



**N-type i-TOPCon Bifacial Dual Glass**  
MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9RC.27

POWER RANGE: 415-445W

**445W**

MAXIMUM POWER OUTPUT

**0~+5W**

POSITIVE POWER TOLERANCE

**22.3%**

MAXIMUM EFFICIENCY



**Small in size, bigger on power**

- Up to 445W, 22.3% module efficiency with high density interconnect technology
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



**Transparent Dual-glass Design**

- Transparent design with aesthetics appearance, 3.2% transparency
- Upgraded dual glass of Vertex S, less prone to micro-cracks and scratches on the back during installation
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



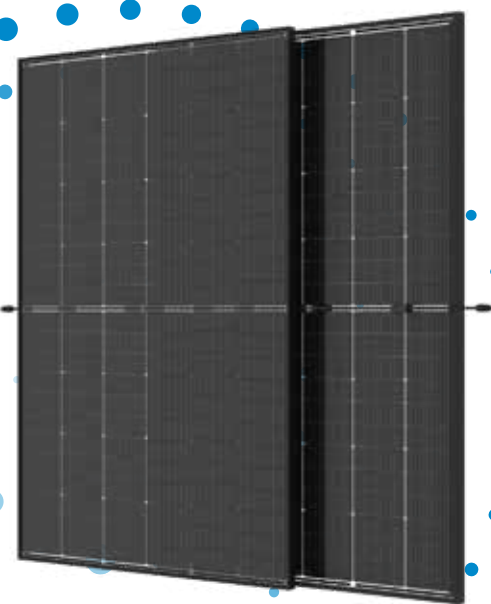
**Ultra-low Degradation, longer warranty, higher output**

- First-year degradation 1% and annual degradation at 0.4%
- Up to 15/25 years product warranty and 30 years power warranty

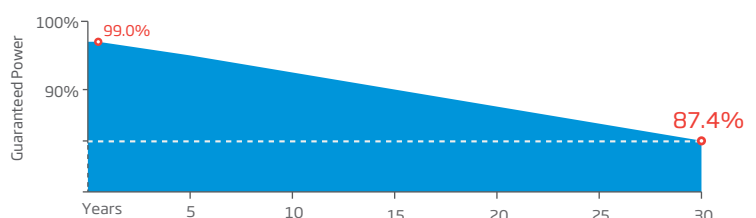


**Universal solution for residential and C&I rooftops**

- 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 Vertex Bifacial Dual Glass Performance Warranty**



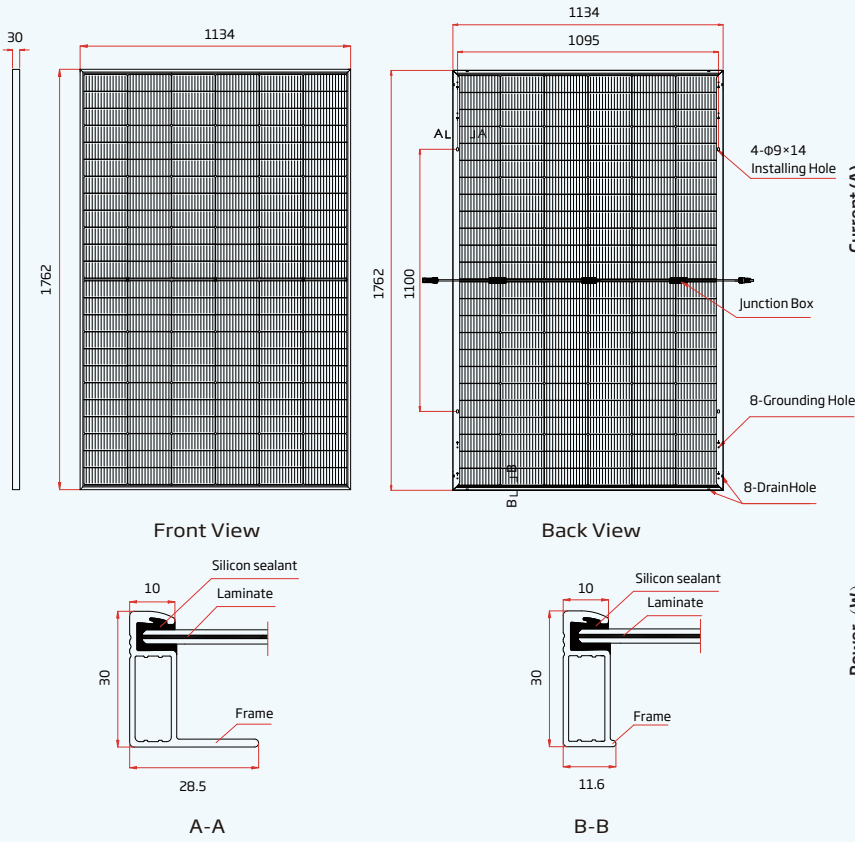
**Comprehensive Products and System Certificates**



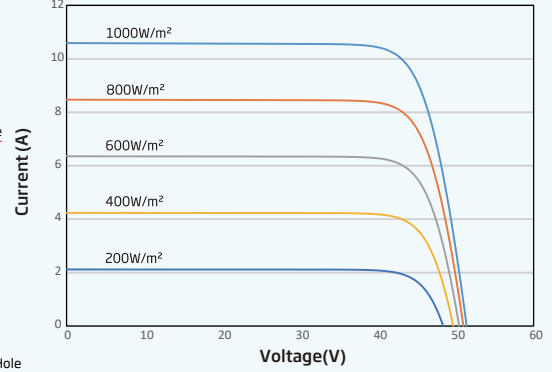
IEC61215/IEC61730/IEC61701/IEC62716/UL61730  
 ISO 9001: Quality Management System  
 ISO 14001: Environmental Management System  
 ISO14064: Greenhouse Gases Emissions Verification  
 ISO45001: Occupational Health and Safety Management System



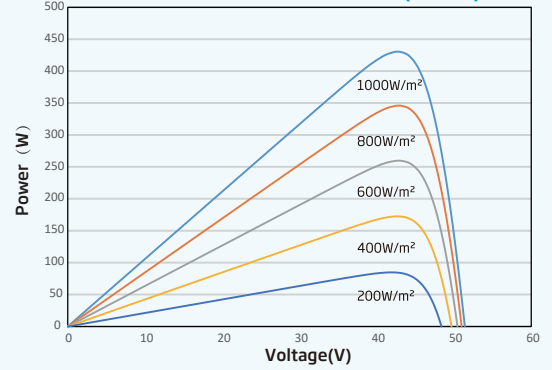
**DIMENSIONS OF PV MODULE(mm)**



**I-V CURVES OF PV MODULE(430W)**



**P-V CURVES OF PV MODULE(430W)**



**MECHANICAL DATA**

Solar Cells	N-type Monocrystalline
No. of cells	144cells
Module Dimensions	1762×1134×30 mm (69.06×43.15×1.18 inches)
Weight	21.0kg (46.30 lb)
Front Glass	1.6 mm (0.06 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	1.6 mm (0.06 inches), High Transmission, Heat Strengthened Glass

Frame	30mm (1.18 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	TS4 PLUS / TS4

**ELECTRICAL DATA (STC & NOCT)**

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts -P <sub>MAX</sub> (Wp)*	415	317	420	321	425	325	430	328	435	332	440	336	445	338
Power Tolerance -P <sub>MAX</sub> (W)	0 ~ +5													
Maximum Power Voltage -V <sub>MPP</sub> (V)	42.1	39.3	42.5	39.7	42.9	40.0	43.2	40.4	43.6	40.7	44.0	41.0	44.3	41.3
Maximum Power Current -I <sub>MPP</sub> (A)	9.86	8.03	9.89	8.07	9.92	8.09	9.96	8.11	9.99	8.15	10.01	8.17	10.05	8.20
Open Circuit Voltage -V <sub>OC</sub> (V)	50.1	47.6	50.5	47.9	50.9	48.3	51.4	48.8	51.8	49.2	52.2	49.5	52.6	49.9
Short Circuit Current -I <sub>SC</sub> (A)	10.50	8.46	10.53	8.49	10.56	8.51	10.59	8.53	10.64	8.57	10.67	8.60	10.71	8.63
Module Efficiency η <sub>m</sub> (%)	20.8		21.0		21.3		21.5		21.8		22.0		22.3	

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s. \*Measuring tolerance: ±3%.

**Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)**

Backside Power Gain	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Total Equivalent power -P <sub>MAX</sub> (Wp)	436	457	441	462	446	468	452	473	457	479	462	484	467	490
Maximum Power Voltage -V <sub>MPP</sub> (V)	42.1	42.1	42.5	42.5	42.9	42.9	43.2	43.2	43.6	43.6	44.0	44.0	44.3	44.3
Maximum Power Current -I <sub>MPP</sub> (A)	10.35	10.85	10.38	10.88	10.42	10.91	10.46	10.96	10.49	10.99	10.51	11.01	10.55	11.06
Open Circuit Voltage -V <sub>OC</sub> (V)	50.1	50.1	50.5	50.5	50.9	50.9	51.4	51.4	51.8	51.8	52.2	52.2	52.6	52.6
Short Circuit Current -I <sub>SC</sub> (A)	11.03	11.55	11.06	11.58	11.09	11.62	11.12	11.65	11.17	11.70	11.20	11.74	11.25	11.78

Power Bifaciality:80±5%.

**TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P <sub>MAX</sub>	-0.29%/°C
Temperature Coefficient of V <sub>OC</sub>	-0.24%/°C
Temperature Coefficient of I <sub>SC</sub>	0.04%/°C

**MAXIMUM RATINGS**

Operational Temperature	-40~+85° C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25A

**WARRANTY**

- 15 / 25\* year Product Workmanship Warranty
- 30 year Power Warranty
- 1% first year degradation
- 0.4% Annual Power Attenuation

(\*upon request. Please refer to product warranty for details)

**PACKAGING CONFIGURATION**

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