



**BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE**

PRODUCT: TSM-DEG21C.20

POWER RANGE: 640-665W

**665W**

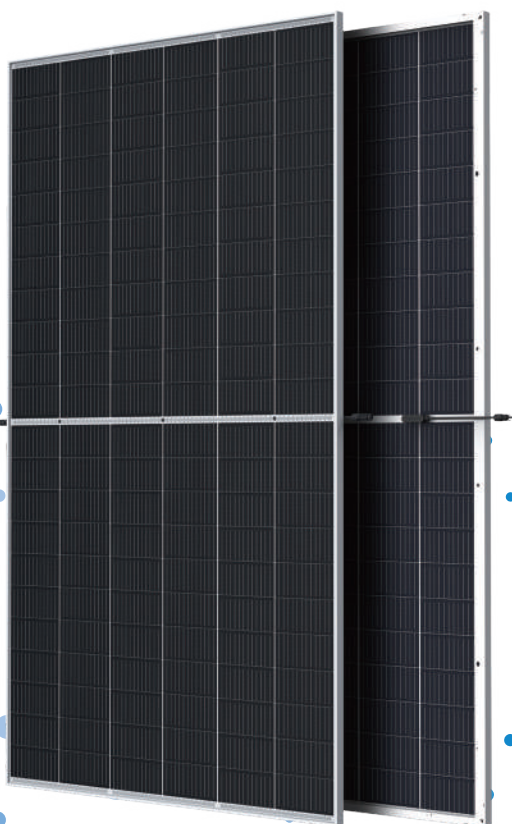
MAXIMUM POWER OUTPUT

**0~+5W**

POSITIVE POWER TOLERANCE

**21.4%**

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 665W**

- Up to 21.4% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



**High reliability**

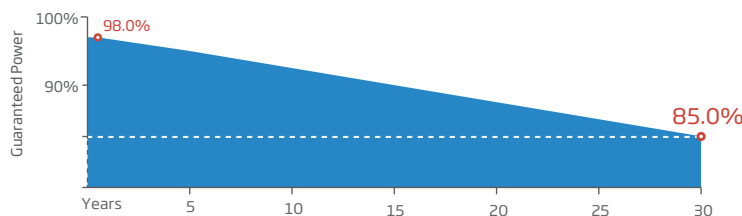
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive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



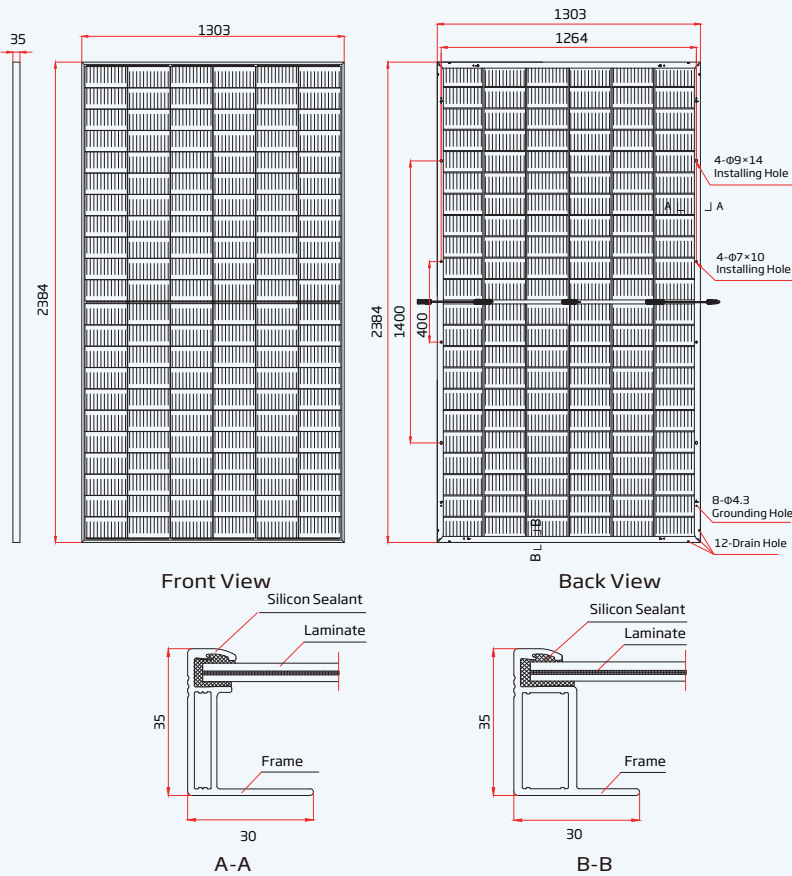
**Comprehensive Products and System Certificates**



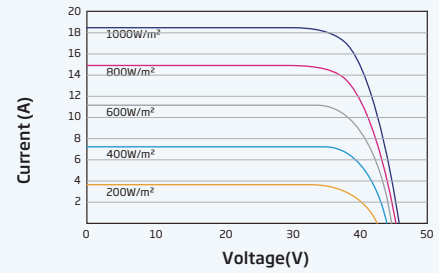
IEC61215/IEC61730/IEC61701/IEC62716/UL61730  
 ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



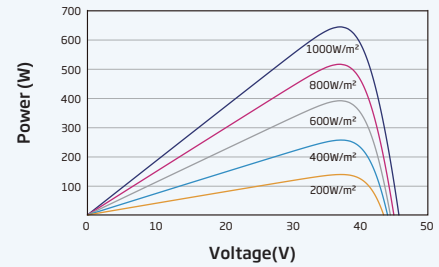
### DIMENSIONS OF PV MODULE(mm)



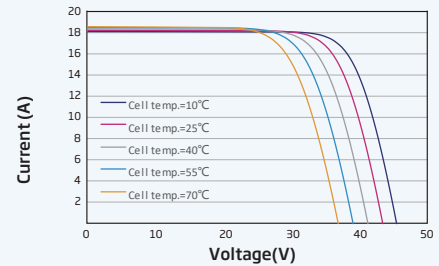
### I-V CURVES OF PV MODULE(645 W)



### P-V CURVES OF PV MODULE(645W)



### I-V CURVES OF PV MODULE(645 W)



### ELECTRICAL DATA (STC)

Peak Power Watts - P <sub>MAX</sub> (Wp)*	640	645	650	655	660	665
Power Tolerance - P <sub>MAX</sub> (W)	0 ~ +5					
Maximum Power Voltage - V <sub>MPP</sub> (V)	37.3	37.5	37.7	37.9	38.1	38.3
Maximum Power Current - I <sub>MPP</sub> (A)	17.19	17.23	17.27	17.31	17.35	17.39
Open Circuit Voltage - V <sub>OC</sub> (V)	45.1	45.3	45.5	45.7	45.9	46.1
Short Circuit Current - I <sub>SC</sub> (A)	18.26	18.31	18.35	18.40	18.45	18.50
Module Efficiency $\eta_m$ (%)	20.6	20.8	20.9	21.1	21.2	21.4

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance:  $\pm$ 3%.

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

Total Equivalent power - P <sub>MAX</sub> (Wp)	685	690	696	701	706	712
Maximum Power Voltage - V <sub>MPP</sub> (V)	37.3	37.5	37.7	37.9	38.1	38.3
Maximum Power Current - I <sub>MPP</sub> (A)	18.39	18.44	18.48	18.52	18.56	18.60
Open Circuit Voltage - V <sub>OC</sub> (V)	45.1	45.3	45.5	45.7	45.9	46.1
Short Circuit Current - I <sub>SC</sub> (A)	19.54	19.59	19.63	19.69	19.74	19.79
Irradiance ratio (rear/front)	10%					

Power Bifaciality: 70 $\pm$ 5%.

### ELECTRICAL DATA (NOCT)

Maximum Power - P <sub>MAX</sub> (Wp)	484	488	492	495	499	504
Maximum Power Voltage - V <sub>MPP</sub> (V)	34.7	34.9	35.1	35.2	35.4	35.6
Maximum Power Current - I <sub>MPP</sub> (A)	13.94	13.98	14.01	14.05	14.10	14.16
Open Circuit Voltage - V <sub>OC</sub> (V)	42.5	42.7	42.9	43.0	43.2	43.4
Short Circuit Current - I <sub>SC</sub> (A)	14.71	14.75	14.79	14.83	14.87	14.91

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	2384x1303x35 mm (93.86x51.30x1.38 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) 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 ( $\pm$ 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)

### PACKAGING CONFIGURATION

Modules per box: 31 pieces  
Modules per 40' container: 558 pieces