

# Vertex N

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

PRODUCT: TSM-XXXNEG18R.28/20

PRODUCT RANGE: 475-505W

**505W**

MAXIMUM POWER OUTPUT

**0~+5W**

BINNING TOLERANCE

**22.7%**

MAXIMUM EFFICIENCY

15/25 Years **PRODUCT WARRANTY**

30 Years **POWER WARRANTY**



### High customer value

- Lower LCOE (levelized cost of energy), reduced BOS (balance of system) cost, shorter payback time
- Designed for compatibility with existing mainstream system components
- High module power, high string power and low voltage design



### High power up to 505W

- Up to 22.7% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping effect, lower series resistance and improved current collection



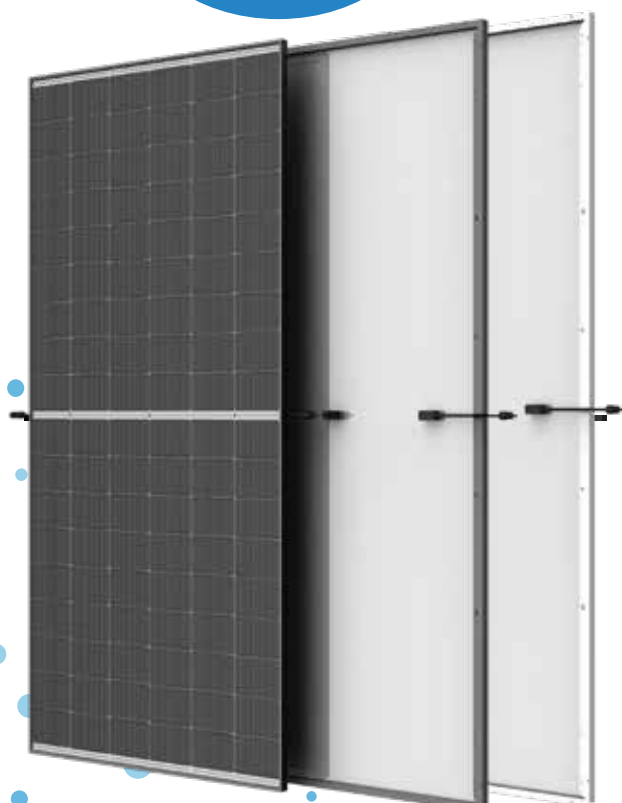
### Dual-glass design, high reliability

- Less prone to micro-cracks and scratches on the back during installation
- Fire class rating C
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load
- Easy to handle and install on roofs with excellent size and light weight

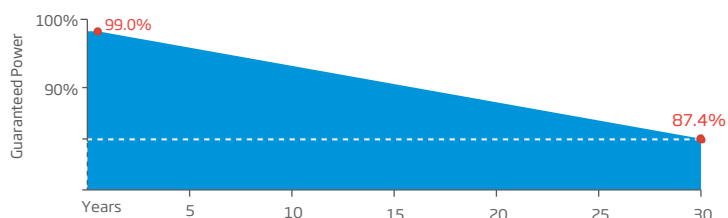


### Ultra-low degradation, longer warranty, higher output

- Extremely low 1% first year degradation and 0.4% annual power attenuation
- 15 years product warranty NEG18R.20 (silver frame)  
25 years product warranty NEG18R.28 (black frame)  
and 30 years power warranty
- Lower temperature coefficient (-0.29%/°C) and operating temperature



### Trina Solar's Vertex Monofacial Dual Glass Performance Warranty



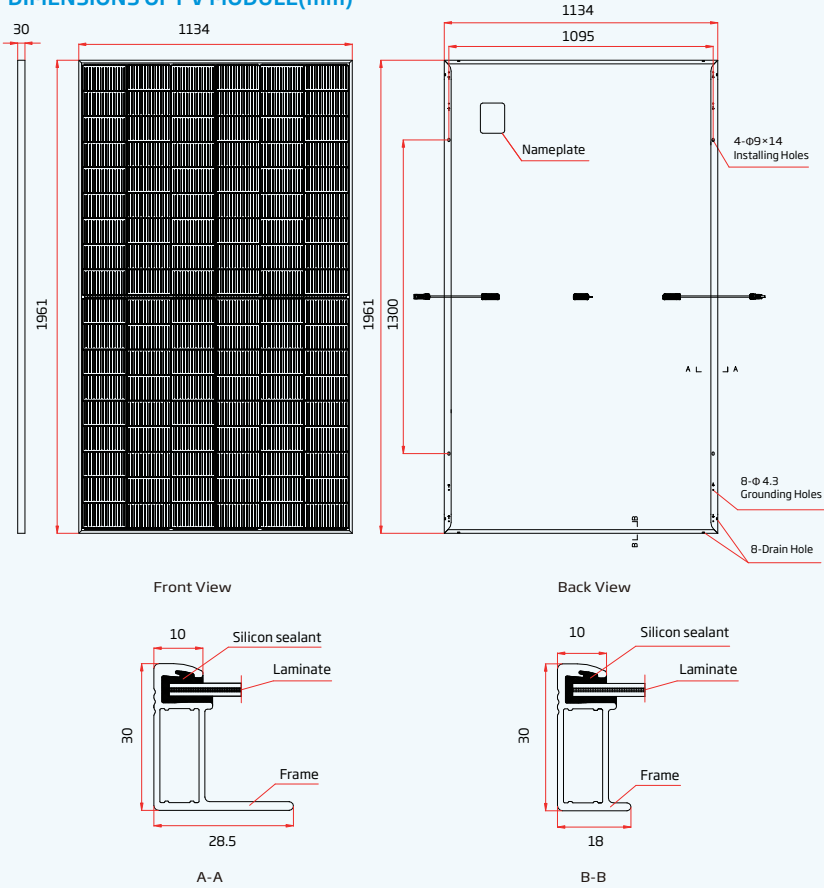
### Comprehensive Products and System Certificates



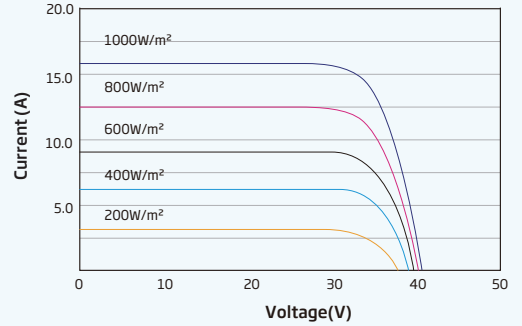
IEC61215/IEC61730  
ISO 9001: Quality Management System  
ISO 14001: Environmental Management System  
ISO14064: Greenhouse Gases Emissions Verification  
ISO45001: Occupational Health and Safety Management System



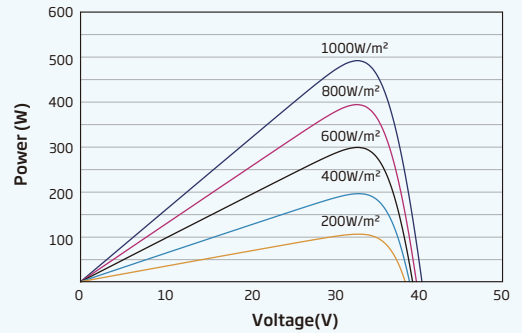
## DIMENSIONS OF PV MODULE(mm)



## I-V CURVES OF PV MODULE (490W)



## P-V CURVES OF PV MODULE (490W)



## ELECTRICAL DATA (STC) TSM-XXXNEG18R.28/20(XXX=475-505)

Peak Power Watts-P <sub>MAX</sub> (Wp)*	475	480	485	490	495	500	505
Binning Tolerance-P <sub>MAX</sub> (W)	0 ~ +5						
Maximum Power Voltage-V <sub>MPP</sub> (V)	32.3	32.5	32.7	32.9	33.1	33.3	33.5
Maximum Power Current-I <sub>MPP</sub> (A)	14.72	14.77	14.84	14.91	14.97	15.03	15.09
Open Circuit Voltage-V <sub>OC</sub> (V)	39.0	39.2	39.4	39.6	39.8	40.1	40.3
Short Circuit Current-I <sub>SC</sub> (A)	15.68	15.72	15.76	15.80	15.83	15.86	15.89
Module Efficiency η <sub>m</sub> (%)	21.4	21.6	21.8	22.0	22.3	22.5	22.7

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

## ELECTRICAL DATA (NOCT)

Maximum Power-P <sub>MAX</sub> (Wp)	363	367	371	375	378	382	386
Maximum Power Voltage-V <sub>MPP</sub> (V)	30.4	30.6	30.8	31.0	31.3	31.5	31.8
Maximum Power Current-I <sub>MPP</sub> (A)	11.94	11.98	12.02	12.06	12.08	12.11	12.15
Open Circuit Voltage-V <sub>OC</sub> (V)	36.9	37.2	37.4	37.6	37.7	38.0	38.3
Short Circuit Current-I <sub>SC</sub> (A)	12.64	12.67	12.70	12.74	12.76	12.78	12.81

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

## MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	108 cells
Module Dimensions	1961×1134×30mm (77.20×44.65×1.18 inches)
Weight	23.5kg (51.8 lb)
Front Glass	1.6mm 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 (.28 black / .20 silver)
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ) Length: 1300mm/1300mm (51.1/51.1 inches)
Connector	Stabuli MC4 EVO2

## TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P <sub>MAX</sub>	-0.29%/°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	30A

## WARRANTY

15 / 25 years 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: 864 pieces

(\*\*Please refer to Limited Warranty Supplement that applies to the TSM-\*\*\*NEG18R.28.Products installed within Australia & New Zealand rooftop market. TSM-\*\*\*NEG18R.20 - 15 years product warranty)