

Vertex N

N-type i-TOPCon bifacial dual glass
Monocrystalline module

PRODUCT: TSM-NEG20C.20

POWER RANGE: 625-650W

650W

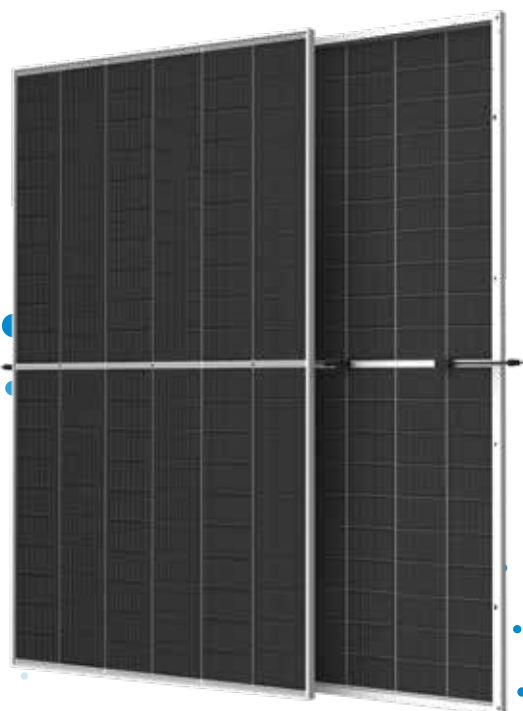
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

23.0%

MAXIMUM EFFICIENCY



High customer value

- Low Voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 1%~5%
- Excellent compatibility with existing mainstream system components



High power up to 650W

- Up to 23.0% module efficiency, on 210 innovative platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



High reliability

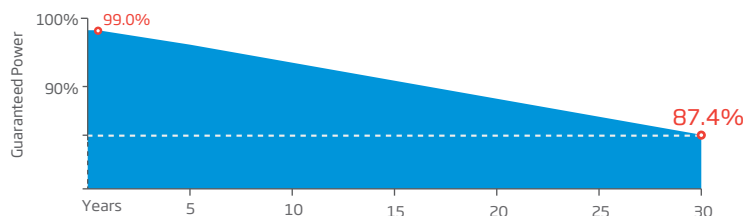
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions



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

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



Comprehensive Products and System Certificates



IEC61215/IEC61730/IEC61701/IEC62716

ISO 9001: Quality Management System

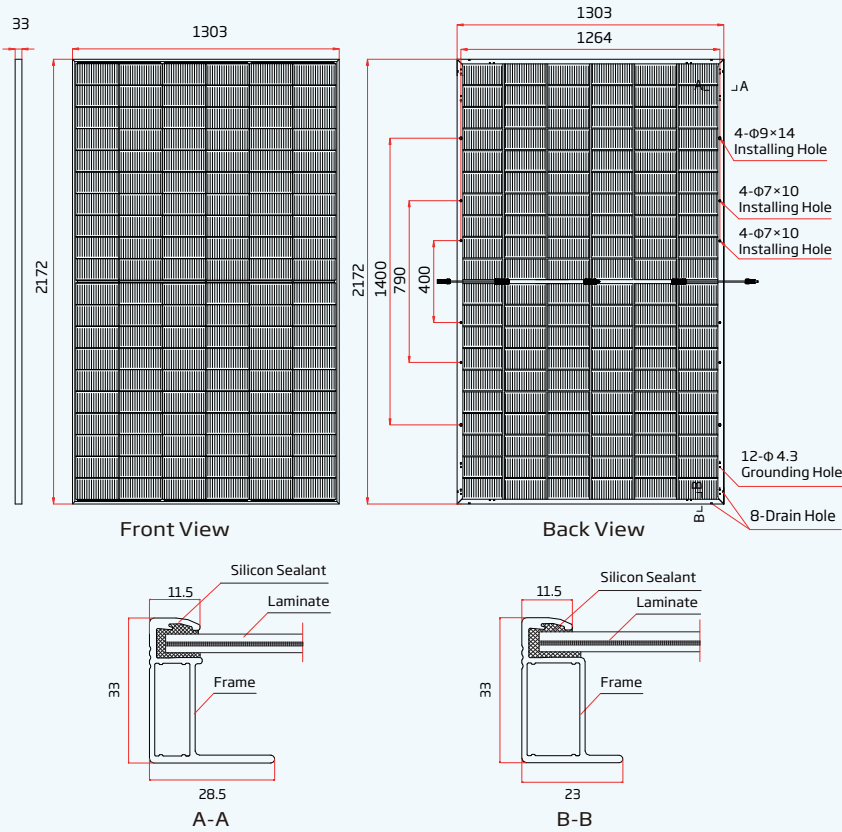
ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

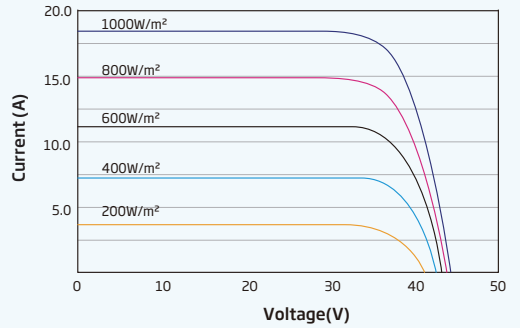
ISO45001: Occupational Health and Safety Management System



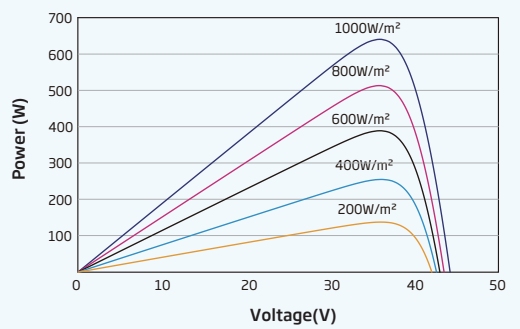
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(640W)



P-V CURVES OF PV MODULE(640 W)



MECHANICAL DATA

Solar Cells	N-type i-TOPCon 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	TS4 Plus / TS4

ELECTRICAL DATA (STC & NOCT)

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- P_{MAX} (Wp)*	625	478	630	482	635	486	640	490	645	493	650	497
Power Tolerance- P_{MAX} (W)	0 ~ +5											
Maximum Power Voltage- V_{MPP} (V)	36.4	34.3	36.6	34.5	36.8	34.7	37.0	35.0	37.2	35.2	37.4	35.4
Maximum Power Current- I_{MPP} (A)	17.19	13.95	17.22	13.96	17.26	13.98	17.30	14.00	17.34	14.03	17.38	14.05
Open Circuit Voltage- V_{OC} (V)	43.5	41.3	43.9	41.6	44.2	41.9	44.5	42.2	44.8	42.5	45.1	42.8
Short Circuit Current- I_{SC} (A)	18.21	14.68	18.24	14.70	18.27	14.73	18.30	14.75	18.33	14.77	18.36	14.80
Module Efficiency η_m (%)	22.1		22.3		22.4		22.6		22.8		23.0	

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%.

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%
Total Equivalent power - P_{MAX} (Wp)	656	688	662	693	667	699	672	704	677	710	683	715
Maximum Power Voltage- V_{MPP} (V)	36.4	36.4	36.6	36.6	36.8	36.8	37.0	37.0	37.2	37.2	37.4	37.4
Maximum Power Current- I_{MPP} (A)	18.05	18.91	18.08	18.94	18.12	18.99	18.17	19.03	18.21	19.07	18.25	19.12
Open Circuit Voltage- V_{OC} (V)	43.5	43.5	43.9	43.9	44.2	44.2	44.5	44.5	44.8	44.8	45.1	45.1
Short Circuit Current- I_{SC} (A)	19.12	20.03	19.15	20.06	19.18	20.10	19.22	20.13	19.25	20.16	19.28	20.20

Power Bifaciality: 80±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

MAXIMUM RATINGS

Operational Temperature	-40~+85° 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

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 26/39 pieces
- Modules per 40' container: 234/351 pieces