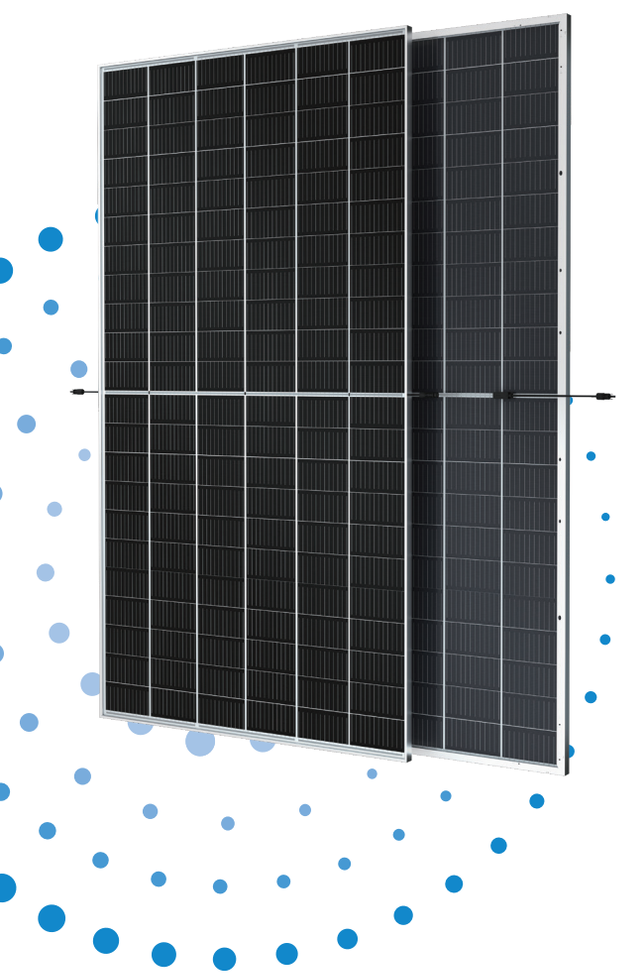
Vertex

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

PRODUCT: TSM-DEG21C.20

POWER RANGE: 645-665W

665W	0~+5W	21.4%
MAXIMUM POWER OUTPUT	POSITIVE POWER TOLERANCE	MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- Designed for compatibility with existing mainstream system components

High power up to 665W

- Up to 21.4% module efficiency with high density interconnect technology
- 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
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- 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
- The unique design provides optimized energy production under inter-row shading conditions
- Lower temperature coefficient (-0.34%) and operating temperature
- Up to 25% additional power gain from back side depending on albedo

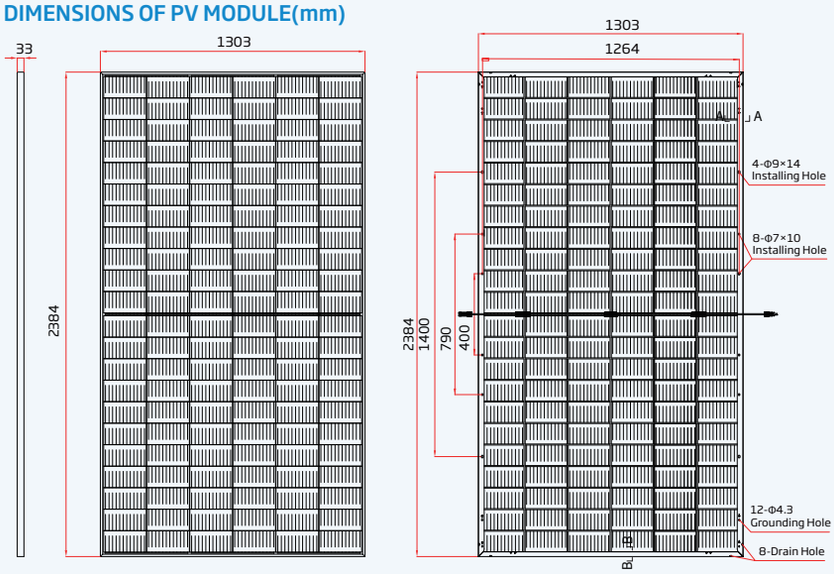
Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

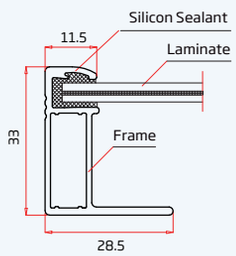
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Vertex BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

DIMENSIONS OF PV MODULE(mm)

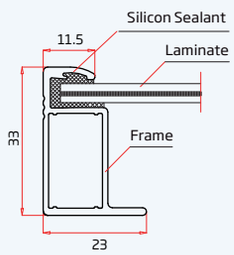


Front View



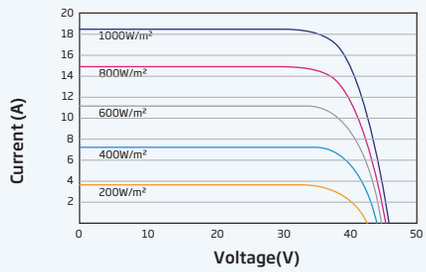
A-A

Back View

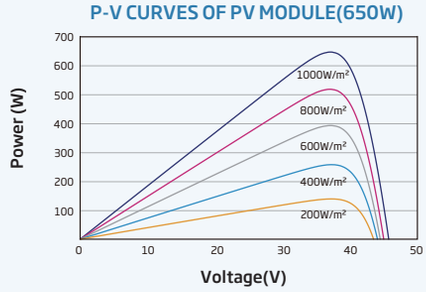


B-B

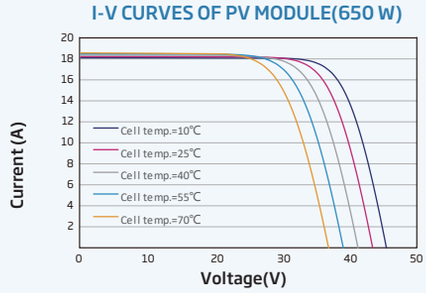
I-V CURVES OF PV MODULE(650 W)



P-V CURVES OF PV MODULE(650W)



I-V CURVES OF PV MODULE(650 W)



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)*	645	650	655	660	665
Power Tolerance-PMAX (W)			0 ~ +5		
Maximum Power Voltage-VMPP (V)	37.5	37.7	37.9	38.1	38.3
Maximum Power Current-IMPP (A)	17.23	17.27	17.31	17.35	17.39
Open Circuit Voltage-VOC (V)	45.3	45.5	45.7	45.9	46.1
Short Circuit Current-ISC (A)	18.31	18.35	18.40	18.45	18.50
Module Efficiency η m (%)	20.8	20.9	21.1	21.2	21.4

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 10% Irradiance ratio)

Total Equivalent power -PMAX (Wp)	690	696	701	706	712
Maximum Power Voltage-VMPP (V)	37.5	37.7	37.9	38.1	38.3
Maximum Power Current-IMPP (A)	18.44	18.48	18.52	18.56	18.60
Open Circuit Voltage-VOC (V)	45.3	45.5	45.7	45.9	46.1
Short Circuit Current-ISC (A)	19.59	19.63	19.69	19.74	19.79
Irradiance ratio (rear/front)			10%		

Power Bifaciality:70±5%.

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	488	492	495	499	504
Maximum Power Voltage-VMPP (V)	34.9	35.1	35.2	35.4	35.6
Maximum Power Current-IMPP (A)	13.98	14.01	14.05	14.10	14.16
Open Circuit Voltage-VOC (V)	42.7	42.9	43.0	43.2	43.4
Short Circuit Current-ISC (A)	14.75	14.79	14.83	14.87	14.91

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	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), 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 4.0mm² (0.006 inches²), Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4*

*Please refer to regional datasheet for specified connector.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of PMAX	- 0.34%/°C
Temperature Coefficient of VOC	- 0.25%/°C
Temperature Coefficient of ISC	0.04%/°C

MAXIMUMRATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	35A

PACKAGING CONFIGUREATION

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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