

Vertex S+

DUAL GLASS N type i-TOPCon MODULE

PRODUCT: TSM-NEG9R.28

POWER RANGE: 425-445 W

445 W

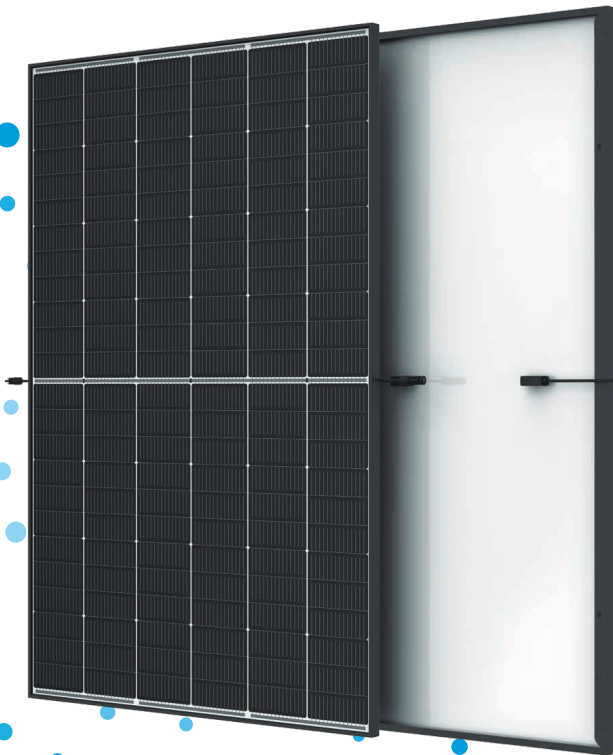
MAXIMUM POWER OUTPUT

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
- 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

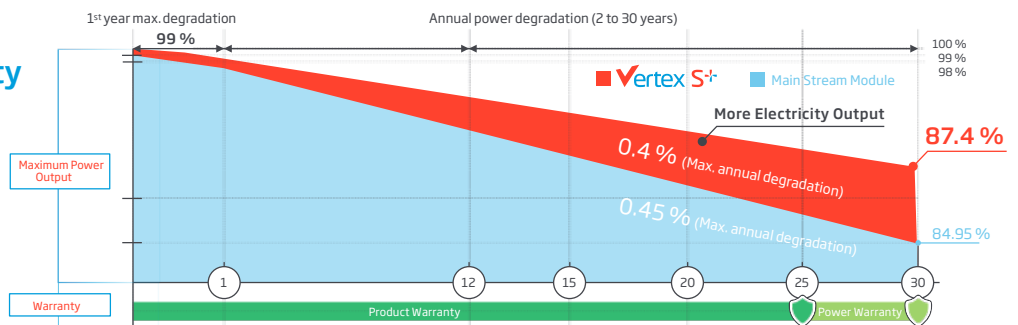
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling. Optimized transportation cost
- Flexible installation solutions for system deployment

Extended Vertex S+ Warranty

1 %
1st year max. degradation

0.4 %
Max. annual degradation from year 2 to 30

25 Years
Product Workmanship Warranty

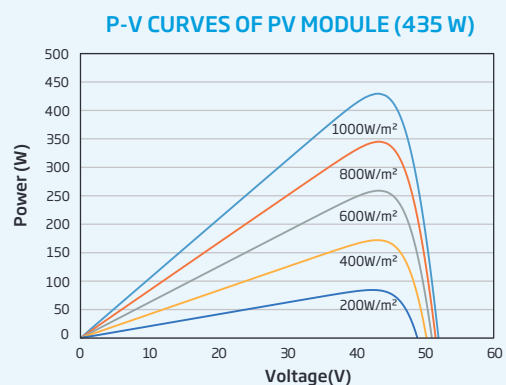
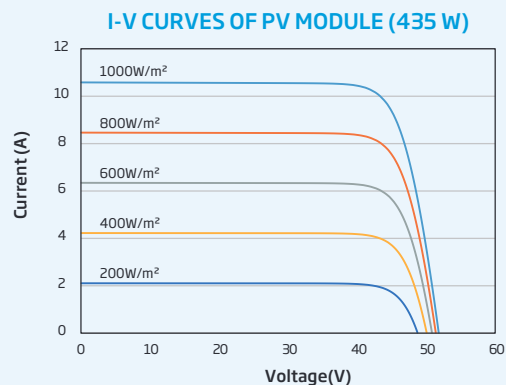
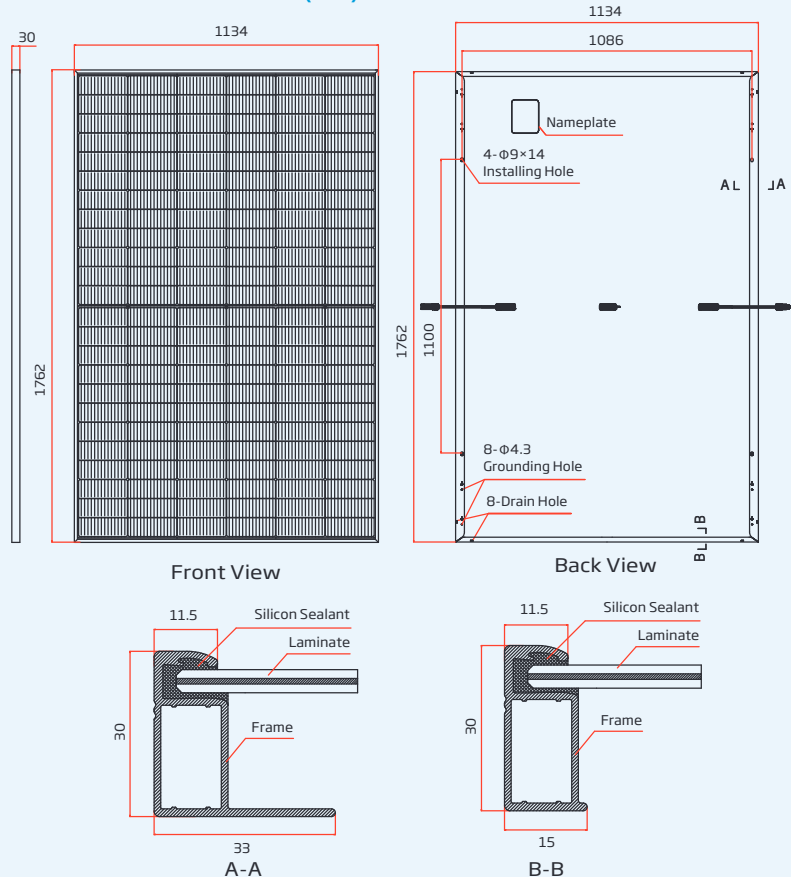


Comprehensive Products and System Certificates



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)


ELECTRICAL DATA (STC)	TSM-425	TSM-430	TSM-435	TSM-440	TSM-445
	NEG9R.2B	NEG9R.2B	NEG9R.2B	NEG9R.2B	NEG9R.2B
Peak Power Watts-P _{MAX} (Wp)*	425	430	435	440	445
Power Tolerance-P _{MAX} (W)	0/+5				
Maximum Power Voltage-V _{MPP} (V)	42.9	43.2	43.6	44.0	44.3
Maximum Power Current-I _{MPP} (A)	9.92	9.96	9.99	10.01	10.05
Open Circuit Voltage-V _{OC} (V)	50.9	51.4	51.8	52.2	52.6
Short Circuit Current-I _{SC} (A)	10.56	10.59	10.64	10.67	10.71
Module Efficiency η _m (%)	21.3	21.5	21.8	22.0	22.3

STC: Irradiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM 1.5. *Measuring tolerance: ±3%.

ELECTRICAL DATA (NOCT)	TSM-425	TSM-430	TSM-435	TSM-440	TSM-445
	NEG9R.2B	NEG9R.2B	NEG9R.2B	NEG9R.2B	NEG9R.2B
Maximum Power-P _{MAX} (Wp)	324	328	332	335	339
Maximum Power Voltage-V _{MPP} (V)	40.0	40.4	40.7	41.0	41.3
Maximum Power Current-I _{MPP} (A)	8.09	8.11	8.15	8.17	8.20
Open Circuit Voltage-V _{OC} (V)	48.2	48.7	49.1	49.4	49.8
Short Circuit Current-I _{SC} (A)	8.51	8.53	8.57	8.60	8.63

NOCT: Irradiance at 800 W/m², Ambient Temperature 20 °C, Wind Speed 1 m/s.

MECHANICAL DATA	
Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm
Weight	21.1 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 ² Landscape: 1100/1100 mm Portrait: 280/350 mm*
Connector	TS4 / MC4 EVO2*

*Special order only

TEMPERATURE RATINGS	MAXIMUM RATINGS		
NOCT (Nominal Operating Cell Temperature)	43 °C (±2 K)	Operational Temperature	-40 to +85 °C
Temperature Coefficient of P _{MAX}	-0.30 %/ K	Maximum System Voltage	1500 V DC (IEC)
Temperature Coefficient of V _{OC}	-0.24 %/ K	Max Series Fuse Rating	20 A
Temperature Coefficient of I _{SC}	0.04 %/ K		

WARRANTY	PACKAGING CONFIGURATION	
25 year Product Workmanship Warranty	Modules per box:	36 pieces
30 year Power Warranty	Modules per 40' container:	936 pieces
1 % first year degradation		
0.4 % Annual Power Attenuation		

(Please refer to product warranty for details)