Vertex S+

DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9R.28

PRODUCT RANGE: 425-450W

450W
MAXIMUM POWER OUTPUT

0~+5W
POSITIVE POWER TOLERANCE

22.5%
MAXIMUM EFFICIENCY



Small in size, bigger on power

- Up to 450W, 22.5% 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
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment

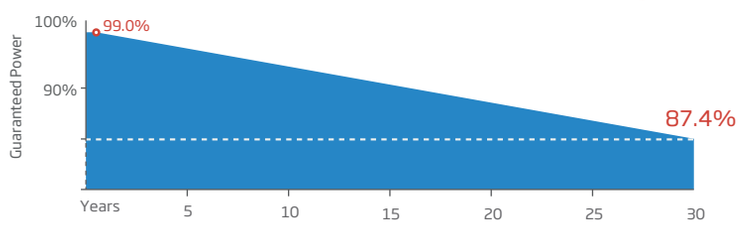
Ultra-low Degradation, longer warranty, higher output

- 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



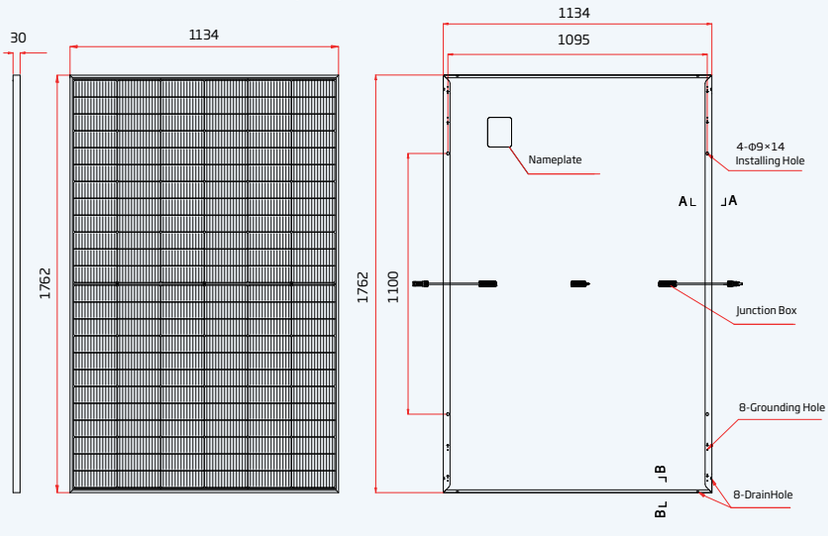
Comprehensive Products and System Certificates

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

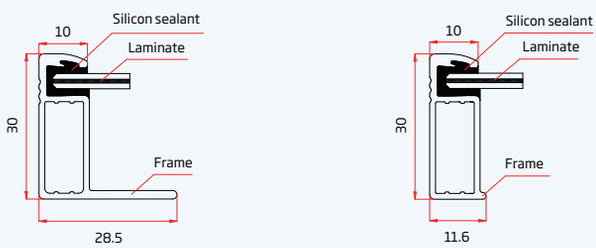
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DIMENSIONS OF PV MODULE(mm)

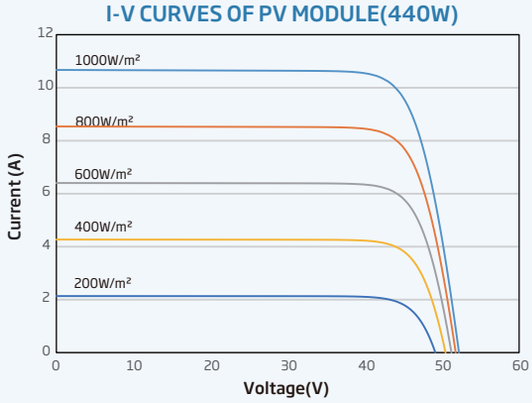


Front View Back View

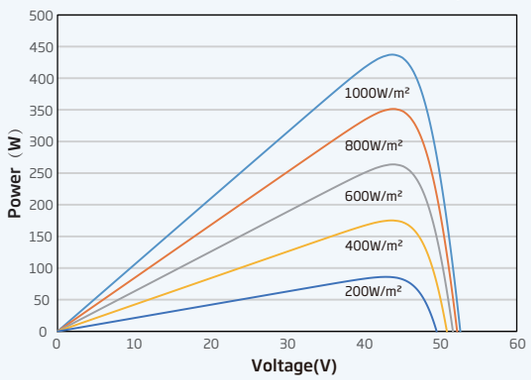


A-A B-B

I-V CURVES OF PV MODULE(440W)



P-V CURVES OF PV MODULE(440W)



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)*	425	430	435	440	445	450
Power Tolerance-PMAX (W)	0 ~ +5					
Maximum Power Voltage-VMPP (V)	42.9	43.2	43.6	44.0	44.3	44.6
Maximum Power Current-IMPP (A)	9.92	9.96	9.99	10.01	10.05	10.09
Open Circuit Voltage-VOC (V)	50.9	51.4	51.8	52.2	52.6	52.9
Short Circuit Current-ISC (A)	10.56	10.59	10.64	10.67	10.71	10.74
Module Efficiency η m (%)	21.3	21.5	21.8	22.0	22.3	22.5

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

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	324	328	332	335	339	343
Maximum Power Voltage-VMPP (V)	40.0	40.4	40.7	41.0	41.3	41.6
Maximum Power Current-IMPP (A)	8.09	8.11	8.15	8.17	8.20	8.24
Open Circuit Voltage-VOC (V)	48.2	48.7	49.1	49.4	49.8	50.1
Short Circuit Current-ISC (A)	8.51	8.53	8.57	8.60	8.63	8.65

NOCT: Irradiance at 800W/m², 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	21.0kg (46.30 lb)
Front Glass	1.6 mm (0.06 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
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 4.0mm² (0.006 inches²), Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4 Plus / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of PMAX	- 0.30%/°C
Temperature Coefficient of VOC	- 0.24%/°C
Temperature Coefficient of ISC	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

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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