Vertex S+

DUAL GLASS N type i-TOPCon MODULE

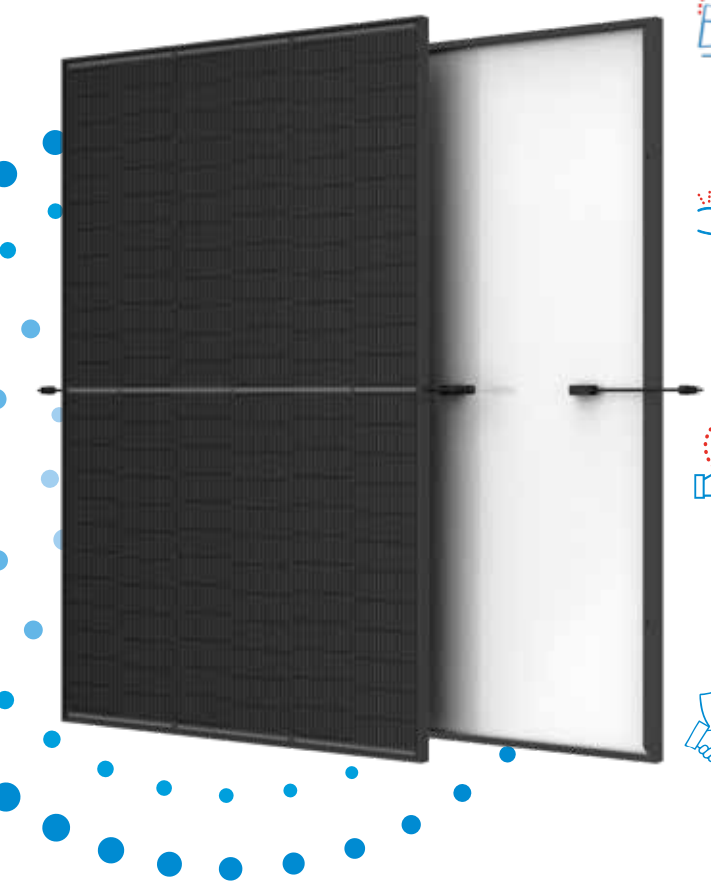
PRODUCT: TSM-NEG9R.25

POWER RANGE: 430-455 W

450 W
MAXIMUM POWER OUTPUT

0/+5 W
POSITIVE POWER TOLERANCE

22.5 %
MAXIMUM EFFICIENCY



Outstanding Visual Appearance

- Designed with aesthetics in mind
- Inheriting Trina Solar awards-winning full black design

Dual-glass Design, High Reliability

- Up to 25 years product warranty and 30 years power warranty
- Excellent fire rating and resistance to harsh environmental conditions
- 5,400 Pa snow load and 4,000 Pa wind load (test loads)

Small in size, bigger on power

- Up to 455 W, 22.8 % module efficiency with high density interconnect technology
- Reduces installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature

Universal solution for residential and C&I rooftops

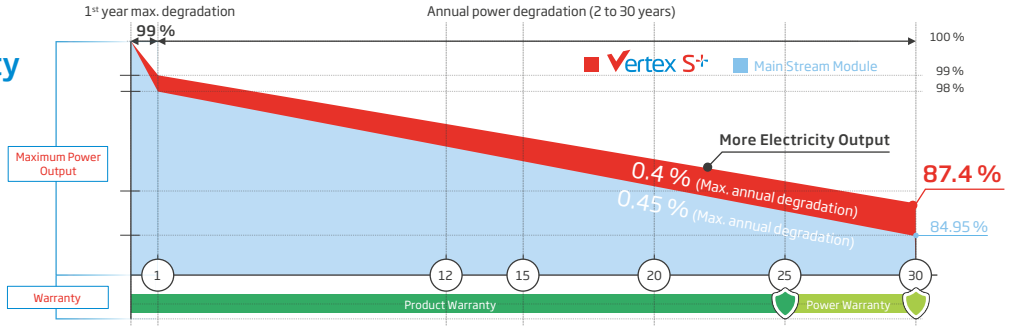
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling. Optimized transportation cost
- Flexible installation solutions for system deployment

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

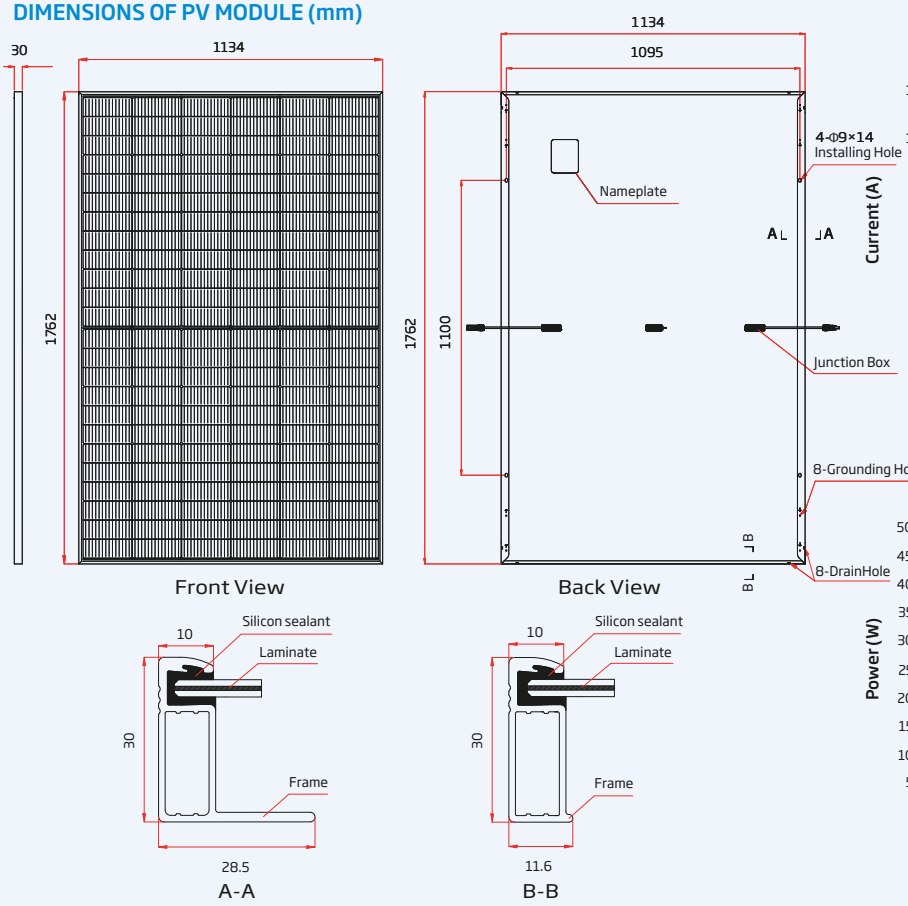
IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System
ISO14025: Environmental Product Declaration

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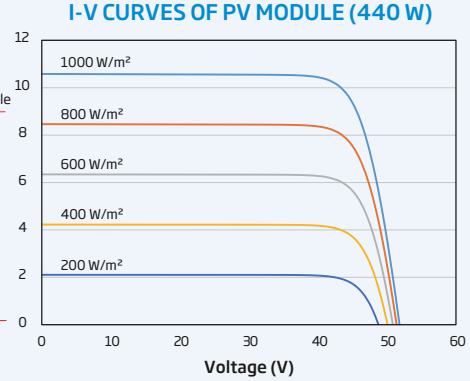
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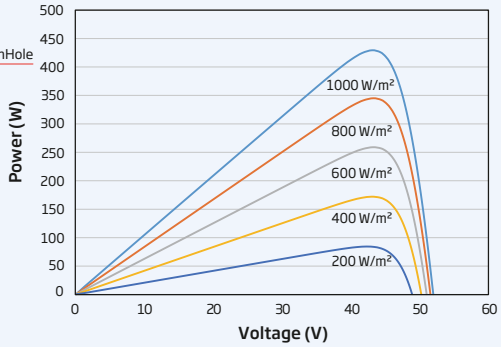
DIMENSIONS OF PV MODULE (mm)



I-V CURVES OF PV MODULE (440 W)



P-V CURVES OF PV MODULE (440 W)



ELECTRICAL DATA (STC)

	TSM-450 NEG9R.25
Peak Power Watts-PMAX (Wp)*	450
Power Tolerance-PMAX (W)**	0/+5
Maximum Power Voltage-VMPP (V)	44.6
Maximum Power Current-IMPP (A)	10.09
Open Circuit Voltage-VOC (V)	52.9
Short Circuit Current-ISC (A)	10.74
Module Efficiency η m (%)	22.5

STC: Irrdiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM 1.5. *Measuring tolerance: ±3 %. ** Power selection up to: +3%

ELECTRICAL DATA (NOCT)

	TSM-450 NEG9R.25
Maximum Power-PMAX (Wp)	344
Maximum Power Voltage-VMPP (V)	42.0
Maximum Power Current-IMPP (A)	8.19
Open Circuit Voltage-VOC (V)	50.2
Short Circuit Current-ISC (A)	8.66

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	21.0 kg
Front Glass	1.6 mm, High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
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 mm² Landscape: 1100/1100 mm Portrait: 280/350 mm*
Connector	TS4/TS4 Plus/MC4 EVO2*

*Special order only

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43 °C (±2 °C)
Temperature Coefficient of PMAX	-0.29 %/°C
Temperature Coefficient of VOC	-0.24 %/°C
Temperature Coefficient of ISC	0.04 %/°C

MAXIMUM RATINGS

Operational Temperature	-40 to +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

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CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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