



N-type i-TOPCon bifacial dual glass
Monocrystalline module

PRODUCT: TSM-XXXNEG9RC.27

POWER RANGE: 415-445W

445W

MAXIMUM POWER OUTPUT

0~+5W

BINNING TOLERANCE

22.3%

MAXIMUM EFFICIENCY

25 Years **PRODUCT WARRANTY**
30 Years **POWER WARRANTY**



Small in size, bigger on power

- Up to 445W, 22.3% module efficiency with high density interconnect technology
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



Transparent Dual-glass Design

- Transparent design with aesthetics appearance, 3.2% transparency
- Upgraded dual glass of Vertex S, less prone to micro-cracks and scratches on the back during installation
- Fire rating class C, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



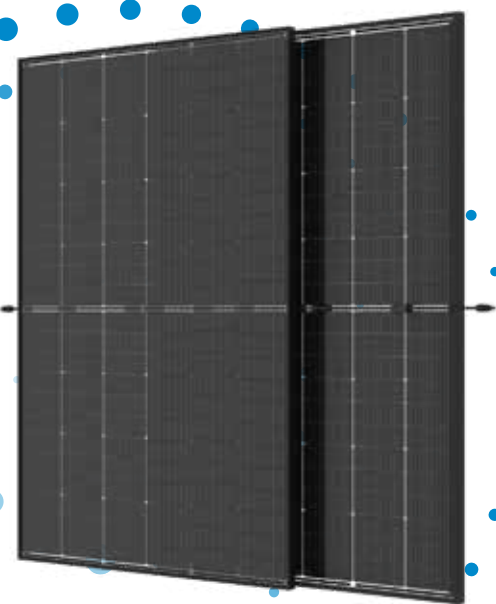
Ultra-low Degradation, longer warranty, higher output

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

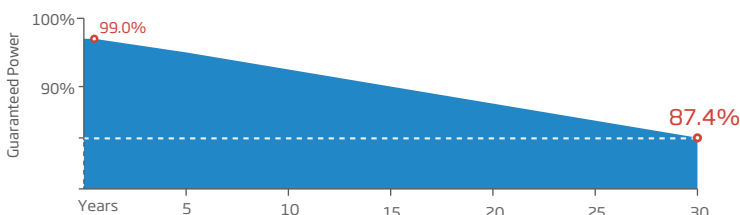


Universal solution for residential and C&I rooftops

- 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 Vertex Bifacial Dual Glass Performance Warranty



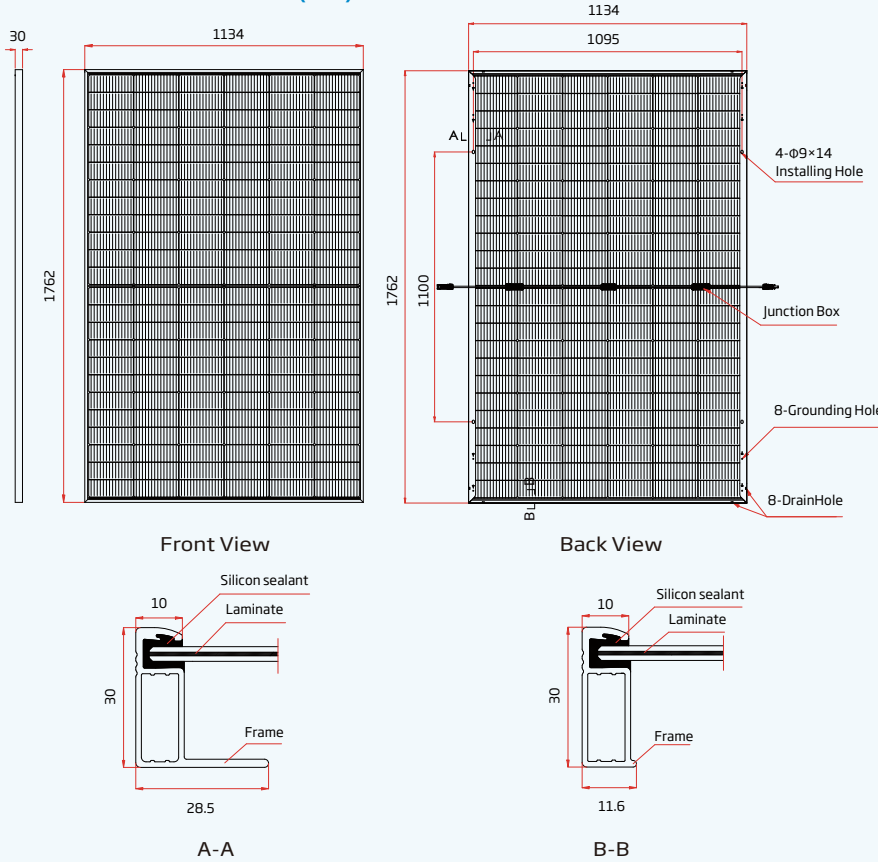
Comprehensive Products and System Certificates



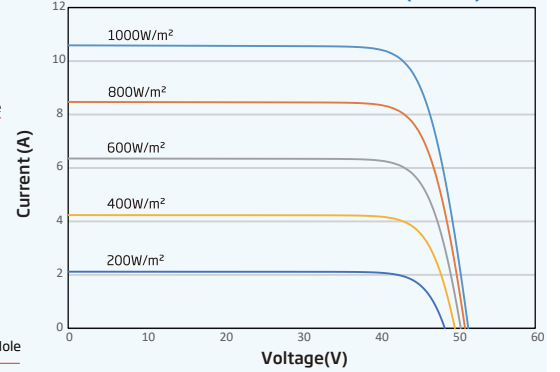
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System



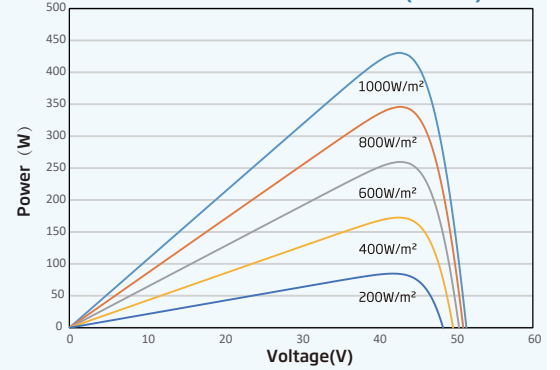
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(430W)



P-V CURVES OF PV MODULE(430W)



ELECTRICAL DATA (STC) TSM-XXXNEG9RC.27(XXX=415-445)

| Peak Power Watts-P _{MAX} (Wp)* | 415 | 420 | 425 | 430 | 435 | 440 | 445 |
|--|--------|-------|-------|-------|-------|-------|-------|
| Binning Tolerance-P _{MAX} (W) | 0 ~ +5 | | | | | | |
| Maximum Power Voltage-V _{MPP} (V) | 42.1 | 42.5 | 42.9 | 43.2 | 43.6 | 44.0 | 44.3 |
| Maximum Power Current-I _{MPP} (A) | 9.86 | 9.89 | 9.92 | 9.96 | 9.99 | 10.01 | 10.05 |
| Open Circuit Voltage-V _{OC} (V) | 50.1 | 50.5 | 50.9 | 51.4 | 51.8 | 52.2 | 52.6 |
| Short Circuit Current-I _{SC} (A) | 10.50 | 10.53 | 10.56 | 10.59 | 10.64 | 10.67 | 10.71 |
| Module Efficiency η _m (%) | 20.8 | 21.0 | 21.3 | 21.5 | 21.8 | 22.0 | 22.3 |

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

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

| Total Equivalent power -P _{MAX} (Wp) | 448 | 454 | 459 | 464 | 470 | 475 | 480 |
|---|-------|-------|-------|-------|-------|-------|-------|
| Maximum Power Voltage-V _{MPP} (V) | 42.1 | 42.5 | 42.9 | 43.2 | 43.6 | 44.0 | 44.3 |
| Maximum Power Current-I _{MPP} (A) | 10.65 | 10.68 | 10.71 | 10.76 | 10.79 | 10.81 | 10.85 |
| Open Circuit Voltage-V _{OC} (V) | 50.1 | 50.5 | 50.9 | 51.4 | 51.8 | 52.2 | 52.6 |
| Short Circuit Current-I _{SC} (A) | 11.34 | 11.37 | 11.40 | 11.44 | 11.49 | 11.52 | 11.57 |
| Irradiance ratio (rear/front) | 10% | | | | | | |

Power Bifaciality: 80±5%.

ELECTRICAL DATA (NOCT)

| Maximum Power-P _{MAX} (Wp) | 316 | 320 | 324 | 328 | 332 | 335 | 338 |
|--|------|------|------|------|------|------|------|
| Maximum Power Voltage-V _{MPP} (V) | 39.3 | 39.7 | 40.0 | 40.4 | 40.7 | 41.0 | 41.3 |
| Maximum Power Current-I _{MPP} (A) | 8.03 | 8.07 | 8.09 | 8.11 | 8.15 | 8.17 | 8.20 |
| Open Circuit Voltage-V _{OC} (V) | 47.5 | 47.8 | 48.2 | 48.7 | 49.1 | 49.4 | 49.8 |
| Short Circuit Current-I _{SC} (A) | 8.46 | 8.49 | 8.51 | 8.53 | 8.57 | 8.60 | 8.63 |

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

| | |
|----------------------|--|
| Solar Cells | N-type Monocrystalline |
| No. of cells | 144cells |
| 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 | 1.6 mm (0.06 inches), High Transmission, Heat Strengthened Glass |
| Frame | 30mm (1.18 inches) Anodized Aluminium Alloy, Black |
| J-Box | IP 68 rated |
| Cables | Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Length: 1100mm/1100mm(43.3/43.3 inches) |
| Connector | Stabuli MC4 EVO2 / Trina Solar TS4 Plus / Trina Solar TS4 |

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 | 25A |

WARRANTY

25 year Product Workmanship Warranty**
30 year Power Warranty
1% first year degradation
0.4% Annual Power Attenuation

PACKAGING CONFIGURATION

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

(**Please refer to Limited Warranty Supplement that applies to the TSM-***NEG9RC.28, TSM-***NEG9RC.27, Products supplied after 1st Jan 2023 and installed within Australia & New Zealand rooftop market.)