

## TRINA SOLAR – TSM225PC05 / TSM230PC05 / TSM235PC05

Solar modules are the key element of every solar power system as they convert sunlight into electricity. Their quality and the optimum use of the respective technology are therefore decisive for the yield and profit of your system. Polycrystalline solar modules provide reliable experience based on more than 40 years of use and continuously deliver excellent yields.

Phoenix Solar selects the best solar modules from leading international manufacturers based on strict quality criteria. They are tested by our own technical experts as well as independent institutes. This provides you with investment security whilst optimising your return at the same time.



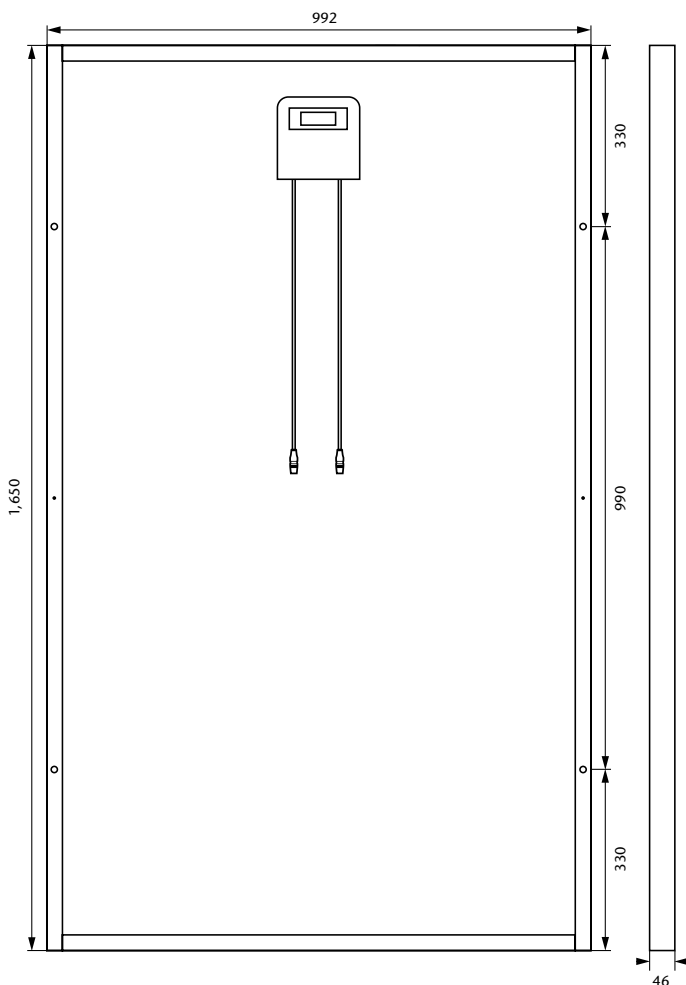
### The advantages at a glance:

- 225, 230 and 235 Wp power output available
- Tested in a RAL certificated process, independent of the manufacturer
- Polycrystalline high-performance modules with an efficiency of up to 14.40%
- 25 years overall performance guarantee: For the first 10 years at 90 %, for the next 15 years at 80 % of the minimal rated power output
- Robust, non-corroding aluminium frame
- Tempered glass provides protection from hail, snow, ice and storm
- Low module weight for easy installation and no static loading problems on the roof

\* The manufacturer's terms and conditions of guarantee apply

### Experience that pays

Phoenix Solar or your local Phoenix Solar partner individually match the solar modules and all additional system components to ensure that you get the ideal system to meet your requirements. All of our sales partners have a considerable amount of expertise and many years of experience in solar technology and have been personally chosen by us according to the strictest quality criteria.



## Mechanical parameters

Length [mm]	1,650
Width [mm]	992
Depth [mm]	46
Depth with connection socket [mm]	46
Weight [kg]	19.50
Connection socket (manufacturer)	Renhe
Positive cable (manufacturer/length [mm]/cable cross-section [mm <sup>2</sup> ])	Renhe/1,000/4
Negative cable (manufacturer/length [mm]/cable cross-section [mm <sup>2</sup> ])	Renhe/1,000/4
Plug connector (manufacturer/type)	Multicontact/MC3 or MC4
Front cover (material/thickness [mm])	Low iron glass, tempered/3.2
Cell type (quantity/technology)	60/polycrystalline
Cell embedding (material)	Ethylene vinyl acetate (EVA)
Rear cover (material)	TPT
Frame (material)	Aluminium

## Manufacturer's guarantee

Product guarantee	5-year product guarantee*
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### Performance guarantee

For the first 10 years at 90 % of the minimal rated power output  
 For the next 15 years at 80 % of the minimal rated power output  
 (25 years overall performance guarantee\*)

\* The manufacturer's terms and conditions of guarantee apply

## Qualifications and Certificates

IEC 61215 Ed. 2

IEC 61730



Trina Solar was founded in 1997 in China, and is thus one of its country's photovoltaic pioneer companies. This solar module manufacturer follows a vertically integrated business model, with production of monocrystalline ingots, through to the finished solar modules. This enables Trina Solar to perfectly monitor the quality of its products in all levels of manufacture.



## Electrical parameters

Electrical parameters for STC (1,000 W/m<sup>2</sup>, T<sub>Module</sub> = 25 (+/- 2) °C, AM 1.5, according to EN/IEC 60904-1 to 60904-3)

Article number	100856	100862	100855	100863	100860	100864
Plug connector	MC4	MC3	MC4	MC3	MC4	MC3
Power output [P <sub>mpp</sub> ]	225		230		235	
Power output tolerances [%]	± 3		± 3		± 3	
Efficiency [%]	13.70		14.00		14.40	
Max. voltage V <sub>mpp</sub> [V]	29.40		29.80		30.10	
Max. current I <sub>mpp</sub> [A]	7.66		7.72		7.81	
Open circuit voltage V <sub>oc</sub> [V]	36.90		37.00		37.10	
Short circuit current I <sub>sc</sub> [A]	8.20		8.26		8.31	

Electrical parameters for 800 W/m<sup>2</sup>, T<sub>Module</sub> = NOCT, AM 1.5, according to EN/IEC 60904-1 to 60904-3  
NOCT = Nominal Operating Cell Temperature, cell temperature under nominal operating conditions

Max. power output P <sub>mpp</sub> [Wp]	161.60	166.60	169.20
Max. voltage V <sub>mpp</sub> [V]	27.40	27.50	27.70
Max. current I <sub>mpp</sub> [A]	5.90	6.02	6.11
Open circuit voltage V <sub>oc</sub> [V]	33.70	33.80	34.10
Short circuit current I <sub>sc</sub> [A]	6.55	6.62	6.72

Electrical parameters for 200 W/m<sup>2</sup>, T<sub>Module</sub> = 25 (+/- 2) °C, AM 1.5, EN/IEC 60904-1 to 60904-3

Max. power output P <sub>mpp</sub> [Wp]	45.10	45.90	46.00
Max. voltage V <sub>mpp</sub> [V]	29.90	30.20	30.40
Max. current I <sub>mpp</sub> [A]	1.51	1.52	1.54
Open circuit voltage V <sub>oc</sub> [V]	35.80	35.90	36.10
Short circuit current I <sub>sc</sub> [A]	1.66	1.68	1.70

Reverse current loading capability I <sub>R</sub> [A]	14
Max. permissible system voltage V <sub>sys</sub> [V]	1,000

### Parameters of the thermal characteristics

NOCT [° C]	47
Temperature coefficient of the short circuit current I <sub>sc</sub> [%/K]	+ 0.05
Temperature coefficient of the open circuit voltage V <sub>oc</sub> [%/K]	- 0.35
Temperature coefficient of the MPP power P <sub>mpp</sub> [%/K]	- 0.45

## Operating conditions

Max. operating temperature [° C]	- 40 to + 80
Max. snow load [Pa]	5,400
Max. wind load [Pa]	2,400

Subject to modifications and errors

## PLANNING GUIDE

The module array displayed below applies specifically to Trina Solar TSM225PC05/TSM230PC05/TSM235PC05 modules, including the distances for connecting them together (using the Tecto-Sun mounting system, scale: 1:100).

**Notes on use:** Draw a scale diagram of the roof (1:100) with all the details (windows, dormer windows, chimneys,

etc.) on transparent paper and place it over this module array. Copy the intersecting points of the grid on the roof diagram and connect them with a line. If the roof diagram is larger than the grid, it can be moved as required. Doing this allows you to determine the maximum allocation of modules while taking shading and objects on the roof into account.

Number of modules	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Module array dimensions	0.99	2.00	3.01	4.02	5.03	6.04	7.05	8.06	9.07	10.08	11.09	12.10	13.11	14.12	15.13
1															
1.65															
2															
3.30															
3															
4.95															
4															
6.60															
5															
8.25															
6															
9.90															
7															
11.55															

Length (m) Width (m)

Subject to modifications and errors