

Vertex N

BIFACIAL DUAL GLASS MODULE

PRODUCT: TSM-NEG21C.20

PRODUCT RANGE: 650-680W

680W

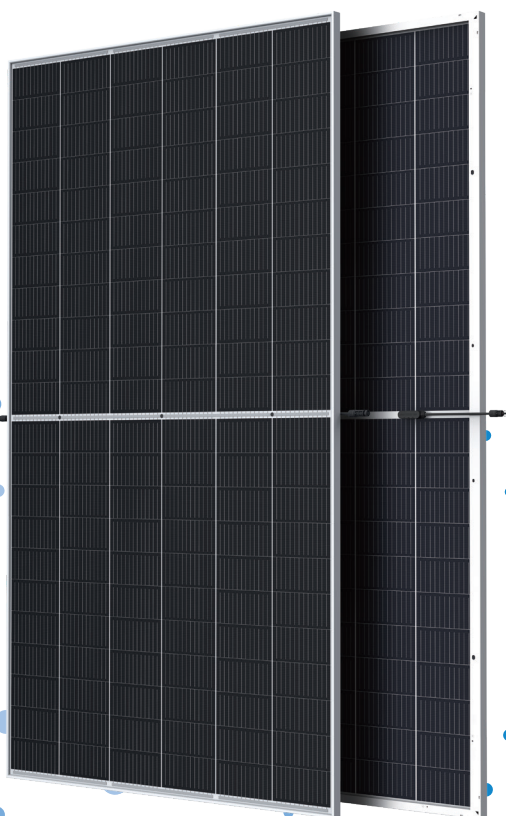
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.9%

MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (levelized cost of energy), reduced BOS (balance of system) cost, shorter payback time
- Lowest guaranteed first year and annual degradation;
- Designed for compatibility with existing mainstream system components



High power up to 680W

- Up to 21.9% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

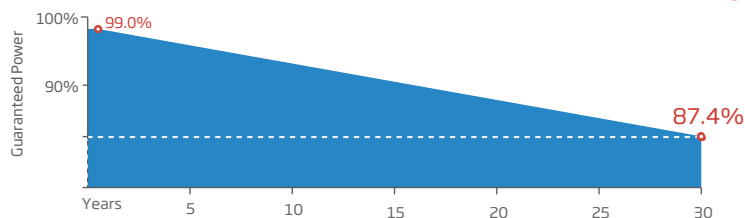
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent product bifaciality and low irradiation performance, validated by 3rd party
- Extremely low 1% first year degradation and 0.4% annual power attenuation
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.30%) and operating temperature
- Up to 30% additional power gain from back side depending on albedo

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



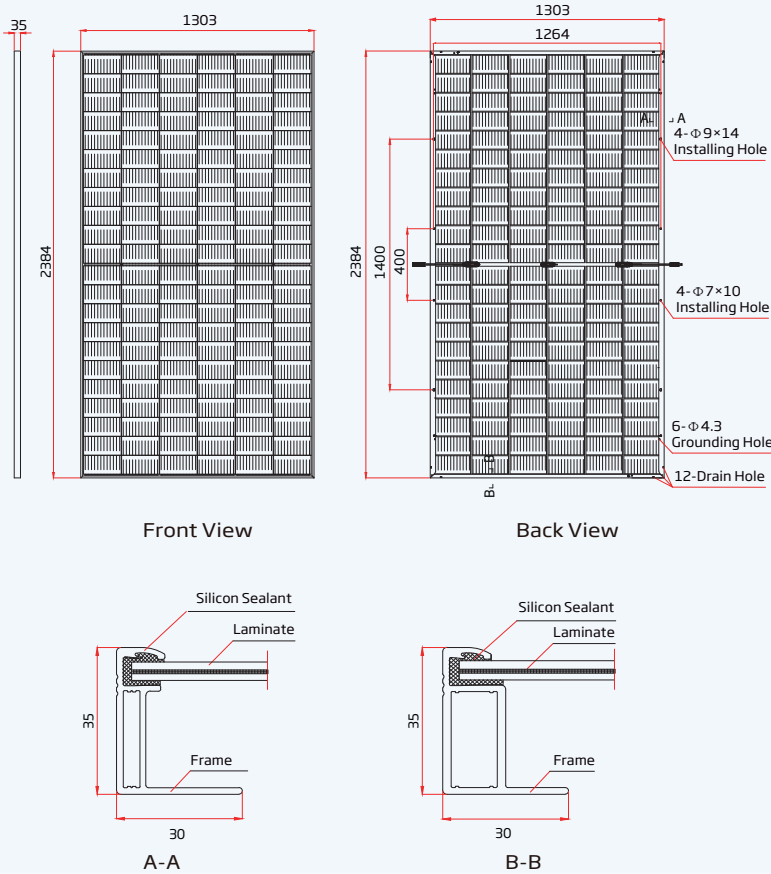
Comprehensive Products and System Certificates



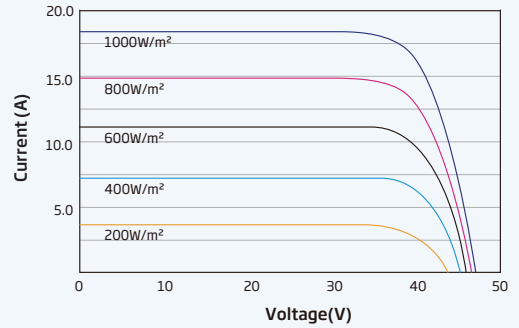
IEC61215/IEC61730/IEC61701/IEC62716
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System



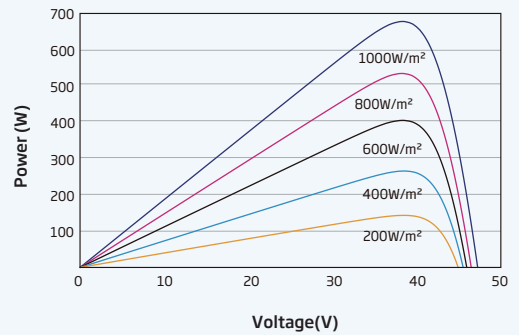
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(665W)



P-V CURVES OF PV MODULE(665 W)



ELECTRICAL DATA (STC)

Peak Power Watts- P_{MAX} (Wp)*	650	655	660	665	670	675	680
Power Tolerance- P_{MAX} (W)	0 ~ +5						
Maximum Power Voltage- V_{MPP} (V)	38.3	38.6	38.8	39.0	39.2	39.4	39.6
Maximum Power Current- I_{MPP} (A)	16.96	16.99	17.02	17.06	17.09	17.12	17.16
Open Circuit Voltage- V_{OC} (V)	46.2	46.4	46.6	46.8	47.0	47.2	47.4
Short Circuit Current- I_{SC} (A)	17.96	18.00	18.03	18.07	18.10	18.14	18.18
Module Efficiency η_m (%)	20.9	21.1	21.2	21.4	21.6	21.7	21.9

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power - P_{MAX} (Wp)	702	707	713	718	724	729	734
Maximum Power Voltage- V_{MPP} (V)	38.3	38.6	38.8	39.0	39.2	39.4	39.6
Maximum Power Current- I_{MPP} (A)	18.32	18.35	18.38	18.42	18.46	18.49	18.53
Open Circuit Voltage- V_{OC} (V)	46.2	46.4	46.6	46.8	47.0	47.2	47.4
Short Circuit Current- I_{SC} (A)	19.40	19.44	19.47	19.52	19.55	19.59	19.63
Irradiance ratio (rear/front)	10%						

Product Bifaciality: 80±5%.

ELECTRICAL DATA (NOCT)

Maximum Power- P_{MAX} (Wp)	494	499	502	506	510	514	517
Maximum Power Voltage- V_{MPP} (V)	36.0	36.3	36.4	36.6	36.8	37.0	37.2
Maximum Power Current- I_{MPP} (A)	13.72	13.77	13.79	13.84	13.86	13.89	13.91
Open Circuit Voltage- V_{OC} (V)	43.8	44.0	44.2	44.4	44.5	44.7	44.9
Short Circuit Current- I_{SC} (A)	14.47	14.51	14.53	14.56	14.59	14.62	14.65

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×35 mm (93.86×51.30×1.38 inches)
Weight	38.7 kg (85.3 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	35mm(1.38 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²), Portrait: 280/280 mm(11.02/11.02 inches) Length can be customized
Connector	MC4 EV02 / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.30%/°C
Temperature Coefficient of V_{OC}	-0.25%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

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

WARRANTY

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 1% first year degradation
- 0.4% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 31 pieces
- Modules per 40' container: 558 pieces
- Modules per 40' container: 527 pieces (with wooden coner)