

Vertex N

N-type i-TOPCon bifacial dual glass
Monocrystalline module

PRODUCT: TSM-XXXNEG20C.20

POWER RANGE: 620-645W

645W

MAXIMUM POWER OUTPUT

0~+5W

BINNING TOLERANCE

22.8%

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



High power up to 645W

- Up to 22.8% 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

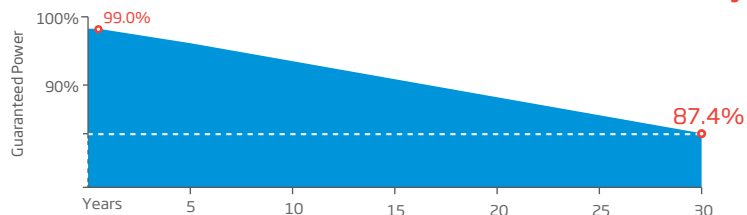
- Minimized micro-cracks with innovative non-destructive cutting technology
- Fire Class rating C
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



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



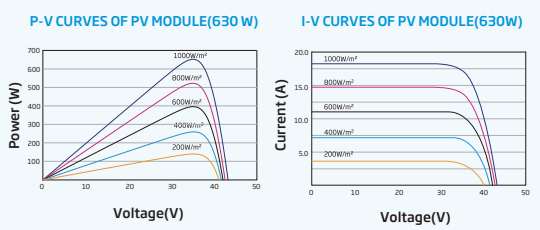
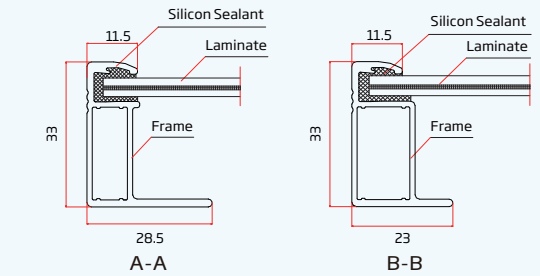
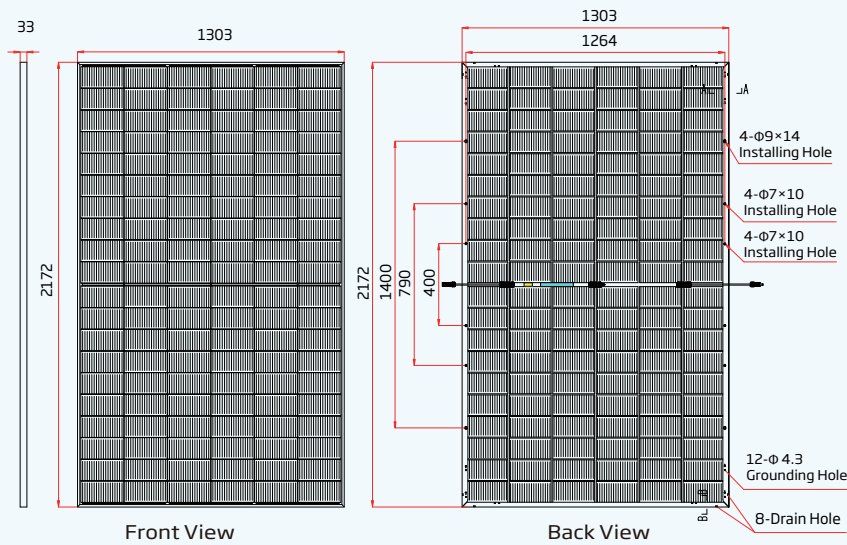
Comprehensive Products and System Certificates



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)



MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	120 cells
Module Dimensions	2172×1303×33 mm (85.51×51.30×1.30 inches)
Weight	34.9 kg (76.9 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	33mm(1.30 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	Staubli MC4 EVO2

ELECTRICAL DATA (STC & NOCT&BNPI) TSM-XXXNEG20C.20 (XXX=620-645)

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} (Wp)*	620	473	687	625	478	693	630	482	698	635	486	704	640	490	709	645	493	715
Binning Tolerance -P _{MAX} (W)	0 ~ +5																	
Maximum Power Voltage -V _{MPP} (V)	36.1	33.9	36.1	36.4	34.3	36.4	36.6	34.5	36.6	36.8	34.7	36.8	37.0	35.0	37.0	37.2	35.2	37.2
Maximum Power Current -I _{MPP} (A)	17.16	13.94	19.03	17.19	13.95	19.04	17.22	13.96	19.07	17.26	13.98	19.12	17.30	14.00	19.17	17.34	14.03	19.22
Open Circuit Voltage -V _{OC} (V)	43.2	40.9	43.2	43.5	41.3	43.5	43.9	41.6	43.9	44.2	41.9	44.2	44.5	42.2	44.5	44.8	42.4	44.8
Short Circuit Current -I _{SC} (A)	18.18	14.65	20.14	18.21	14.68	20.18	18.24	14.70	20.21	18.27	14.73	20.24	18.30	14.75	20.28	18.33	14.77	20.31
Module Efficiency η _m (%)	21.9		22.1			22.3			22.4			22.6			22.8			

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. BNPI: Irradiance at 1000W/m² × q₁ × 1.35W/m², 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%
Total Equivalent power -P _{MAX} (Wp)	651	682	656	688	662	693	667	699	672	704	677	710		
Maximum Power Voltage -V _{MPP} (V)	36.1	36.1	36.4	36.4	36.6	36.6	36.8	36.8	37.0	37.0	37.2	37.2		
Maximum Power Current -I _{MPP} (A)	18.02	18.88	18.05	18.91	18.08	18.94	18.12	18.99	18.17	19.03	18.21	19.07		
Open Circuit Voltage -V _{OC} (V)	43.2	43.2	43.5	43.5	43.9	43.9	44.2	44.2	44.5	44.5	44.8	44.8		
Short Circuit Current -I _{SC} (A)	19.09	20.00	19.12	20.03	19.15	20.06	19.18	20.10	19.22	20.13	19.25	20.16		

Power Bifaciality: 80±7%; q_{Pmax}: 80%±7%; q_{Voc}: 100%±3%; q_{Isc}: 80%±7%

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~+70 °C
Maximum System Voltage	1500V DC (IEC)
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: 26/39 pieces
 Modules per 40' container: 234/351 pieces