



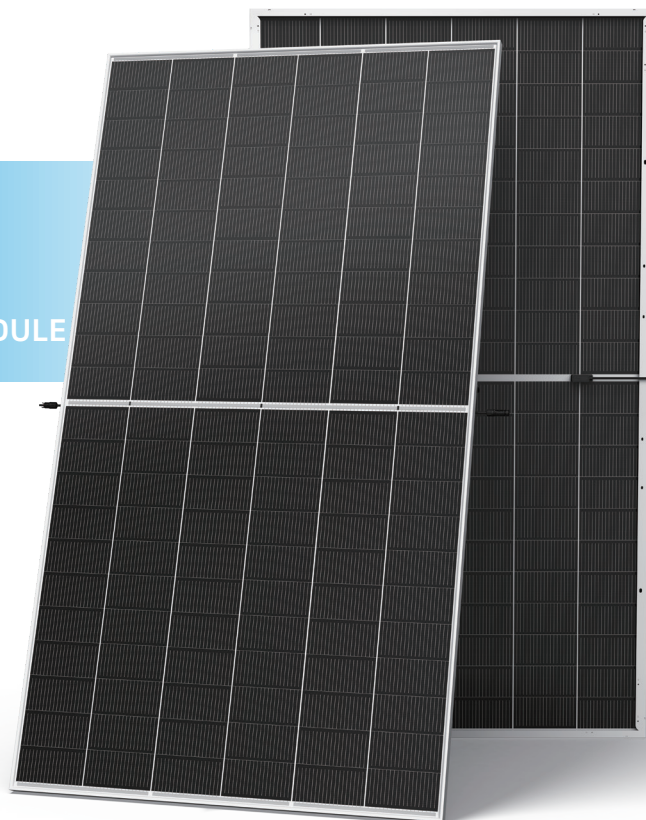
# N-type i-TOPCon

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-XXXNEG21C.20 685-695W

**695<sub>W</sub>** / POWER OUTPUT

**22.4%** / EFFICIENCY



## High customer value

- Standardized module size with flagship module power, 35W higher compared with conventional technology
- Low voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 2%~6%
- Higher container space utilization effectively reduces the freight cost
- Certified Low-Carbon Footprint
- The Star of LCOE



## High power 695W

- 22.4% module efficiency, on 210 innovation platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



## High reliability

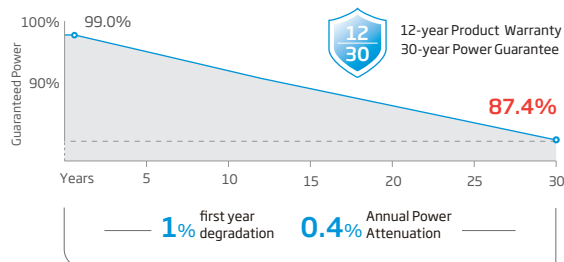
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Fire Class rating C, Safety Class II



## 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



\* (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



## ELECTRICAL DATA (STC & NOCT & BNPI) TSM-XXXNEG21C.20 (XXX=685-695)

Testing Condition	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI
Peak Power Watts- $P_{MAX}(W_p)^*$	685	522	759	690	526	765	695	531	770
Power Selection (W)	0 ~ +5								
Maximum Power Voltage- $V_{MPP}$ (V)	39.8	37.4	39.8	40.1	37.7	40.1	40.3	37.9	40.3
Maximum Power Current- $I_{MPP}$ (A)	17.19	13.93	19.07	17.23	13.95	19.07	17.25	14.00	19.11
Open Circuit Voltage- $V_{oc}$ (V)	47.7	45.3	47.7	47.9	45.4	47.9	48.3	45.9	48.3
Short Circuit Current- $I_{sc}$ (A)	18.21	14.67	20.18	18.25	14.71	20.22	18.28	14.72	20.25
Module Efficiency $\eta_m$ (%)	22.1			22.2			22.4		

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:  $P_{max} \pm 3\%$ ,  $V_{oc} \pm 3\%$  and  $I_{sc} \pm 5\%$

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

Backside Power Gain	5%	10%	5%	10%	5%	10%
Peak Power Watts- $P_{MAX}(W_p)^*$	719	754	725	759	730	765
Maximum Power Voltage- $V_{MPP}$ (V)	39.8	39.8	40.1	40.1	40.3	40.3
Maximum Power Current- $I_{MPP}$ (A)	18.05	18.91	18.09	18.95	18.11	18.98
Open Circuit Voltage- $V_{oc}$ (V)	47.7	47.7	47.9	47.9	48.3	48.3
Short Circuit Current- $I_{sc}$ (A)	19.12	20.03	19.16	20.08	19.19	20.11

$\phi P_{max}$ : 80% $\pm 5\%$ ;  $\phi V_{oc}$ : 100% $\pm 3\%$ ;  $\phi I_{sc}$ : 80% $\pm 5\%$

## TEMPERATURE RATINGS

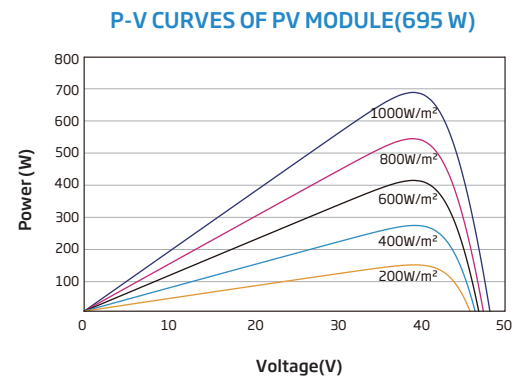
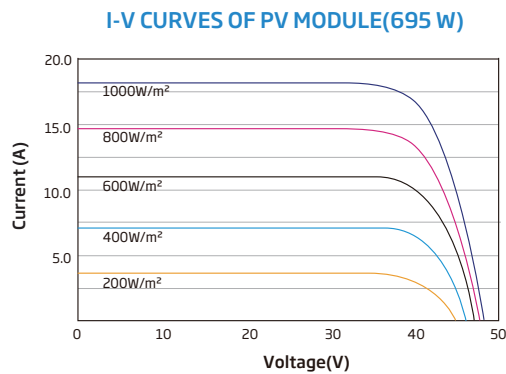
NOCT (Nominal Operating Cell Temperature)	43°C ( $\pm 2^\circ\text{C}$ )
Temperature Coefficient of $P_{MAX}$	- 0.29% /°C
Temperature Coefficient of $V_{oc}$	- 0.24% /°C
Temperature Coefficient of $I_{sc}$	0.04% /°C

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

## MAXIMUM RATINGS

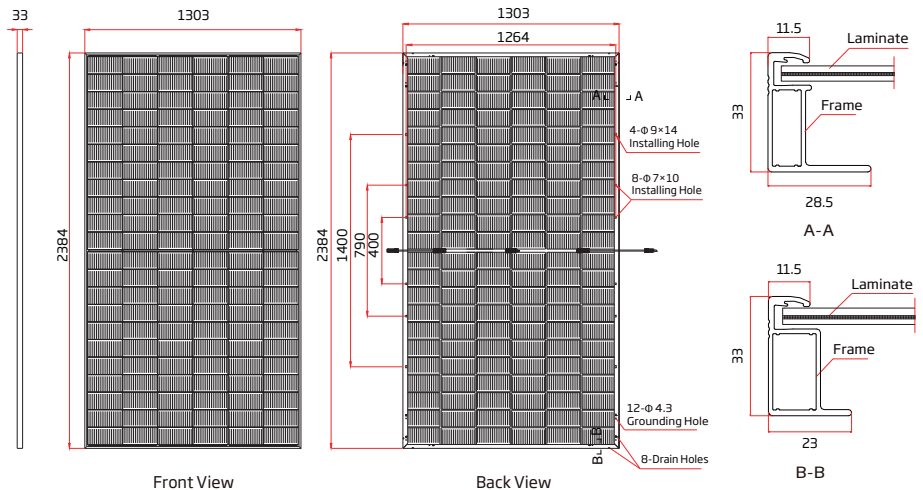
Operational Temperature	-40~+70°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	35A

## CURVES OF PV MODULE (Cell Temperature (25 $\pm 2^\circ\text{C}$ ))



## MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×33 mm (93.86×51.30×1.30 inches)
Weight	38.3 kg (84.4 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 (White Coating)
Frame	33mm (1.30 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: 370/230 mm (14.57/9.06 inches) Length can be customized
Connector	Stäubli Electrical Connectors AG PV-KST4-EV02/xy_UR; PV-KBT4-EV02/xy_UR PV-KST4-EV02A/xy; PV-KBT4-EV02A/xy
Packaging	Modules per box: 33 pieces Modules per 40' container: 594 pieces



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