



BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE21

POWER RANGE: 645-670W

670W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

21.6%

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 Mono Perc to 670W

- Up to 21.6% 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

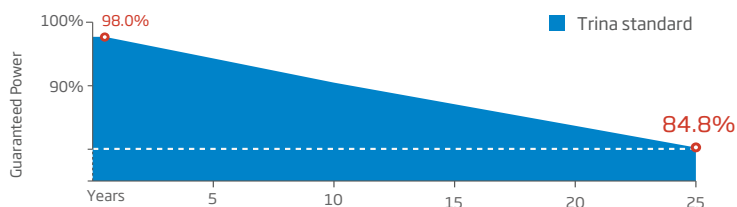


High energy yield

- 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



Trina Solar's Backsheet Performance Warranty



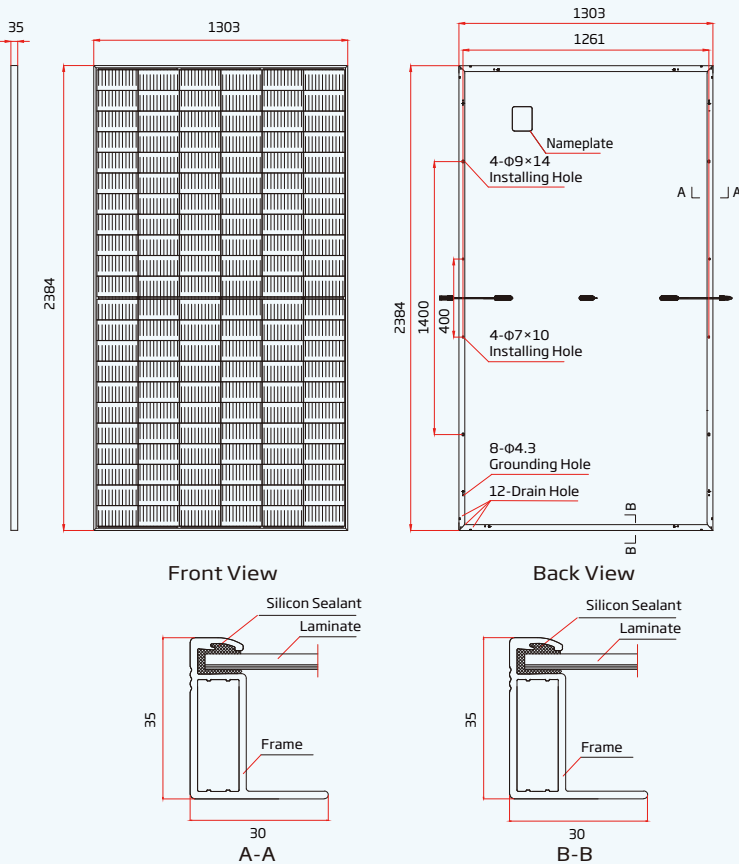
Comprehensive Products and System Certificates



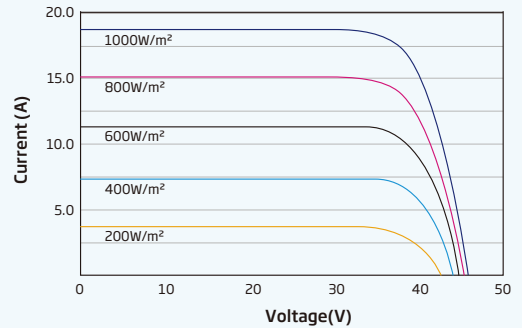
IEC61215/IEC61730/IEC61701/IEC62716
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System



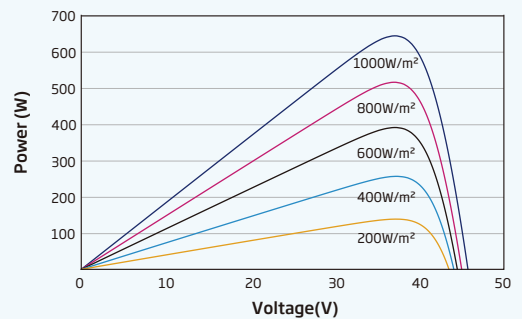
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(650 W)



P-V CURVES OF PV MODULE(650W)



ELECTRICAL DATA (STC)

Parameter	645	650	655	660	665	670
Peak Power Watts-P _{MAX} (Wp)*	645	650	655	660	665	670
Power Tolerance-P _{MAX} (W)	0 ~ +5					
Maximum Power Voltage-V _{MPP} (V)	37.2	37.4	37.6	37.8	38.0	38.2
Maximum Power Current-I _{MPP} (A)	17.35	17.39	17.43	17.47	17.51	17.55
Open Circuit Voltage-V _{OC} (V)	45.1	45.3	45.5	45.7	45.9	46.1
Short Circuit Current-I _{SC} (A)	18.39	18.44	18.48	18.53	18.57	18.62
Module Efficiency η_m (%)	20.8	20.9	21.1	21.2	21.4	21.6

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

ELECTRICAL DATA (NOCT)

Maximum Power-P _{MAX} (Wp)	488	492	496	500	504	508
Maximum Power Voltage-V _{MPP} (V)	34.8	34.9	35.1	35.3	35.4	35.6
Maximum Power Current-I _{MPP} (A)	14.05	14.09	14.13	14.17	14.22	14.26
Open Circuit Voltage-V _{OC} (V)	42.5	42.7	42.9	43.0	43.2	43.4
Short Circuit Current-I _{SC} (A)	14.82	14.86	14.89	14.93	14.96	15.01

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 \times 1303 \times 35 mm (93.86 \times 51.30 \times 1.38 inches)
Weight	33.6 kg (74.1 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA
Backsheet	White
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	TS4

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (\pm 2°C)
Temperature Coefficient of P _{MAX}	-0.34%/°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) 1500V DC (UL)
Max Series Fuse Rating	30A

WARRANTY

12 year Product Workmanship Warranty
25 year Power Warranty
2% first year degradation
0.55% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 31 pieces
Modules per 40' container: 527 pieces