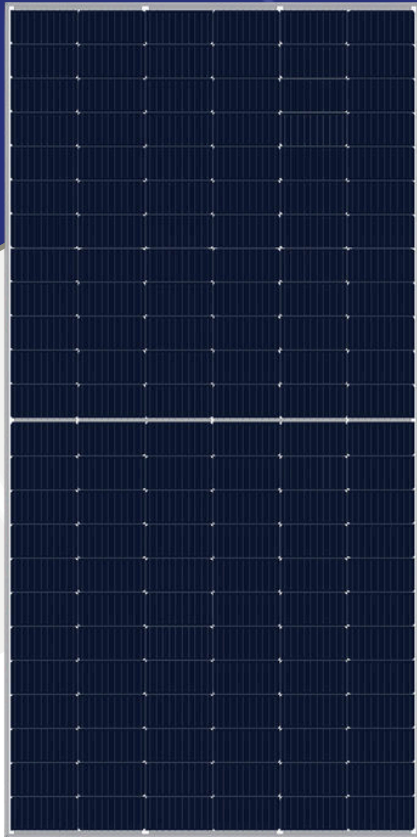


## HIGH PERFORMANCE BIFACIAL MONOCRYSTALLINE P.E.R.C MODULE



### TM - 650/670M-132HC









**132 CELL**  
Mono PERC Module

**650 - 670Wp**  
Power Output Range

**1500VDC**  
Maximum System Voltage

**21.6%**  
Maximum Efficiency

### KEY SALIENT FEATURES

-  Industry leading lowest thermal co-efficient of power
-  Industry leading 25 years product warranty
-  Excellent low irradiance performance
-  Excellent PID resistance
-  Positive power tolerance of 0~+3%
-  Fully automated production at all stages
-  Fully Reduced power loss by minimizing the effect of shadow shading ( 9 - 12 Busbar)
-  European Warranty & After - Sales Service



#### TAMESOL SOLAR GROUP S.L

TAMESOL is a global provider of high-efficiency PV panels with a 10GW annual production capacity and a 100% automated production line, innovating state-of-the-art products for over 15 years. Our panels have been installed in more than 50 countries, with over 20 million panels already connected to the grid.

Tel : +34 872 222 388

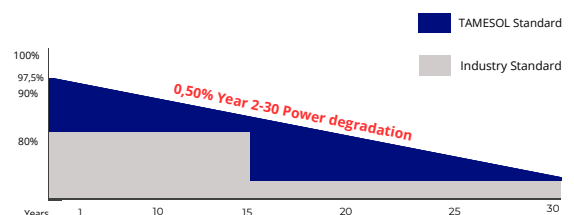
E - mail: [info@tamesol.com](mailto:info@tamesol.com) Website: [www.tamesol.com](http://www.tamesol.com)

**TAMESOL**  
— be bright, go solar —

Since 2007, building a green future

### LINEAR PERFORMANCE WARRANTY

25 year Product Warranty / 30-Year Linear Power Warranty



**21,6%**  
MAX MODULE  
EFFICIENCY

**0 - 3%**  
POWER  
TOLERANCE

**2,5%**  
FIRST YEAR POWER  
DEGRADATION

**0,50%**  
YEAR 2-30  
POWER DEGRADATION

**PERC CELL**  
Lower operating temperature

## ELECTRICAL CHARACTERISTICS

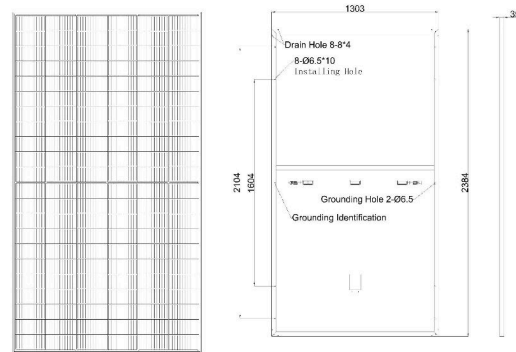
STC: AM1.5 1.000W/m2 NOTC: AM1.5 800W/m2 20° 1 m/s Test uncertainty for Pmax +-3%

Module type	TM - 650M-144HC		TM - 655M-144HC		TM - 660M-144HC		TM - 665M-144HC		TM - 670M-144HC	
	STC	NOTC	STC	NOTC	STC	NOTC	STC	NOTC	STC	NOTC
Testing condition	STC	NOTC	STC	NOTC	STC	NOTC	STC	NOTC	STC	NOTC
Maximum Power (Pmax/w)	650	484	655	487	660	491	665	495	670	498
Open Circuit Voltage (Voc/V)	45	42,6	45,2	42,8	45,4	43,0	45,6	43,1	45,8	43,3
Short Circuit Current (Isc/A)	18,39	14,41	18,43	14,43	18,47	14,48	18,51	9,09	18,55	14,58
Voltage at Maximum Power (Vmp/V)	37,6	35,7	37,8	35,9	38	36,05	38,2	36,1	38,4	36,3
Current at maximum Power (Imp/A)	17,29	13,56	17,33	13,57	17,37	13,62	17,41	13,71	17,45	13,72
Module Efficiency (%)	20,90%	15,58%	21,10%	15,68%	21,30%	15,81%	21,40%	15,94%	21,60%	16,03%

## MECHANICAL PARAMETERS

Cell Orientation	single crystal PERC210x105mm (132 pieces)
Junction Box	IP68, three diodes
Output Cable	4.0mm <sup>2</sup> 1200mm(+) / 1200mm(-) or customized
Glass	3.2mm tempered coated glass, low iron
Frame	Anodized aluminum alloy frame
Weight	32 kg
Dimensión	2384*1303*35mm
Packaging	31 pcs*pallet / 124cs*20GP / 558pcs*40HC

## PHYSICAL CHARACTERISTICS



## OPERATING PARAMETERS

Operational Temperature	-40°C - +85°C
Power Output Tolerance	(0, +3%)
Voc and Isc Tolerance	±3%
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	20 A
Nominal Operating Cell Temperature	45±2°C
Protection Glass	Class II
Fire Rating	Class C

## MECHANICAL LOADING

Front Side Maximum Static Loading	5400 PA
Rear Side Maximum Static Loading	2400 PA
Hailstone Test	Diameter 25mm, impact speed 23m/s

## TEMPERATURA RATINGS (STC)

Temperature Coefficient of Isc	+0.05%/°C
Temperature Coefficient of Voc	-0.27%/°C
Temperature Coefficient of Pmax	-0.35%/°C

## PACKING MANNER

Container	40ft(HQ)
Number of modules per container	558
Number of modules per pallet	31
Number of pallets per container	18
Box gross weight (kg)	1070

TAMESOL Authorized Solar Dealer

**Note:** The specifications are obtained under the Standard Test Conditions (STCs): 1000 W/m<sup>2</sup> solar irradiance, 1.5 Air Mass, and cell temperature of 25°C. The NOCT is obtained under the Test Conditions: 800 W/m<sup>2</sup>, 20°C ambient temperature, 1m/s wind speed, AM 1.5 spectrum.

Please contact [info@tamesol.com](mailto:info@tamesol.com) for technical support. The actual transactions will be subject to the contracts. This parameter is for reference only and it is not a part of the contracts. The specifications are subject to change without prior notice.