

# Vertex S+

## DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9.28

PRODUCT RANGE: 400-425W

# 425W

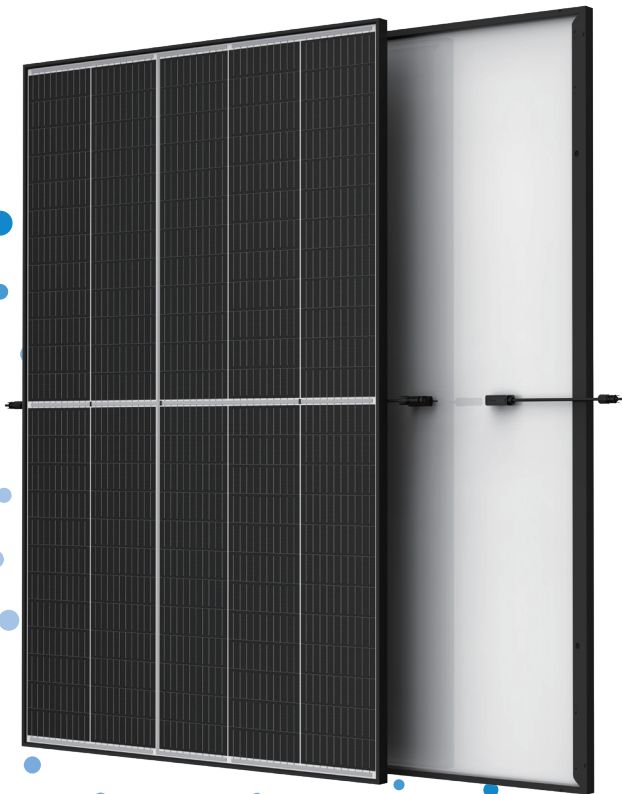
MAXIMUM POWER OUTPUT

# 0~+5W

POSITIVE POWER TOLERANCE

# 21.9%

MAXIMUM EFFICIENCY



### Small in size, bigger on power

- Up to 425W, 21.9% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



### Dual-glass Design, more secure and sustainable

- Upgraded dual glass of Vertex S, less prone to micro-cracks and scratches on the back during installation
- Double-glass + innovative non-destructive cutting for improved mechanical resistance and strength
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



### Ultra-low Degradation, longer warranty, higher output

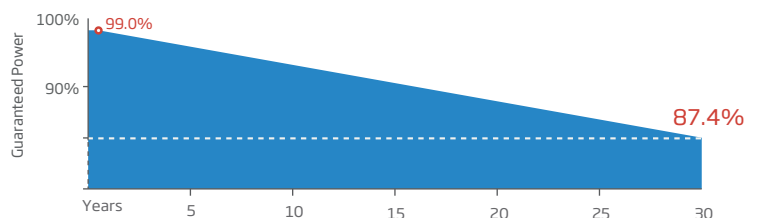
- First-year degradation 1% and annual degradation at 0.4%
- Up to 25 years product warranty and 30 years power warranty



### Universal solution for residential and C&I rooftops

- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
- Mechanical performance up to 5400 Pa positive load and 4000 Pa negative load

### Trina Solar's Dual Glass Performance Warranty



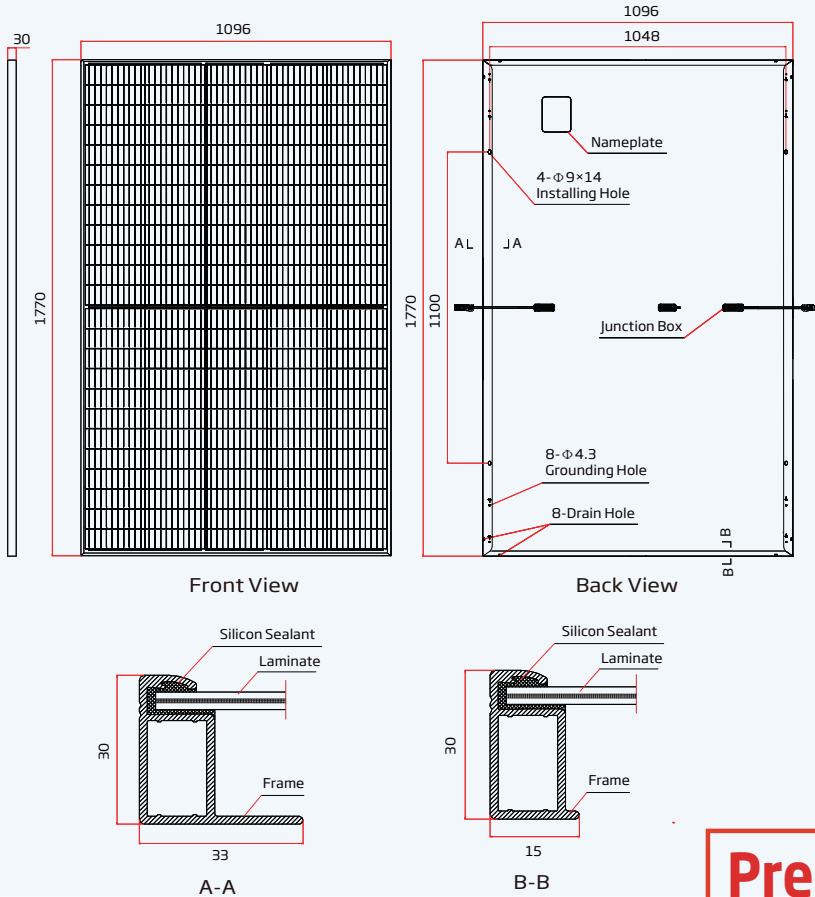
### Comprehensive Products and System Certificates



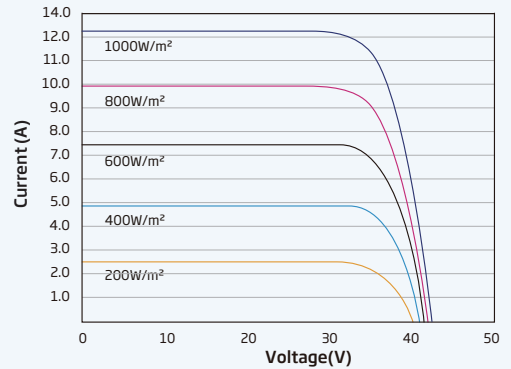
ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



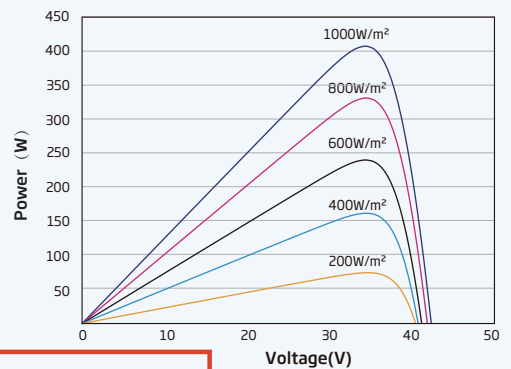
## DIMENSIONS OF PV MODULE(mm)



## I-V CURVES OF PV MODULE(415W)



## P-V CURVES OF PV MODULE(415W)



**Preliminary**

## ELECTRICAL DATA (STC)

Peak Power Watts-P <sub>MAX</sub> (Wp)*	400	405	410	415	420	425
Power Tolerance-P <sub>MAX</sub> (W)	0 ~ +5					
Maximum Power Voltage-V <sub>MPP</sub> (V)	35.1	35.4	35.7	36.0	36.3	36.6
Maximum Power Current-I <sub>MPP</sub> (A)	11.41	11.44	11.48	11.52	11.57	11.61
Open Circuit Voltage-V <sub>OC</sub> (V)	41.9	42.2	42.4	42.7	43.1	43.4
Short Circuit Current-I <sub>SC</sub> (A)	12.16	12.20	12.23	12.27	12.33	12.37
Module Efficiency η <sub>m</sub> (%)	20.6	20.9	21.1	21.4	21.7	21.9

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

## ELECTRICAL DATA (NOCT)

Maximum Power-P <sub>MAX</sub> (Wp)	305	308	312	316	320	324
Maximum Power Voltage-V <sub>MPP</sub> (V)	32.8	33.1	33.3	33.6	33.9	34.2
Maximum Power Current-I <sub>MPP</sub> (A)	9.29	9.32	9.36	9.40	9.45	9.48
Open Circuit Voltage-V <sub>OC</sub> (V)	39.7	40.0	40.2	40.5	40.8	41.1
Short Circuit Current-I <sub>SC</sub> (A)	9.80	9.83	9.86	9.89	9.94	9.97

NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

## MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	120 cells
Module Dimensions	1770×1096×30 mm (69.06×43.15×1.18 inches)
Weight	21.5 kg (47.4lb)
Front Glass	1.6 mm (0.06 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	1.6mm(0.06 inches), Heat Strengthened Glass
Frame	30mm (0.06 inches) Anodized Aluminium Alloy, Black
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 EVO2 / 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 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)
Max Series Fuse Rating	20A

## WARRANTY

25 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: 36 pieces  
Modules per 40' container: 936 pieces