

Vertex S+

DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9R.28

PRODUCT RANGE: 415-440W

440W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

22.0%

MAXIMUM EFFICIENCY



Small in size, bigger on power

- Up to 440W, 22.0% 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



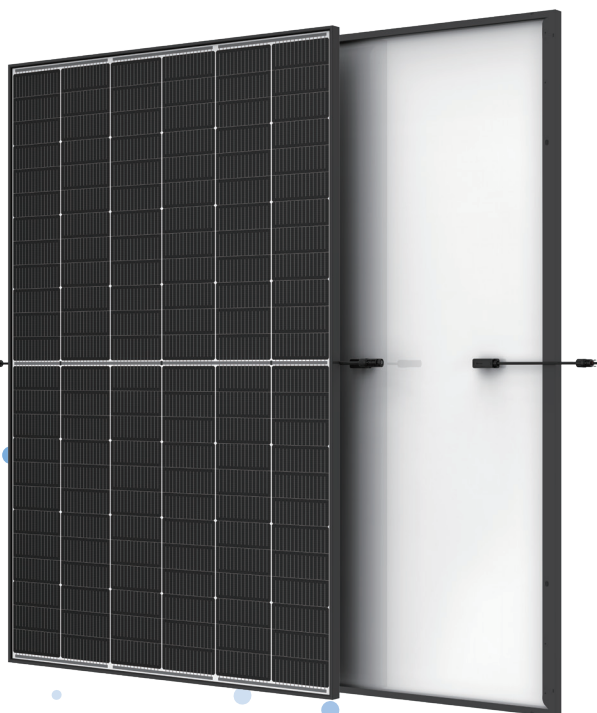
Ultra-low Degradation, longer warranty, higher output

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

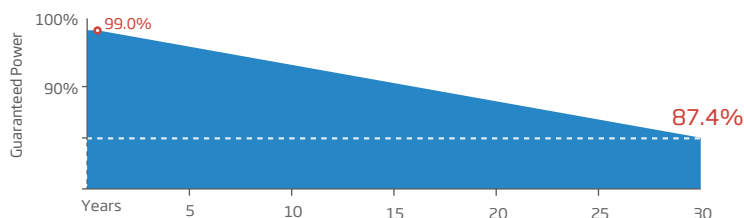


Universal solution for residential and C&I rooftops

- 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



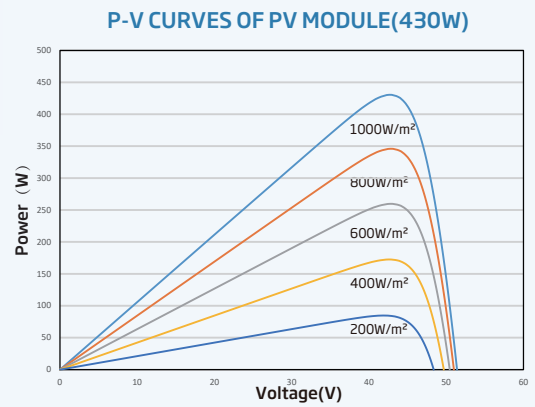
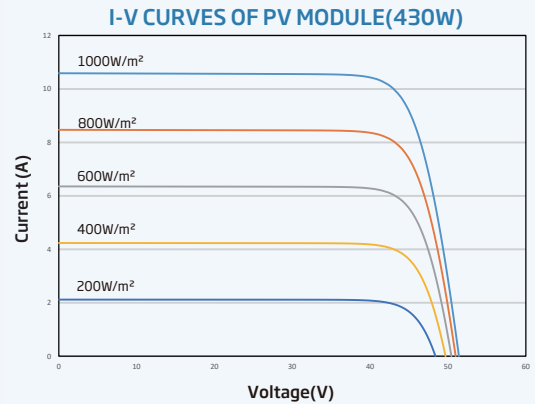
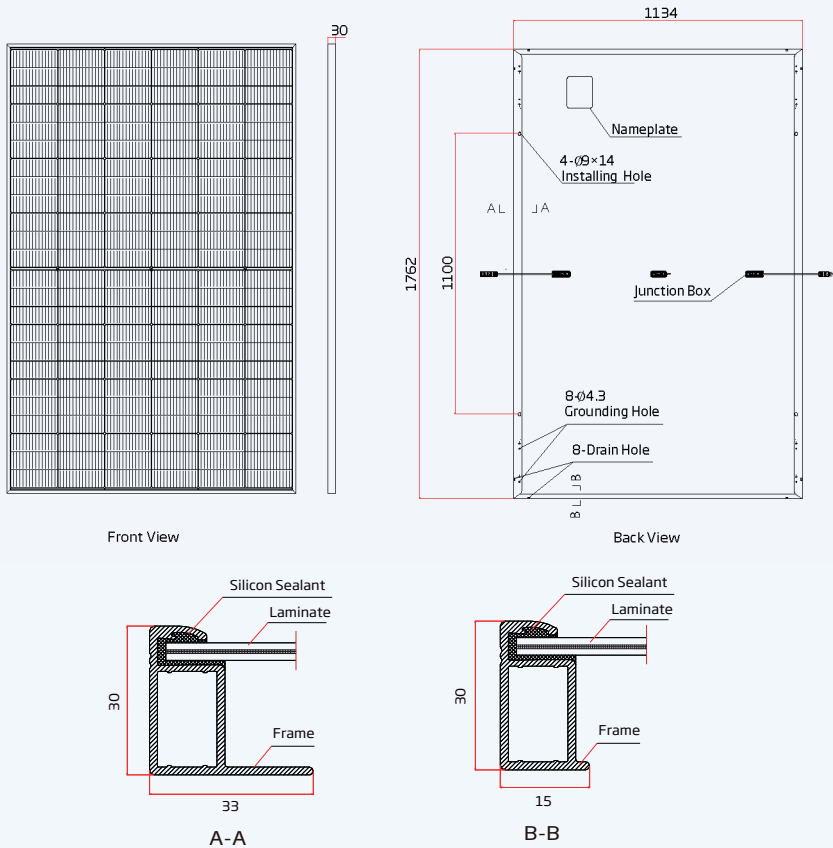
Comprehensive Products and System Certificates



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)



ELECTRICAL DATA (STC)

| | | | | | | |
|--|--------|-------|-------|-------|-------|-------|
| Peak Power Watts-P _{MAX} (Wp)* | 415 | 420 | 425 | 430 | 435 | 440 |
| Power Tolerance-P _{MAX} (W) | 0 ~ +5 | | | | | |
| Maximum Power Voltage-V _{MPP} (V) | 42.1 | 42.5 | 42.8 | 43.2 | 43.6 | 43.9 |
| Maximum Power Current-I _{MPP} (A) | 9.85 | 9.89 | 9.92 | 9.95 | 9.99 | 10.02 |
| Open Circuit Voltage-V _{OC} (V) | 50.1 | 50.5 | 50.9 | 51.4 | 51.8 | 52.2 |
| Short Circuit Current-I _{SC} (A) | 10.50 | 10.54 | 10.57 | 10.60 | 10.65 | 10.68 |
| Module Efficiency η _m (%) | 20.8 | 21.0 | 21.3 | 21.5 | 21.8 | 22.0 |

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

ELECTRICAL DATA (NOCT)

| | | | | | | |
|--|------|------|------|------|------|------|
| Maximum Power-P _{MAX} (Wp) | 316 | 320 | 323 | 327 | 332 | 335 |
| Maximum Power Voltage-V _{MPP} (V) | 39.3 | 39.6 | 39.9 | 40.3 | 40.6 | 40.9 |
| Maximum Power Current-I _{MPP} (A) | 8.04 | 8.07 | 8.09 | 8.12 | 8.16 | 8.17 |
| Open Circuit Voltage-V _{OC} (V) | 47.5 | 47.9 | 48.2 | 48.7 | 49.1 | 49.4 |
| Short Circuit Current-I _{SC} (A) | 8.46 | 8.49 | 8.52 | 8.54 | 8.58 | 8.61 |

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 | 21.8kg (48.0lb) |
| 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 ² (0.006 inches ²), 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 _{MAX} | -0.30%/°C |
| Temperature Coefficient of V _{OC} | -0.24%/°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 | 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