

Strong
Wind Protection

Severe
Hail Protection

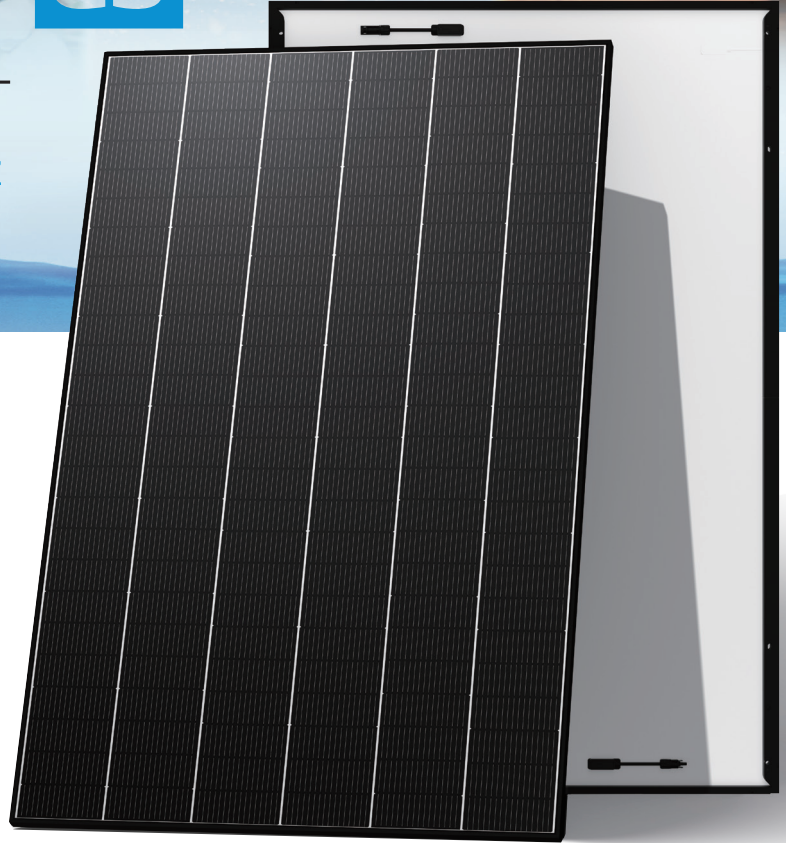
Heavy
Snow Protection

Superior
Fire Protection

Vertex S+ G3

— i-TOPCon Ultra —

Shield TSM-NED9R.28Z 465-485W



Key Features



VKF HW4 Hail Test



Standard load capacity: +7000/-5000 Pa



Fire rating (IEC 61730-2): Class A+A



High power & efficiency

- Up to 485 W output and 24.3% cell efficiency, with a high-voltage, low-current architecture enabling more power on limited roof space



Long-term reliability

- Low annual degradation backed by up to 30 year power warranty and 25 year product warranty



Extreme climate capabilities

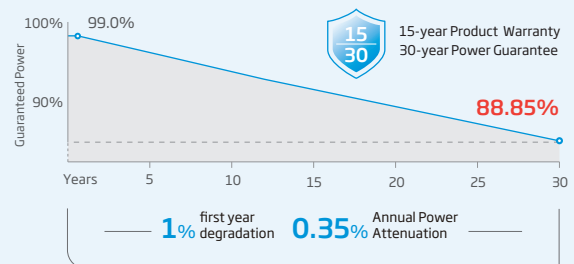
- Ongoing testing for IEC 45 mm hailstones, HW4 impact testing and high mechanical load capability up to +7000/-5000 Pa



Safe and durable

- Under evaluation for IEC Class A+A fire rating, exceeding conventional module standards for energy generation

Performance Warranty



* Please refer to product warranty for details

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



ELECTRICAL DATA (STC)

Peak Power Watts- $P_{MAX}(W_p)^*$	465	470	475	480	485
Power Selection (W)**	0 ~ +5				
Maximum Power Voltage- $V_{MPP}(V)$	46.90	47.20	47.60	47.90	48.30
Maximum Power Current- $I_{MPP}(A)$	9.93	9.96	9.99	10.03	10.05
Open Circuit Voltage- $V_{oc}(V)$	55.50	55.80	56.20	56.50	56.70
Short Circuit Current- $I_{sc}(A)$	10.62	10.65	10.68	10.71	10.73
Module Efficiency $\eta_m(\%)$	23.3	23.5	23.8	24.0	24.3

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

ELECTRICAL DATA (NOCT)

Peak Power Watts- $P_{MAX}(W_p)$	353	357	361	364	368
Maximum Power Voltage- $V_{MPP}(V)$	43.60	44.00	44.30	44.60	44.90
Maximum Power Current- $I_{MPP}(A)$	8.10	8.13	8.15	8.17	8.20
Open Circuit Voltage- $V_{oc}(V)$	52.40	52.80	53.20	53.50	53.70
Short Circuit Current- $I_{sc}(A)$	8.55	8.58	8.61	8.63	8.65

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

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature) 43°C (±2°C)

Temperature Coefficient of P_{MAX} -0.26%/°C

Temperature Coefficient of V_{oc} -0.24%/°C

Temperature Coefficient of I_{sc} 0.04%/°C

Due to different testing methods, the actual performances might differ from the declared specifications.

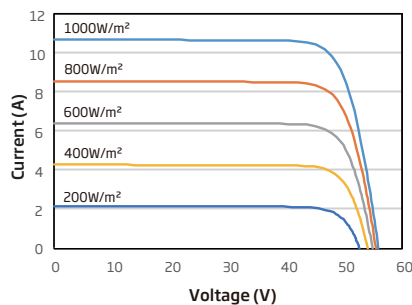
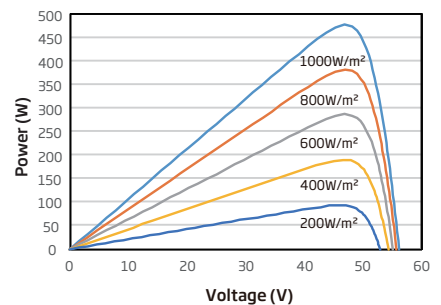
APPLICATION CONDITIONS

Operating Temperature -40~+70°C

Maximum System Voltage 1500V DC (IEC)

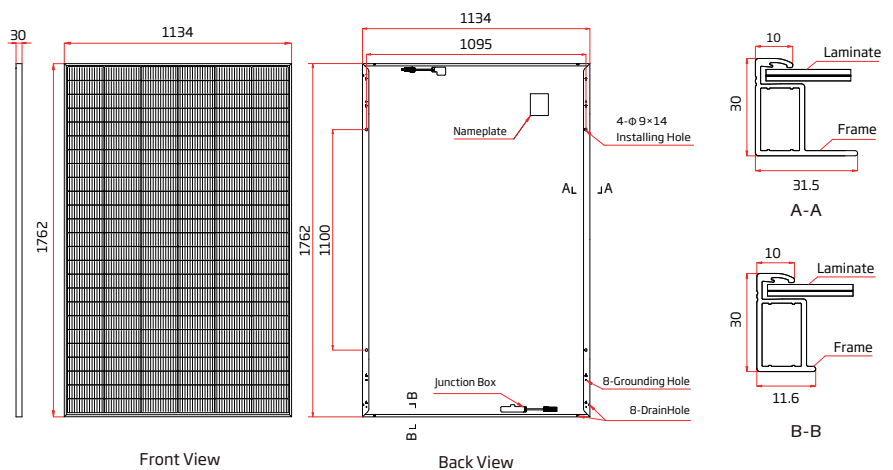
Max Series Fuse Rating 25A

*PV module 98th percentile operating temperature: 70°C.

CURVES OF PV MODULE
I-V CURVES OF PV MODULE (475W)

P-V CURVES OF PV MODULE (475W)

MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	150 cells
Module Dimensions	1762×1134×30 mm (69.37×44.65×1.18 inches)
Weight	27.1 kg (59.74 lb)
Front Glass	2.5mm (0.10 inches), AR Coating Heat Strengthened Glass
Back Glass	2.0mm (0.08 inches), Heat Strengthened Glass
Frame	30mm (1.18 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 6.0mm ² (0.009 inches ²) Landscape :1100/1100 mm (43.31/43.31 inches) Length can be customized
Connector	TS4 Plus / TS4 / MC4 EVO2*
Packaging	Modules per box: 37 pieces Modules per 40' container: 962 pieces

*The connector names listed are general names; specific types are subject to the certification documents.



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