

**Certificate
of conformity with the following
European Directives**

Registered No.:
44 799 22 406749 - 027

Low-Voltage Directive 2014/35/EU

Date of application	File reference	Test report No.	Date of issue	Place of issue
2022-01-06	PVP12033/21P-02	492010913.030	2022-02-28	Essen

This is to certify that the following products comply to the essential requirements of the above mentioned European Directive and the following standards, taking into account the German national deviations:

Product: Crystalline Silicon Terrestrial Photovoltaic (PV) Modules

Type designation: See Annex 1

Applicant: Tongwei Solar (Hefei) Co., Ltd.
No.888, Changning Road, High-tech District,
Hefei City, Anhui Province, 230088, P.R. China

Standard(s): EN IEC 61730-1:2018; EN IEC 61730-1:2018/AC:2018-06
EN IEC 61730-2:2018; EN IEC 61730-2:2018/AC:2018-06

This Certificate of conformity is based on the evaluation of samples of the product. It does not imply an assessment of the production and it does not permit the use of a mark of conformity or of a safety mark of the TÜV NORD CERT GmbH. The holder of this certificate may use this Certificate together with his EC-Declaration of Conformity.



Certification Body
Specialist Manager Consumer Products

TÜV NORD CERT GmbH
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Description of product(s):

Module types: **PV Modules with Segmented 6" Mono-crystalline Silicon Solar Cells:**
408 cells: THxxxCM5-72S (xxx = 350-390, in increment of 5)
340 cells: THxxxCM5-60S (xxx = 290-325, in increment of 5)

Module types: **PV Modules with Segmented 6" PERC Mono-crystalline Silicon Solar Cells:**
432 cells: THxxxPM5-78S (xxx = 445-480, in increment of 5)
432 cells: THxxxPM5-78SA (xxx = 445-480, in increment of 5)
432 cells: THxxxPM5-78SAF (xxx = 445-480, in increment of 5)
432 cells: THxxxPM5-78SAS (xxx = 445-480, in increment of 5)
432 cells: THxxxPMB5-78S (xxx = 445-480, in increment of 5)
432 cells: THxxxPMB5-78SA (xxx = 445-480, in increment of 5)
432 cells: THxxxPMB5-78SAF (xxx = 445-480, in increment of 5)
432 cells: THxxxPMB5-78SAS (xxx = 445-480, in increment of 5)
408 cells: THxxxPM5-72S (xxx = 395-455, in increment of 5)
408 cells: THxxxPM5-72SA (xxx = 420-455, in increment of 5)
408 cells: THxxxPM5-72SAF (xxx = 420-455, in increment of 5)
408 cells: THxxxPM5-72SAS (xxx = 420-455, in increment of 5)
408 cells: THxxxPM5-72SB (xxx = 460-500, in increment of 5)
408 cells: THxxxPM5-72SBF (xxx = 460-500, in increment of 5)
408 cells: THxxxPM5-72SBS (xxx = 460-500, in increment of 5)
408 cells: THxxxPMB5-72SB (xxx = 460-500, in increment of 5)
408 cells: THxxxPMB5-72SBF (xxx = 460-500, in increment of 5)
408 cells: THxxxPMB5-72SBS (xxx = 460-500, in increment of 5)
408 cells: THxxxPM5-72SF (xxx = 395-435, in increment of 5)
408 cells: THxxxPM5-72SS (xxx = 395-435, in increment of 5)
408 cells: THxxxPMB5-72S (xxx = 395-455, in increment of 5)
408 cells: THxxxPMB5-72SA (xxx = 420-455, in increment of 5)
408 cells: THxxxPMB5-72SAF (xxx = 420-455, in increment of 5)
408 cells: THxxxPMB5-72SAS (xxx = 420-455, in increment of 5)
408 cells: THxxxPMB5-72SF (xxx = 395-435, in increment of 5)
408 cells: THxxxPMB5-72SS (xxx = 395-435, in increment of 5)



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Consumer Products

360 cells: THxxxPM5-66S (xxx = 370-400, in increment of 5)
360 cells: THxxxPM5-66SA (xxx = 370-400, in increment of 5)
360 cells: THxxxPM5-66SAF (xxx = 370-400, in increment of 5)
360 cells: THxxxPM5-66SAS (xxx = 370-400, in increment of 5)
360 cells: THxxxPMB5-66S (xxx = 370-400, in increment of 5)
360 cells: THxxxPMB5-66SA (xxx = 370-400, in increment of 5)
360 cells: THxxxPMB5-66SAF (xxx = 370-400, in increment of 5)
360 cells: THxxxPMB5-66SAS (xxx = 370-400, in increment of 5)
340 cells: THxxxPM5-60S (xxx = 325-380, in increment of 5)
340 cells: THxxxPM5-60SA (xxx = 350-380, in increment of 5)
340 cells: THxxxPM5-60SAF (xxx = 350-380, in increment of 5)
340 cells: THxxxPM5-60SAS (xxx = 350-380, in increment of 5)
340 cells: THxxxPM5-60SB (xxx = 380-415, in increment of 5)
340 cells: THxxxPM5-60SBF (xxx = 380-415, in increment of 5)
340 cells: THxxxPM5-60SBS (xxx = 380-415, in increment of 5)
340 cells: THxxxPMB5-60SB (xxx = 380-415, in increment of 5)
340 cells: THxxxPMB5-60SBF (xxx = 380-415, in increment of 5)
340 cells: THxxxPMB5-60SBS (xxx = 380-415, in increment of 5)
340 cells: THxxxPM5-60SF (xxx = 325-360, in increment of 5)
340 cells: THxxxPM5-60SS (xxx = 325-360, in increment of 5)
340 cells: THxxxPMB5-60S (xxx = 325-380, in increment of 5)
340 cells: THxxxPMB5-60SA (xxx = 350-380, in increment of 5)
340 cells: THxxxPMB5-60SAF (xxx = 350-380, in increment of 5)
340 cells: THxxxPMB5-60SAS (xxx = 350-380, in increment of 5)
340 cells: THxxxPMB5-60SF (xxx = 325-360, in increment of 5)
340 cells: THxxxPMB5-60SS (xxx = 325-360, in increment of 5)

Module types:

PV Modules with Segmented 8" PERC Mono-crystalline Silicon Solar Cells:

408 cells: THxxxPM6-68SC (xxx = 635-655, in increment of 5)
408 cells: THxxxPMB6-68SC (xxx = 635-660, in increment of 5)
414 cells: THxxxPM6-69SC (xxx = 645-655, in increment of 5)
414 cells: THxxxPMB6-69SC (xxx = 645-670, in increment of 5)
390 cells: THxxxPM6-65SC (xxx = 605-625, in increment of 5)
390 cells: THxxxPMB6-65SC (xxx = 605-630, in increment of 5)
340 cells: THxxxPM6-57SC (xxx = 530-545, in increment of 5)
340 cells: THxxxPMB6-57SC (xxx = 530-550, in increment of 5)
345 cells: THxxxPM6-58SC (xxx = 535-550, in increment of 5)
345 cells: THxxxPMB6-58SC (xxx = 535-555, in increment of 5)
325 cells: THxxxPM6-54SC (xxx = 505-520, in increment of 5)
325 cells: THxxxPMB6-54SC (xxx = 505-525, in increment of 5)
320 cells: THxxxPMB7-46SC (xxx = 425-445, in increment of 5)
320 cells: THxxxPMB7-46SCS (xxx = 425-445, in increment of 5)
320 cells: THxxxPMB7-46SCF (xxx = 420-440, in increment of 5)



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Shingled monofacial module

TH535~560PMB6 58SC



Features of Module



Shingling Technology

Innovative structure, low-temperature adhesive bonding, high-density layout.



Beautiful Appearance

Uniform layout, better aesthetic.



Superior Safety and Reliability

No hidden welding crack, low operating temperature, high pressure resistance.



Low System Cost

High module efficiency, reducing system cost.



Low Hot Spot Risk

Parallel circuit design reduces shading loss.



Low Shading Loss

Full parallel arrangement brings high effective power generation hours.



Eco-friendly

Adhering to green philosophy, no fluorine and low lead.

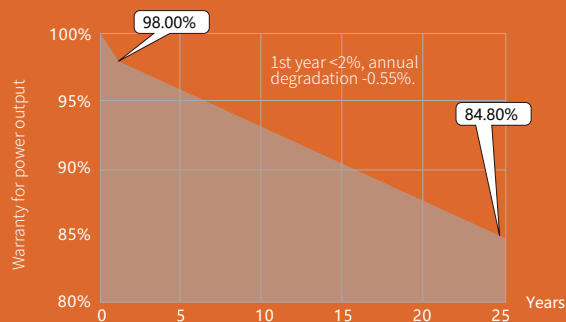
Linear Power Output Warranty

15

15-year
warranty for
materials.

25

25-year
warranty for
linear power
output.



Quality Management System and Product Certification

IEC61215/61730、IEC62804(PID)、IEC61701(Salt)、
IEC62716 (Ammonia)、IEC60068-2-68(Sand)
ISO 9001:2015 / quality management system
ISO 14001:2015 / environmental management system
ISO 45001:2018 / occupation health safety management system
ISO 50001:2011 / energy management system
IEC TS 62941—2016 / PV industry quality management system



Electrical Characteristics (STC)

Module Type: TH***PMB7-46SC	560	555	550	545	540	535
Maximum Power - Pm (W)	560	555	550	545	540	535
Open Circuit Voltage - Voc (V)	47.3	47.2	47.1	47.0	46.9	46.8
Short Circuit Current-Isc [A]	15.17	15.07	14.97	14.86	14.76	14.65
Maximum Power Voltage-Vm [V]	39.3	39.2	39.1	39.0	38.9	38.8
Maximum Power Current-Im [A]	14.26	14.17	14.07	13.97	13.87	13.77
Module Efficiency-η [%]	21.4	21.2	21.0	20.9	20.7	20.5

Electrical Characteristics at NMOT

Maximum Power-Pm [W]	422	418	414	410	407	403
Open Circuit Voltage-Voc [V]	45.1	45.0	44.9	44.8	44.7	44.6
Short Circuit Current-Isc [A]	12.22	12.14	12.06	11.97	11.89	11.80
Maximum Power Voltage-Vm [V]	37.4	37.3	37.3	37.2	37.1	37.0
Maximum Power Current-Im [A]	11.27	11.19	11.11	11.03	10.96	10.88

Note: 1. Standard Test Conditions [STC]: irradiance 1000 W/m²; AM 1.5; ambient temperature 25°C according to EN 60904-3;
 2. Nominal Module Operating Temperature (NMOT): Irradiance 800W/ m²; wind speed 1m/s, ambient temperature 20°C.
 3. Tolerance of Pm: 0~+5W, Measuring uncertainty of power: ±3%. Performance deviation of Voc [V], Isc [A], Vm [V] and Im [A]: ±3%.

Mechanical Parameters

Dimensions	2384 × 1096 × 35mm
Weight	28.3kg
Front glass	tempered glass, 3.2mm
Frame	Anodized aluminum profile
Cells	Mono-crystalline solar cell
Cell Orientation	345 (69°5)
Junction Box	IP68, three diodes
Cable	4mm ² , +300mm/-1000(Vertical), +220mm/-180mm(Horizontal)
Packaging	31pcs/box; 620pcs/40'container; 868pcs/flat car

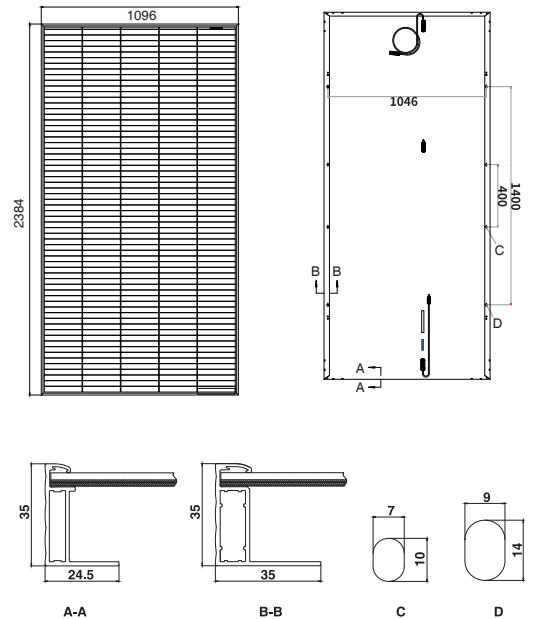
Temperature Parameters

NMOT	42.30 °C (±2°C)
Temperature Coefficient of Voc	-0.27%/°C
Temperature Coefficient of Isc	+0.04%/°C
Temperature Coefficient of Pm	-0.34%/°C

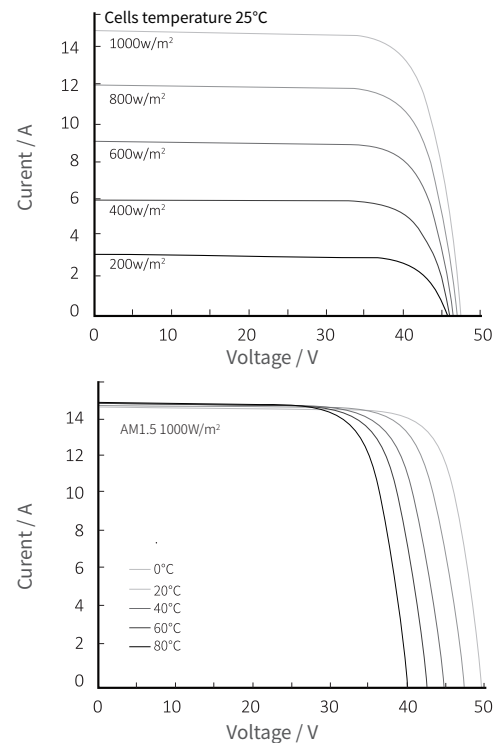
Maximum Ratings

Maximum System Voltage [V]	DC1500 (IEC)
Series Fuse Rating [A]	25
Maximum Surface Load Capacity [Pa]	Front 5400 / Back 2400
Temperature Range [°C]	-40 ~ + 85
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s

Drawings



I-V Curve



Declaration:
 With the technical progress and product updates, there exists a deviation between the technical parameter of the TW Solar's future products and the technical parameter in this specification. The TW Solar reserves the right to adjust the technical parameter at any time without notifying the customers. TW Solar reserves the final right of interpretation.

**Shingled
bifacial module**

**TH635~675PMB6
69SDC**



Features of Module



Shingling Technology

Innovative structure, low-temperature adhesive bonding, high-density layout.



Beautiful Appearance

Uniform layout, better aesthetic.



Superior Safety and Reliability

No hidden welding crack, low operating temperature, high pressure resistance.



Low System Cost

High module efficiency, reducing system cost.



Low Hot Spot Risk

Parallel circuit design reduces shading loss.



Low Shading Loss

Full parallel arrangement brings high effective power generation hours.



Eco-friendly

Adhering to green philosophy, no fluorine and low lead.

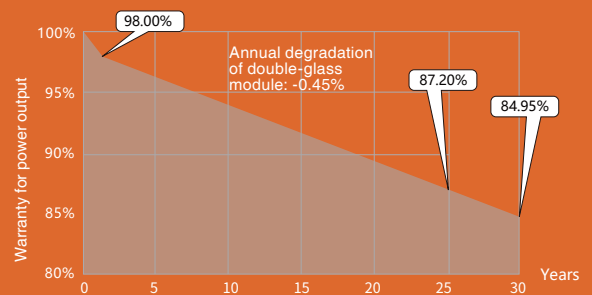
Linear Power Output Warranty

15

15-year warranty for materials.

30

30-year warranty for linear power output.



Quality Management System and Product Certification

IEC61215/61730、IEC62804(PID)、IEC61701(Salt)、
IEC62716 (Ammonia)、IEC60068-2-68(Sand)
ISO 9001:2015 / quality management system
ISO 14001:2015 / environmental management system
ISO 45001:2018 / occupation health safety management system
ISO 50001:2011 / energy management system
IEC TS 62941—2016 / PV industry quality management system



Electrical Characteristics (STC)

Module type: TH *** PMB6-69SDC	675	670	665	660	655	650	645	640	635
Maximum power - P _m (W)	675	670	665	660	655	650	645	640	635
Open circuit voltage - V _{oc} (V)	47.2	47.1	47.0	46.9	46.8	46.7	46.6	46.5	46.4
Short circuit current I _{sc} (A)	18.36	18.26	18.16	18.06	17.97	17.84	17.74	17.64	17.54
Maximum Power Voltage-V _m (V)	39.2	39.1	39.0	38.9	38.8	38.8	38.7	38.6	38.5
Maximum Power Current-I _m (A)	17.26	17.16	17.07	16.98	16.89	16.77	16.68	16.58	16.49
Module Efficiency-η (%)	21.7	21.6	21.4	21.2	21.1	20.9	20.8	20.6	20.4

Electrical Characteristics (NMOT)

Maximum power - P _m (W)	508	504	501	497	493	489	486	482	478
Open circuit voltage - V _{oc} (V)	45.0	44.9	44.8	44.7	44.5	44.4	44.3	44.2	44.2
Short circuit current I _{sc} (A)	14.79	14.71	14.63	14.55	14.47	14.37	14.29	14.21	14.13
Maximum Power Voltage-V _m (V)	37.3	37.3	37.2	37.1	37.0	37.0	36.9	36.8	36.7
Maximum Power Current-I _m (A)	13.61	13.54	13.46	13.39	13.32	13.25	13.17	13.10	13.02

* STC: Irradiation 1000W/m²; AM1.5; environmental temperature 25°C; tested according to EN 60904-3;
 * NMOT: irradiation 800W/m²; wind speed 1m/s; environmental temperature 20°C;
 * P_m tolerance: 0~+5W ; power test uncertainty: ±3%; V_{oc}[V], I_{sc}[A], V_m[V] and I_m[A] test tolerance: ±3%
 * Bifaciality: 70%±5%;

Comparison of Rear Power Gains (650W)

Power Gain-PG	5%	10%	15%	20%	25%	30%
Maximum Power-P _m (W)	693	726	759	792	825	858
Open Circuit Voltage-V _{oc} (V)	46.9	46.9	46.9	47.0	47.0	47.0
Short Circuit Current-I _{sc} (A)	18.97	19.87	20.77	21.68	22.58	23.48
Maximum Power Voltage-V _m (V)	38.9	38.9	38.9	39.0	39.0	39.0
Maximum Power Current-I _m (A)	17.83	18.68	19.53	20.38	21.23	22.07

Mechanical Parameters

Dimensions	2384×1303×35mm (L×W×H)
Weight	39.0kg
Front Glass	Tempered glass, 2.0mm
Frame	Anodized aluminum profile
Cells	Mono-crystalline solar cell
Cell Orientation	414 (69°6)
Junction Box	IP68, three diodes
Cable	4mm ² , +500mm/-1000mm(Vertical), +220mm/-180mm (Horizontal)
Packaging mode	31pcs/ box; 558pcs/ 40' HQ; 744pcs/ flat car

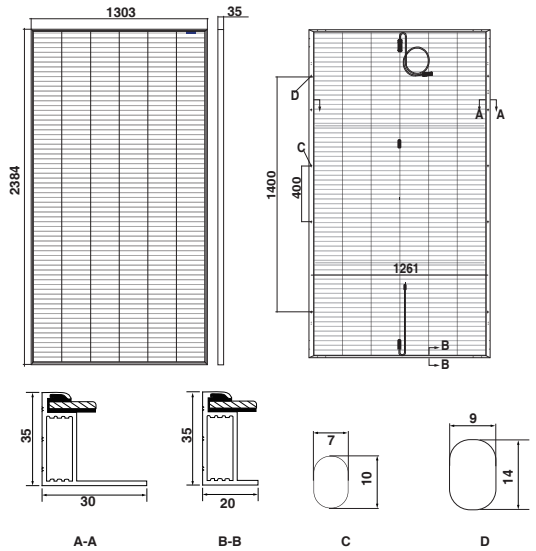
Temperature Parameters

NMOT	42.3°C(±2°C)
Temperature Coefficient of V _{oc}	-0.27%/°C
Temperature Coefficient of I _{sc}	0.04%/°C
Temperature Coefficient of P _m	-0.34%/°C

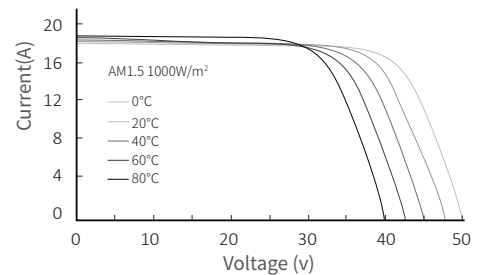
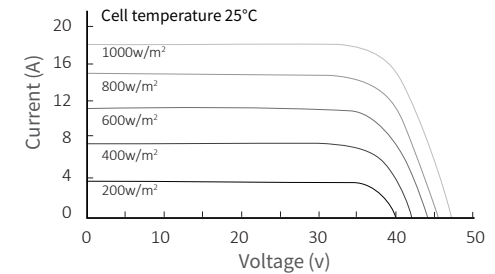
Maximum Rated Parameters

Maximum System Voltage (V)	DC1500
Series Fuse Rating (A)	30
Surface Load Capacity (Pa)	Front5400/ Back2400
Temperature Range (°C)	-40~+ 85
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m·s ⁻¹

Drawings



I-V Curve



Statement:

With technological progress and product updates, there may be deviations between the technical parameters of Tongwei's module products and the technical parameters contained in this specification, and Tongwei Solar has the right to adjust the technical parameters at any time without notifying the customer, the final interpretation of the technical specification is vested in Tongwei Solar.