# Vertex S+

## N-type i-TOPCon Monofacial Dual Glass
### MONOCRYSTALLINE MODULE

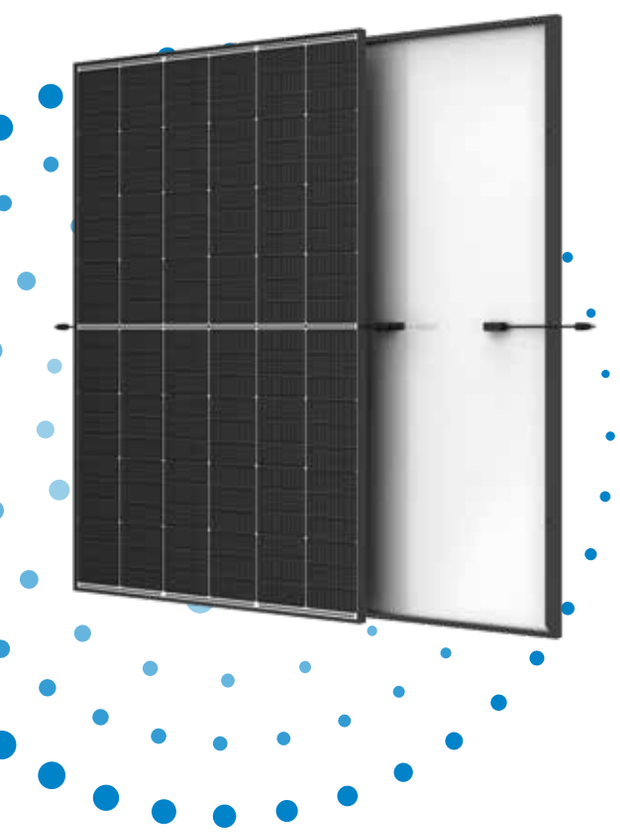
PRODUCT: TSM-NEG9R.28

PRODUCT RANGE: 425-455W

**455W**
MAXIMUM POWER OUTPUT

**0~+5W**
POSITIVE POWER TOLERANCE

**22.8%**
MAXIMUM EFFICIENCY



### Small in size, bigger on power

- Up to 455W, 22.8% 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

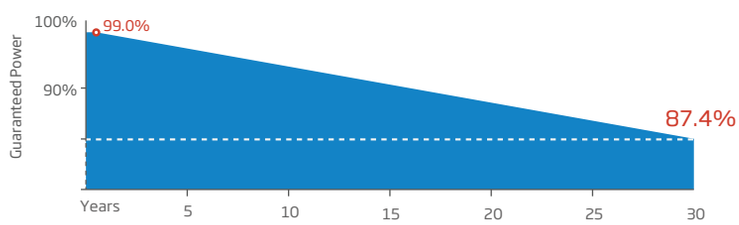
### Ultra-low Degradation, longer warranty, higher output

- First-year degradation 1% and annual degradation at 0.4%
- Up to 15/25 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 Monofacial Dual Glass Performance Warranty




### Comprehensive Products and System Certificates

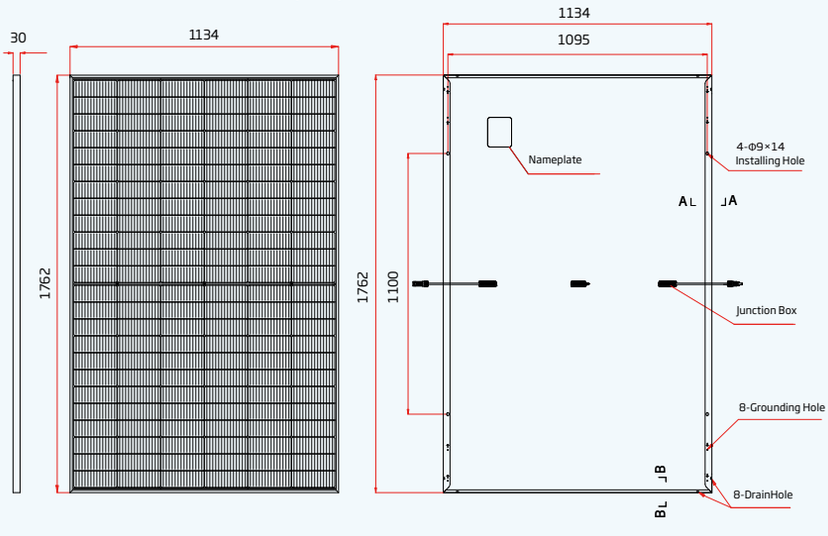
IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

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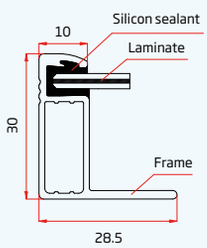
N-type i-TOPCon Monofacial Dual Glass Module

## DIMENSIONS OF PV MODULE(mm)

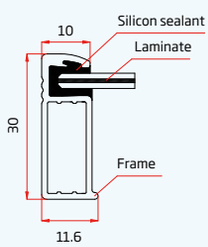



Front View

Back View

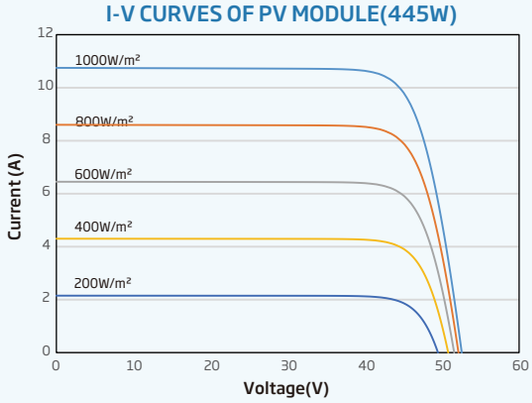



A-A

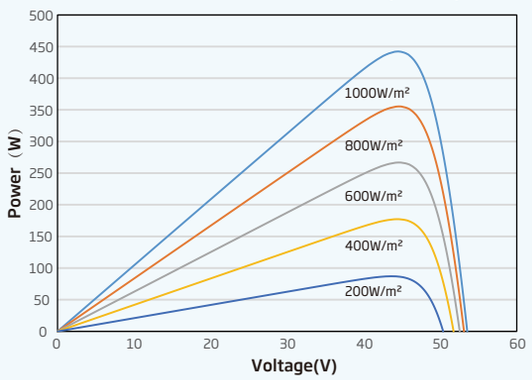



B-B

## I-V CURVES OF PV MODULE(445W)




## P-V CURVES OF PV MODULE(445W)




## ELECTRICAL DATA (STC)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Peak Power Watts-PMAX (Wp)* | 425 | 430 | 435 | 440 | 445 | 450 | 455 |
| Power Tolerance-PMAX (W) | 0 ~ +5 | | | | | | |
| Maximum Power Voltage-VMPP (V) | 42.9 | 43.2 | 43.6 | 44.0 | 44.3 | 44.6 | 45.0 |
| Maximum Power Current-IMPP (A) | 9.92 | 9.96 | 9.99 | 10.01 | 10.05 | 10.09 | 10.11 |
| Open Circuit Voltage-VOC (V) | 50.9 | 51.4 | 51.8 | 52.2 | 52.6 | 52.9 | 53.4 |
| Short Circuit Current-ISC (A) | 10.56 | 10.59 | 10.64 | 10.67 | 10.71 | 10.74 | 10.77 |
| Module Efficiency η m (%) | 21.3 | 21.5 | 21.8 | 22.0 | 22.3 | 22.5 | 22.8 |

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

## ELECTRICAL DATA (NOCT)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Maximum Power-PMAX (Wp) | 325 | 329 | 332 | 336 | 339 | 343 | 348 |
| Maximum Power Voltage-VMPP (V) | 40.1 | 40.7 | 41.0 | 41.4 | 41.7 | 42.0 | 42.3 |
| Maximum Power Current-IMPP (A) | 8.09 | 8.08 | 8.12 | 8.14 | 8.17 | 8.19 | 8.22 |
| Open Circuit Voltage-VOC (V) | 48.3 | 48.7 | 49.1 | 49.5 | 49.9 | 50.2 | 50.6 |
| Short Circuit Current-ISC (A) | 8.51 | 8.54 | 8.58 | 8.60 | 8.63 | 8.66 | 8.68 |

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

## MECHANICAL DATA

| | |
|---|---|
| Solar Cells | N-tpye 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 (1.18 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 | TS4 Plus / TS4 |

## TEMPERATURE RATINGS

| | |
|---|---|
| NOCT(Nominal Operating Cell Temperature) | 43°C (±2°C) |
| Temperature Coefficient of PMAX | -0.29%/°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 | 25A |

## WARRANTY

15 / 25* year Product Workmanship Warranty

30 year Power Warranty

1% first year degradation

0.4% Annual Power Attenuation

(*upon request, Please refer to product warranty for details)

## PACKAGING CONFIGURATION

Modules per box: 36 pieces

Modules per 40' container: 936 pieces

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

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