

# 425 W

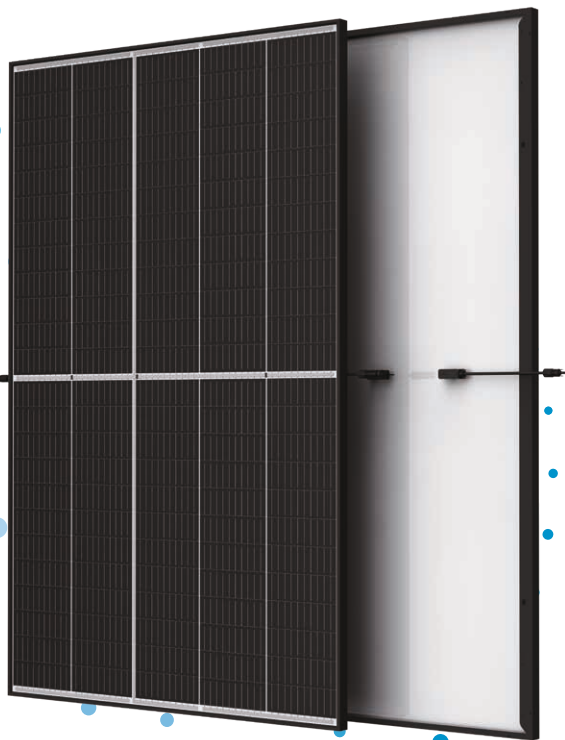
MAXIMUM POWER OUTPUT

# 0/+5 W

POSITIVE POWER TOLERANCE

# 21.9 %

MAXIMUM EFFICIENCY



### Small in size, bigger on power

- Generates up to 425 W, 21.9 % module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Reduces installation cost with higher power bin and efficiency



### Dual-glass Design, High Reliability

- Excellent fire rating and resistance to harsh environmental conditions
- 5,400 Pa snow load and 4,000 Pa wind load (test loads)



### Maximize Energy Harvest

- Up to 25 years product warranty and 30 years power warranty
- 1 % first-year degradation and 0.4 % annual degradation enabled by N-type technology



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

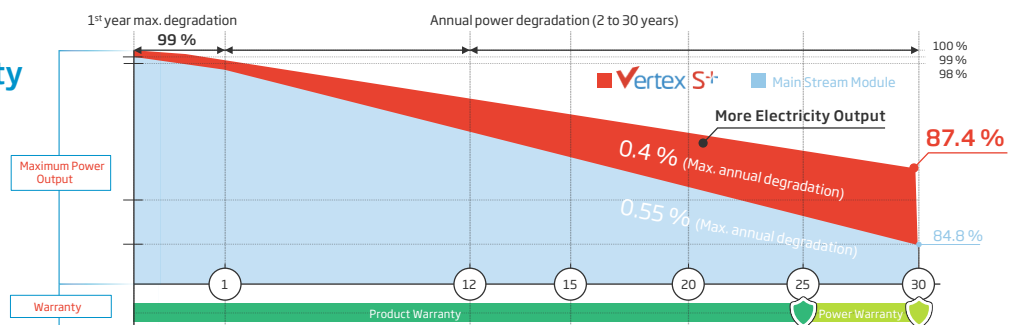
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling. Optimized transportation cost
- Flexible installation solutions for system deployment

## Extended Vertex S+ Warranty

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

**0.4 %**  
Max. annual degradation from year 2 to 30

**25 Years**  
Product Workmanship Warranty

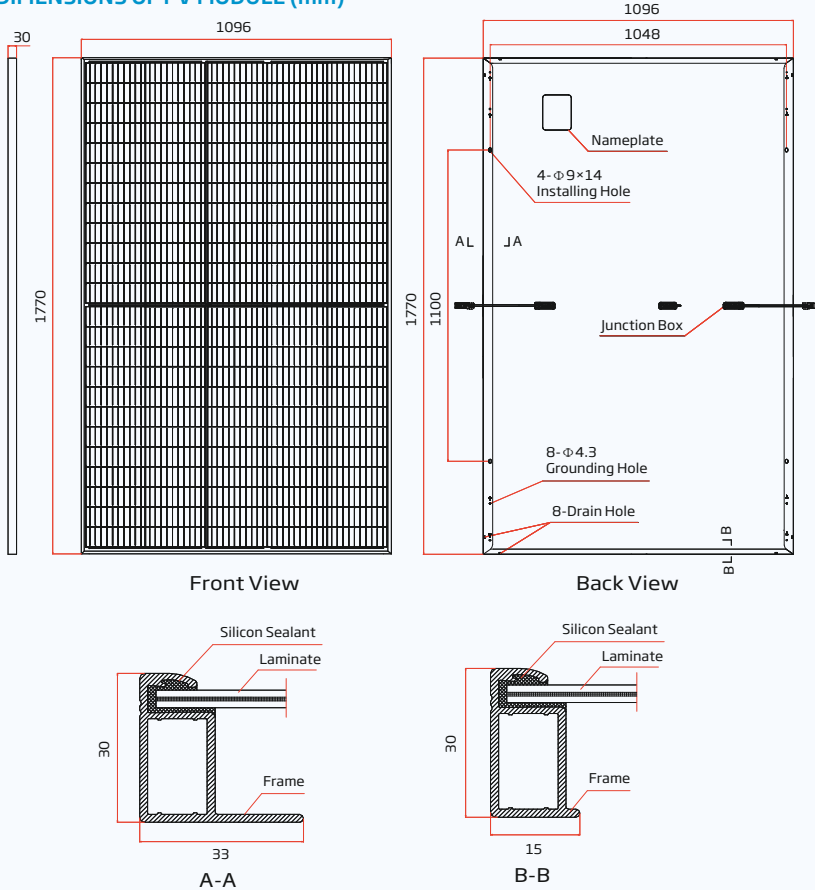
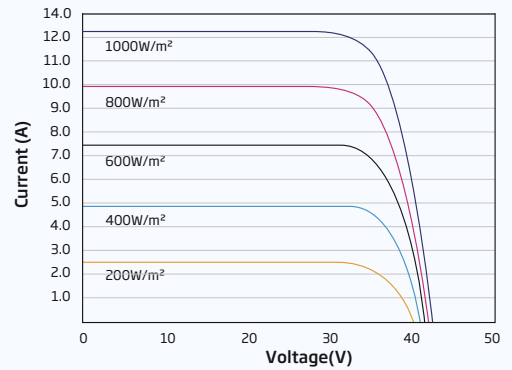
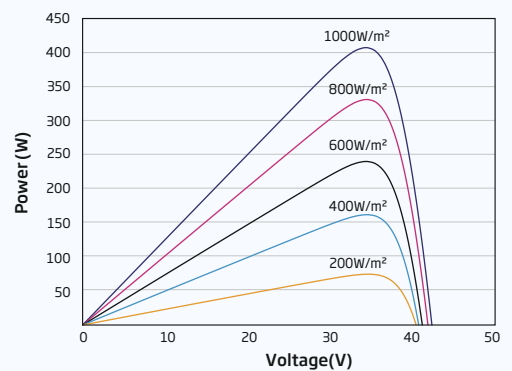


## Comprehensive Products and System Certificates



ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



**DIMENSIONS OF PV MODULE (mm)**

**I-V CURVES OF PV MODULE (415 W)**

**P-V CURVES OF PV MODULE (415 W)**

**ELECTRICAL DATA (STC)**

	TSM-400 NEG09.28	TSM-405 NEG09.28	TSM-410 NEG09.28	TSM-415 NEG09.28	TSM-420 NEG09.28	TSM-425 NEG09.28
Peak Power Watts-P <sub>MAX</sub> (Wp)*	400	405	410	415	420	425
Power Tolerance-P <sub>MAX</sub> (W)	0/+5					
Maximum Power Voltage-V <sub>MPP</sub> (V)	35.1	35.4	35.7	36.0	36.3	36.6
Maximum Power Current-I <sub>MPP</sub> (A)	11.41	11.44	11.48	11.52	11.57	11.61
Open Circuit Voltage-V <sub>OC</sub> (V)	41.9	42.2	42.4	42.7	43.1	43.4
Short Circuit Current-I <sub>SC</sub> (A)	12.16	12.20	12.23	12.27	12.33	12.37
Module Efficiency η <sub>m</sub> (%)	20.6	20.9	21.1	21.4	21.7	21.9

STC: Irradiance 1000 W/m<sup>2</sup>, Cell Temperature 25 °C, Air Mass AM 1.5. \*Measuring tolerance: ±3%.

**ELECTRICAL DATA (NOCT)**

	TSM-400 NEG09.28	TSM-405 NEG09.28	TSM-410 NEG09.28	TSM-415 NEG09.28	TSM-420 NEG09.28	TSM-425 NEG09.28
Maximum Power-P <sub>MAX</sub> (Wp)	305	308	312	316	320	324
Maximum Power Voltage-V <sub>MPP</sub> (V)	32.8	33.1	33.3	33.6	33.9	34.2
Maximum Power Current-I <sub>MPP</sub> (A)	9.29	9.32	9.36	9.40	9.45	9.48
Open Circuit Voltage-V <sub>OC</sub> (V)	39.7	40.0	40.2	40.5	40.8	41.1
Short Circuit Current-I <sub>SC</sub> (A)	9.80	9.83	9.86	9.89	9.94	9.97

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

**MECHANICAL DATA**

Solar Cells	Monocrystalline
No. of cells	120 cells
Module Dimensions	1770×1096×30 mm
Weight	21.5 kg
Front Glass	1.6 mm, High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	1.6 mm, Heat Strengthened Glass
Frame	30 mm Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mm <sup>2</sup> Landscape: 1100/1100 mm Portrait: 280/350 mm*
Connector	TS4 / MC4 EVO2*

\*Special order only

**TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43 °C (±2 K)
Temperature Coefficient of P <sub>MAX</sub>	-0.30 %/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	20A

**WARRANTY**

25 year Product Workmanship Warranty  
30 year Power Warranty  
1 % first year degradation  
0.4 % Annual Power Attenuation

(Please refer to product warranty for details)

**PACKAGING CONFIGURATION**

Modules per box:	36 pieces
Modules per 40' container:	936 pieces