Vertex S+

DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9R.28

POWER RANGE: 420-440W

440W
MAXIMUM POWER OUTPUT

0~+5W
POSITIVE POWER TOLERANCE

22.0%
MAXIMUM EFFICIENCY

Small in size, bigger on power

• Up to 440W, 22.0% module efficiency with high density interconnect technology
• Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
• Reduce installation cost with higher power bin and efficiency
• Boost performance in warm weather with low temperature coefficient and operating temperature

Dual-glass Design, more secure and sustainable

• Upgraded dual glass of Vertex S, less prone to micro-cracks and scratches on the back during installation
• Double-glass + innovative non-destructive cutting for improved mechanical resistance and strength
• Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment

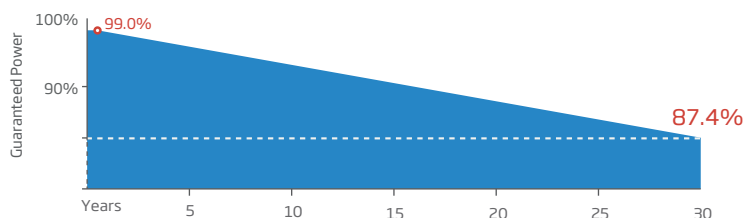### Ultra-low Degradation, longer warranty, higher output

• First-year degradation 1% and annual degradation at 0.4%
• Up to 15 years product warranty and 30 years power warranty

Universal solution for residential and C&I rooftops

• Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
• Perfect size and low weight for handling and installation
• Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
• Mechanical performance up to 5400 Pa positive load and 4000 Pa negative load

Trina Solar's Dual Glass Performance Warranty

Guaranteed Power

100%
99.0%
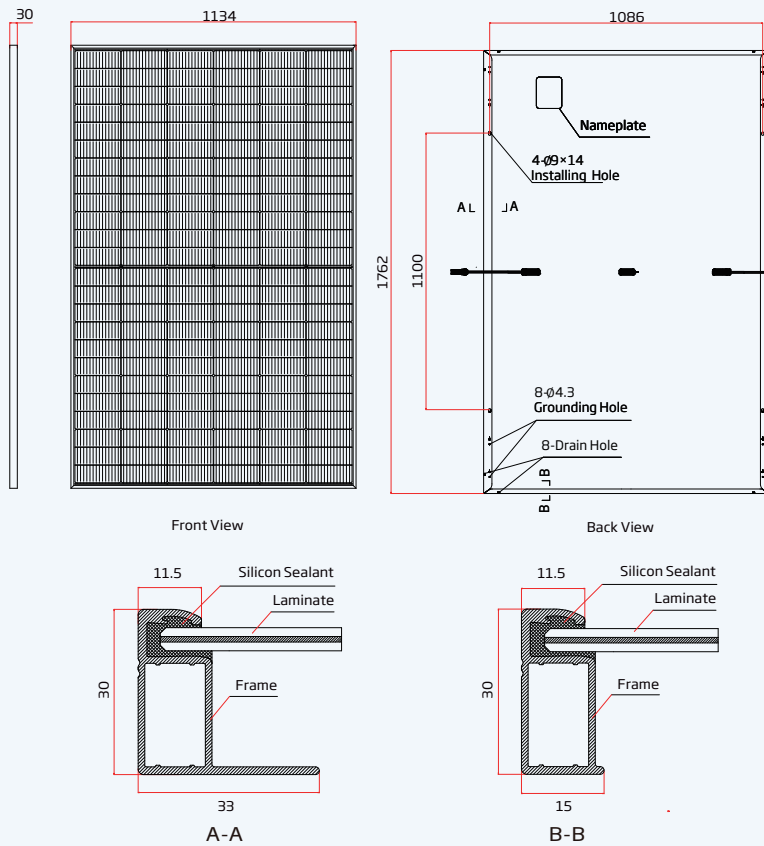90%
87.4%

Years   5   10   15   20   25   30
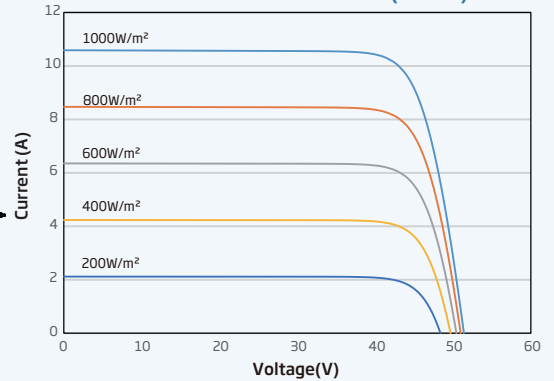
Comprehensive Products and System Certificates

ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
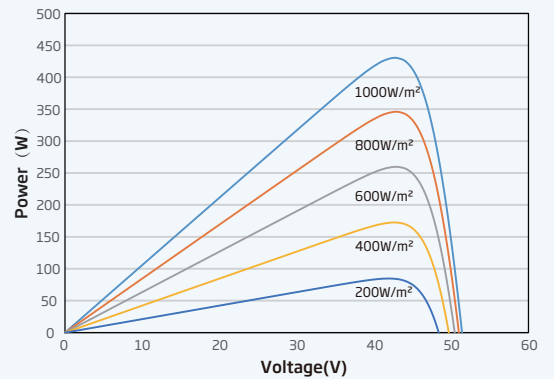ISO45001: Occupational Health and Safety Management System

TÜV CE V CYCLE

Trinasolar

Vertex S+   Dual Glass MONOCRYSTALLINE MODULE

DIMENSIONS OF PV MODULE(mm)

Front View

Back View

Nameplate
4-Ø9×14 Installing Hole
8-Ø4.3 Grounding Hole
8-Drain Hole

11.5 Silicon Sealant
Laminate
Frame
33
A-A

11.5 Silicon Sealant
Laminate
Frame
15
B-B

I-V CURVES OF PV MODULE(430W)

P-V CURVES OF PV MODULE(430W)

ELECTRICAL DATA (STC)

Peak Power Watts-P$_{MAX}$ (Wp)*	420	425	430	435	440
Power Tolerance-P$_{MAX}$ (W)			0 ~ +5		
Maximum Power Voltage-V$_{MPP}$ (V)	42.5	42.9	43.2	43.6	43.9
Maximum Power Current-I$_{MPP}$ (A)	9.89	9.92	9.96	9.99	10.02
Open Circuit Voltage-V$_{OC}$ (V)	50.5	50.9	51.4	51.8	52.2
Short Circuit Current-I$_{SC}$ (A)	10.54	10.57	10.60	10.65	10.68
Module Efficiency η m (%)	21.0	21.3	21.5	21.8	22.0

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

ELECTRICAL DATA (NOCT)

Maximum Power-P$_{MAX}$ (Wp)	320	324	328	332	335
Maximum Power Voltage-V$_{MPP}$ (V)	39.7	40.0	40.4	40.7	41.0
Maximum Power Current-I$_{MPP}$ (A)	8.07	8.09	8.11	8.15	8.17
Open Circuit Voltage-V$_{OC}$ (V)	47.8	48.2	48.7	49.1	49.4
Short Circuit Current-I$_{SC}$ (A)	8.49	8.51	8.53	8.57	8.60

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

MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm (69.06×43.15×1.18 inches)
Weight	21.1kg (46.5lb)
Front Glass	1.6 mm (0.06 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	1.6mm(0.06 inches), Heat Strengthened Glass
Frame	30mm (0.06 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NOCT(Nominal Operating Cell Temperature)	43℃ (±2℃)
Temperature Coefficient of P$_{MAX}$	- 0.30%/℃
Temperature Coefficient of V$_{OC}$	- 0.24%/℃
Temperature Coefficient of I$_{SC}$	0.04%/℃

MAXIMUM RATINGS

Operational Temperature	-40~+85℃
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	20A

WARRANTY

15 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 CONFIGUREATION

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

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