Low-Carbon Footprint



High power up to 650W

- Up to 24.1% module efficiency, on 210 innovation platform
- Patented i-TOPCon technology with continuous efficiency upgrade, including contact resistance reduction, rear reflection enhancement and edge quality repairment



High reliability

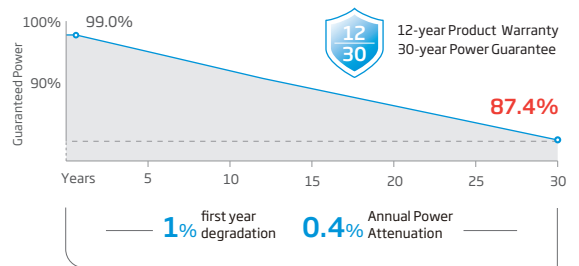
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions



High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature coefficient (-0.29%/°C)
- Higher bifaciality, with up to 10%~20% additional power gain from back side depending on albedo
- Reliable dual-glass structure with 30-year power guarantee

Performance Warranty



* Please refer to product warranty for details

Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL61730

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

ISO45001: Occupational Health and Safety Management System

ISO14067: Product Carbon Footprint Limited Assurance



ELECTRICAL DATA (STC & NOCT & BNPI)

| Testing Condition | STC | NOCT | BNPI | STC | NOCT | BNPI | STC | NOCT | BNPI | STC | NOCT | BNPI | STC | NOCT | BNPI | STC | NOCT | BNPI |
|--------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Power Watts- $P_{MAX}(W_p)^*$ | 625 | 477 | 692 | 630 | 481 | 698 | 635 | 487 | 704 | 640 | 489 | 709 | 645 | 492 | 715 | 650 | 496 | 720 |
| Power Selection (W)** | 0 ~ +5 | | | | | | | | | | | | | | | | | |
| Maximum Power Voltage- V_{MPP} (V) | 40.46 | 38.10 | 40.46 | 40.68 | 38.30 | 40.68 | 40.84 | 38.60 | 40.84 | 41.06 | 38.70 | 41.06 | 41.22 | 38.80 | 41.22 | 41.43 | 39.00 | 41.43 |
| Maximum Power Current- I_{MPP} (A) | 15.45 | 12.52 | 17.12 | 15.49 | 12.57 | 17.16 | 15.55 | 12.60 | 17.23 | 15.60 | 12.67 | 17.28 | 15.65 | 12.70 | 17.34 | 15.69 | 12.73 | 17.38 |
| Open Circuit Voltage- V_{oc} (V) | 48.70 | 46.30 | 48.70 | 48.90 | 46.50 | 48.90 | 49.10 | 46.60 | 49.10 | 49.30 | 46.80 | 49.30 | 49.52 | 47.00 | 49.52 | 49.77 | 47.30 | 49.77 |
| Short Circuit Current- I_{sc} (A) | 16.32 | 13.15 | 18.08 | 16.38 | 13.20 | 18.15 | 16.44 | 13.25 | 18.22 | 16.51 | 13.30 | 18.29 | 16.55 | 13.33 | 18.34 | 16.59 | 13.37 | 18.38 |
| Module Efficiency η_m (%) | 23.1 | | | 23.3 | | | 23.5 | | | 23.7 | | | 23.9 | | | 24.1 | | |

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s. BNPI: Irradiance: front 1000W/m², rear 135W/m², Temperature 25°C, Air Mass AM1.5
 *Measuring tolerance: ±3%. **Power selection up to: +3%.

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

| Backside Power Gain | 5% | 10% | 5% | 10% | 5% | 10% | 5% | 10% | 5% | 10% | 5% | 10% |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peak Power Watts- $P_{MAX}(W_p)$ | 656 | 688 | 662 | 693 | 667 | 699 | 672 | 704 | 677 | 710 | 683 | 715 |
| Maximum Power Voltage- V_{MPP} (V) | 40.46 | 40.46 | 40.68 | 40.68 | 40.84 | 40.84 | 41.06 | 41.06 | 41.22 | 41.22 | 41.43 | 41.43 |
| Maximum Power Current- I_{MPP} (A) | 16.22 | 17.00 | 16.26 | 17.04 | 16.33 | 17.11 | 16.38 | 17.16 | 16.43 | 17.22 | 16.47 | 17.26 |
| Open Circuit Voltage- V_{oc} (V) | 48.70 | 48.70 | 48.90 | 48.90 | 49.10 | 49.10 | 49.30 | 49.30 | 49.52 | 49.52 | 49.77 | 49.77 |
| Short Circuit Current- I_{sc} (A) | 17.14 | 17.95 | 17.20 | 18.02 | 17.26 | 18.08 | 17.34 | 18.16 | 17.38 | 18.21 | 17.42 | 18.25 |

Power Bifaciality: 80±5%.

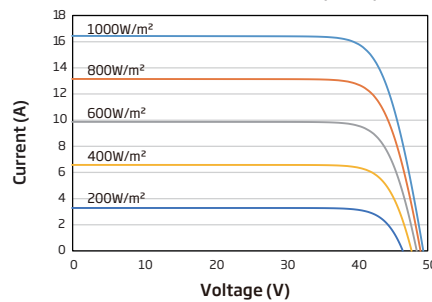
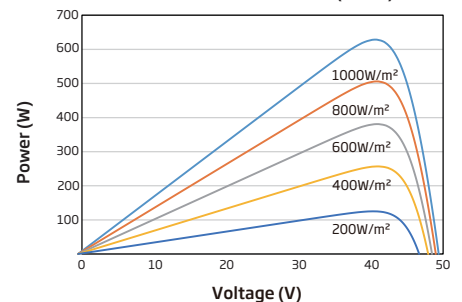
TEMPERATURE RATINGS

| | |
|---|-------------|
| NOCT (Nominal Operating Cell Temperature) | 43°C (±2°C) |
| Temperature Coefficient of P_{MAX} | -0.29% /°C |
| Temperature Coefficient of V_{oc} | -0.24% /°C |
| Temperature Coefficient of I_{sc} | 0.04% /°C |

Due to different testing methods, the actual performances might differ from the declared specifications.

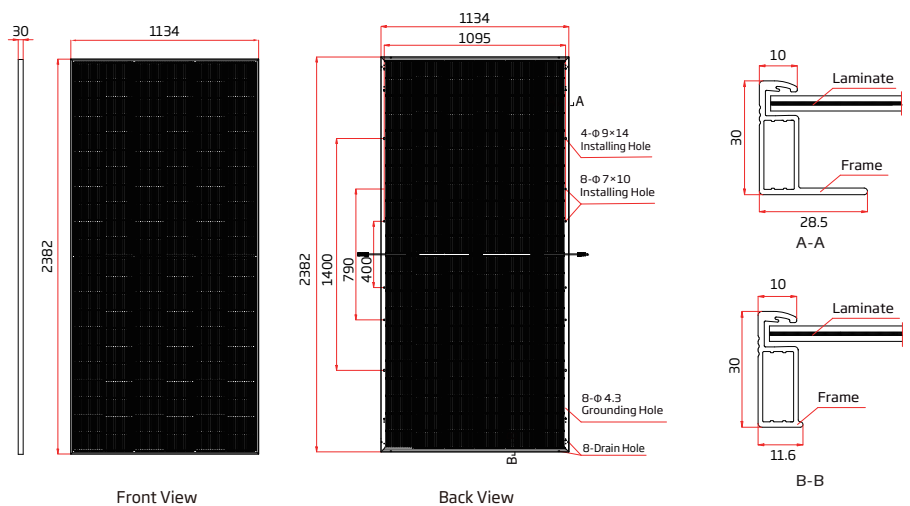
APPLICATION CONDITIONS

| | |
|------------------------|----------------|
| Operating Temperature | -40~+70°C |
| Maximum System Voltage | 1500V DC (IEC) |
| | 1500V DC (UL) |
| Max Series Fuse Rating | 35A |

CURVES OF PV MODULE
I-V CURVES OF PV MODULE (635W)

P-V CURVES OF PV MODULE (635W)

MECHANICAL DATA

| | |
|-------------------|--|
| Solar Cells | N-type i-TOPCon Monocrystalline |
| No. of cells | 132 cells |
| Module Dimensions | 2382×1134×30 mm (93.78×44.65×1.18 inches) |
| Weight | 33.0 kg (72.8 lb) |
| Front Glass | 2.0 mm (0.08 inches), AR Coating Heat Strengthened Glass |
| Back Glass | 2.0 mm (0.08 inches), Heat Strengthened Glass |
| Frame | 30mm (1.18 inches) Anodized Aluminium Alloy |
| J-Box | IP 68 rated |
| Cables | Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Portrait: 200/320 mm (7.87/12.60 inches) Length can be customized |
| Connector | TS4 Plus / TS4 / MC4 EVO2* |
| Packaging | Modules per box: 36 pieces Modules per 40' container: 720 pieces |

*The connector names listed are general names; specific types are subject to the certification documents.



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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