



N-type TOPCon

BACKSHEET MONOCRYSTALLINE MODULE

TSM-NE09RH.05 420-445W

445W / MAXIMUM POWER OUTPUT

22.3% / MAXIMUM EFFICIENCY



High Customer Value

- Bloomberg Tier 1 manufacturer
- Produced in advanced solar panel factory in USA with expert-level engineering & quality system
- Superior aesthetics with full black design, ideal for residential and C&I rooftops
- Perfect size and weight less than 50 lbs for easier handling and installation
- Certified mechanical performance up to -5400Pa, which is 2.5 times than conventional solar panel



High Reliability and Durability

- Top performance in 3rd party labs
- 45mm hail stone strike test pass, by PVEL & TÜV Rheinland
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in high temperature, humidity area and harsh environment



Small in size, bigger on power

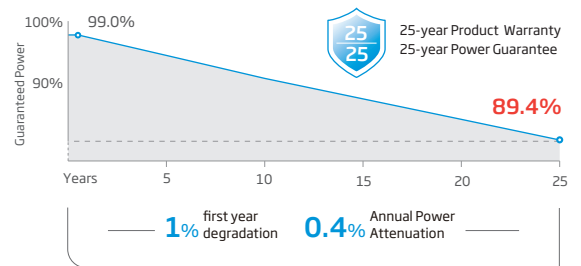
- Up to 445W, 22.3% module efficiency with high density interconnect technology
- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Lower BOS cost with lower open-circuit voltage, higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature efficiency



Ultra-low Degradation, higher output

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

Performance Warranty



* Please refer to product warranty for details

Comprehensive Products and System Certificates

IEC61215/IEC61730/UL61730

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- $P_{MAX}(W_p)^*$	420	425	430	435	440	445
Power Selection (W)**	0 ~ +5					
Maximum Power Voltage- $V_{MPP}(V)$	28.3	28.5	28.8	29.1	29.3	29.5
Maximum Power Current- $I_{MPP}(A)$	14.84	14.88	14.93	14.99	15.02	15.08
Open Circuit Voltage- $V_{oc}(V)$	33.7	33.9	34.3	34.5	34.8	35.1
Short Circuit Current- $I_{sc}(A)$	15.80	15.84	15.89	15.96	16.01	16.07
Module Efficiency $\eta_m(\%)$	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%. **Power selection up to: +3%.

ELECTRICAL DATA (NOCT)

Peak Power Watts- $P_{MAX}(W_p)$	321	324	329	333	336	340
Maximum Power Voltage- $V_{MPP}(V)$	26.6	26.7	27.0	27.2	27.4	27.7
Maximum Power Current- $I_{MPP}(A)$	12.10	12.12	12.17	12.22	12.26	12.30
Open Circuit Voltage- $V_{oc}(V)$	32.0	32.2	32.5	32.7	33.0	33.3
Short Circuit Current- $I_{sc}(A)$	12.74	12.77	12.81	12.86	12.90	12.95

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

TEMPERATURE RATINGS

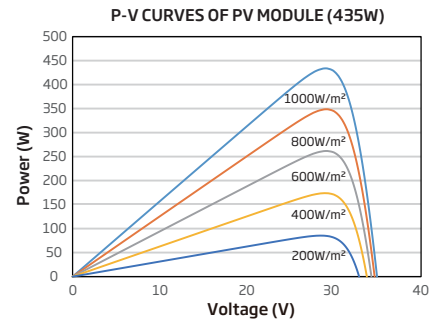
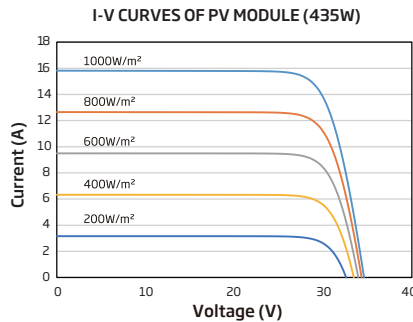
NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.29%/°C
Temperature Coefficient of V_{oc}	-0.24%/°C
Temperature Coefficient of I_{sc}	0.04%/°C

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

MAXIMUM RATINGS

Operational Temperature	-40 ~ +85°C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	30A

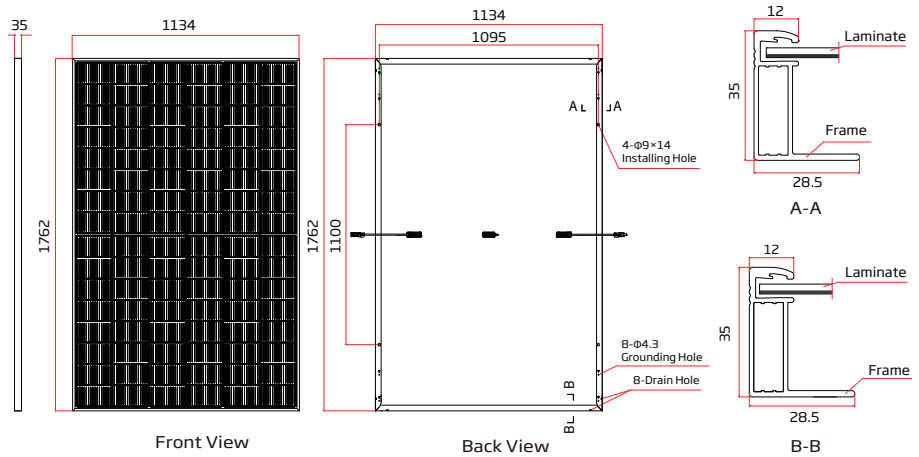
CURVES OF PV MODULE



MECHANICAL DATA

Solar Cells	N-type TOPCon Monocrystalline
No. of cells	96 cells
Module Dimensions	1762×1134×35 mm (69.37×44.65×1.38 inches)
Weight	21.5 kg (47.40 lb)
Front Glass	3.2mm (0.13inches), AR Coating Tempered Glass
Backsheet	White-black Opaque Backsheet
Frame	35mm(1.38 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Landscape: 1100 mm/ 1100 mm (43.31/43.31 inches) Length can be customized
Connector	MC4 EV02 / TS4 Plus / TS4*
Packaging	Modules per box: 31 pieces Modules per 53' container: 806 pieces
Fire Type	Type 1 or Type 2

*Please refer to regional datasheet for specified connector.



CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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Version number: TSM_NA_EN_2025_A