

# Vertex N

BIFACIAL DUAL GLASS MODULE

PRODUCT: TSM-NEG21C.20

PRODUCT RANGE: 660-690W

## 690W

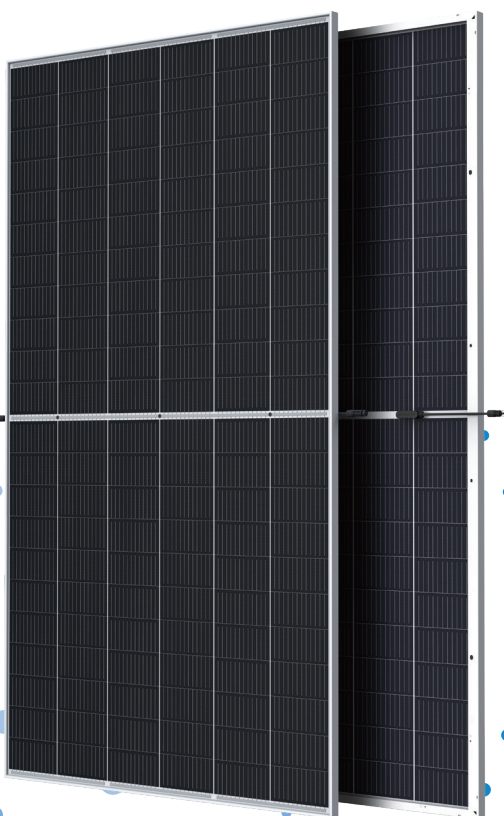
MAXIMUM POWER OUTPUT

## 0~+5W

POSITIVE POWER TOLERANCE

## 22.2%

MAXIMUM EFFICIENCY



### High customer value

- Lower LCOE (levelized cost of energy), reduced BOS (balance of system) cost, shorter payback time
- Guaranteed first year and annual degradation
- High module power; high string power and low voltage design



### High power up to 690W

- Up to 22.2% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



### High reliability

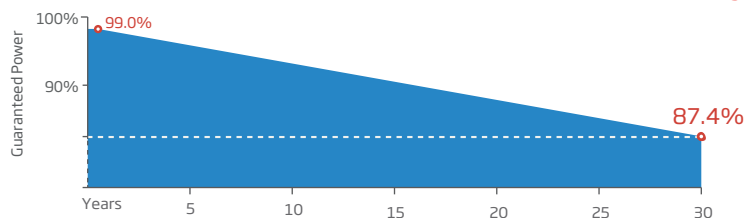
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive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

ISO 45001: Occupational Health and Safety Management System

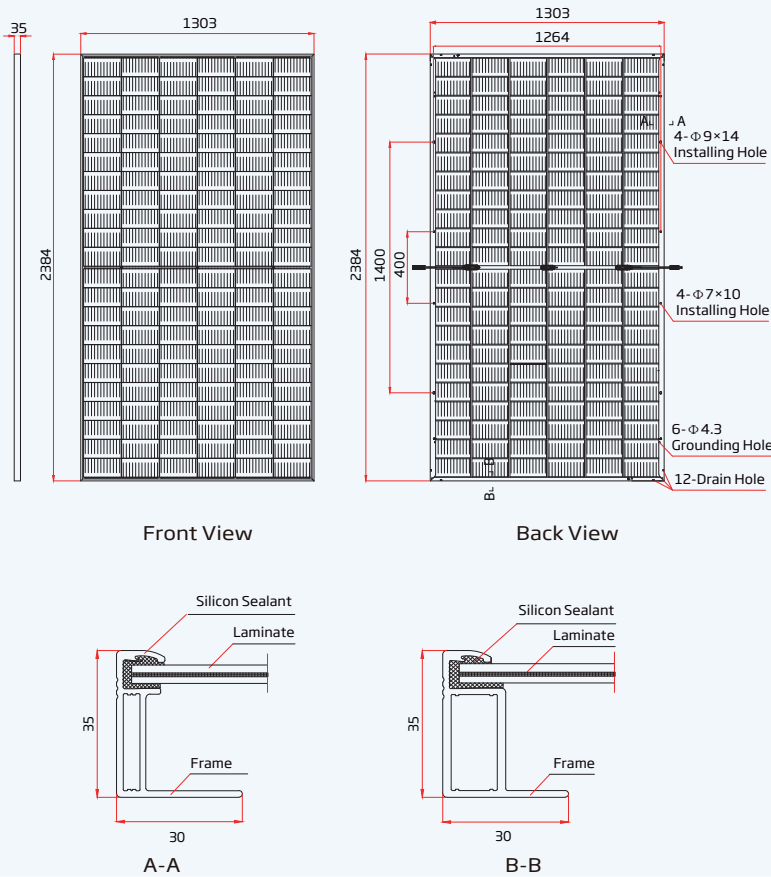


We deliver. You install. The sun does all the rest.

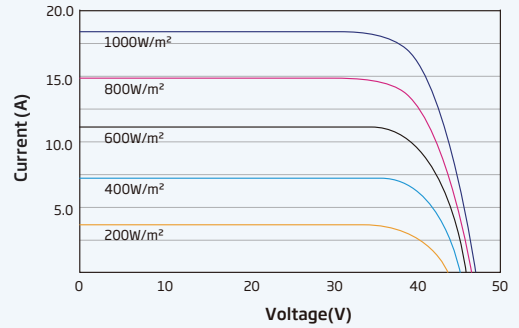
Data sheet provided for you @ [www.densys-pv5.de](http://www.densys-pv5.de)



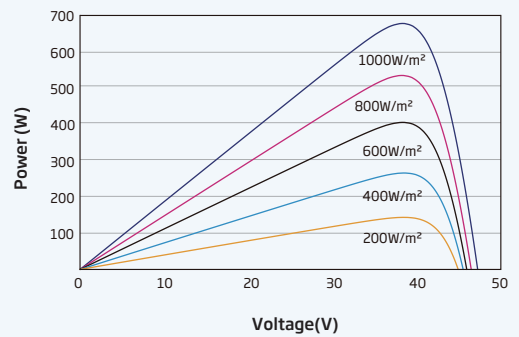
**DIMENSIONS OF PV MODULE(mm)**



**I-V CURVES OF PV MODULE(675W)**



**P-V CURVES OF PV MODULE(675 W)**



**ELECTRICAL DATA (STC)**

Peak Power Watts-P <sub>MAX</sub> (Wp)*	660	665	670	675	680	685	690
Power Tolerance-P <sub>MAX</sub> (W)	0 ~ +5						
Maximum Power Voltage-V <sub>MPP</sub> (V)	38.8	39.0	39.2	39.4	39.6	39.8	40.1
Maximum Power Current-I <sub>MPP</sub> (A)	17.02	17.06	17.09	17.12	17.16	17.19	17.23
Open Circuit Voltage-V <sub>OC</sub> (V)	46.6	46.8	47.0	47.2	47.4	47.7	47.9
Short Circuit Current-I <sub>SC</sub> (A)	18.03	18.07	18.10	18.14	18.18	18.21	18.25
Module Efficiency η <sub>m</sub> (%)	21.2	21.4	21.6	21.7	21.9	22.1	22.2

STC: Irradiance 1000W/m<sup>2</sup>, 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 <sub>MAX</sub> (Wp)	713	718	724	729	734	740	745
Maximum Power Voltage-V <sub>MPP</sub> (V)	38.8	39.0	39.2	39.4	39.6	39.8	40.1
Maximum Power Current-I <sub>MPP</sub> (A)	18.38	18.42	18.46	18.49	18.53	18.57	18.60
Open Circuit Voltage-V <sub>OC</sub> (V)	46.6	46.8	47.0	47.2	47.4	47.7	47.9
Short Circuit Current-I <sub>SC</sub> (A)	19.47	19.52	19.55	19.59	19.63	19.67	19.71
Irradiance ratio (rear/front)	10%						

Product Bifaciality: 80±5%.

**ELECTRICAL DATA (NOCT)**

Maximum Power-P <sub>MAX</sub> (Wp)	502	506	510	514	517	521	526
Maximum Power Voltage-V <sub>MPP</sub> (V)	36.4	36.6	36.8	37.0	37.2	37.3	37.7
Maximum Power Current-I <sub>MPP</sub> (A)	13.79	13.84	13.86	13.89	13.91	13.94	13.96
Open Circuit Voltage-V <sub>OC</sub> (V)	44.2	44.4	44.5	44.7	44.9	45.2	45.4
Short Circuit Current-I <sub>SC</sub> (A)	14.53	14.56	14.59	14.62	14.65	14.67	14.71

NOCT: Irradiance at 800W/m<sup>2</sup>, 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 <sup>2</sup> (0.006 inches <sup>2</sup> ), 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 <sub>MAX</sub>	-0.30%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Isc	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