

# TS CIGS SERIES HIGH-EFFICIENCY CIGS SOLAR MODULE

145 W / 150 W / 155 W / 160 W

## Features

- Advanced proprietary CIGS thin-film technology
- Plus sorting at +5 W to -0 W
- Up to 3% additional energy yield due to light soaking effect
- Low temperature coefficient provides energy yield benefits
- Aesthetically appealing all-black appearance
- Framed module designed for easy use with industry-standard mounting systems
- Etched, unchangeable serial numbers for full traceability of each module

## Quality and Safety

- IEC, MCS and UL certified
- Rated for snow and wind loads up to 2,400 Pa
- Free of potential induced degradation (PID) effects
- Manufactured at an ISO 9001: 2008, ISO 14001 and OHSAS 18001 certified facility
- Certified for harsh environments: Salt mist corrosion (IEC 61701) and Blowing sand resistant (DIN EN 60068-2-68)

## Warranty

- Product warranty\*: 10 years for material and workmanship
- Power output warranty\*: 90% at 10 years and 80% at 25 years of minimum rated power output



A TSMC Company

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## Electrical Characteristics

Standard Test Conditions (STC)

TS CIGS Series		TS-145C2	TS-150C2	TS-155C2	TS-160C2	
Maximum power	$P_{max}$	145	150	155	160	$W_p$
Factory binning		+5/-0	+5/-0	+5/-0	+5/-0	W
Open-circuit voltage	$V_{oc}$	86.0	86.6	86.7	86.8	V
Short-circuit current	$I_{sc}$	2.62	2.62	2.62	2.62	A
Maximum power voltage	$V_{mpp}$	63.6	65.5	67.1	68.7	V
Maximum power current	$I_{mpp}$	2.28	2.29	2.31	2.33	A
Module efficiency	Eff%	13.3	13.8	14.3	14.7	%
Power tolerance <sup>1</sup>		+/-5%				
Maximum reverse current	$I_R$	6.5 A				
Maximum system voltage		1000 Vdc (IEC), 600 Vdc (UL)				
Operating temperature		-40°C to 85°C				

IV Parameters measured at STC: 1000 W/m<sup>2</sup>, module temperature 25°C, AM 1.5 after factory light soaking. All IV ratings are +/- 10%.

<sup>1</sup> Pre-binning power tolerance as certified by UL/TÜV-SÜD, TSMC Solar only delivers modules with greater than or equal to nameplate power.

## Normal Operating Cell Temperature Conditions (NOCT)

Maximum power	$P_{max}$	109.4	113.2	116.9	120.7	W
Open-circuit voltage	$V_{oc}$	78.9	79.4	79.5	79.6	V
Short-circuit current	$I_{sc}$	2.1	2.1	2.1	2.1	A
Maximum power voltage	$V_{mpp}$	60.0	61.8	63.3	64.8	V
Maximum power current	$I_{mpp}$	1.82	1.83	1.85	1.86	A

Conditions at NOCT: 800 W/m<sup>2</sup>, ambient temperature 20°C, AM 1.5

## Thermal Characteristics

NOCT	46.5 ± 1°C
Temperature Coefficient of $P_{max}$	-0.30% / °C
Temperature Coefficient of $V_{oc}$	-0.29% / °C
Temperature Coefficient of $I_{sc}$	0.01% / °C

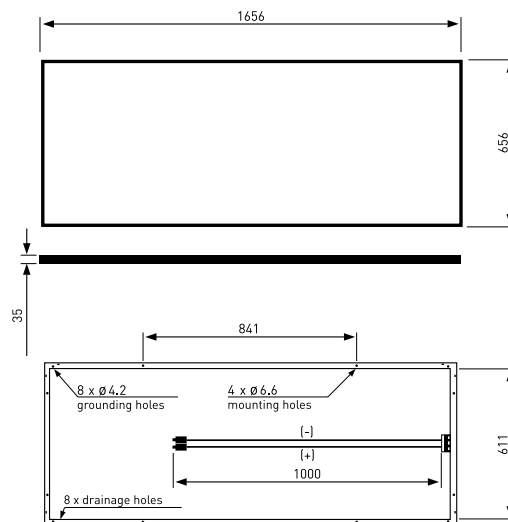
## Mechanical Characteristics

Snow/wind load (IEC)	2,400 Pa
Dimensions in mm	1656 x 656 x 35
Weight in kg	17.5
Frame	Black anodised aluminum
Front cover	Anti-reflective coated, textured white tempered glass
Junction box, connector	IP 67, MC-4 compatible
Output cable cross section and length	2.5 mm <sup>2</sup> , 1000 mm
Cell type	133 CIGS cells
Safety class	II
Fire rating	Class C

The information contained herein is subject to change without notice.

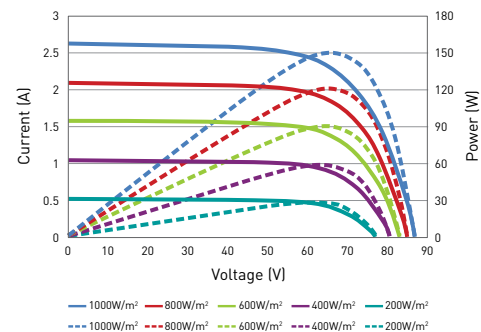
Caution: Read the installation guidelines before using, handling, installing or operating TSMC Solar modules.

## Physical Specifications



All measurements in mm

## I-V and P-V Curve (TS-150C2)



## Performance at Low Irradiance

Typical relative efficiency reduction of maximum power from an irradiance of 1,000 W/m<sup>2</sup> to 200 W/m<sup>2</sup> at 25°C is 7%.

## Certifications



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Get in contact with us!  
We look forward to your call or your e-mail!

**EUROPE**  
TSMC Solar Europe GmbH  
Am Kaiserkai 1  
20457 Hamburg, Germany  
Tel.: +49 (0) 40 / 80 80 745 40  
SolarEU@tsmc.com

**NORTH AMERICA**  
TSMC Solar North America  
2595 Junction Avenue  
San Jose, CA 95134, USA  
Tel.: +1 408 678 2816  
SolarNA@tsmc.com

**ASIA/REST OF WORLD**  
TSMC Solar Ltd.  
5, Keya W. Rd., Daya Dist.  
Taichung, Taiwan 428-82  
Tel.: +886 4 27 03 66 88  
SolarAsia@tsmc.com