



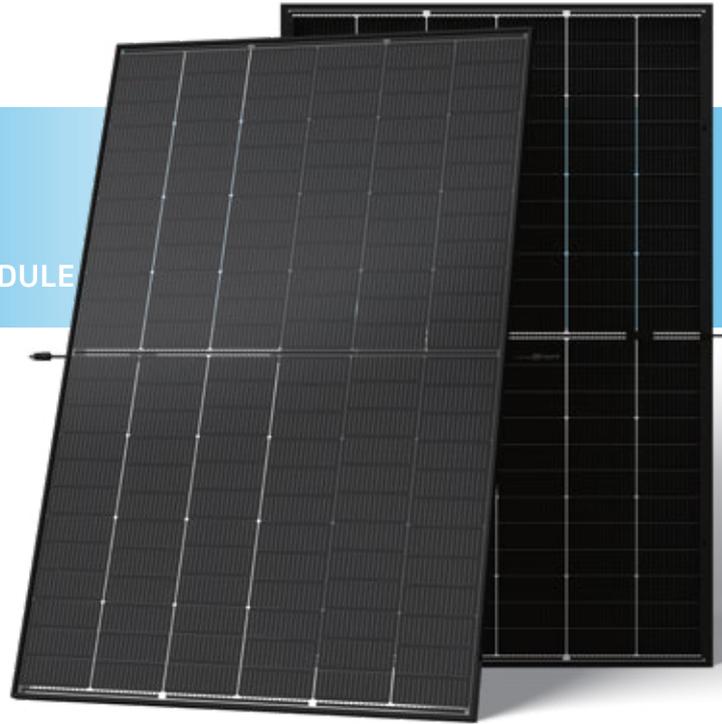
# N-type i-TOPCon

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-XXXNEG9RC.27 425-450W

**450<sub>W</sub>** / MAXIMUM POWER OUTPUT

**22.5%** / MAXIMUM EFFICIENCY



## High Customer Value

- Clear black, designed with aesthetics in mind, suitable for residential and C&I rooftop
- Perfect size and low weight for handling and installation
- Compatible with mainstream inverters and diverse mounting systems
- Mechanical test loads up to 5400 Pa front side and 4000 Pa back side
- Certified lifetime carbon footprint assessment



## High reliability with light double glass

- Less prone to micro-cracks and scratches on the back side
- Excellent fire rating, weather resistance, Sustainable in harsh environments and extreme weather conditions
- Fire Class rating C, Safety Class II
- Up to 25 years product warranty and 30 years power warranty



## High power up to 450W

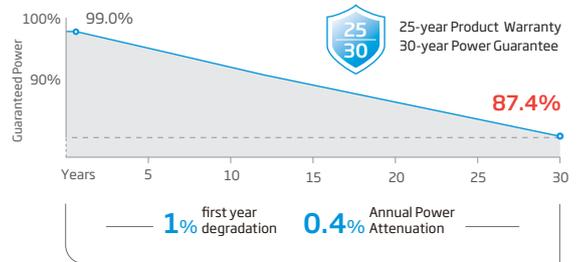
- Up to 22.5% module efficiency, on 210 innovative platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



## High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature efficient (-0.29%/°C) and lower working temperature
- Higher bifaciality, with up to 10%~20% additional power gain from back side depending on albedo

## Performance Warranty



(\*Please refer to Limited Warranty Supplement that applies to TSM-\*\*\*NEG9R.2B, TSM-\*\*\*NEG9RC.27, Products supplied and installed within Australia & New Zealand.)

\*\*Power degradation values above apply to frontside, refer to product warranty for power degradation for backside and other details)

## Comprehensive Products and System Certificates

IEC61215/IEC61730

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

ISO45001: Occupational Health and Safety Management System

ISO14067: Product Carbon Footprint Limited Assurance

ISO14025: Environmental Product Declaration



**ELECTRICAL DATA** (STC & NOCT & BNPI) TSM-XXXNEG9RC.27 (XXX=425-450)

Testing Condition	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI
Peak Power Watts- $P_{MAX}(W_p)^*$	425	325	471	430	329	476	435	333	482	440	337	488	445	341	493	450	344	499
Power Selection (W)**	0 ~ +5																	
Maximum Power Voltage- $V_{MPP}(V)$	42.9	40.4	42.9	43.2	40.7	43.2	43.6	41.0	43.6	44.0	41.4	44.0	44.3	41.7	44.3	44.6	42.0	44.6
Maximum Power Current- $I_{MPP}(A)$	9.92	8.06	10.98	9.96	8.08	11.03	9.99	8.12	11.05	10.01	8.14	11.08	10.05	8.17	11.13	10.09	8.19	11.18
Open Circuit Voltage- $V_{oc}(V)$	50.9	48.3	50.9	51.4	48.7	51.4	51.8	49.1	51.8	52.2	49.5	52.2	52.6	49.9	52.6	52.9	50.2	52.9
Short Circuit Current- $I_{sc}(A)$	10.56	8.51	11.70	10.59	8.54	11.73	10.64	8.58	11.79	10.67	8.60	11.82	10.71	8.63	11.87	10.74	8.66	11.90
Module Efficiency $\eta_m(\%)$	21.3			21.5			21.8			22.0			22.3			22.5		

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. BNPI: Irradiance: front 1000W/m<sup>2</sup>, rear 135W/m<sup>2</sup>, Temperature 25°C, Air Mass AM1.5  
 \*Measuring tolerance: ±3%. \*\*Power selection up to: +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%
Peak Power Watts- $P_{MAX}(W_p)$	446	468	452	473	457	479	462	484	467	490	473	495	473	495
Maximum Power Voltage- $V_{MPP}(V)$	42.9	42.9	43.2	43.2	43.6	43.6	44.0	44.0	44.3	44.3	44.6	44.6	44.6	44.6
Maximum Power Current- $I_{MPP}(A)$	10.42	10.91	10.46	10.96	10.49	10.99	10.51	11.01	10.55	11.06	10.59	11.10	10.59	11.10
Open Circuit Voltage- $V_{oc}(V)$	50.9	50.9	51.4	51.4	51.8	51.8	52.2	52.2	52.6	52.6	52.9	52.9	52.9	52.9
Short Circuit Current- $I_{sc}(A)$	11.09	11.62	11.12	11.65	11.17	11.70	11.20	11.74	11.25	11.78	11.28	11.81	11.28	11.81

Power Bifaciality: 80±5%.  $\phi_{Pmax}$  : 80%±7% ;  $\phi_{Voc}$ : 100%±3%;  $\phi_{Isc}$ : 80%±7%

**TEMPERATURE RATINGS**

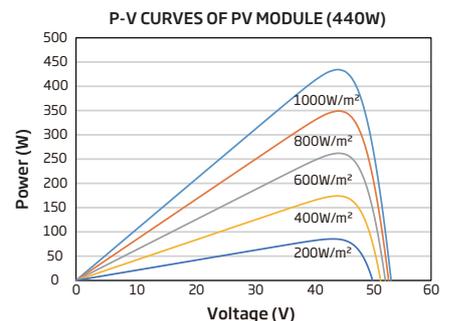
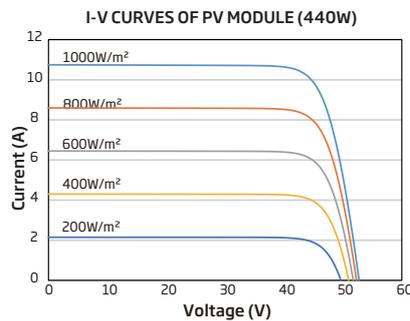
NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of $P_{MAX}$	-0.29%/°C
Temperature Coefficient of $V_{oc}$	-0.24%/°C
Temperature Coefficient of $I_{sc}$	0.04%/°C

Due to different testing methods, the actual performances might differ from the declared specifications.

**MAXIMUM RATINGS**

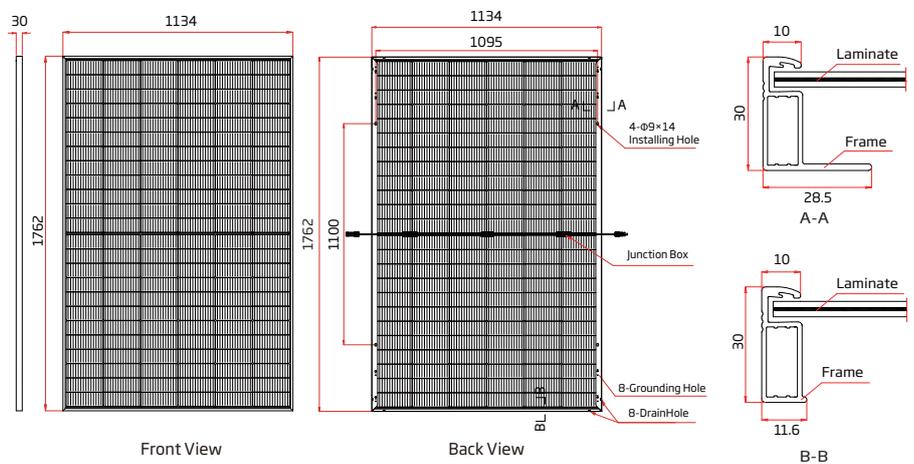
Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25A

**CURVES OF PV MODULE**



**MECHANICAL DATA**

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm (69.37×44.65×1.18 inches)
Weight	21.0kg (72.8 lb)
Front Glass	1.6 mm (0.06 inches) AR Coating Heat Strengthened Glass
Back Glass	1.6 mm (0.06 inches), Heat Strengthened Glass
Frame	30mm (1.18 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.006 inches <sup>2</sup> ) Length: 1100/1100 mm (43.3/43.3 inches)
Connector	Stabuli MC4 EVO2
Packaging	Modules per box: 36 pieces Modules per 40' container: 936 pieces



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