

Preliminary

Vertex N

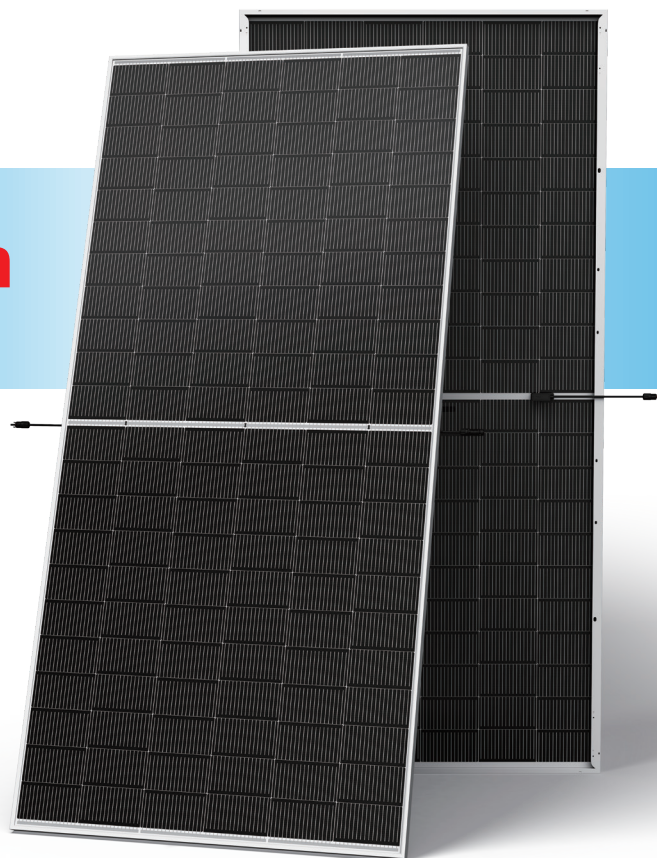
N-type i-TOPCon Ultra

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-NEG19RC.20U 625-650W

650_W / MAXIMUM POWER OUTPUT

24.1% / 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) by 1%~5%
- Standardized module size with higher container space utilization effectively reduces the freight cost
- Excellent compatibility with existing mainstream system components



High power up to 650W

- Up to 24.1% module efficiency, on 210 innovation platform
- Patented i-TOPCon technology with continuous efficiency upgrade, including contact resistance reduction, rear reflection enhancement and edge quality repairment



High reliability

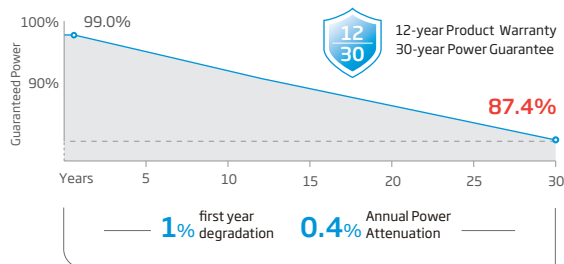
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions



High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature coefficient (-0.29%/°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

Performance Warranty



* Please refer to product warranty for details

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



ELECTRICAL DATA (STC & NOCT)

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- $P_{MAX}(W_p)^*$	625	477	630	481	635	487	640	489	645	492	650	496
Power Selection (W)**	0 ~ +5											
Maximum Power Voltage- V_{MPP} (V)	40.46	38.10	40.68	38.30	40.84	38.60	41.06	38.70	41.22	38.80	41.43	39.00
Maximum Power Current- I_{MPP} (A)	15.45	12.52	15.49	12.57	15.55	12.60	15.60	12.67	15.65	12.70	15.69	12.73
Open Circuit Voltage- V_{oc} (V)	48.70	46.30	48.90	46.50	49.10	46.60	49.30	46.80	49.52	47.00	49.77	47.30
Short Circuit Current- I_{sc} (A)	16.32	13.15	16.38	13.20	16.44	13.25	16.51	13.30	16.55	13.33	16.59	13.37
Module Efficiency η_m (%)	23.1		23.3		23.5		23.7		23.9		24.1	

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s. *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%
Peak Power Watts- $P_{MAX}(W_p)$	656	688	662	693	667	699	672	704	677	710	683	715
Maximum Power Voltage- V_{MPP} (V)	40.46	40.46	40.68	40.68	40.84	40.84	41.06	41.06	41.22	41.22	41.43	41.43
Maximum Power Current- I_{MPP} (A)	16.22	17.00	16.26	17.04	16.33	17.11	16.38	17.16	16.43	17.22	16.47	17.26
Open Circuit Voltage- V_{oc} (V)	48.70	48.70	48.90	48.90	49.10	49.10	49.30	49.30	49.52	49.52	49.77	49.77
Short Circuit Current- I_{sc} (A)	17.14	17.95	17.20	18.02	17.26	18.08	17.34	18.16	17.38	18.21	17.42	18.25

Power Bifaciality: 85±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

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

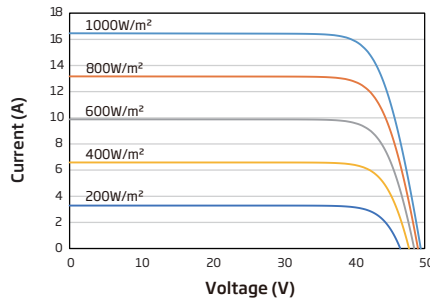
APPLICATION CONDITIONS

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

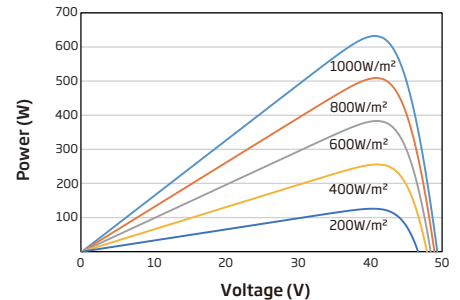
CURVES OF PV MODULE

Preliminary

I-V CURVES OF PV MODULE (635W)



P-V CURVES OF PV MODULE (635W)



MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	132 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	33.0 kg (72.8 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 ² (0.006 inches ²) Portrait: 200/320 mm (7.87/12.60 inches) Length can be customized
Connector	MC4 EV02 / TS4 Plus / TS4*
Packaging	Modules per box: 36 pieces Modules per 40' container: 720 pieces

*Please refer to regional datasheet for specified connector.

