

415 W

MAXIMUM POWER OUTPUT

0/+5 W

POSITIVE POWER TOLERANCE

21.4 %

MAXIMUM EFFICIENCY



Small in size, bigger on power

- Generates up to 415 W, 21.4 % 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

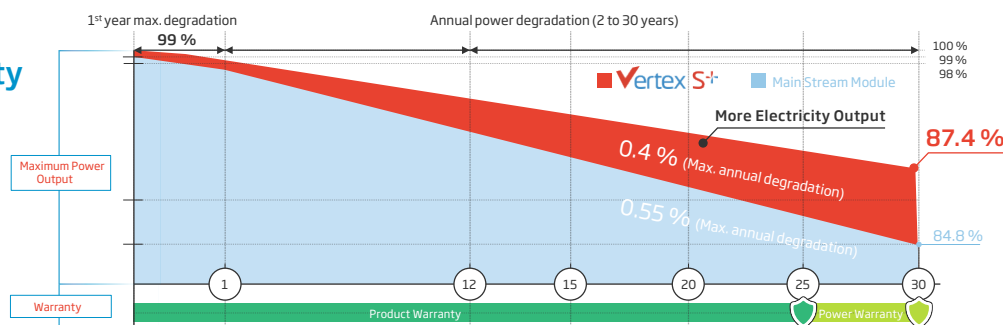
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling

Extended Vertex S⁺ Warranty

1 %
1st year max. degradation

0.4 %
Max. annual degradation from year 2 to 30

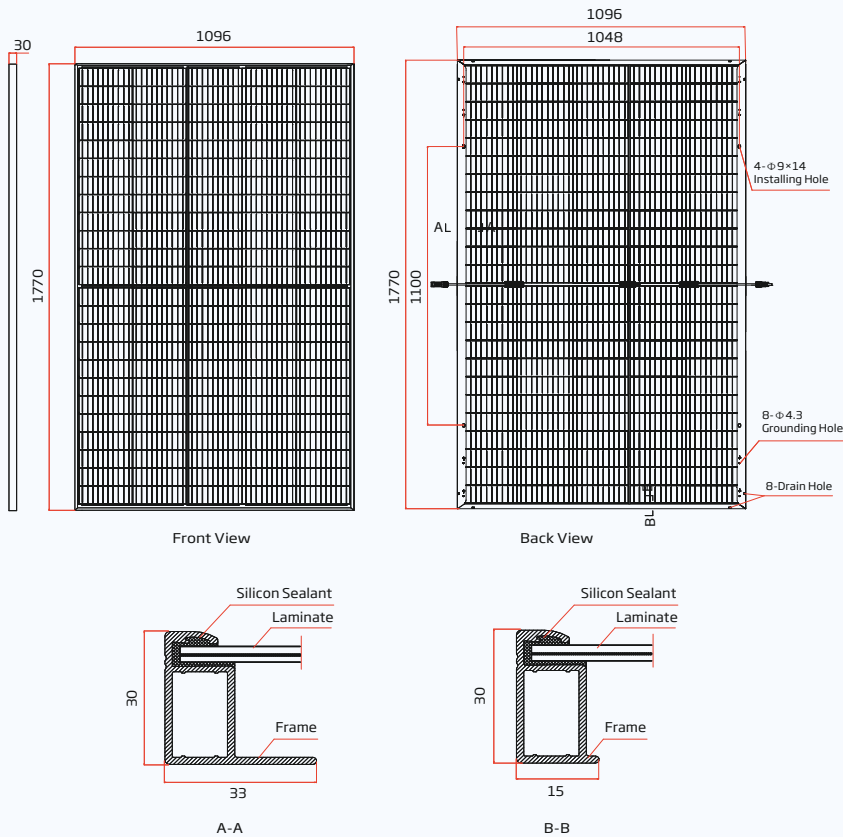
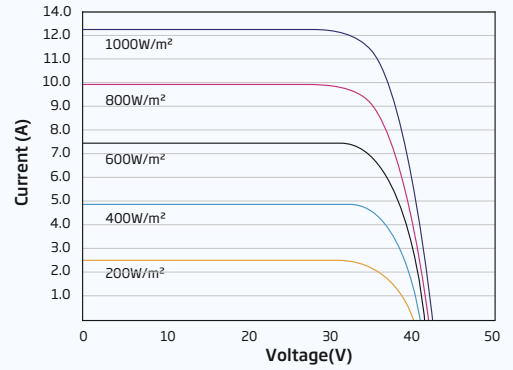
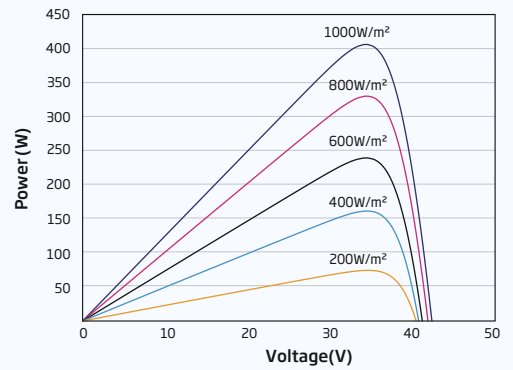
25 Years
Product Workmanship Warranty



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 (405 W)

P-V CURVES OF PV MODULE (405 W)

ELECTRICAL DATA (STC)

	TSM-400 NEG9C.27	TSM-405 NEG9C.27	TSM-410 NEG9C.27	TSM-415 NEG9C.27
Peak Power Watts-P _{MAX} (Wp)*	400	405	410	415
Power Tolerance-P _{MAX} (W)	0/+5			
Maximum Power Voltage-V _{MPP} (V)	35.1	35.4	35.7	36.0
Maximum Power Current-I _{MPP} (A)	11.41	11.44	11.48	11.52
Open Circuit Voltage-V _{OC} (V)	41.9	42.2	42.4	42.7
Short Circuit Current-I _{SC} (A)	12.16	12.20	12.23	12.27
Module Efficiency η_m (%)	20.6	20.9	21.1	21.4

STC: Irradiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM1.5. *Measuring tolerance: ±3 %.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power -P _{MAX} (Wp)	433	437	442	447
Maximum Power Voltage-V _{MPP} (V)	35.1	35.4	35.7	36.0
Maximum Power Current-I _{MPP} (A)	12.32	12.36	12.40	12.44
Open Circuit Voltage-V _{OC} (V)	41.9	42.2	42.4	42.7
Short Circuit Current-I _{SC} (A)	13.13	13.18	13.18	13.25
Irradiance ratio (rear/front)	10 %			

Power Bifaciality: 80 ±5 %.

ELECTRICAL DATA (NOCT)

	TSM-400 NEG9C.27	TSM-405 NEG9C.27	TSM-410 NEG9C.27	TSM-415 NEG9C.27
Maximum Power-P _{MAX} (Wp)	305	308	312	316
Maximum Power Voltage-V _{MPP} (V)	32.7	33.0	33.3	33.5
Maximum Power Current-I _{MPP} (A)	9.30	9.34	9.37	9.41
Open Circuit Voltage-V _{OC} (V)	39.7	40.0	40.2	40.5
Short Circuit Current-I _{SC} (A)	9.80	9.83	9.85	9.89

NOCT: Irradiance at 800 W/m², 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, High Transmission, Heat Strengthened Glass
Frame	30 mm Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mm ² Landscape: 1100/1100 mm Portrait: 280/350 mm*
Connector	TS4 / MC4 EV02*

*Special order only

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43 °C (±2 K)
Temperature Coefficient of P _{MAX}	-0.30 %/ 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

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