

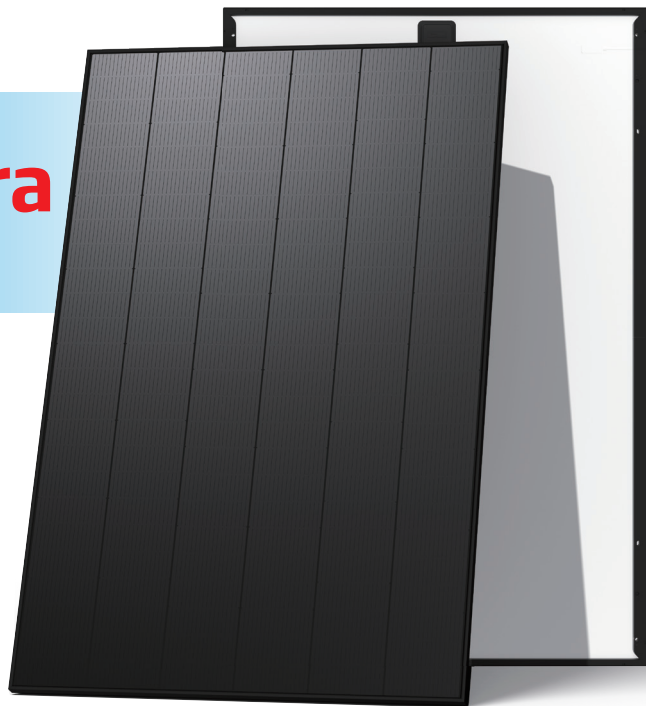
N-type i-TOPCon Ultra

DUAL GLASS MONOCRYSTALLINE MODULE

TSM-NEG9RP.25Z 460-480W

480W MAXIMUM POWER OUTPUT

24.0% MAXIMUM EFFICIENCY



Premium full black aesthetic

- Uniform, all-black, full-screen high density interconnection for a seamless design with no cell gaps



High power & efficiency

- Up to 480 W and 24% efficiency with low-voltage, high-current architecture for more power on limited roof space



Optimised performance

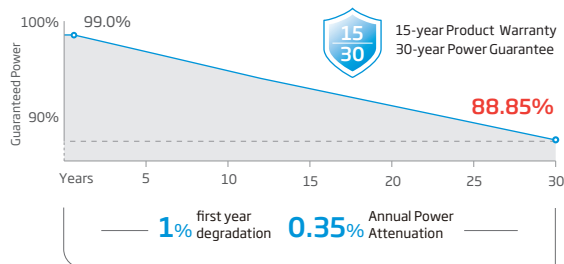
- Lower temperature coefficient and strong low-irradiance performance maximises power generation on rooftops



Long-term value for residential homes

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

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- $P_{MAX}(W_p)^*$	460	465	470	475	480
Power Selection (W)**	0 ~ +5				
Maximum Power Voltage- $V_{MPP}(V)$	30.90	31.20	31.50	31.80	32.00
Maximum Power Current- $I_{MPP}(A)$	14.89	14.91	14.93	14.96	15.00
Open Circuit Voltage- $V_{oc}(V)$	36.90	37.10	37.30	37.50	37.70
Short Circuit Current- $I_{sc}(A)$	15.93	15.96	15.99	16.02	16.05
Module Efficiency $\eta_m(\%)$	23.0	23.3	23.5	23.8	24.0

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- $P_{MAX}(W_p)$	349	353	357	361	364
Maximum Power Voltage- $V_{MPP}(V)$	29.00	29.20	29.40	29.60	29.80
Maximum Power Current- $I_{MPP}(A)$	12.06	12.11	12.16	12.20	12.23
Open Circuit Voltage- $V_{oc}(V)$	35.00	35.20	35.40	35.60	35.80
Short Circuit Current- $I_{sc}(A)$	12.80	12.83	12.85	12.88	12.90

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

TEMPERATURE RATINGS

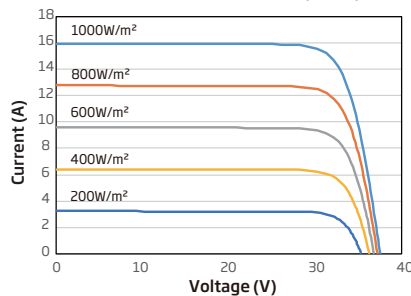
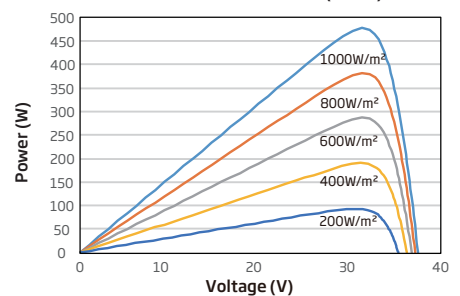
NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.26% /°C
Temperature Coefficient of V_{oc}	-0.24% /°C
Temperature Coefficient of I_{sc}	0.04% /°C

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

APPLICATION CONDITIONS

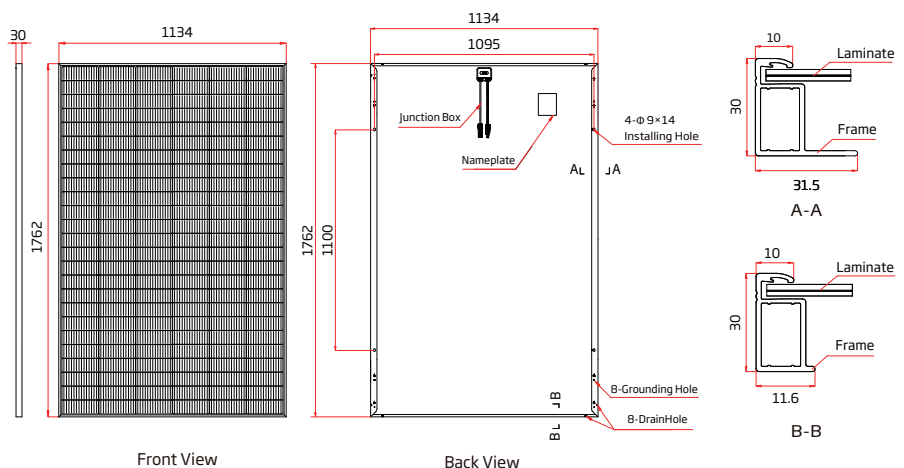
Operating Temperature	-40~+70°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25A

*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	21.1 kg (46.52lb)
Front Glass	1.6mm (0.06inches), AR Coating Heat Strengthened Glass
Back Glass	1.6mm (0.06inches), Heat Strengthened Glass
Frame	30mm (1.18 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 6.0mm ² (0.009inches 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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