

HIT photovoltaic module

VBHN235SE10

The HIT cell and module have very high conversion efficiency in mass production.

Model	Cell Efficiency	Module Efficiency
VBHN235SE10	21.1%	18.6%

R&D technology adaptation

Improvement of cell efficiency to reduce

- carrier recombination loss
- optical absorption loss
- resistance loss

Application of three tabs

- Reducing electrical loss between the cell fingers and tabs
- Making the tab width thinner to expand the light receiving surface

New tab design

18.6%
186 W/m²

Anti-reflection glass

Light capturing technology

- Reducing reflection and scattering of incoming light
- Improving generated electricity levels in morning and evening times



HIT cell technology

The HIT (Heterojunction with IntrinsicThin layer) solar cell is made of a thin monocrystalline 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.

Quality

Panasonic is truly committed to quality since it began developing and manufacturing solar PV modules in 1975. Our long track record is supported with our claim-rate of only 0,00214 % or 62 product- guarantee cases out of 2,885,689 solar modules produced in our European factory in Dorog, Hungary (as of Nov. 2011) with 0 cases of output guarantee and 0 guarantee-related legal challenges. (This is data from the European factory, quoted just as a reference to show that HIT products have high quality control.)

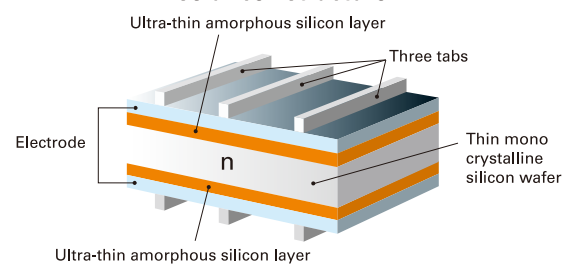
Special features

HIT solar modules are 100% emission free, have no moving parts and produce no noise. The small dimensions of the HIT modules allows for a space-saving installation and achievement of maximum output power possible on a given roof area. The light weight design reduces the load bearing on the roof.

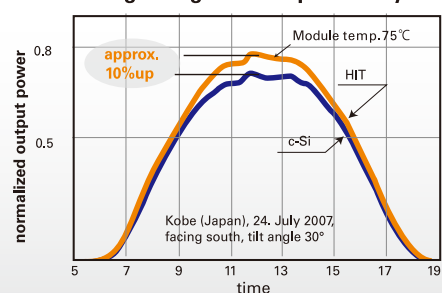
High performance at high temperatures

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

HIT® solar cell structure



Changes in generated power daytime



HIT[®]
Photovoltaic Module

HIT is a registered trademark of Panasonic Group. The name "HIT" comes from "Heterojunction with intrinsic Thin-layer" which is an original technology of Panasonic Group.

Electrical data (at STC)

Max. power (Pmax) [W]	235
Max. power voltage (Vmp) [V]	43.0
Max. power current (Imp) [A]	5.48
Open circuit voltage (Voc) [V]	51.8
Short circuit current (Isc) [A]	5.84
Max. over current rating [A]	15
Output power tolerance [%]	+10/-5*
Max. system voltage [V]	1000

Note: Standard Test Conditions: Air mass 1.5; Irradiance = 1000W/m²; cell temp. 25°C
 * All modules measured by Panasonic facility have output with positive tolerance.

Temperature characteristics

Temperature (NOCT) [°C]	46.0
Temp. coefficient of Pmax [%/°C]	-0.30
Temp. coefficient of Voc [V/°C]	-0.130
Temp. coefficient of Isc [mA/°C]	1.75

At NOCT

Max. power (Pmax) [W]	179
Max. power voltage (Vmp) [V]	40.5
Max. power current (Imp) [A]	4.41
Open circuit voltage (Voc) [V]	48.9
Short circuit current (Isc) [A]	4.70

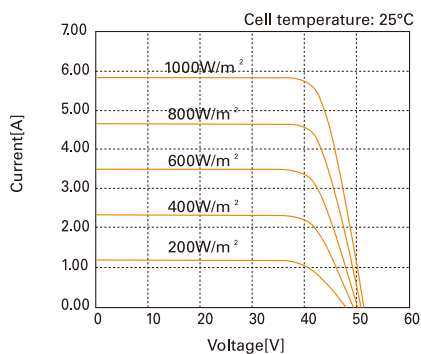
Note: Nominal Operating Cell Temp.: Air mass 1.5 spectrum; Irradiance = 800W/m²;
 Air temperature 20°C; wind speed 1 m/s

At low irradiance

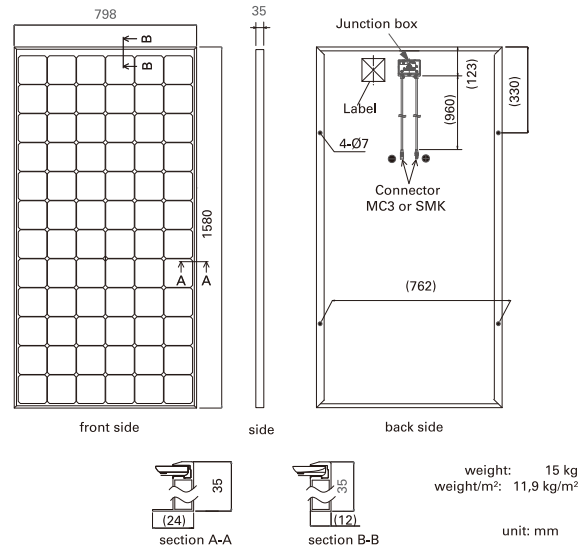
Max. power (Pmax) [W]	44.7
Max. power voltage (Vmp) [V]	41.0
Max. power current (Imp) [A]	1.09
Open circuit voltage (Voc) [V]	48.4
Short circuit current (Isc) [A]	1.17

Note: Low irradiance: Air mass 1.5 spectrum; Irradiance = 200W/m²; cell temp. = 25°C

Dependence on irradiance



Dimensions and weight



Guarantee

Power output: 10 years (90% of Pmin), 25 years (80% of Pmin)
 Product workmanship: 10 years
 (Based on guarantee document)

Materials

Cell material: 5 inch HIT cells
 Glass material: AR coated tempered glass
 Frame materials: Black anodized aluminium
 Connectors type: MC3 or SMK

Certificates



Manufactured by SANYO Electric Co., Ltd.

Please consult your local dealer for more information.

CAUTION! Please read the installation manual carefully before using the products.

Panasonic Australia Pty. Ltd.

■ 1 Innovation Road Macquarie Park NSW 2113 Australia
 ■ Tel: +61-2-9491-7400
 ■ Fax: +61-2-9491-7450
 www.panasonic.com.au

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