

**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/m<sup>2</sup>



\* 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).

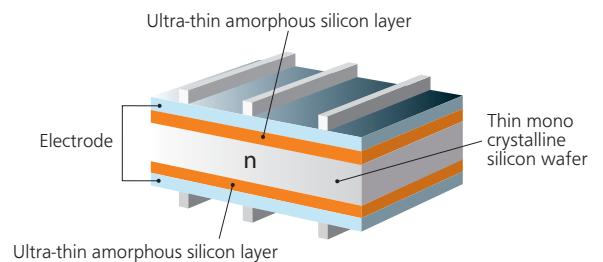
**Special features**

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.

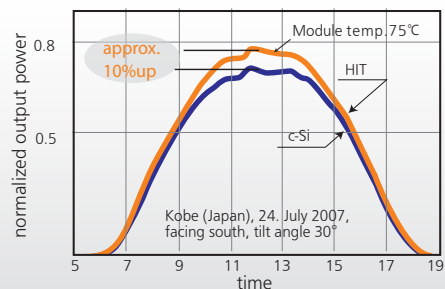
**High performance at high temperatures**

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

**HIT<sup>®</sup> 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 <sup>2</sup>
N240	21.6%	19.0%	190 W/m <sup>2</sup>
N235	21.1%	18.6%	186 W/m <sup>2</sup>

### 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/m<sup>2</sup>; 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

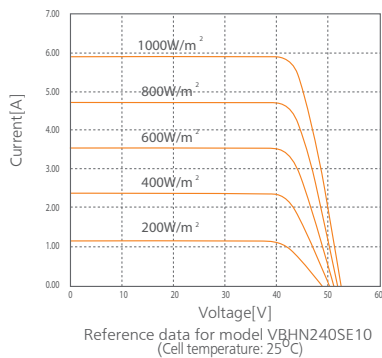
Note: Nominal Operating Cell Temp.: Air mass 1.5 spectrum; Irradiance = 800W/m<sup>2</sup>; Air temperature 20°C; wind speed 1 m/s

### At low irradiance

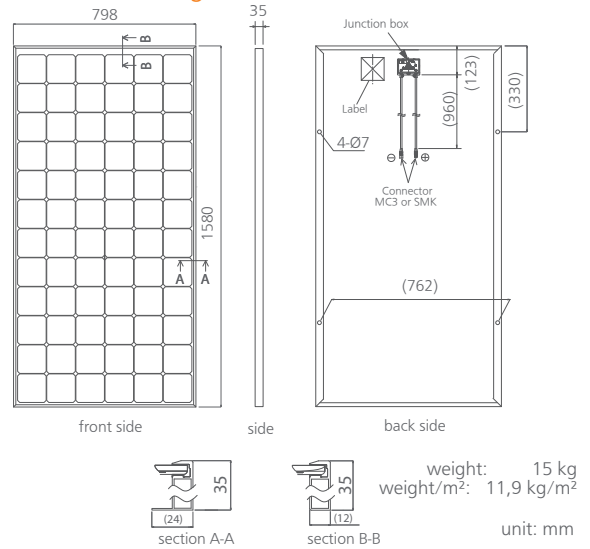
	VBHN240SE10	VBHN235SE10
Max. power (Pmax) [W]	45.9	44.7
Max. power voltage (Vmp) [V]	41.7	41.0
Max. power current (Imp) [A]	1.10	1.09
Open circuit voltage (Voc) [V]	49.0	48.4
Short circuit current (Isc) [A]	1.17	1.17

Note: Low irradiance: Air mass 1.5 spectrum; Irradiance = 200W/m<sup>2</sup>; 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

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ID: 00002345

APPROVED PRODUCT

Certificate No. MCS PV0034  
Photovoltaic System

Member of

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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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