

## 425 W+

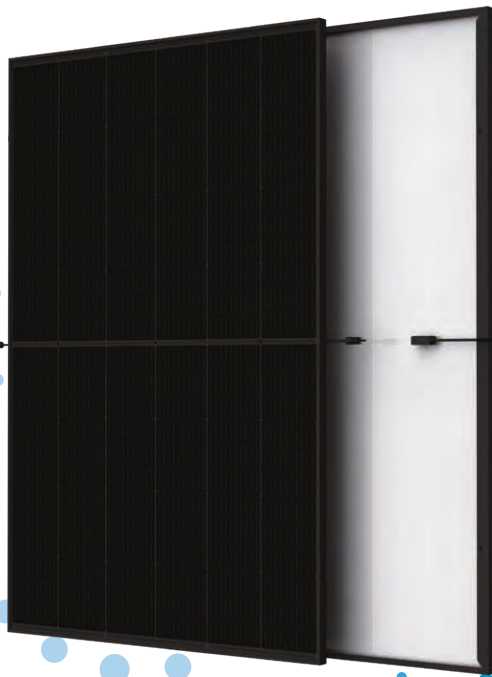
MAXIMUM POWER OUTPUT

## 0/+5 W

POSITIVE POWER TOLERANCE

## 21.3 %

MAXIMUM EFFICIENCY



### Outstanding Visual Appearance

- Designed with aesthetics in mind
- Ultra-thin, virtually invisible busbars
- Excellent cell color control by machine selection



### Small in size, big on power

- Generates up to 425 W, 21.3 % 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



### Optimal solution for residential 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

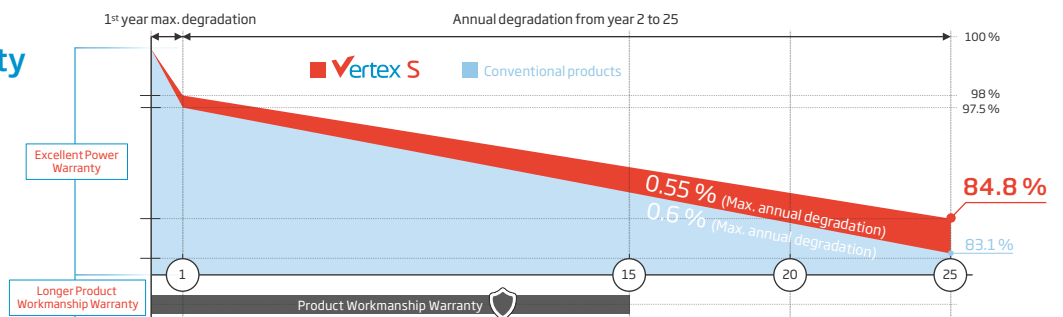
- Positive load up to 6,000 Pa (snow)
- Negative load up to 4,000 Pa (wind)

## 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

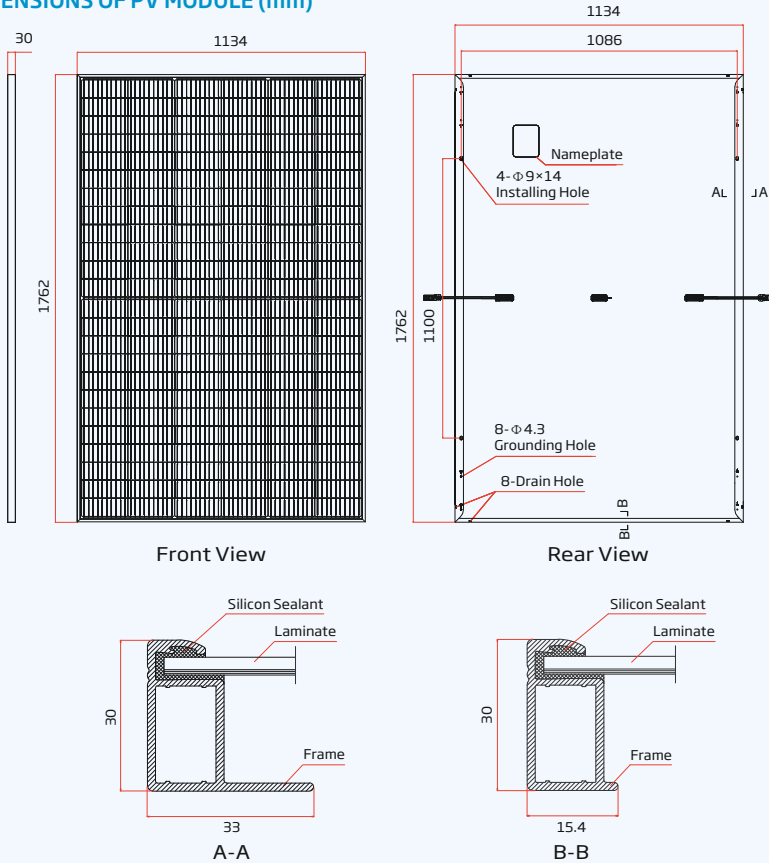


## Comprehensive Product and System Certificates

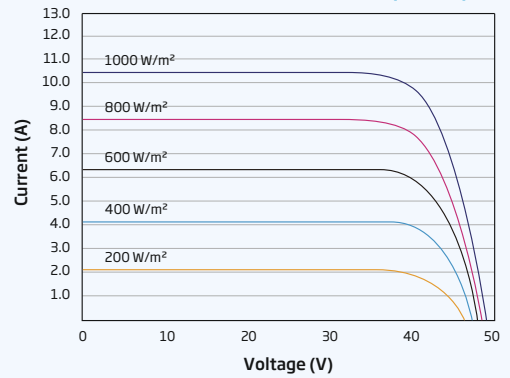


IEC61215/IEC61730/IEC61701/IEC62716  
ISO 9001: Quality Management System  
ISO 14001: Environmental Management System  
ISO14064: Greenhouse Gases Emissions Verification  
ISO45001: Occupational Health and Safety Management System

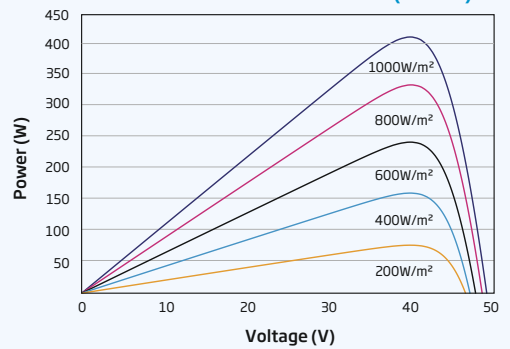
### DIMENSIONS OF PV MODULE (mm)



### I-V CURVES OF PV MODULE (410W)



### P-V CURVES OF PV MODULE (410W)



### ELECTRICAL DATA (STC)

|                                      | TSM-405<br>DE09R.05 | TSM-410<br>DE09R.05 | TSM-415<br>DE09R.05 | TSM-420<br>DE09R.05 | TSM-425<br>DE09R.05 |
|--------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Peak Power Watts- $P_{MAX}$ (Wp)*    | 405                 | 410                 | 415                 | 420                 | 425                 |
| Power Tolerance- $P_{MAX}$ (W)       | 0/+5                | 0/+5                | 0/+5                | 0/+5                | 0/+5                |
| Maximum Power Voltage- $V_{MPP}$ (V) | 40.6                | 40.8                | 41.0                | 41.3                | 41.5                |
| Maximum Power Current- $I_{MPP}$ (A) | 9.99                | 10.05               | 10.11               | 10.17               | 10.24               |
| Open Circuit Voltage- $V_{oc}$ (V)   | 49.0                | 49.2                | 49.4                | 49.7                | 49.9                |
| Short Circuit Current- $I_{sc}$ (A)  | 10.52               | 10.58               | 10.64               | 10.69               | 10.74               |
| Module Efficiency $\eta_m$ (%)       | 20.3                | 20.5                | 20.8                | 21.0                | 21.3                |

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            | Black-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-405<br>DE09R.05 | TSM-410<br>DE09R.05 | TSM-415<br>DE09R.05 | TSM-420<br>DE09R.05 | TSM-425<br>DE09R.05 |
|--------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Maximum Power- $P_{MAX}$ (Wp)        | 306                 | 310                 | 313                 | 317                 | 321                 |
| Maximum Power Voltage- $V_{MPP}$ (V) | 38.2                | 38.3                | 38.5                | 38.8                | 39.1                |
| Maximum Power Current- $I_{MPP}$ (A) | 8.03                | 8.08                | 8.13                | 8.17                | 8.21                |
| Open Circuit Voltage- $V_{oc}$ (V)   | 46.1                | 46.3                | 46.5                | 46.7                | 46.9                |
| Short Circuit Current- $I_{sc}$ (A)  | 8.48                | 8.53                | 8.58                | 8.62                | 8.66                |

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 $P_{MAX}$     | -0.34%/K    |
| Temperature Coefficient of $V_{oc}$      | -0.25%/K    |
| Temperature Coefficient of $I_{sc}$      | 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 |