

445 W

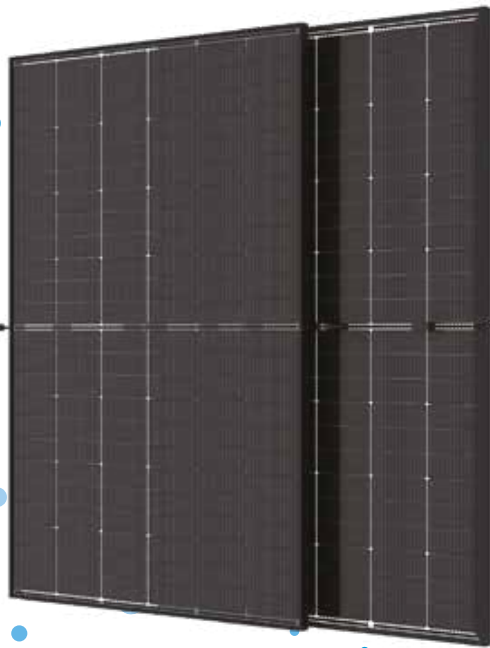
MAXIMUM POWER OUTPUT

0/+5 W

POSITIVE POWER TOLERANCE

22.3 %

MAXIMUM EFFICIENCY



Small in size, bigger on power

- Generates up to 445 W, 22.3 % module efficiency with high density interconnect technology
- Boost performance at high temperature environments with better thermal behavior



Transparent Dual-glass Design

- Designed with aesthetics in mind
- 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

- Higher bifaciality up to 85 %
- 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

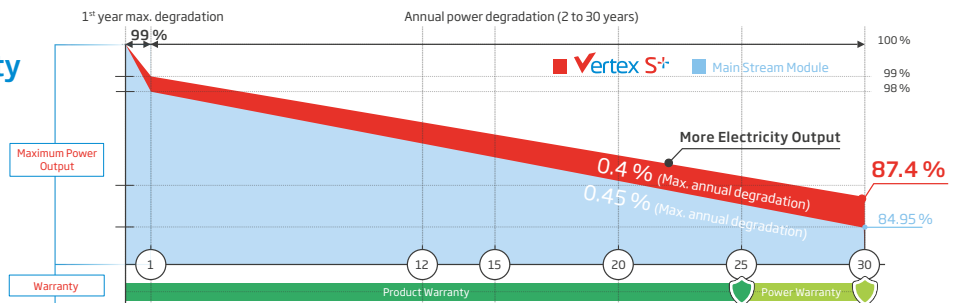
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling

Extended Vertex S⁺ Warranty

1 %
1st year max. degradation

0.4 %
Max. annual degradation from year 2 to 30

25 Years
Product Workmanship Warranty

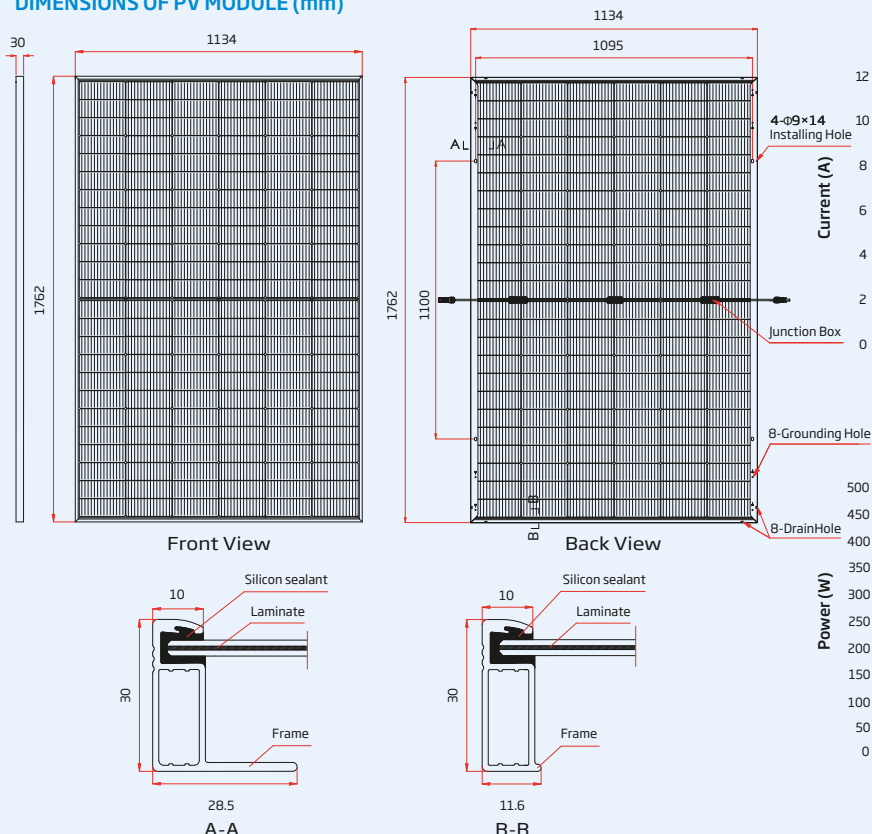


Comprehensive Products and System Certificates

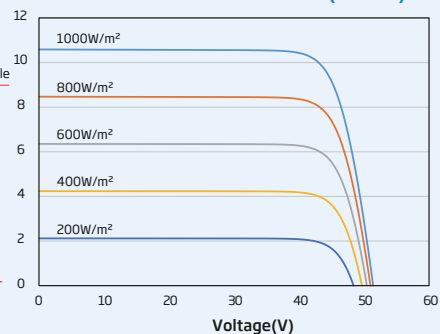


IEC61215/IEC61730/IEC61701/IEC62716/UL61730
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System

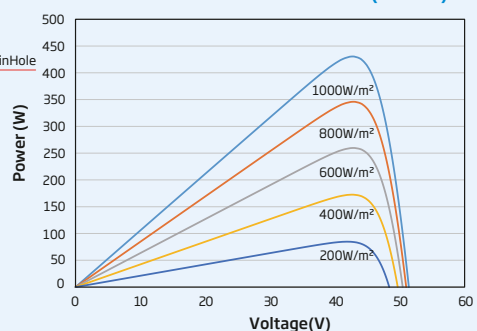
DIMENSIONS OF PV MODULE (mm)



I-V CURVES OF PV MODULE (430 W)



P-V CURVES OF PV MODULE (430 W)



MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm
Weight	21.0 kg
Front Glass	1.6 mm, High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	1.6 mm, High Transmission, Heat Strengthened Glass

Frame	30 mm Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mm² Landscape: 1100/1100 mm Portrait: 280/350 mm*
Connector	TS4 / MC4 EV02*

*Special order only

ELECTRICAL DATA (STC & NOCT)

	TSM-415 NEG9RC.27		TSM-420 NEG9RC.27		TSM-425 NEG9RC.27		TSM-430 NEG9RC.27		TSM-435 NEG9RC.27		TSM-440 NEG9RC.27		TSM-445 NEG9RC.27	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- P_{MAX} (Wp)*	415	317	420	321	425	325	430	328	435	332	440	336	445	338
Power Tolerance- P_{MAX} (W)	0 ~ +5													
Maximum Power Voltage- V_{MPP} (V)	42.1	39.3	42.5	39.7	42.9	40.0	43.2	40.4	43.6	40.7	44.0	41.0	44.3	41.3
Maximum Power Current- I_{MPP} (A)	9.86	8.03	9.89	8.07	9.92	8.09	9.96	8.11	9.99	8.15	10.01	8.17	10.05	8.20
Open Circuit Voltage- V_{OC} (V)	50.1	47.6	50.5	47.9	50.9	48.3	51.4	48.8	51.8	49.2	52.2	49.5	52.6	49.9
Short Circuit Current- I_{SC} (A)	10.50	8.46	10.53	8.49	10.56	8.51	10.59	8.53	10.64	8.57	10.67	8.60	10.71	8.63
Module Efficiency η_m (%)	20.8		21.0		21.3		21.5		21.8		22.0		22.3	

STC: Irradiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM1.5. NOCT: Irradiance at 800 W/m², Ambient Temperature 20 °C, Wind Speed 1 m/s. *Measuring tolerance: ±3 %.

ELECTRICAL CHARACTERISTICS WITH DIFFERENT POWER BIN (reference to 5 % & 10 % backside power gain)

Backside Power Gain	5 %		10 %		5 %		10 %		5 %		10 %		5 %		10 %	
Total Equivalent power - P_{MAX} (Wp)	436	457	441	462	446	468	452	473	457	479	462	484	467	490	467	490
Maximum Power Voltage- V_{MPP} (V)	42.1	42.1	42.5	42.5	42.9	42.9	43.2	43.2	43.6	43.6	44.0	44.0	44.3	44.3	44.3	44.3
Maximum Power Current- I_{MPP} (A)	10.35	10.85	10.38	10.88	10.42	10.91	10.46	10.96	10.49	10.99	10.51	11.01	10.55	11.06	10.55	11.06
Open Circuit Voltage- V_{OC} (V)	50.1	50.1	50.5	50.5	50.9	50.9	51.4	51.4	51.8	51.8	52.2	52.2	52.6	52.6	52.6	52.6
Short Circuit Current- I_{SC} (A)	11.03	11.55	11.06	11.58	11.09	11.62	11.12	11.65	11.17	11.70	11.20	11.74	11.25	11.78	11.25	11.78

Power Bifaciality: 80 ±5 %.

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

MAXIMUM RATINGS

Operational Temperature	-40 ~ +85 °C
Maximum System Voltage	1500 V DC (IEC)
Max Series Fuse Rating	25 A

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