



# BLACK DRAGON SOLAR PANEL

Data sheet

# Vertex

BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE19R

PRODUCT RANGE: 560-580W

## 580W

MAXIMUM POWER OUTPUT

## 0~+5W

POSITIVE POWER TOLERANCE

## 21.5%

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 Mono Perc up to 580W

- Up to 21.5% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



### High reliability

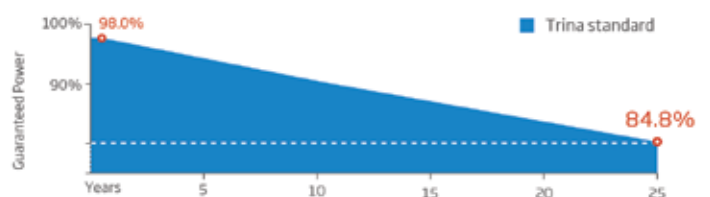
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



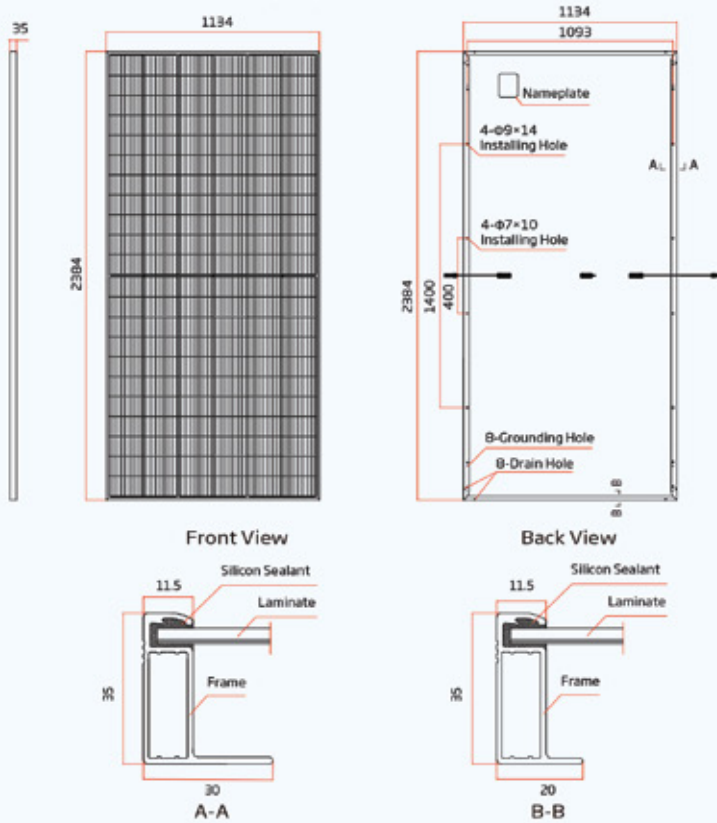
### High energy yield

- 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

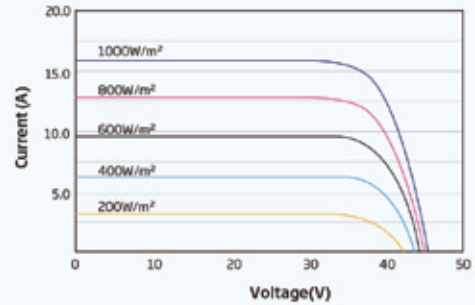
### Trina Solar's Backsheet Performance Warranty



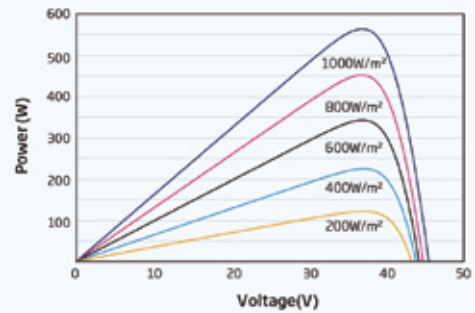
**DIMENSIONS OF PV MODULE(mm)**



**I-V CURVES OF PV MODULE(570W)**



**P-V CURVES OF PV MODULE(570W)**



**ELECTRICAL DATA (STC)**

Peak Power Watts- $P_{max}$ (Wp)*	560	565	570	575	580
Power Tolerance- $P_{max}$ (W)			0 ~ +5		
Maximum Power Voltage- $V_{MPP}$ (V)	38.0	38.3	38.5	38.8	39.0
Maximum Power Current- $I_{MPP}$ (A)	14.72	14.76	14.79	14.83	14.86
Open Circuit Voltage- $V_{oc}$ (V)	45.3	45.6	45.8	46.1	46.3
Short Circuit Current- $I_{sc}$ (A)	15.76	15.81	15.85	15.90	15.94
Module Efficiency $\eta_m$ (%)	20.7	20.9	21.1	21.3	21.5

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass 1.5. \*Measuring tolerance: ±3%.

**ELECTRICAL DATA (NOCT)**

Maximum Power- $P_{max}$ (Wp)	423	428	431	435	439
Maximum Power Voltage- $V_{MPP}$ (V)	35.1	35.3	35.5	35.8	35.9
Maximum Power Current- $I_{MPP}$ (A)	12.06	12.10	12.13	12.17	12.20
Open Circuit Voltage- $V_{oc}$ (V)	42.6	42.9	43.1	43.4	43.6
Short Circuit Current- $I_{sc}$ (A)	12.70	12.74	12.77	12.81	12.84

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	2384×1134×35 mm (93.86×44.65×1.38 inches)
Weight	29.1 kg (64.2 lb)
Glass	3.2 mm (0.13 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Backsheet	White
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: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	TS4

**TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43°C (±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)
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: 620 pieces

# BLACK DRAGON



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FOR A BRIGHTER FUTURE



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