

# Vertex N

**N-type i-TOPCon Bifacial Dual Glass**  
Monocrystalline module

PRODUCT: TSM-XXXNEG19RC.20

POWER RANGE: 585-620W

**620W**

MAXIMUM POWER OUTPUT

**0~+5W**

BINNING TOLERANCE

**23.0%**

MAXIMUM EFFICIENCY



### High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- More energy harvest with cutting-edge N-type i-TOPCon technology
- Designed for compatibility with existing mainstream system components
- Higher container space utilization effectively reduces the freight cost



### High power up to 620 W

- Up to 23.0% module efficiency with high density interconnect technology
- SMBB (Super multi-busbar) technology for better light trapping effect, lower series resistance and improved current collection



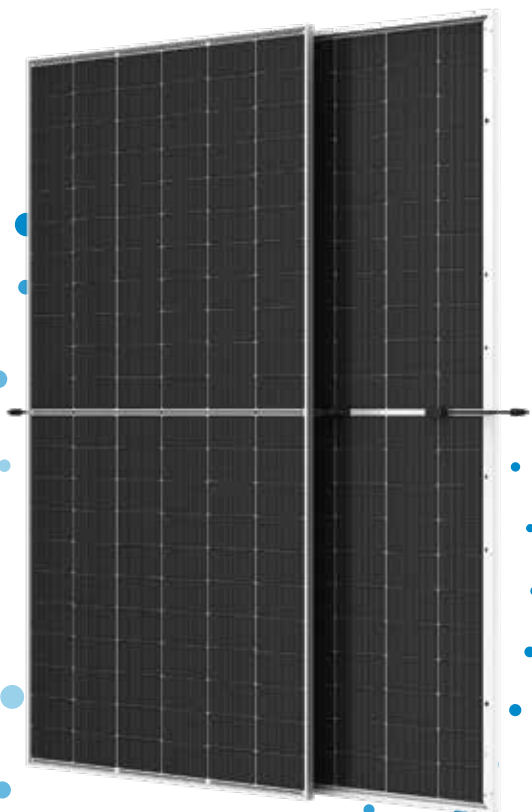
### High reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Fire class rating C
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

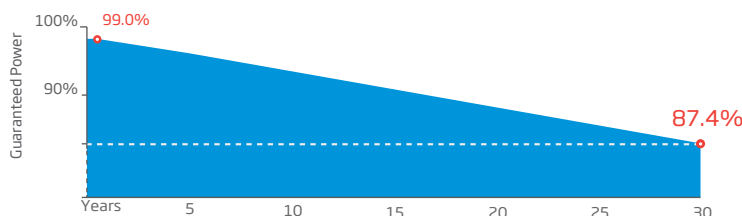


### High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- Lower degradation: 1% first year, 0.4% annually thereafter
- Lower temperature coefficient (-0.29%/°C)
- Up to 30% additional power gain from back side depending on albedo



### Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



### Comprehensive Products and System Certificates



IEC61215/IEC61730

ISO 9001: Quality Management System

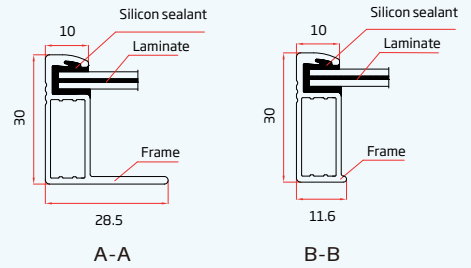
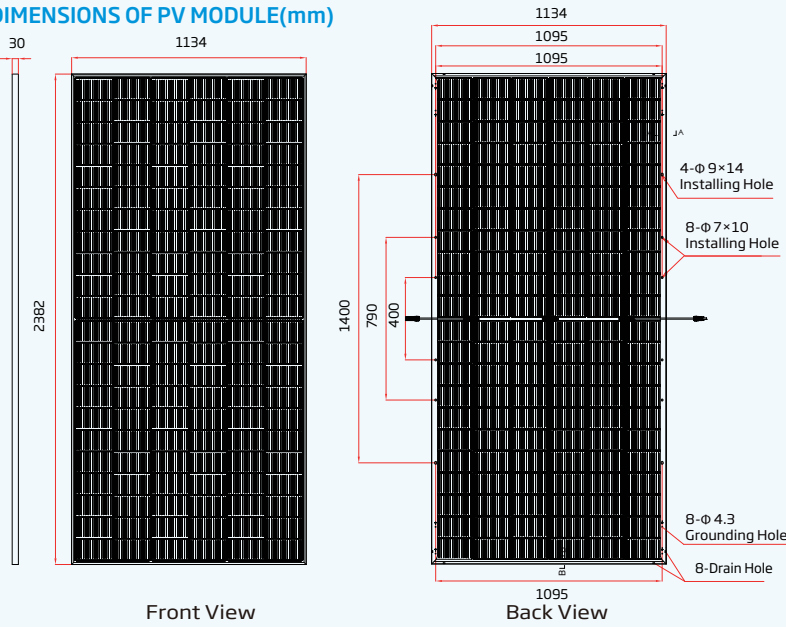
ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

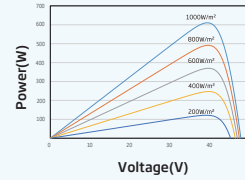
ISO45001: Occupational Health and Safety Management System



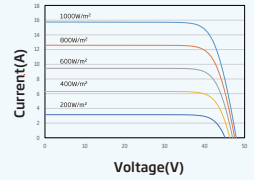
## DIMENSIONS OF PV MODULE(mm)



P-V CURVES OF PV MODULE (605 W)



I-V CURVES OF PV MODULE (605 W)



## MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	132 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	33.7kg (74.3 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)

Frame	30mm(1.18 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated (TS306F20/F20T)
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	Staubli MC4 EVO2

## ELECTRICAL DATA (STC & NOCT&BNPI) TSM-XXXNEG19RC.20(XXX=585-620)

Testing Condition	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	
Peak Power Watts -P <sub>MAX</sub> (Wp)*	585	447	648	590	450	654	595	454	659	600	459	665	605	462	670	610	466	676	615	469	681	620	473	687							
Binning Tolerance-P <sub>MAX</sub> (W)	0 ~ +5																														
Maximum Power Voltage -V <sub>MPP</sub> (V)	39.5	37.2	39.5	39.7	37.4	39.7	40.0	37.6	40.0	40.3	37.9	40.3	40.5	38.1	40.5	40.8	38.3	40.8	41.1	38.5	41.1	41.4	38.8	41.4							
Maximum Power Current -I <sub>MPP</sub> (A)	14.82	12.02	16.41	14.86	12.05	16.47	14.89	12.07	16.48	14.91	12.11	16.50	14.94	12.13	16.55	14.96	12.16	16.57	14.98	12.19	16.58	14.99	12.20	16.59							
Open Circuit Voltage -V <sub>OC</sub> (V)	47.5	45.1	47.5	47.8	45.4	47.8	48.1	45.7	48.1	48.4	46.0	48.4	48.7	46.2	48.7	49.0	46.5	49.0	49.3	46.7	49.3	49.6	47.0	49.6							
Short Circuit Current -I <sub>SC</sub> (A)	15.68	12.64	17.37	15.72	12.67	17.42	15.76	12.69	17.46	15.80	12.73	17.51	15.83	12.75	17.54	15.86	12.78	17.57	15.89	12.80	17.61	15.91	12.82	17.63							
Module Efficiency η <sub>m</sub> (%)	21.7		21.8		22.0		22.2		22.4		22.6		22.8		23.0																

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 at 1000W/m<sup>2</sup>+φ<sub>p</sub>135W/m<sup>2</sup>, Air Mass AM1.5, Temp 25°C \*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%	5%	10%	5%	10%	5%	10%	
Total Equivalent power -P <sub>MAX</sub> (Wp)	614	644	620	649	625	655	630	660	635	666	641	671	646	644	651	649			
Maximum Power Voltage -V <sub>MPP</sub> (V)	39.5	39.5	39.7	39.7	40.0	40.0	40.3	40.3	40.5	40.5	40.8	40.8	41.1	41.1	41.4	41.4			
Maximum Power Current -I <sub>MPP</sub> (A)	15.56	16.30	15.60	16.35	15.63	16.38	15.66	16.40	15.69	16.43	15.71	16.46	15.73	16.48	15.74	16.49			
Open Circuit Voltage -V <sub>OC</sub> (V)	47.5	47.5	47.8	47.8	48.1	48.1	48.4	48.4	48.7	48.7	49.0	49.0	49.3	49.3	49.6	49.6			
Short Circuit Current -I <sub>SC</sub> (A)	16.46	17.25	16.51	17.29	16.55	17.34	16.59	17.38	16.62	17.41	16.65	17.45	16.68	17.48	16.71	17.50			

Power Bifaciality: 80±7%; φ<sub>p</sub>Max: 80±7%; φ<sub>Voc</sub>: 100±3%; φ<sub>Isc</sub>: 80±7%

## TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P <sub>MAX</sub>	-0.29%/°C
Temperature Coefficient of V <sub>OC</sub>	-0.24%/°C
Temperature Coefficient of I <sub>SC</sub>	0.04%/°C

## MAXIMUM RATINGS

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

## WARRANTY

12 year Product Workmanship Warranty
30 year Power Warranty
1% first year degradation
0.40% Annual Power Attenuation (Power degradation values above apply to frontside, refer to product warranty for power degradation for backside and other details)

## PACKAGING CONFIGURATION

Modules per box: 36 pieces
Modules per 40' container: 720 pieces