



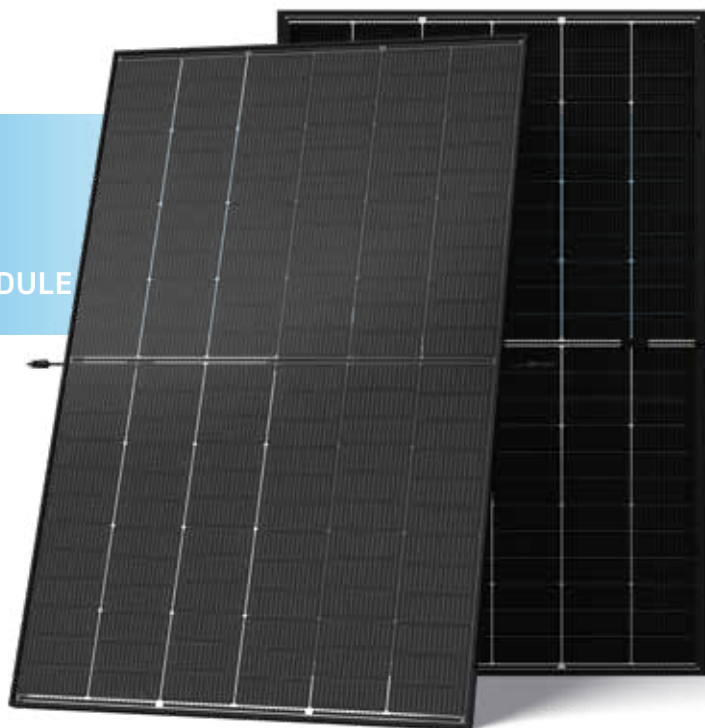
# N-type i-TOPCon

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-NEG9RC.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
- Certified resistance against salt spray, sand dust, ammonia, PID
- Up to 15/25 years product warranty and 30 years power warranty



## High power up to 450W

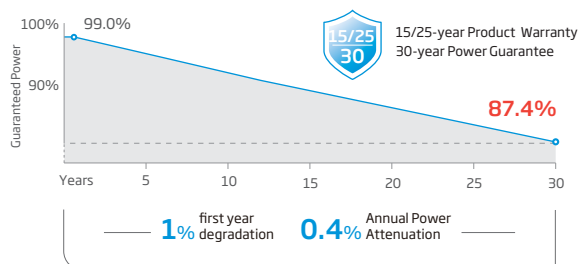
- Up to 22.5% module efficiency, on 210 innovative platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



## 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



\* Upon request, please refer to product warranty for details

## 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

ISO14067: Product Carbon Footprint Limited Assurance

ISO14025: Environmental Product Declaration



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

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## ELECTRICAL DATA (STC & NOCT & BNPI)

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 Tolerance- $P_{MAX}(W_p)$	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. \*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%
Peak Power Watts- $P_{MAX}(W_p)$	446	468	452	473	457	479	462	484	467	490	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
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
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
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

Power Bifaciality: 80±5%.

## TEMPERATURE RATINGS

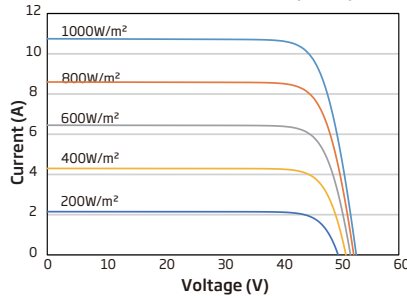
NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of $P_{MAX}$	-0.29% /°C
Temperature Coefficient of $V_{oc}$	-0.24% /°C
Temperature Coefficient of $I_{sc}$	0.04% /°C

## MAXIMUM RATINGS

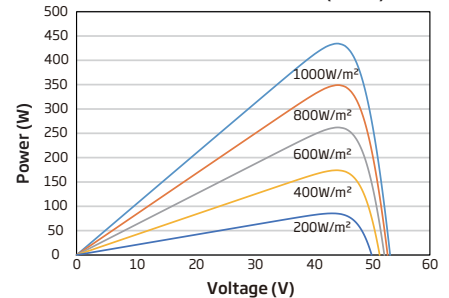
Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	25A

## CURVES OF PV MODULE

I-V CURVES OF PV MODULE (440W)

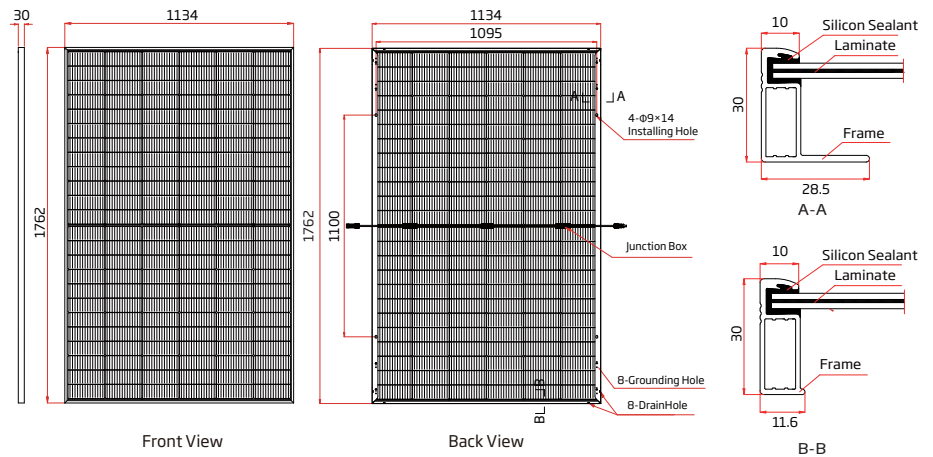


P-V CURVES OF PV MODULE (440W)



## 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 Coated 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> ) Portrait: 350/280 mm (13.78/11.02 inches) Length can be customized
Connector	TS4 Plus / TS4
Packaging	Modules per box: 36 pieces Modules per 40' container: 936 pieces



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