

**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**

**Anti-
reflection
glass**

Light capturing technology

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

19.0%*
190 W/m²



* For N240

HIT cell technology

The HIT (Heterojunction with Intrinsic Thin 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. The development of the HIT solar cell was supported in part by the New Energy and Industrial Technology Development Organization (NEDO).

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 0.0034% out of 3,200,497 solar modules produced in our European factory in Dorog, Hungary (as of July 2012).

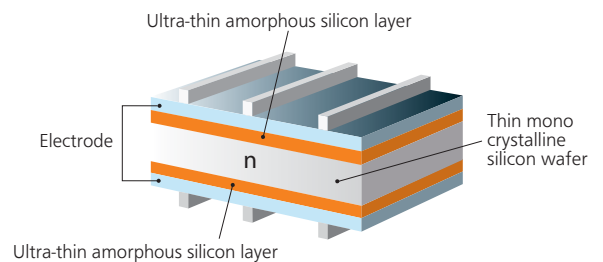
Special features

HIT solar modules are 100% emission free, have no moving parts and produce no noise. The dimensions of the HIT modules enable a space saving installation and the achievement of maximum output power possible on a given roof area.

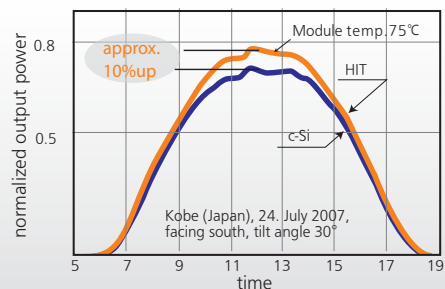
High performance at high temperatures

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

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

Model	Cell Efficiency	Module Efficiency	Output/m ²
N240	21.6%	19.0%	190 W/m ²
N235	21.1%	18.6%	186 W/m ²

Electrical data (at STC)

	VBHN240SE10	VBHN235SE10
Max. power (Pmax) [W]	240	235
Max. power voltage (Vmp) [V]	43.7	43.0
Max. power current (Imp) [A]	5.51	5.48
Open circuit voltage (Voc) [V]	52.4	51.8
Short circuit current (Isc) [A]	5.85	5.84
Max. over current rating [A]	15	
Production tolerance power [%]	+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

	VBHN240SE10	VBHN235SE10
Temperature (NOCT) [°C]	44.0	44.0
Temp. coefficient of Pmax [%/°C]	-0.29	-0.29
Temp. coefficient of Voc [V/°C]	-0.131	-0.130
Temp. coefficient of Isc [mA/°C]	1.76	1.75

At NOCT

	VBHN240SE10	VBHN235SE10
Max. power (Pmax) [W]	182	179
Max. power voltage (Vmp) [V]	41.1	40.5
Max. power current (Imp) [A]	4.44	4.41
Open circuit voltage (Voc) [V]	49.4	48.9
Short circuit current (Isc) [A]	4.71	4.70

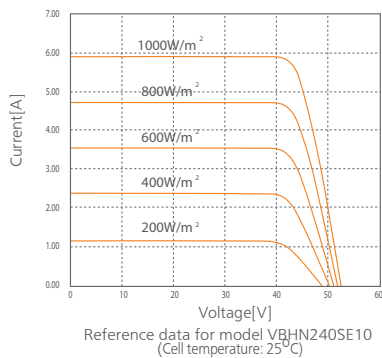
Note: Nominal Operating Cell Temp.: Air mass 1.5 spectrum; Irradiance = 800W/m²;
 Air temperature 20°C; wind speed 1 m/s

At low irradiance

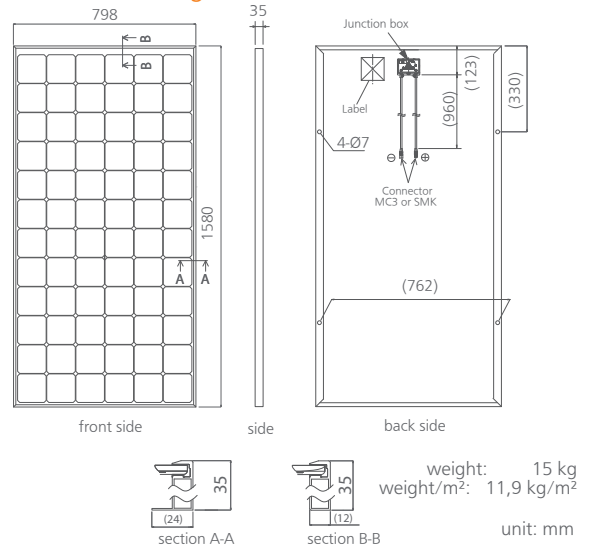
	VBHN240SE10	VBHN235SE10
Max. power (Pmax) [W]	45.9	44.7
Max. power voltage (Vmp) [V]	41.7	41.0
Max. power current (Imp) [A]	1.10	1.09
Open circuit voltage (Voc) [V]	49.0	48.4
Short circuit current (Isc) [A]	1.17	1.17

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

www.tuv.com
TÜVRheinland
ID: 00002345

APPROVED PRODUCT

Certificate No. MCS PV0034
Photovoltaic System

Member of

www.tuv.com
TÜVRheinland
ID: 00002345

- Ammonia resistance tested
- Salt mist corrosion tested
- Periodic inspection

Electrical Protection
Class II

Please consult your local dealer for more information.

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

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