

## N-type i-TOPCon Ultra

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-NEG19RC.20Q 645-670W

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

**24.8%** / MAXIMUM EFFICIENCY



### High customer value

- Best partner of 1P tracker, with highest utilization of tracker length
- Low voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy)
- Excellent compatibility with existing mainstream system components



### High power up to 670W

- Up to 24.8% module efficiency, on 210 innovation platform
- Patented i-TOPCon Ultra technology with continuous efficiency upgrade, including contact resistance reduction, rear reflection enhancement



### High reliability

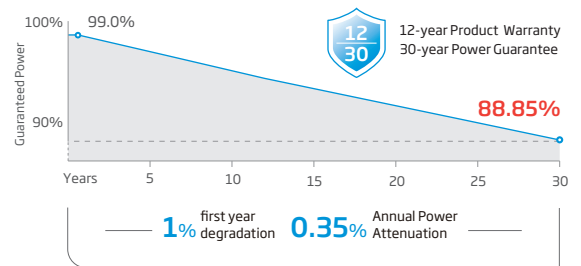
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot and micro-cracks with multi-cut technology and cell clearance buffering
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions



### High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature coefficient (-0.26%/°C)
- Higher bifaciality, with up to 10%~20% additional power gain from back side depending on albedo
- Reliable dual-glass structure with 30-year power guarantee
- Lower annual attenuation guarantees a higher power generation within lifecycle

### Performance Warranty



\* Please refer to product warranty for details

### Comprehensive Products 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



**ELECTRICAL DATA** (STC & NOCT)

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- $P_{MAX}(W_p)^*$	645	495	650	498	655	502	660	507	665	511	670	515
Power Tolerance	0 ~ +3%											
Maximum Power Voltage- $V_{MPP}$ (V)	41.22	39.70	41.43	39.90	41.59	40.10	41.74	40.30	41.88	40.50	42.04	40.70
Maximum Power Current- $I_{MPP}$ (A)	15.65	12.46	15.69	12.50	15.75	12.53	15.82	12.58	15.88	12.60	15.94	12.64
Open Circuit Voltage- $V_{oc}$ (V)	49.78	47.40	50.00	47.60	50.25	47.90	50.45	48.10	50.70	48.30	50.95	48.50
Short Circuit Current- $I_{sc}$ (A)	16.31	13.15	16.35	13.18	16.39	13.21	16.45	13.26	16.48	13.28	16.52	13.31
Module Efficiency $\eta_m$ (%)	23.9		24.1		24.2		24.4		24.6		24.8	

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- $P_{MAX}(W_p)$	677	710	683	715	688	721	693	726	698	732	704	737
Maximum Power Voltage- $V_{MPP}$ (V)	41.22	41.22	41.43	41.43	41.59	41.59	41.74	41.74	41.88	41.88	42.04	42.04
Maximum Power Current- $I_{MPP}$ (A)	16.43	17.22	16.47	17.26	16.54	17.33	16.61	17.40	16.67	17.47	16.74	17.53
Open Circuit Voltage- $V_{oc}$ (V)	49.78	49.78	50.00	50.00	50.25	50.25	50.45	50.45	50.70	50.70	50.95	50.95
Short Circuit Current- $I_{sc}$ (A)	17.13	17.94	17.17	17.99	17.21	18.03	17.27	18.10	17.30	18.13	17.35	18.17

Power Bifaciality: 85±5%.

**TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of $P_{MAX}$	-0.26% /°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.

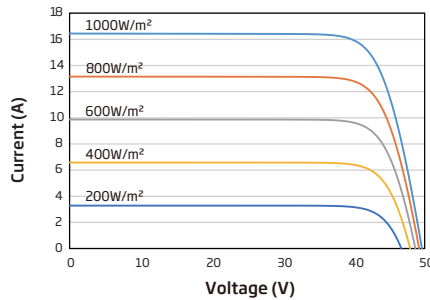
**APPLICATION CONDITIONS**

Operating Temperature	-40 ~ +70°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	35A

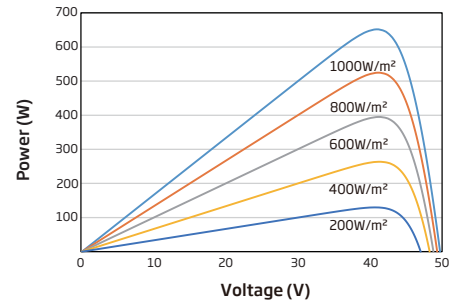
**CURVES OF PV MODULE**

**Preliminary**

I-V CURVES OF PV MODULE (655W)



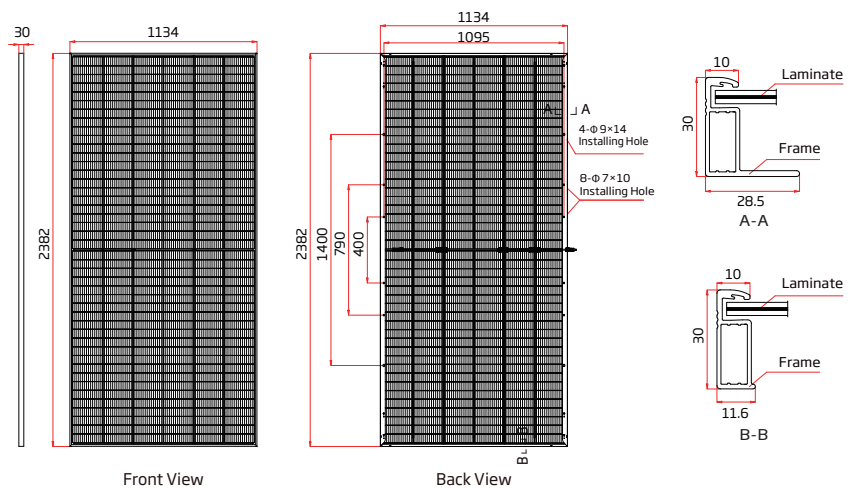
P-V CURVES OF PV MODULE (655W)



**MECHANICAL DATA**

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	264 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	32.1 kg (70.8 lb)
Front Glass	2.0 mm (0.08 inches), AR Coating Heat Strengthened Glass
Back Glass	2.0 mm (0.08 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: 200/510 mm (7.87/20.08 inches) Length can be customized
Connector	MC4 EV02 / TS4 Plus / TS4*
Packaging	Modules per box: 36 pieces Modules per 40' container: 720 pieces

\*The connector names listed are general names; specific types are subject to the certification documents.



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