

# HIT PHOTOVOLTAIC MODULE HIP-190NE1



The SANYO HIT (Heterojunction with Intrinsic Thin layer) solar cell is made of a thin mono crystalline silicon wafer surrounded by ultra-thin amorphous silicon layers. This product provides the industry's leading performance and value using state-of-the-art manufacturing techniques.



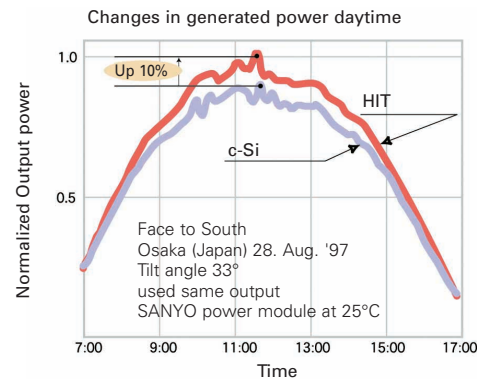
## Benefit in Terms of Performance

**High efficiency cell: 18.4%, Module: 16.5%**

The HIT cell and module have the world's highest level of conversion efficiency in mass production.

## High performance at high temperatures

Even at high temperatures, the HIT solar cell can maintain higher efficiency than a conventional crystalline silicon solar cell.



## Benefit to the Environment

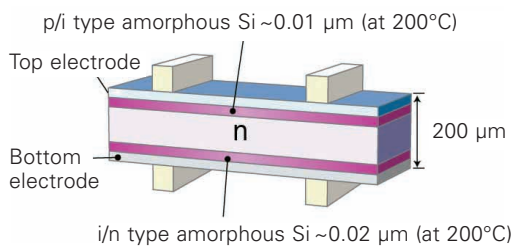
### Low production energy

HIT solar cell requires only 200°C for the junction forming process (conventional crystalline silicon solar cell: about 900°C). This helps save energy.

### Thin design

The HIT solar cell is only about 200  $\mu\text{m}$  thick. (A conventional crystalline silicon solar cell is about 350  $\mu\text{m}$  thick.) This helps save on silicon materials.

## HIT Solar Cell Structure



Development of HIT solar cell was supported in part by the New Energy and Industrial Technology Development Organization (NEDO).

## Benefit in Terms of Quality

### High quality in accordance with ISO 9001 and 14001 standards

HIT solar cells and modules are subject to strict inspections and measurements to ensure compliance with electrical, mechanical and visual criteria.

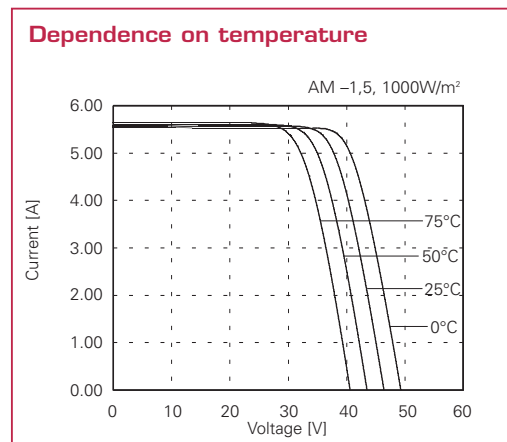
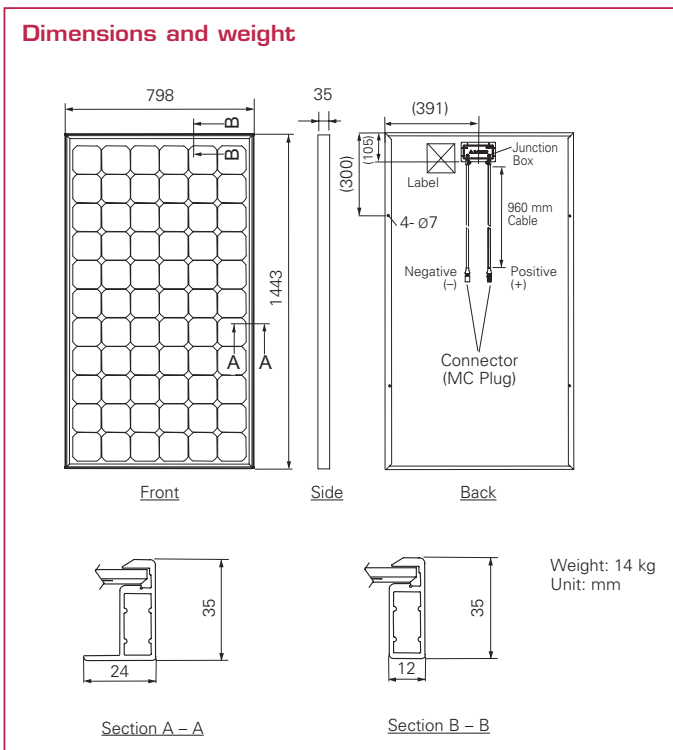
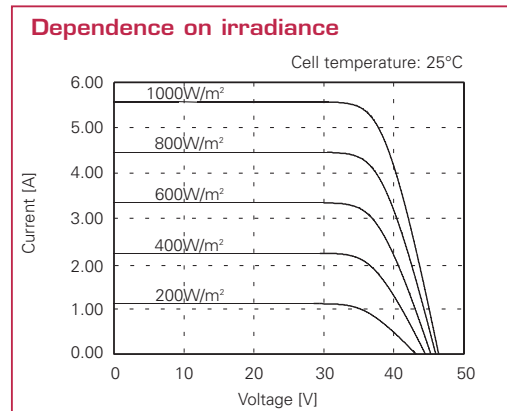


# Electrical and Mechanical Characteristics

## HIP-190NE1

Electrical data		
Maximum power (Pmax)	[W]	190
Max. power voltage (Vmp)	[V]	37.6
Max. power current (Imp)	[A]	5.05
Open circuit voltage (Voc)	[V]	46.4
Short circuit current (Isc)	[A]	5.57
Warranted minimum power (Pmin)	[W]	180.5
Output tolerance	[%]	+10/-5
Maximum system voltage	[V]	760
Temperature coefficient of Pmax	[% / °C]	-0.30
Voc	[V / °C]	-0.116
Isc	[mA / °C]	1.67

Note 1: Standard test conditions: Air mass 1.5, Irradiance = 1000W/m<sup>2</sup>, Cell temperature = 25°C  
 Note 2: The values in the above table are nominal.



### Certificates



IEC 61215



- Qualified IEC 61215
- Safety tested
- TÜV-Spec 821/2 572.9
- Periodic inspection



Electrical Protection Class II

Please consult your local dealer for more information.



**Caution!** Please read the operating instructions carefully before using the products.

Owing to our policy of continual improvement the products covered by this brochure may be changed without notice.

**SANYO Component Europe GmbH**  
**Mobile & Clean Energy Division**  
 Stahlgruberring 4  
 81829 Munich, Germany  
 TEL: +49-(0)89-460095-0  
 FAX: +49-(0)89-460095-170  
<http://www.sanyo-energy-europe.com>  
 email: info.europe@sanyo-energy.com

**SANYO Energy (U.K.) Co., Ltd.**  
 Masterson House, 30 - 31 Mark Road,  
 Hemel Hempstead,  
 Hertfordshire HP2 7BW  
 TEL: +44-(0)1442-21 31 21  
 FAX: +44-(0)1442-21 20 21  
<http://www.sanyo-energy-europe.com>  
 email: info.europe@sanyo-energy.com



**SANYO Electric Co., Ltd**  
 Component Group, Clean Energy Company  
 5-5, Keihan-Hondori 2, Moriguchi,  
 Osaka 570-8677, Japan  
 TEL: +81-(0)6-6994-7282  
 FAX: +81-(0)6-6994-7289  
[http://www.sanyo.co.jp/solar/hit\\_e/index\\_e.html](http://www.sanyo.co.jp/solar/hit_e/index_e.html)  
 email: i-webmaster@sm.energy.sanyo.co.jp