

# Vertex S

BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE09R.08  
POWER RANGE: 415-435 W

## 435 W+

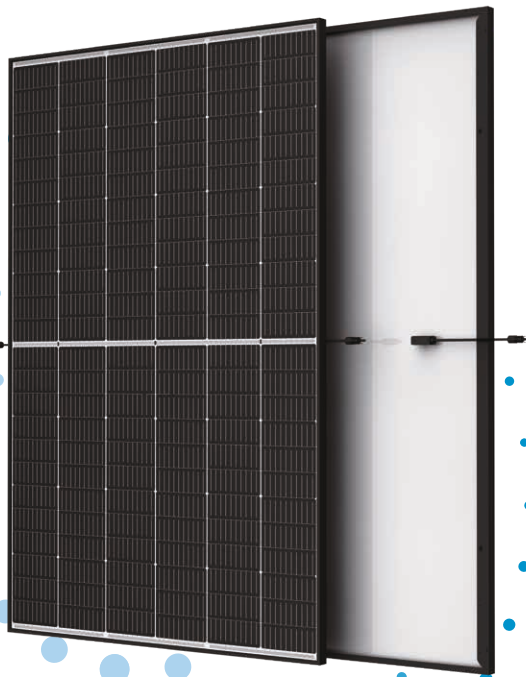
MAXIMUM POWER OUTPUT

## 0/+5 W

POSITIVE POWER TOLERANCE

## 21.8 %

MAXIMUM EFFICIENCY



### Small in size, big on power

- Generates up to 435 W, 21.8 % module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Excellent low light performance (IAM) with cell process and module material optimization



### Universal solution for residential and C&I rooftops

- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling. Optimized transportation cost
- Reduces installation cost with higher power bin and efficiency
- Flexible installation solutions for system deployment



### High Reliability

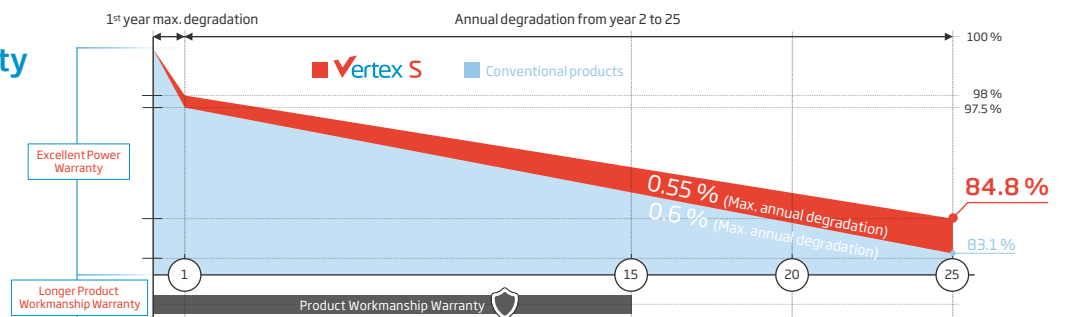
- Positive load up to 6,000 Pa (snow)
- Negative load up to 4,000 Pa (wind)

## Extended Vertex S Warranty

**2 %**  
1<sup>st</sup> year max. degradation

**0.55 %**  
Max. annual degradation from year 2 to 25

**15 Years**  
Product Workmanship Warranty



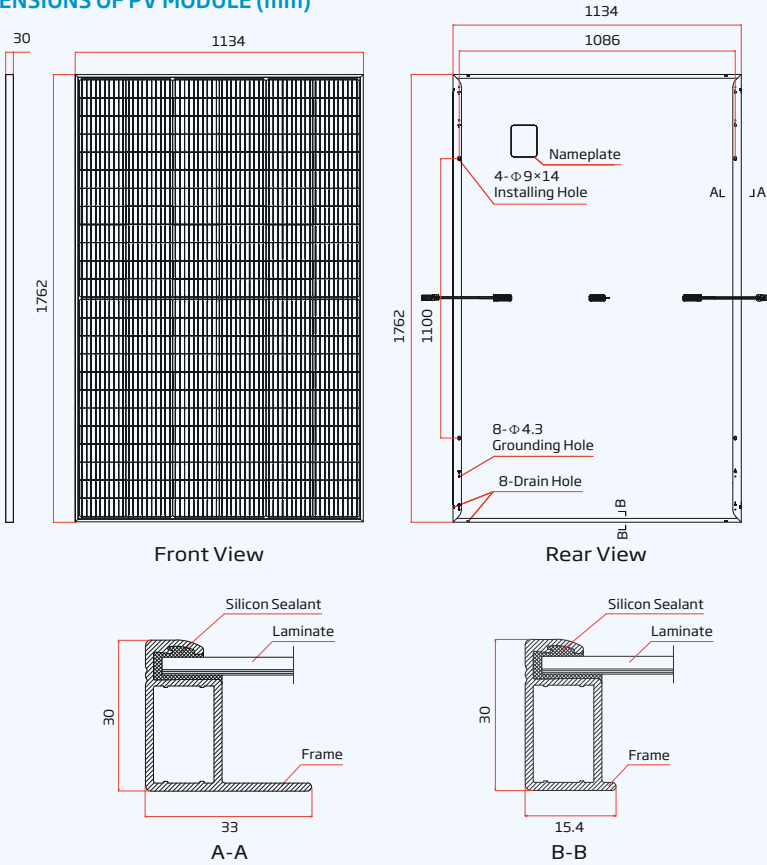
## Comprehensive Product and System Certificates



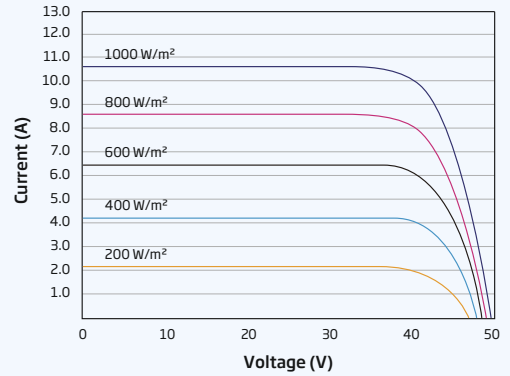
IEC61215/IEC61730/IEC61701/IEC62716  
 ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



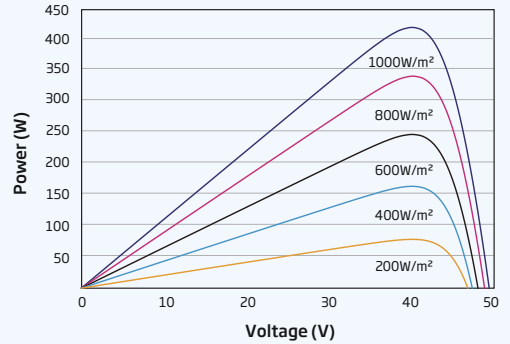
### DIMENSIONS OF PV MODULE (mm)



### I-V CURVES OF PV MODULE (420 W)



### P-V CURVES OF PV MODULE (420 W)



### ELECTRICAL DATA (STC)

|  | TSM-415<br>DE09R.08 | TSM-420<br>DE09R.08 | TSM-425<br>DE09R.08 | TSM-430<br>DE09R.08 | TSM-435<br>DE09R.08 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| Peak Power Watts-P <sub>MAX</sub> (Wp)*    | 415                 | 420                 | 425                 | 430                 | 435                 |
| Power Tolerance-P <sub>MAX</sub> (W)       | 0/+5                | 0/+5                | 0/+5                | 0/+5                | 0/+5                |
| Maximum Power Voltage-V <sub>MPP</sub> (V) | 41.0                | 41.3                | 41.5                | 41.8                | 42.0                |
| Maximum Power Current-I <sub>MPP</sub> (A) | 10.11               | 10.17               | 10.24               | 10.30               | 10.36               |
| Open Circuit Voltage-V <sub>oc</sub> (V)   | 49.4                | 49.7                | 49.9                | 50.3                | 50.6                |
| Short Circuit Current-I <sub>sc</sub> (A)  | 10.64               | 10.69               | 10.74               | 10.81               | 10.86               |
| Module Efficiency η <sub>m</sub> (%)       | 20.8                | 21.0                | 21.3                | 21.5                | 21.8                |

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

### MECHANICAL DATA

|                      |   |
|----------------------|---|
| Solar Cells          | Monocrystalline   |
| No. of cells         | 144 cells   |
| Module Dimensions    | 1762×1134×30 mm   |
| Weight               | 21.8 kg   |
| Glass                | 3.2 mm, High Transmission, AR Coated Heat Strengthened Glass  |
| Encapsulant material | EVA/POE   |
| Backsheet            | White   |
| Frame                | 30 mm Anodized Aluminium Alloy  |
| J-Box                | IP 68 rated   |
| Cables               | Photovoltaic Technology Cable 4.0 mm <sup>2</sup><br>Landscape: 1100/1100 mm<br>Portrait: 280/350 mm* |
| Connector            | TS4/MC4 EVO2*   |

\*Special order only

### ELECTRICAL DATA (NOCT)

|  | TSM-415<br>DE09R.08 | TSM-420<br>DE09R.08 | TSM-425<br>DE09R.08 | TSM-430<br>DE09R.08 | TSM-435<br>DE09R.08 |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| Maximum Power-P <sub>MAX</sub> (Wp)        | 313                 | 317                 | 321                 | 325                 | 329                 |
| Maximum Power Voltage-V <sub>MPP</sub> (V) | 38.5                | 38.8                | 39.1                | 39.4                | 39.6                |
| Maximum Power Current-I <sub>MPP</sub> (A) | 8.13                | 8.17                | 8.21                | 8.26                | 8.30                |
| Open Circuit Voltage-V <sub>oc</sub> (V)   | 46.5                | 46.7                | 46.9                | 47.3                | 47.6                |
| Short Circuit Current-I <sub>sc</sub> (A)  | 8.58                | 8.62                | 8.66                | 8.71                | 8.75                |

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

### TEMPERATURE RATINGS

|   |              |
|---|--------------|
| NOCT(Nominal Operating Cell Temperature)    | 43 °C (±2 K) |
| Temperature Coefficient of P <sub>MAX</sub> | -0.34 %/K    |
| Temperature Coefficient of V <sub>oc</sub>  | -0.25 %/K    |
| Temperature Coefficient of I <sub>sc</sub>  | 0.04 %/K     |

### MAXIMUM RATINGS

|                         |                 |
|-------------------------|-----------------|
| Operational Temperature | -40 to +85 °C   |
| Maximum System Voltage  | 1500 V DC (IEC) |
| Max Series Fuse Rating  | 20 A            |

### WARRANTY

- 15 Year product workmanship warranty
- 25 Year power warranty
- 2% First year degradation
- 0.55 % Annual power degradation

(Please refer to the applicable limited warranty for details)

### PACKAGING CONFIGURATION

|                           |            |
|---------------------------|------------|
| Modules per box           | 36 pieces  |
| Modules per 40' container | 936 pieces |