

## HOJA TÉCNICA MÓDULO TSM-160M

### INFORMACION GENERAL

Fabricante	Shanghai Topsolar Green Energy Co.Ltd.
Origen	China

### CÉLULAS

Eficiencia	> 14%
Tipo de célula	Monocristalino
Número de células por módulo	72
Dimensiones (mm)	125x125

### DIMENSIONES

Altura (mm)	1574
Ancho (mm)	825
Grosor (sin caja) (mm)	40
Peso (Kg)	15,5
Tipo de marco	Aleación de aluminio anodizado

### CRISTAL

Fabricante	AFG en USA o PILKINGTON en Australia
Tipo	Cristal reforzado

### OTROS

Caja de conexiones	Caja de conexiones TYPV-BM101
Cable	2 cables de 88,50 cm
Conectores	Macho y hembra

### GARANTÍAS

Garantía de la potencia	90% los 10 primeros años y 80% a los 25 años
Garantía de la totalidad del producto	2 años
Certificados	IEC-61215 (CE, TUV)

### FACTORES AMBIENTALES

Voltaje máximo de sistema ( V )	1000
NOCT (nominal operating cell temperature) °C	47 ± 2
Resistencia la viento	60 m/s (216 Km/h) - 200 kg/m <sup>2</sup>
Resistencia al granizo	Caída bola de acero de 227gr desde 1m altura

### COEFICIENTES DE TEMPERATURA

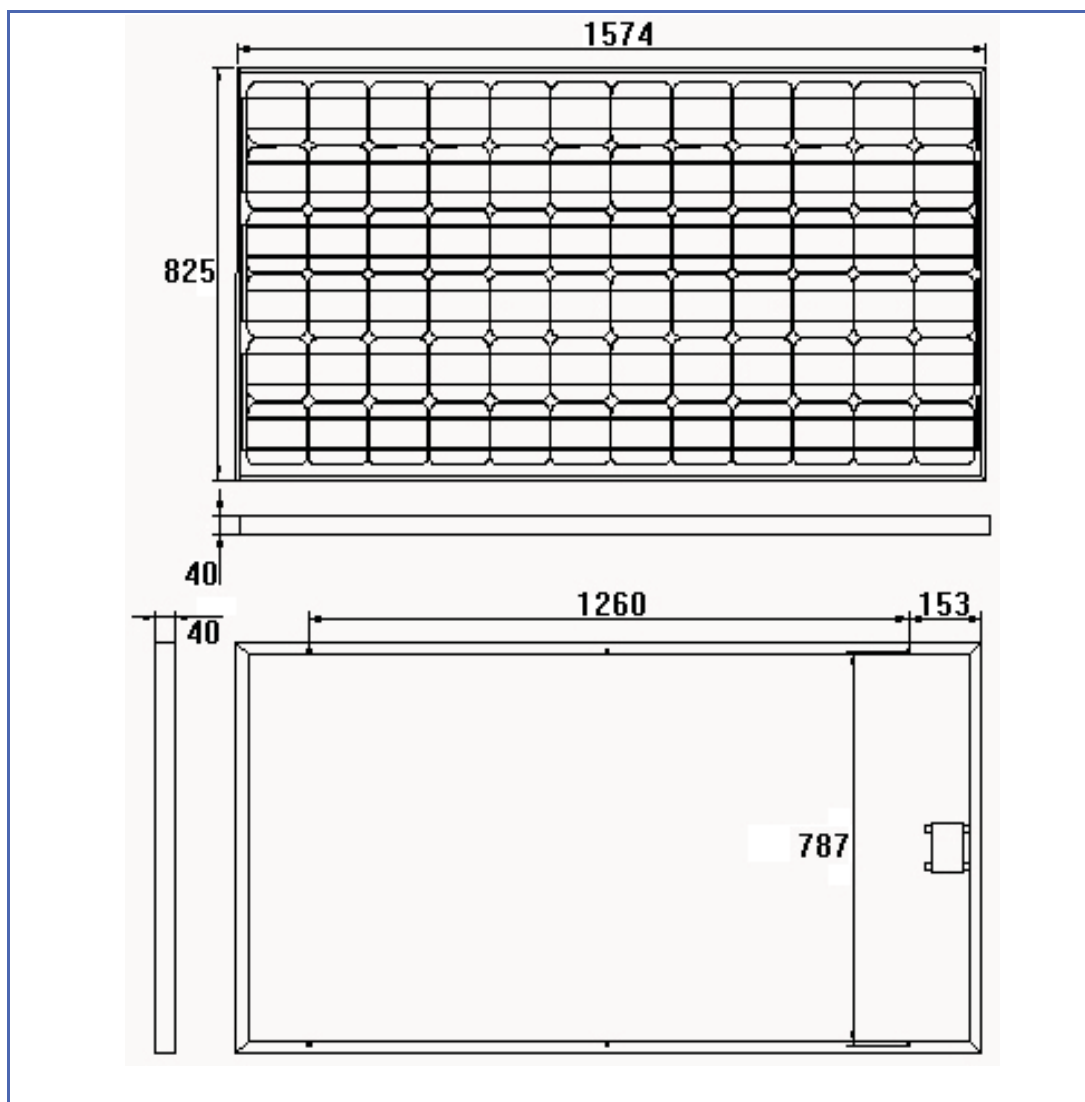
De Potencia ( - )	-0,5% / °C
De Vmax ( - )	-0,34% / °C
De I <sub>max</sub> ( - )	+0,05% / °C
De V <sub>ca</sub> ( - )	-0,34% / °C
De I <sub>cc</sub> ( - )	+0,05% / °C

### ESPECIFICACIONES ELÉCTRICAS

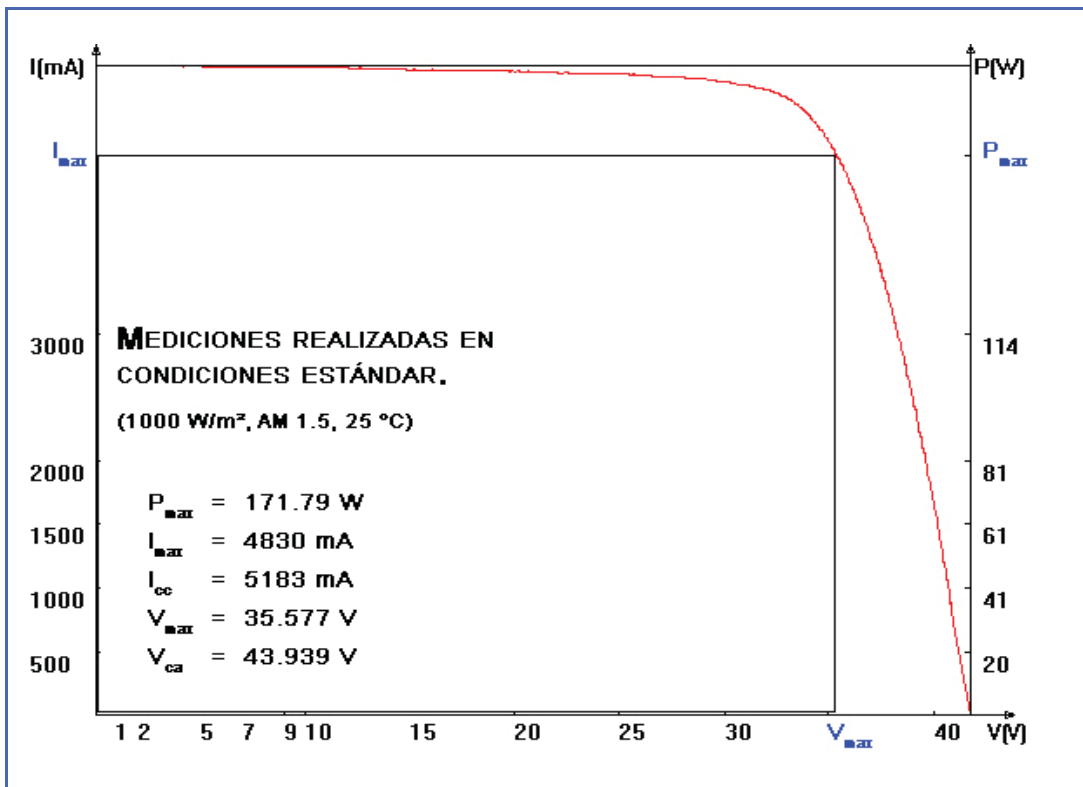
Potencia máxima (P <sub>max</sub> ) (W)	160	165	170	175	180
Intensidad a potencia máxima (I <sub>max</sub> ) (A)	4,54	4,68	4,82	4,96	5,11
Intensidad de cortocircuito (I <sub>cc</sub> ) (A)	4,94	5,06	5,21	5,36	5,52
Voltaje a potencia máxima (V <sub>max</sub> )(V)	35,25	35,25	35,25	35,25	35,25
Voltaje de circuito abierto (V <sub>ca</sub> ) (V)	43,5	43,5	43,5	43,5	43,5
Tolerancia de producción (-)	± 3%	± 3%	± 3%	± 3%	± 3%

Condiciones estándar de test: 1000W/m<sup>2</sup>, AM 1.5,25°C

**DIMENSIONES (mm)**



**CURVA I - V**





# Certificate

Page 1 Report No.: 21205212-1

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<p><b>License Holder:</b>  <b>Shanghai Topsolar Green Energy Co., Ltd.</b>          951 Jianchuan Road          Minhang District, Shanghai          China, 200240</p>	<p><b>Product:</b>  <b>PV Modules</b>          Type: TSM-160M (140 to 165W)</p>
<p><b>Manufacturing Plant:</b>          Shanghai JTU Topsolar Green Energy Co., Ltd.          951 Jianchuan Road          Minhang District, Shanghai          China, 200240</p>	

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**Basis:**

<p><input checked="" type="checkbox"/> <b>TÜV Spec TZE/2.572.09</b>          "Safety Class II Test on Photovoltaic (PV) Modules"</p> <p><input checked="" type="checkbox"/> <b>Factory Inspection</b>          To document the consistent quality of the product factory inspections are performed periodically.</p>		<ul style="list-style-type: none"> <li>• Safety tested,</li> <li>• TÜV-Spec 931/2.572.9</li> <li>• Periodic Inspection</li> </ul>
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**Remarks:**  
 The above mentioned PV module may be used in PV plants at a total voltage (maximum system voltage) of up to **1000 VDC**. The modules consist of glass / EVA / cells / PET- Al Oxide -PET Kallra WP/WP250 (0.25 mm) foil, Yukita junction box, Yukita cable 4mm<sup>2</sup>, Yukita connectors YS-188x/YS-189y and aluminium frame. The module types which are listed above differ in electrical rating and contain 72 mono silicon solar cells (125 mm x 125 mm).

**Conditions:**  
 The product test is voluntarily according to technical regulations. Any change of the design, materials, components or processing may require the repetition of some of the qualification tests in order to retain type approval. The certificate is only valid in conjunction with proof of the mechanical suitability of the modules in accordance with IEC 61215 (or similar procedure).  
**The certificate has a validity of 3 years counting from the date of issue, provided that the testing basis remains unchanged. The series production is not subject to a control and is not part of the assessment.**

Renewable Energies



Dipl.-Ing. W. Vaßen

Cologne, 3 August 2006

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TUV Immissionsschutz und Energiesysteme GmbH, Am Grauen Stein, D-51105 Köln



**VERIFICATION OF EMC COMPLIANCE**

No.:	SHEMO060100017TXC
Applicant:	SHANGHAI TOPSOLAR GREEN ENERGY CO., LTD. No.951 JIANCHUAN ROAD, MINHANG DISTRICT, SHANGHAI, CHINA.
Manufacturer:	SHANGHAI TOPSOLAR GREEN ENERGY CO., LTD. No.951 JIANCHUAN ROAD, MINHANG DISTRICT, SHANGHAI, CHINA.
Product Description:	SOLAR MODULE
Model No:	TSM-185M, 180M, 170M, 165M, 160M, 150M, 140M, 100M, 80M, 75M, 60M, 50M, 40M, 30M, 20M, 15M, 10M, 5M
Technical data:	Not supplied by client
Sufficient samples of the product have been tested and found to be in conformity with	
Test Standard:	EN 61000-6-3: 2001, EN 61000-6-1: 2001
as shown in the	
Test Report Number(s):	SHEMO060100017TX

This verification of EMC Compliance has been granted to the applicant based on the results of the tests, performed by laboratory of SGS-CSTC Standards Technical Services Co., Ltd. on the sample of the above-mentioned product in accordance with the provisions of the relevant specific standards and Directive 2004/108/EC. The affixing of the CE marking presumes in addition that the conditions in annexes III and V of the Directive are fulfilled.

**CE**

  
Tino Pan  
E&E Section Head  
SGS-CSTC

January 20, 2006

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SGSPAPER  
04308658 

# ASU-PTL Photovoltaic Module Qualification

Test Certificate 05092601 is awarded to

**Manufacturer: Shanghai Topsolar Green Energy Co., Ltd.**

**Type: TSM-160M**

**Model: TSM-150M**

Specifications: 72 monocrystalline silicon cells, Yukita potted junction box, EVA encapsulant, TPT backsheet, tempered glass superstrate, and anodized aluminum alloy frame. Maximum system voltage is 1000 V. (See photos on back.)

Tested type: TSM-160M Sampling: Eight unconditioned test samples

Samples received: 6/20/05

Tests conducted from: 6/21/05

To: 9/26/05

Tests conducted at: PTL, 7349 E. Unity Avenue, Mesa, Arizona, 85212

Manufacturer's Address: Shanghai JIU Topsolar Green Energy Co., Ltd., 951 Jianchuan Road, Minhang District, Shanghai, China, 200240

Test data and analysis detailed in Test Report #: 05092601

Certificate Issue Date: September 26, 2005

PTL Project: THT05002



Certificate #0921-01  
Since 6/23/97

The **Arizona State University Photovoltaic Testing Laboratory (ASU-PTL)** acknowledges that the above model(s) of photovoltaic modules have been subjected to and passed the minimum requirements defined in test standard(s):

- 1. IEC 61215: Design qualification and type approval for crystalline silicon terrestrial photovoltaic (PV) modules [1993-04].**

Models listed above qualified based upon IEC TC82WG2 Re-test Guidelines [5/17/00] and IEC TC82WG2 Type and Model Conventions [4/16/02].

All tests in the above listed test standard(s) are within the ASU-PTL's scope of accreditation. Exception(s): None

Deviations from, additions to, or exclusions from aforementioned test standard(s): None

This test certificate may be used by the manufacturing company for its own purposes. However, the ASU-PTL cannot accept any legal responsibility from such use. If the tested type undergoes any future design or process modifications, limited re-testing is required to maintain valid certification according to the applicable Re-test Guidelines.

*G. Govindasamy*

Dr. Govindasamy Tamizh-Mani, Director  
Certifying Authority

*Joseph M. Kuitche*

Joseph M. Kuitche, Test Engineer  
Certifying Witness

*Todd W. Arendt*

Todd Arendt, Test Manager  
Certifying Witness

