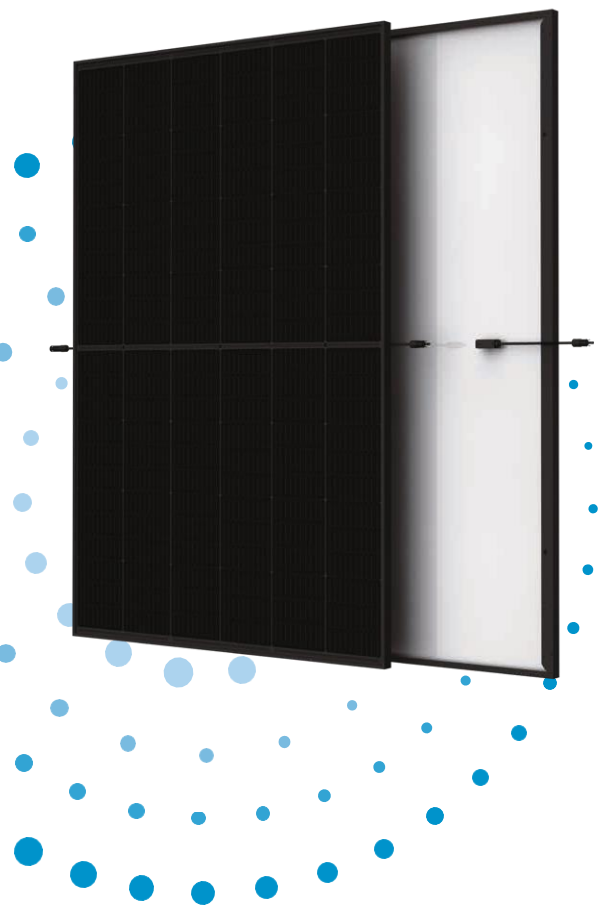
Vertex S

BACKSHEET MONOCRYSTALLINE MODULE

PRODUCT: TSM-DE09R.05

POWER RANGE: 405–425 W

425 W+	0/+5 W	21.3 %
MAXIMUM POWER OUTPUT	POSITIVE POWER TOLERANCE	MAXIMUM EFFICIENCY



Outstanding Visual Appearance

- Designed with aesthetics in mind
- Ultra-thin, virtually invisible busbars
- Excellent cell color control by machine selection

Small in size, big on power

- Generates up to 425 W, 21.3 % module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Excellent low light performance (IAM) with cell process and module material optimization

Optimal solution for residential rooftops

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

High Reliability

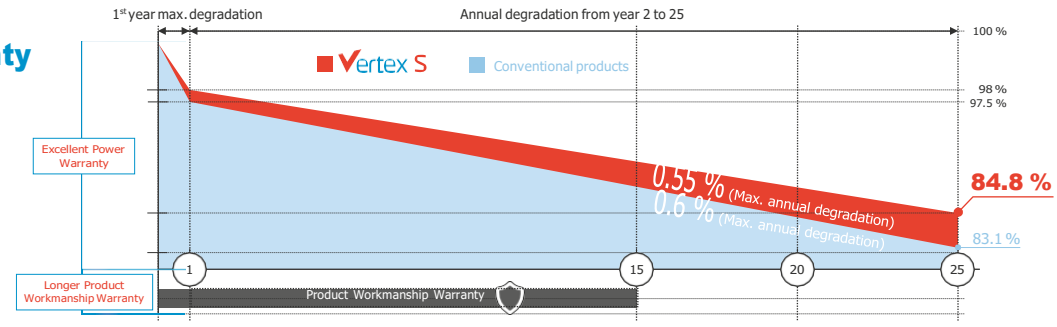
- Positive load up to 6,000 Pa (snow)
- Negative load up to 4,000 Pa (wind)

Extended Vertex S Warranty

2 %
1st year max. degradation

0.55 %
Max. annual degradation from year 2 to 25

25 Years
Product Workmanship Warranty



Comprehensive Product 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

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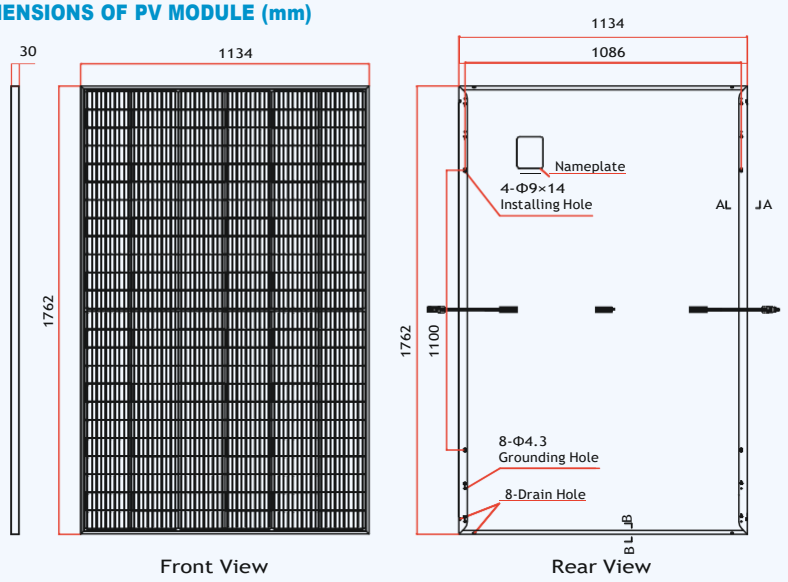
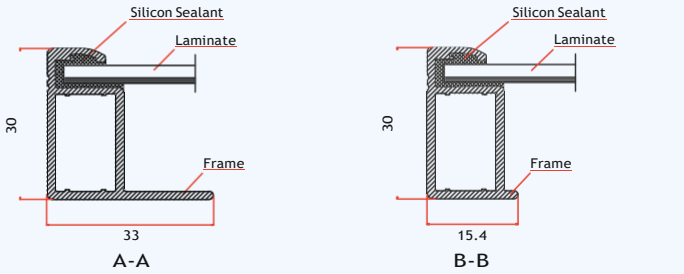
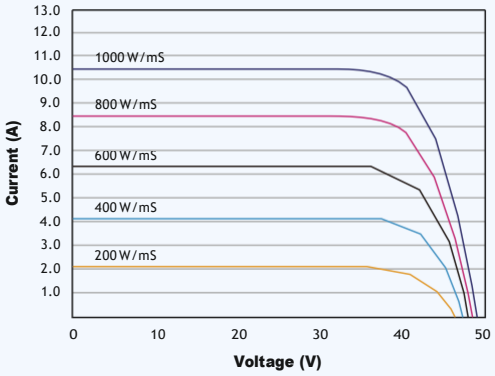
DIMENSIONS OF PV MODULE (mm)

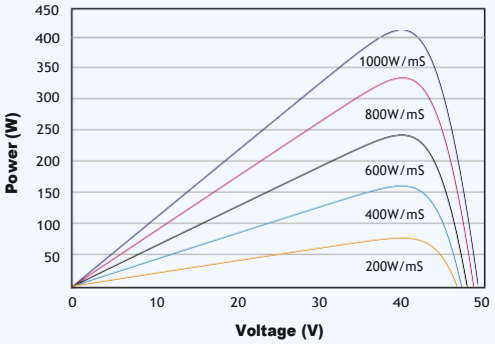




I-V CURVES OF PV MODULE (410W)



P-V CURVES OF PV MODULE (410W)



ELECTRICAL DATA (STC)

	TSM-405 DE09R.05	TSM-410 DE09R.05	TSM-415 DE09R.05	TSM-420 DE09R.05	TSM-425 DE09R.05
Peak Power Watts-PMAX (Wp)*	405	410	415	420	425
Power Tolerance-PMAX (W)	0/+5	0/+5	0/+5	0/+5	0/+5
Maximum Power Voltage-VMPP (V)	40.6	40.8	41.0	41.3	41.5
Maximum Power Current-IMPP (A)	9.99	10.05	10.11	10.17	10.24
Open Circuit Voltage-VOC (V)	49.0	49.2	49.4	49.7	49.9
Short Circuit Current-ISC (A)	10.52	10.58	10.64	10.69	10.74
Module Efficiency η m (%)	20.3	20.5	20.8	21.0	21.3

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

MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm
Weight	21.8 kg
	3.2 mm, High Transmission, AR Coated Heat Strengthened Glass
material	EVA/POE
Backsheet	Black-White
Frame	30 mm Anodized Aluminium Alloy
	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0 mmS Landscape: 1100/1100 mm Portrait: 280/350 mm*
	TS4/MC4 EVO2*

*Special order only

ELECTRICAL DATA (NOCT)

	TSM-405 DE09R.05	TSM-410 DE09R.05	TSM-415 DE09R.05	TSM-420 DE09R.05	TSM-425 DE09R.05
Maximum Power-PMAX (Wp)	306	310	313	317	321
Maximum Power Voltage-VMPP (V)	38.2	38.3	38.5	38.8	39.1
Maximum Power Current-IMPP (A)	8.03	8.08	8.13	8.17	8.21
Open Circuit Voltage-VOC (V)	46.1	46.3	46.5	46.7	46.9
Short Circuit Current-ISC (A)	8.48	8.53	8.58	8.62	8.66

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

TEMPERATURE RATINGS

NOCT(Nominal Operating Cell Temperature)	43°C (±2 K)
Temperature Coefficient of PMAX	-0.34 %/K
Temperature Coefficient of VOC	-0.25 %/K
Temperature Coefficient of ISC	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
25 Year power warranty
2% First year degradation
0.55% Annual power degradation

(Please refer to the applicable limited warranty for details)

PACKAGING CONFIGURATION

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

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www.trinasolar.com

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