

# Vertex S+

## DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9R.28

PRODUCT RANGE: 425-445W

# 445W

MAXIMUM POWER OUTPUT

# 0~+5W

POSITIVE POWER TOLERANCE

# 22.3%

MAXIMUM EFFICIENCY



### Small in size, bigger on power

- Up to 445W, 22.3% 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

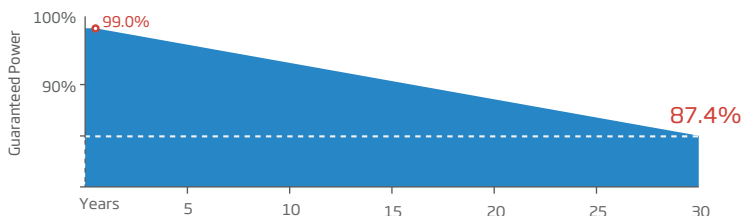
- First-year degradation 1% and annual degradation at 0.4%
- Up to 15 years product warranty and 30 years power warranty



### 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



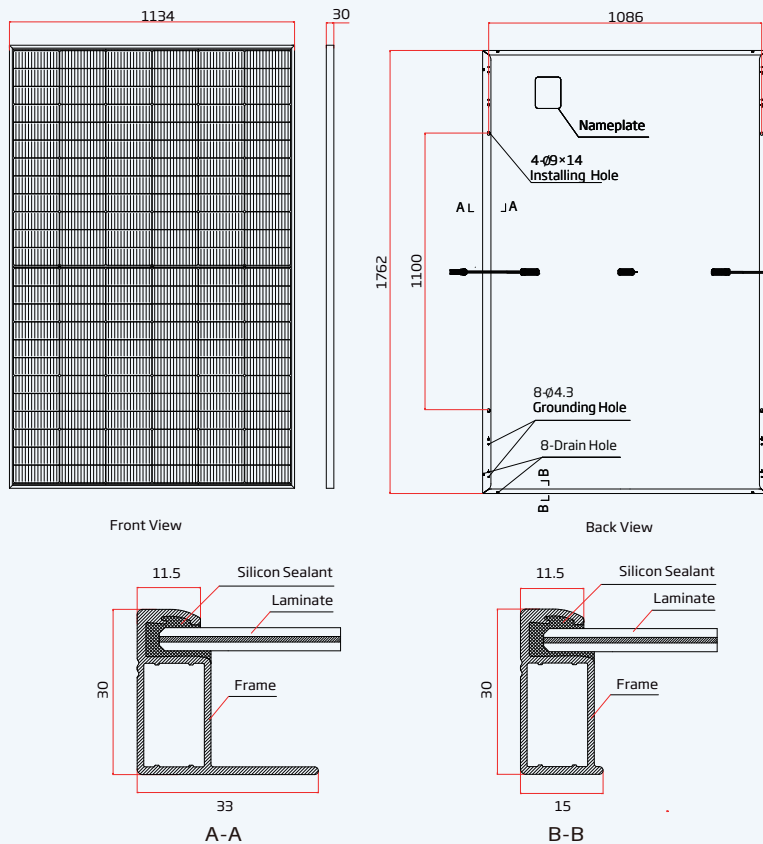
### Comprehensive Products and System Certificates



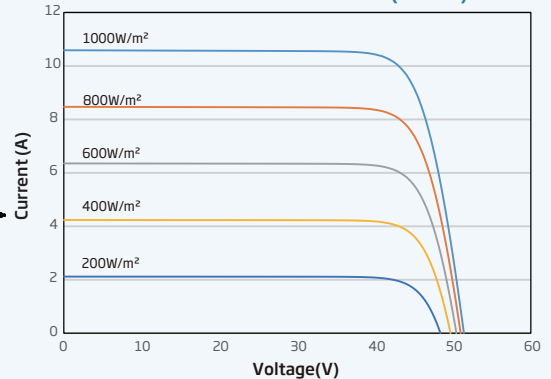
ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



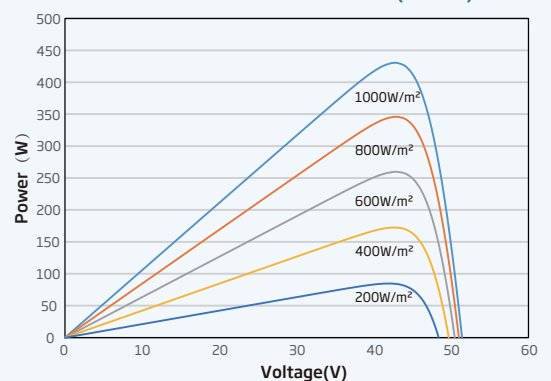
## DIMENSIONS OF PV MODULE(mm)



## I-V CURVES OF PV MODULE(430W)



## P-V CURVES OF PV MODULE(430W)



## ELECTRICAL DATA (STC)

Parameter	425	430	435	440	445
Peak Power Watts-P <sub>MAX</sub> (Wp)*					
Power Tolerance-P <sub>MAX</sub> (W)			0 ~ +5		
Maximum Power Voltage-V <sub>MPP</sub> (V)	42.9	43.2	43.6	44.0	44.3
Maximum Power Current-I <sub>MPP</sub> (A)	9.92	9.96	9.99	10.01	10.05
Open Circuit Voltage-V <sub>OC</sub> (V)	50.9	51.4	51.8	52.2	52.6
Short Circuit Current-I <sub>SC</sub> (A)	10.56	10.59	10.64	10.67	10.71
Module Efficiency η <sub>m</sub> (%)	21.3	21.5	21.8	22.0	22.3

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

## ELECTRICAL DATA (NOCT)

Parameter	324	328	332	335	339
Maximum Power-P <sub>MAX</sub> (Wp)					
Maximum Power Voltage-V <sub>MPP</sub> (V)	40.0	40.4	40.7	41.0	41.3
Maximum Power Current-I <sub>MPP</sub> (A)	8.09	8.11	8.15	8.17	8.20
Open Circuit Voltage-V <sub>OC</sub> (V)	48.2	48.7	49.1	49.4	49.8
Short Circuit Current-I <sub>SC</sub> (A)	8.51	8.53	8.57	8.60	8.63

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

## MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm (69.06×43.15×1.18 inches)
Weight	21.1kg (46.5 lb)
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: 350/280 mm(13.78/11.02 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>	-0.24%/°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

15 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