

# Vertex N

N-type i-TOPCon bifacial dual glass  
Monocrystalline module

PRODUCT: TSM-XXXNEG21C.20

POWER RANGE: 705-725W

**725W**

MAXIMUM POWER OUTPUT

**0~+5W**

BINNING TOLERANCE

**23.3%**

MAXIMUM EFFICIENCY

Trinasolar



### High customer value

- Standardized module size with flagship module power, 35W higher compared with conventional technology
- Low voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 2%~6%
- Higher container space utilization effectively reduces the freight cost
- Certified Low-Carbon Footprint
- The Star of LCOE



### High power up to 725W

- Up to 23.3% module efficiency, on 210 innovation platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



### High reliability

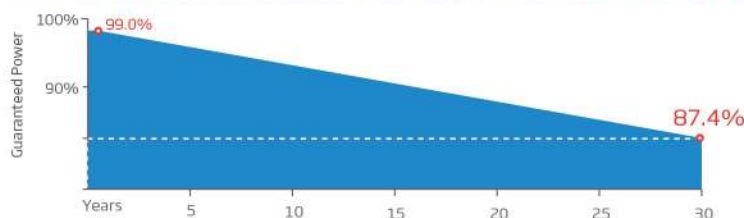
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Fire Class rating C



### 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

### Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



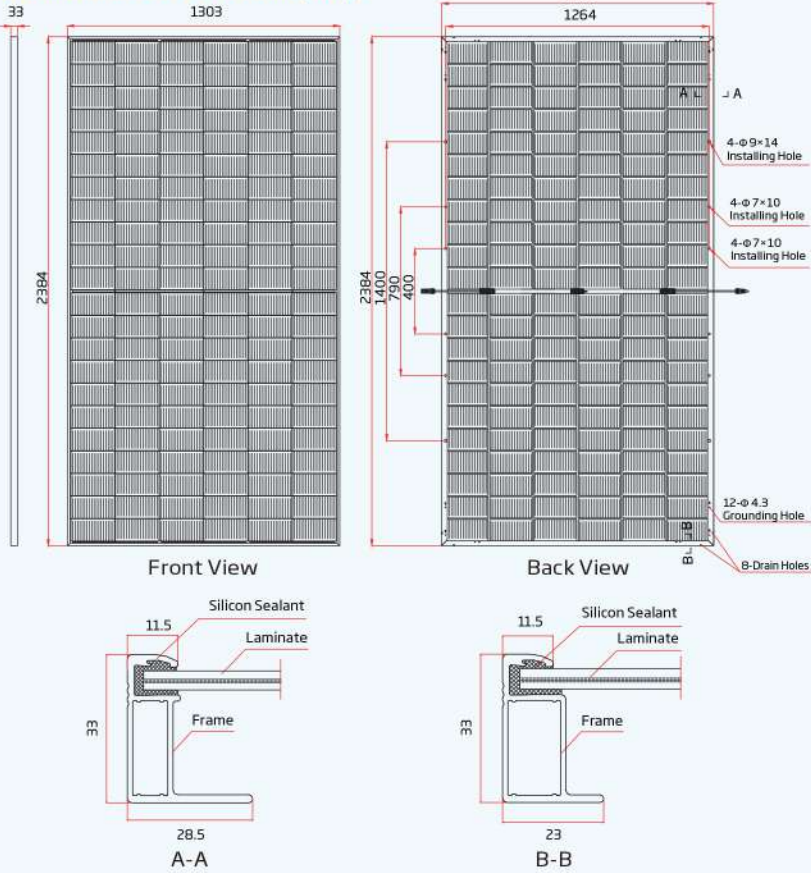
### Comprehensive Products and System Certificates



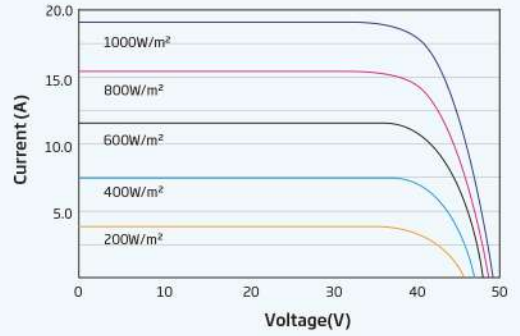
IEC61215/IEC61730  
 ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System  
 ISO14067: Product Carbon Footprint Limited Assurance

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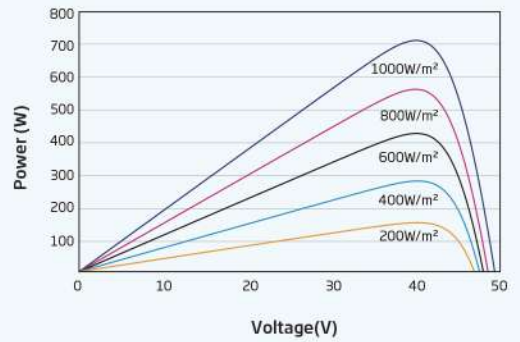
**DIMENSIONS OF PV MODULE(mm)**



**I-V CURVES OF PV MODULE(715 W)**



**P-V CURVES OF PV MODULE(715 W)**



**MECHANICAL DATA**

|                   |   |
|-------------------|---|
| Solar Cells       | N-type i-TOPCon Monocrystalline                               |
| No. of cells      | 132 cells   |
| Module Dimensions | 2384×1303×33 mm (93.86×51.30×1.30 inches)                     |
| Weight            | 38.3 kg (84.4 lb)   |
| Front Glass       | 2.0 mm (0.08 inches), AR Coated Heat Strengthened Glass       |
| Back Glass        | 2.0 mm (0.08 inches), Heat Strengthened Glass (White Coating) |

|           |   |
|-----------|---|
| Frame     | 33mm(1.30 inches) Anodized Aluminium Alloy  |
| J-Box     | IP 68 rated   |
| Cables    | Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> )<br>Portrait: 350/280 mm(13.78/11.02 inches)<br>Length can be customized |
| Connector | Stäubli MC4 EVO2  |

**ELECTRICAL DATA (STC & NOCT & BNPI) TSM-XXXNEG21C.20 (XXX=705-725)**

| Testing Condition                    | STC    |       |       | NOCT  |       |       | BNPI  |       |       | STC   |       |       | NOCT  |       |       | BNPI |      |      | STC |      |      | NOCT |      |      | BNPI |  |  |
|--------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|-----|------|------|------|------|------|------|--|--|
|                                      | STC    | NOCT  | BNPI  | STC   | NOCT  | BNPI  | STC   | NOCT  | BNPI  | STC   | NOCT  | BNPI  | STC   | NOCT  | BNPI  | STC  | NOCT | BNPI | STC | NOCT | BNPI | STC  | NOCT | BNPI |      |  |  |
| Peak Power Watts- $P_{MAX}$ (Wp)*    | 705    | 540   | 781   | 710   | 543   | 787   | 715   | 547   | 792   | 720   | 551   | 798   | 725   | 555   | 801   |      |      |      |     |      |      |      |      |      |      |  |  |
| Binning Tolerance- $P_{MAX}$ (W)     | 0 ~ +5 |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |      |      |     |      |      |      |      |      |      |  |  |
| Maximum Power Voltage- $V_{MPP}$ (V) | 40.7   | 38.3  | 40.7  | 40.9  | 38.5  | 40.9  | 41.1  | 38.7  | 41.1  | 41.3  | 38.8  | 41.3  | 41.5  | 39.0  | 41.5  |      |      |      |     |      |      |      |      |      |      |  |  |
| Maximum Power Current- $I_{MPP}$ (A) | 17.33  | 14.08 | 19.19 | 17.36 | 14.12 | 19.23 | 17.40 | 14.14 | 19.28 | 17.44 | 14.19 | 19.32 | 17.47 | 14.23 | 19.30 |      |      |      |     |      |      |      |      |      |      |  |  |
| Open Circuit Voltage- $V_{OC}$ (V)   | 48.8   | 46.3  | 48.8  | 49.0  | 46.5  | 49.0  | 49.2  | 46.7  | 49.2  | 49.4  | 46.9  | 49.4  | 49.6  | 47.1  | 49.6  |      |      |      |     |      |      |      |      |      |      |  |  |
| Short Circuit Current- $I_{SC}$ (A)  | 18.36  | 14.80 | 20.34 | 18.40 | 14.83 | 20.39 | 18.44 | 14.86 | 20.43 | 18.49 | 14.90 | 20.49 | 18.54 | 14.94 | 20.54 |      |      |      |     |      |      |      |      |      |      |  |  |
| Module Efficiency $\eta_m$ (%)       | 22.7   |       |       | 22.9  |       |       | 23.0  |       |       | 23.2  |       |       | 23.3  |       |       |      |      |      |     |      |      |      |      |      |      |  |  |

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass 1.5. NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s. \*Measuring tolerance: ±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%   | 5%    | 10%   | 5%    | 10%   | 5%    | 10%   | 5%    | 10%   | 5%  | 10% | 5% | 10% | 5%  | 10% | 5% | 10% | 5%  | 10% |  |
| Total Equivalent power- $P_{MAX}$ (Wp) | 740   | 776   | 746   | 781   | 751   | 787   | 756   | 792   | 761   | 798   |     |     |    |     |     |     |    |     |     |     |  |
| Maximum Power Voltage- $V_{MPP}$ (V)   | 40.7  | 40.7  | 40.9  | 40.9  | 41.1  | 41.1  | 41.3  | 41.3  | 41.5  | 41.5  |     |     |    |     |     |     |    |     |     |     |  |
| Maximum Power Current- $I_{MPP}$ (A)   | 18.20 | 19.06 | 18.23 | 19.10 | 18.27 | 19.14 | 18.31 | 19.18 | 18.34 | 19.22 |     |     |    |     |     |     |    |     |     |     |  |
| Open Circuit Voltage- $V_{OC}$ (V)     | 48.8  | 48.8  | 49.0  | 49.0  | 49.2  | 49.2  | 49.4  | 49.4  | 49.6  | 49.6  |     |     |    |     |     |     |    |     |     |     |  |
| Short Circuit Current- $I_{SC}$ (A)    | 19.28 | 20.20 | 19.32 | 20.24 | 19.36 | 20.28 | 19.41 | 20.34 | 19.47 | 20.39 |     |     |    |     |     |     |    |     |     |     |  |

Power Bifaciality: 80±7%;  $\eta_{Pmax}$ : 80±7%;  $\eta_{Voc}$ : 100±3%;  $\eta_{Isc}$ : 80±7%

**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    |

**MAXIMUM RATINGS**

|                         |                                 |
|-------------------------|---------------------------------|
| Operational Temperature | -40~+85°C                       |
| Maximum System Voltage  | 1500V DC (IEC)<br>1500V DC (UL) |
| Max Series Fuse Rating  | 35A                             |

**WARRANTY**

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 1% first year degradation
- 0.40% Annual Power Attenuation

(Power degradation values above apply to frontside, refer to product warranty for power degradation for backside and other details)

**PACKAGING CONFIGURATION**

- Modules per box: 33 pieces
- Modules per 40' container: 594 pieces