

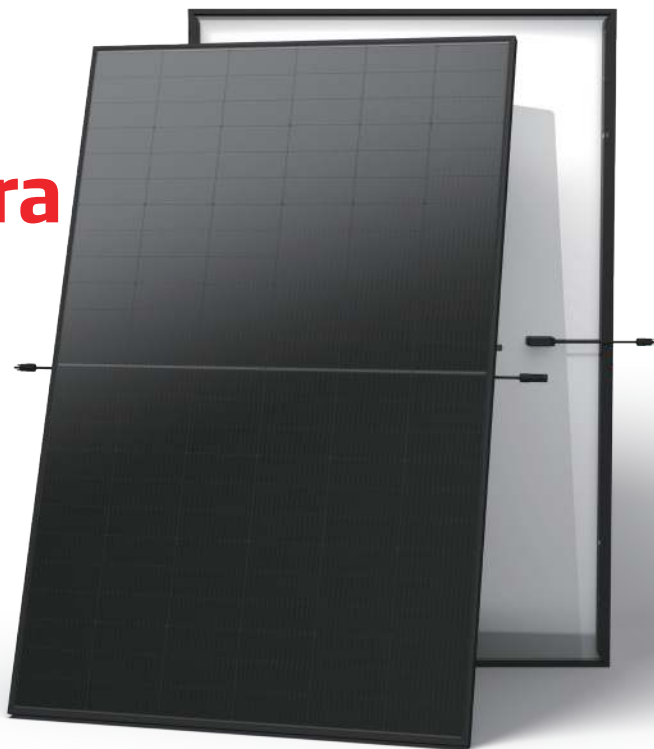


# Ultra

TSM-NEG9R.25 440-465W

**465<sub>W</sub>** / MAXIMUM  
POWER OUTPUT

**23.3%** / MAXIMUM  
EFFICIENCY



## High Customer Value

- Full black, designed with aesthetics in mind, suitable for residential and C&I rooftop
- Perfect size and low weight for handling and installation
- Compatible with mainstream inverters and diverse mounting systems
- Mechanical test load up to 5400 Pa front side and 4000 Pa back side
- Certified lifetime carbon footprint assessment



## High reliability with light double glass

- Less prone to micro-cracks and scratches on the back side
- Excellent fire rating, weather resistance, sustainable in harsh environments and extreme weather conditions
- Certified resistance against salt spray, sand dust, ammonia, PID
- Up to 25 years product warranty and 30 years power warranty



## High power up to 465W

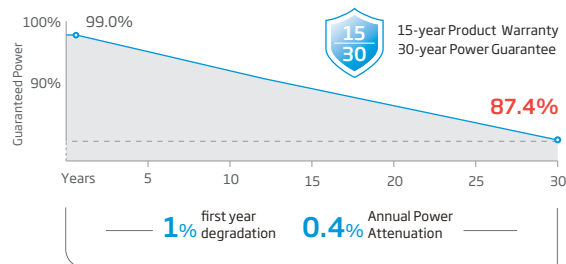
- Up to 23.3% module efficiency, on 210 innovative platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



## High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature efficient (-0.29%/°C) and lower working temperature

## Performance Warranty



\* Please refer to product warranty for details

## 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



|                                      |        |       |       |       |       |       |
|--------------------------------------|--------|-------|-------|-------|-------|-------|
| Peak Power Watts- $P_{MAX}(W_p)^*$   | 440    | 445   | 450   | 455   | 460   | 465   |
| Power Selection (W)**                | 0 ~ +5 |       |       |       |       |       |
| Maximum Power Voltage- $V_{MPP}$ (V) | 44.00  | 44.30 | 44.60 | 45.00 | 45.40 | 45.80 |
| Maximum Power Current- $I_{MPP}$ (A) | 10.01  | 10.05 | 10.09 | 10.11 | 10.14 | 10.16 |
| Open Circuit Voltage- $V_{oc}$ (V)   | 52.20  | 52.60 | 52.90 | 53.40 | 53.80 | 54.20 |
| Short Circuit Current- $I_{sc}$ (A)  | 10.67  | 10.71 | 10.74 | 10.77 | 10.81 | 10.85 |
| Module Efficiency $\eta_m$ (%)       | 22.0   | 22.3  | 22.5  | 22.8  | 23.0  | 23.3  |

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance:  $\pm 3\%$ . \*\*Power selection up to: +3%.

|                                      |       |       |       |       |       |       |
|--------------------------------------|-------|-------|-------|-------|-------|-------|
| Peak Power Watts- $P_{MAX}(W_p)$     | 337   | 341   | 344   | 348   | 352   | 355   |
| Maximum Power Voltage- $V_{MPP}$ (V) | 41.40 | 41.70 | 42.00 | 42.30 | 42.70 | 42.80 |
| Maximum Power Current- $I_{MPP}$ (A) | 8.14  | 8.17  | 8.19  | 8.22  | 8.25  | 8.28  |
| Open Circuit Voltage- $V_{oc}$ (V)   | 49.50 | 49.90 | 50.20 | 50.60 | 51.00 | 51.40 |
| Short Circuit Current- $I_{sc}$ (A)  | 8.60  | 8.63  | 8.66  | 8.68  | 8.71  | 8.74  |

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

NOCT (Nominal Operating Cell Temperature) 43°C ( $\pm 2^\circ\text{C}$ )

Temperature Coefficient of  $P_{MAX}$  -0.29% /°C

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

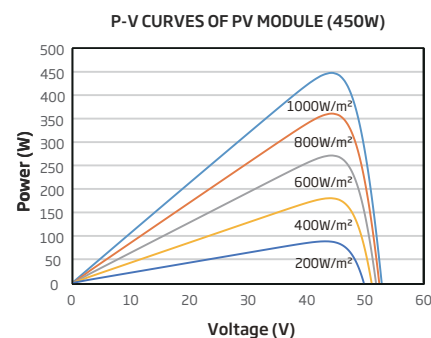
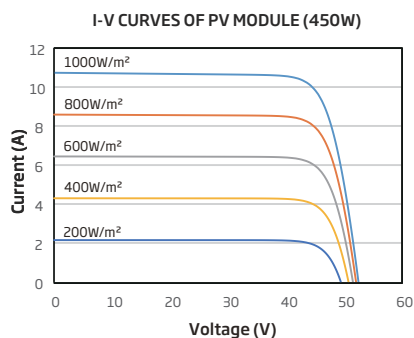
Temperature Coefficient of  $I_{sc}$  0.04% /°C

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

Operating Temperature -40~+70°C

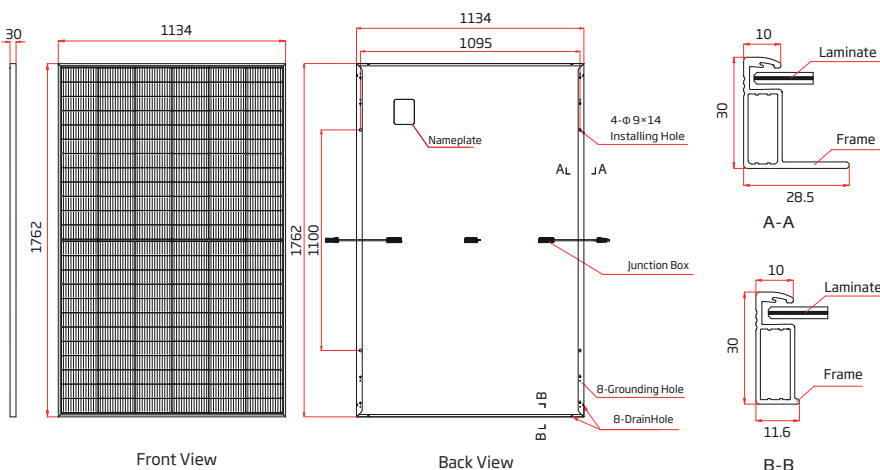
Maximum System Voltage 1500V DC (IEC)

Max Series Fuse Rating 25A



|                   |                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solar Cells       | N-type i-TOPCon Monocrystalline                                                                                                                          |
| No. of cells      | 144 cells                                                                                                                                                |
| Module Dimensions | 1762×1134×30 mm<br>(69.37×44.65×1.18 inches)                                                                                                             |
| Weight            | 21.0 kg (46.30lb)                                                                                                                                        |
| Front Glass       | 1.6 mm (0.06 inches),<br>AR Coating Heat Strengthened Glass                                                                                              |
| Back Glass        | 1.6 mm (0.06 inches),<br>Heat Strengthened Glass                                                                                                         |
| Frame             | 30mm(1.18 inches)<br>Anodized Aluminium Alloy, Black                                                                                                     |
| J-Box             | IP 68 rated                                                                                                                                              |
| Cables            | Photovoltaic Technology<br>Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> )<br>Portrait: 200/320 mm (7.87/12.60 inches)<br>Length can be customized |
| Connector         | TS4 Plus / TS4 / MC4 EV02*                                                                                                                               |
| Packaging         | Modules per box: 36 pieces<br>Modules per 40' container: 936 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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