



BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-DEG21C.20

PRODUCT RANGE: 635-660W

660W+

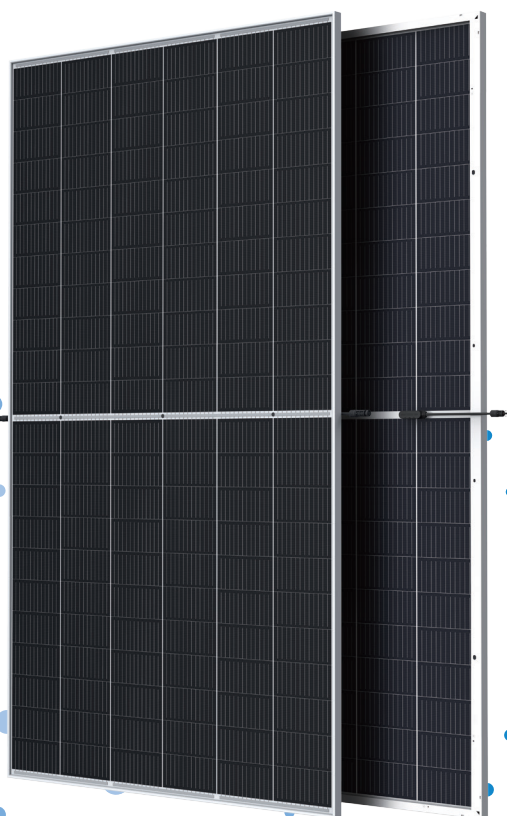
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.2%

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
- Higher return on Investment



High power up to 660W

- Up to 21.2% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



High reliability

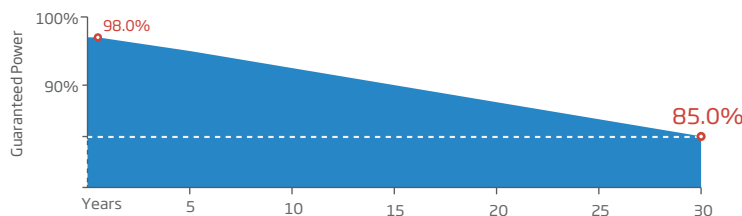
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive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



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.34%) and operating temperature
- Up to 25% additional power gain from back side depending on albedo

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



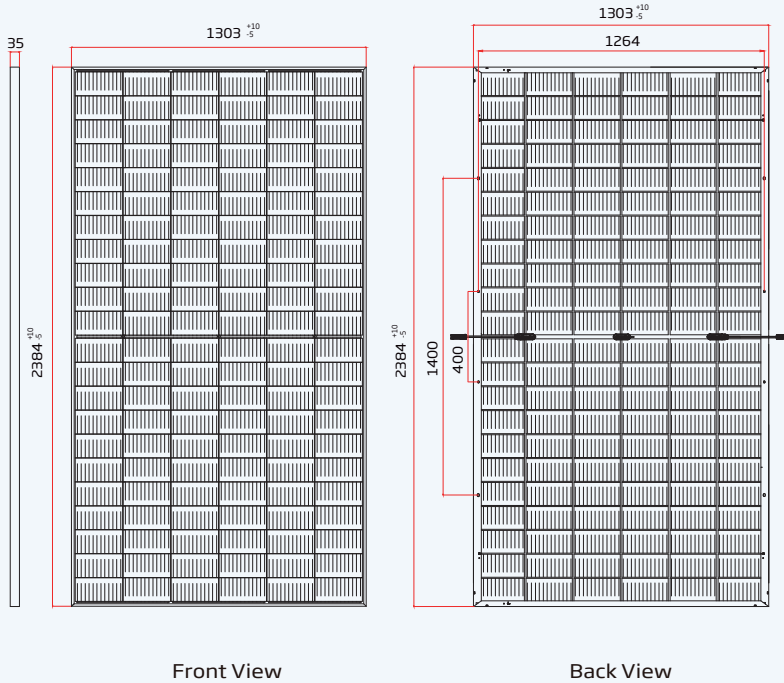
Comprehensive Products and System Certificates



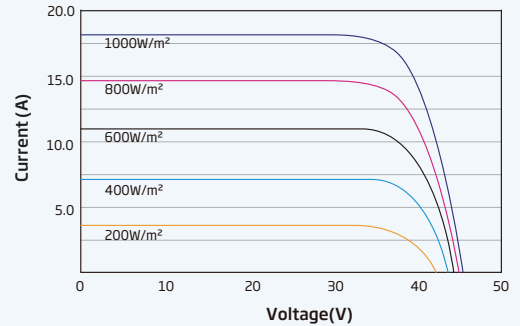
IEC61215/IEC61730/IEC61701/IEC62716/UL61730  
 ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



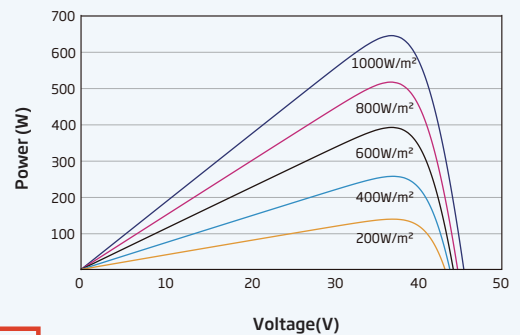
### DIMENSIONS OF PV MODULE(mm)



### I-V CURVES OF PV MODULE(650 W)



### P-V CURVES OF PV MODULE(650 W)



Preliminary

#### ELECTRICAL DATA (STC)

Peak Power Watts - P <sub>MAX</sub> (Wp)*	635	640	645	650	655	660
Power Tolerance - P <sub>MAX</sub> (W)	0 ~ +5					
Maximum Power Voltage - V <sub>MPP</sub> (V)	37.1	37.3	37.5	37.7	37.9	38.1
Maximum Power Current - I <sub>MPP</sub> (A)	17.15	17.19	17.23	17.27	17.31	17.35
Open Circuit Voltage - V <sub>OC</sub> (V)	44.9	45.1	45.3	45.5	45.7	45.9
Short Circuit Current - I <sub>SC</sub> (A)	18.21	18.26	18.31	18.35	18.40	18.45
Module Efficiency η <sub>m</sub> (%)	20.4	20.6	20.8	20.9	21.1	21.2

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)	680	685	690	696	701	706
Maximum Power Voltage - V <sub>MPP</sub> (V)	37.1	37.3	37.5	37.7	37.9	38.1
Maximum Power Current - I <sub>MPP</sub> (A)	18.35	18.39	18.44	18.48	18.52	18.56
Open Circuit Voltage - V <sub>OC</sub> (V)	44.9	45.1	45.3	45.5	45.7	45.9
Short Circuit Current - I <sub>SC</sub> (A)	19.48	19.54	19.59	19.63	19.69	19.74
Irradiance ratio (rear/front)	10%					

Power Bifaciality: 70±5%.

#### ELECTRICAL DATA (NOCT)

Maximum Power - P <sub>MAX</sub> (Wp)	480	484	488	492	495	499
Maximum Power Voltage - V <sub>MPP</sub> (V)	34.6	34.7	34.9	35.1	35.2	35.4
Maximum Power Current - I <sub>MPP</sub> (A)	13.90	13.94	13.98	14.01	14.05	14.10
Open Circuit Voltage - V <sub>OC</sub> (V)	42.3	42.5	42.7	42.9	43.0	43.2
Short Circuit Current - I <sub>SC</sub> (A)	14.67	14.71	14.75	14.79	14.83	14.87

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	POE/EVA
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) Landscape: 1400/1400 mm (55.12/55.12 inches)
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>	-0.34%/°C
Temperature Coefficient of V <sub>OC</sub>	-0.25%/°C
Temperature Coefficient of I <sub>SC</sub>	0.04%/°C

#### MAXIMUM RATINGS

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

#### WARRANTY

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 2% first year degradation
- 0.45% Annual Power Attenuation

(Please refer to product warranty for details)