



## BP-M-WD Series Amorphous Thin Film Solar Module

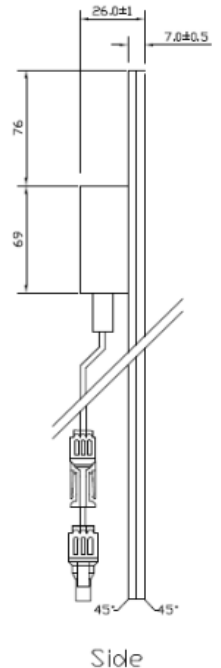
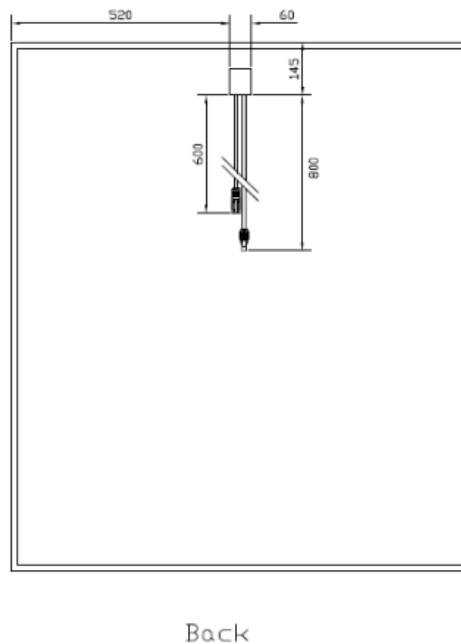
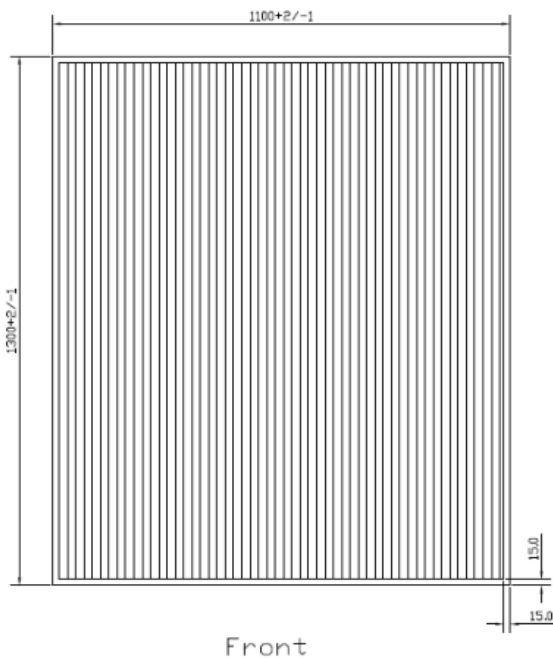
BP-M-WD Series products represent the latest advancements in Amorphous Silicon Thin Film Photovoltaic Modules technology. This is our basic products with excellent performance and reliability suitable for solar farms and BAPV applications. These are easy to install, require little maintenance, and long life ( over 80% of nominal power output after 25 years guaranteed). The module (type BP-M-WD) complies with the requirements of IEC 61730 & IEC 61646. It's a choice combined with both performance and safety.



### 1. Dimensions and Drawing

Refer to the following diagram.

Unit: mm



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## 2. Product Specifications

### Physical Specifications

Active Material of Cell	Amorphous silicon	
Junction Type of Cell	Single-junction	
Material for Encapsulation	Polyvinylbutyral (PVB), thickness: 0.76 mm	
Front Cover	Float glass, thickness: 3.2 mm	
Back Cover	Thermally strengthened glass, thickness: 3.2 mm	
Wiring Material	Tin & silver coated copper ribbon, thickness: 0.1 mm	
Junction Box	Bypass Diode	Yes
	IP Class	IP67
	Cable Length	Direction: Downward ; Length: 800 mm(+), 600 mm(-)
Connecting Cable/Plug	Rated voltage: 1000 V D.C. Temperature range: -40 to 85 °C Plug/Socket type: MC4 compatible, $\varnothing$ 4 mm Cable cross section: 2.5 mm <sup>2</sup>	
Transparency	No	
Frame	No	
Dimensions	Length	1300 mm +2/-1 mm
	Width	1100 mm +2/-1 mm
	Thickness	7.0 $\pm$ 0.5 mm (without junction box) ; 26.0 $\pm$ 1.0 mm (with junction box)
Weight	24.0 $\pm$ 1.0 Kg	

### Certifications

Certifications	EN/IEC 61646 EN/IEC 61730 application Class A UL 1703
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#### Remark:

The module is tested under 2400 Pa (50 lb/ft<sup>2</sup>) mechanical load or approximately to a wind speed of 130 km/h (80 mph) with certificated mounting solution. Other mounting solutions for higher mechanical loads tested in-house by SWS are also available and warranted.

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## Electrical Specifications

Max. System Voltage 1000 V D.C. (IEC) ; 600 V D.C. (UL)

Temperature Coefficients  
 Isc: +0.04 %/K  
 Voc: -0.34 %/K  
 Pmpp: -0.22 %/K  
 Vmpp: -0.33 %/K

Maximum Over-current Protection Rating 2 A

Maximum Series Fuse Rating 2 A

Module Classification	Power Grade	Power Grade Tolerance	Stabilized Performance at STC				Initial Performance at STC			
			V <sub>mp</sub> [V]	I <sub>mp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]	V <sub>mp</sub> [V]	I <sub>mp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]
			Electrical Tolerance: $\pm 10\%$							
BP-M-WD105	105W	+4.99/-0Wp	106	1.02	140	1.20	114	1.14	143	1.26
BP-M-WD100	100W		104	0.99	139	1.18	112	1.10	141	1.24
BP-M-WD95	95W		103	0.94	137	1.15	107	1.09	140	1.23

### Remarks:

- The modules electrical ratings are measured under Standard Test Conditions (STC) and have been delivered on the specific table of electrical characteristics as shown above.
- A photovoltaic module may produce more current and/or voltage than reported at STC. Sunny, cool weather and reflection from snow or water can increase current and power output. Therefore, the values of Isc and Voc marked on the modules should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse sizes, and size of controls connected to PV output.
- STC(Standard Test Condition): irradiation of 1000 W/m<sup>2</sup> , spectrum AM 1.5 and a cell temperature of 25 °C.
- The exact measured electrical characteristics are shown on the label of the modules.
- All electrical data is average production data and is subjected to a measuring equipment tolerance of  $\pm 3\%$ .
- Electronic tolerance is  $\pm 10\%$  except power grade tolerance.

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## 3. Packing Specifications

### Packing specifications for 30 modules

30 modules vertically posited in a crate with pallet

Box approx. dimension: 1420(L)×1130(W)×1260(H) mm

Net weight : 710 Kg ± 2%

Gross weight : 810 Kg ± 2%

\*The Packing specification is used in special case.

### Packing specifications for 40 modules

40 modules vertically posited in a crate with pallet

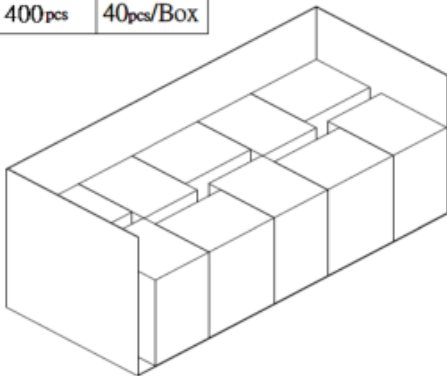
Box approx. dimension: 1180(L)×960(W)×1480(H) mm

Net weight : 947 Kg ± 2%

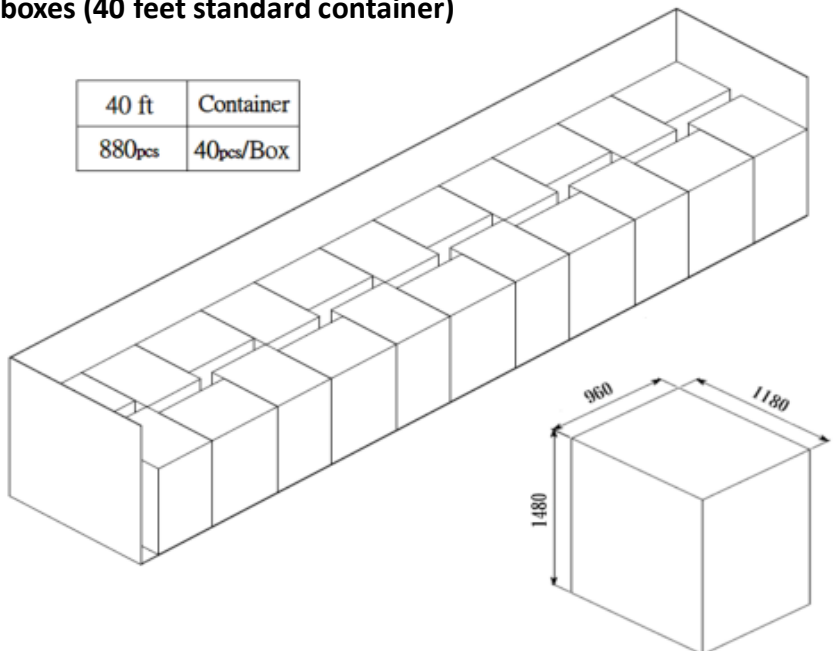
Gross weight : 1010 Kg ± 2%

**Container capacity: 10 boxes (20 feet standard container)  
22 boxes (40 feet standard container)**

20 ft	Container
400pcs	40pcs/BOX



40 ft	Container
880pcs	40pcs/BOX



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## 4. Operating conditions

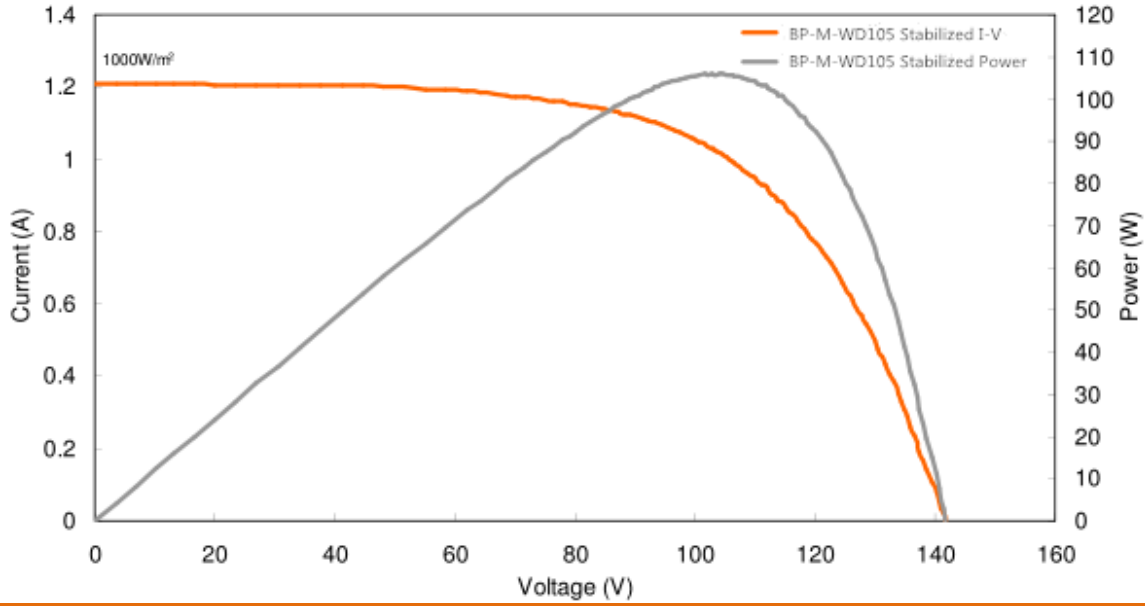
- (1) The modules should be operated under sufficient sunlight and subjected to seawater or snowfall (1 m or more) should be avoided. Ambient temperature should be in the range between  $-20^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ . Module operating temperature should be in the range between  $-20^{\circ}\text{C}$  and  $85^{\circ}\text{C}$ . The vertical installation ( ie. the laser lines on the panel point to ground ) of the PV modules is recommended. Shadow on modules should be prevented otherwise shading shall cause power output decline and even fire hazard. Water accumulating on the junction box or junction box being immersed in water should be avoided.
- (2) The modules must only be used in configurations where the negative polarity of the PV module is connected to ground. Fail to comply with this requirement will invalidate warranty for the modules. Details for the grounding should refer to the applicable local codes for electrical system on specific requirements. Contact your sales agent or SWS if any questions about grounding remained.

## 5. Warranty

Warranty on Product (Workmanship / Material)	Warranty on Power Grade Output
5 years from the date of shipment from SWS.	90% of the power grade output of the module for a 10-year period, 80% of the power grade output of the module for a 25-year period from the date of shipment from SWS.

## 6. Performance characteristics

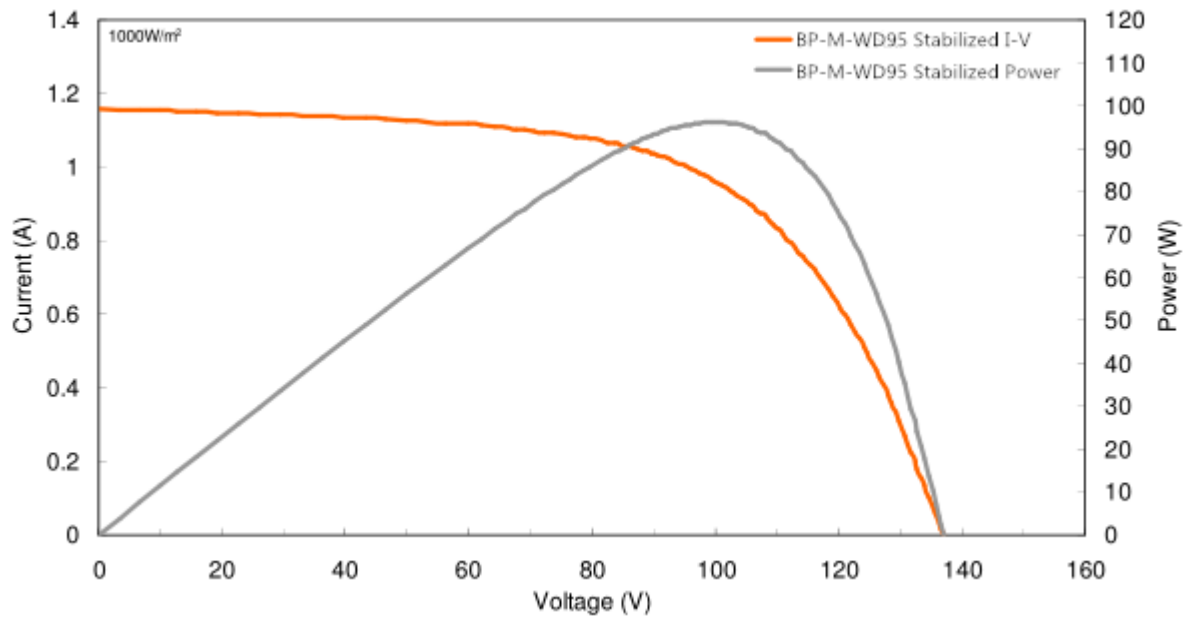
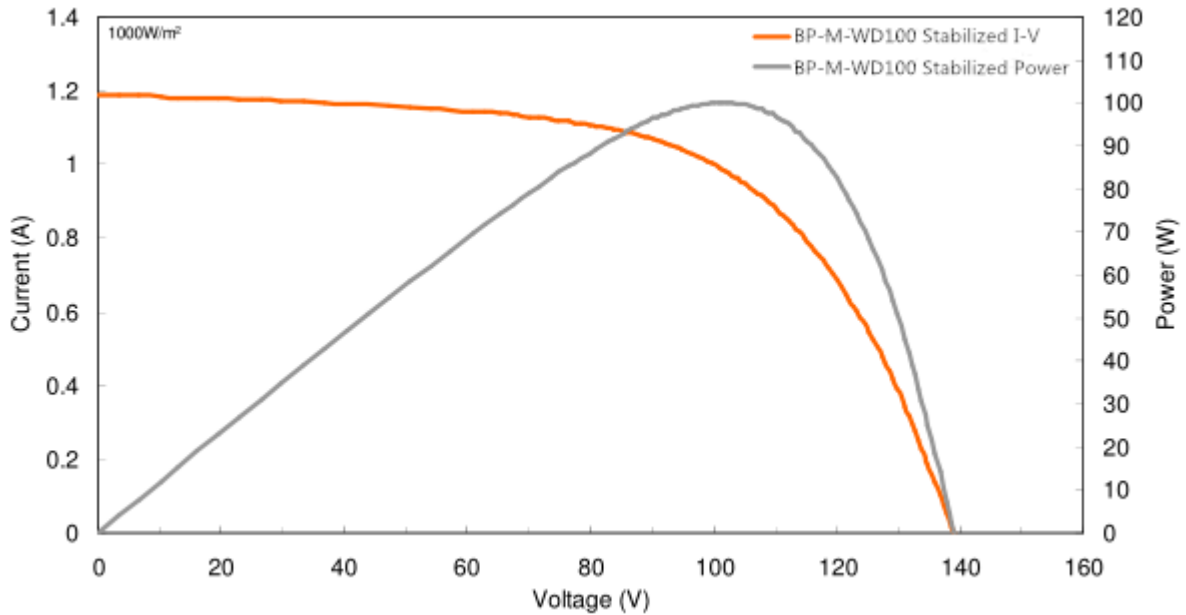
### (1) I-V performance



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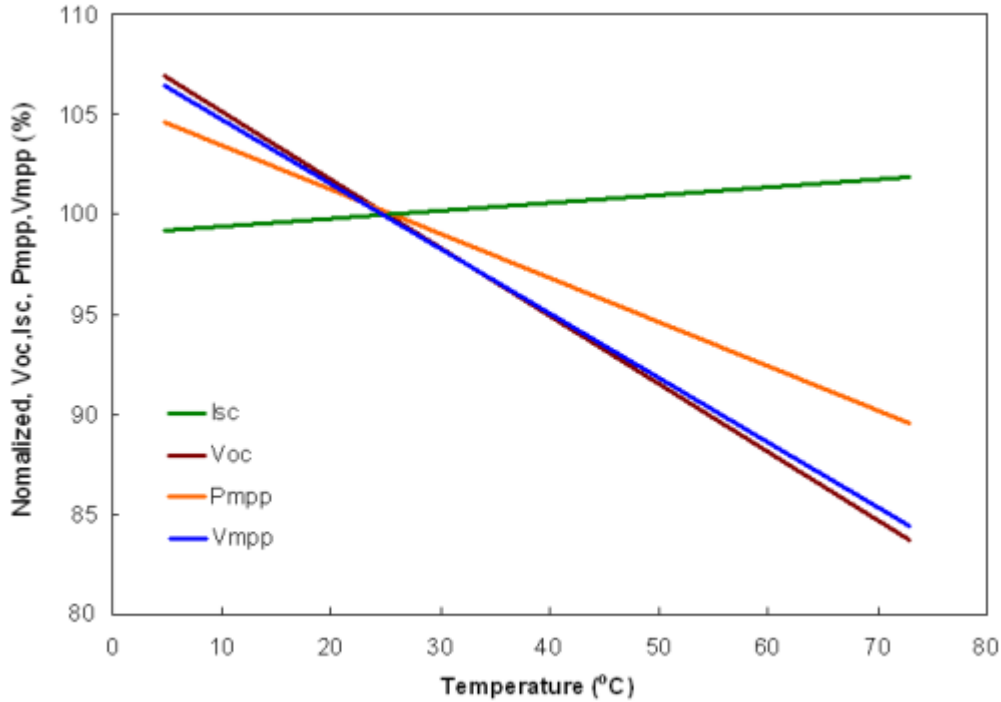
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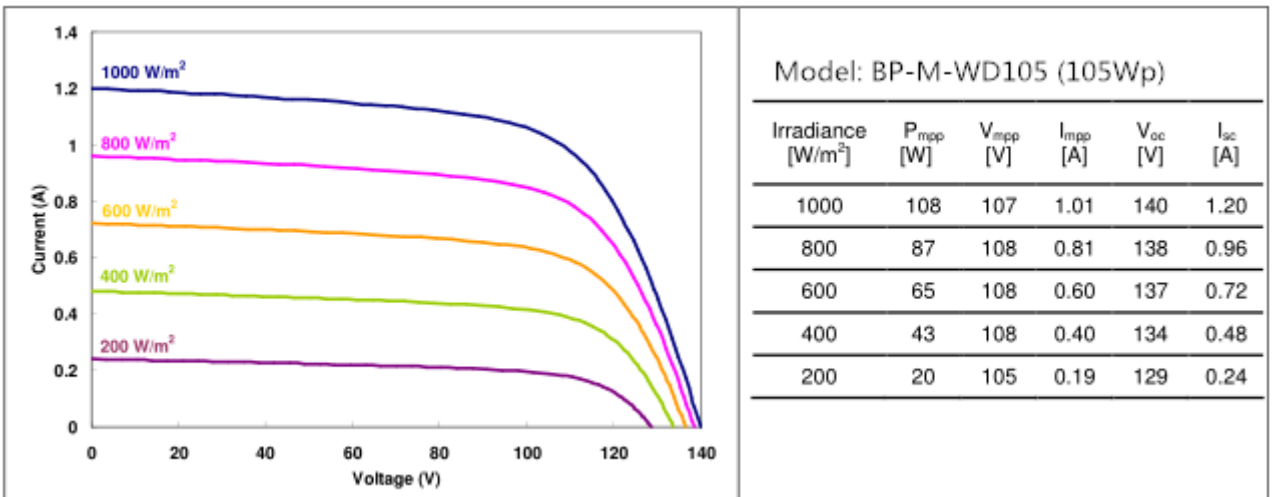


## (2) Temperature coefficients



## (3) Module performance under different irradiances at AM 1.5 and 25°C cell temperature

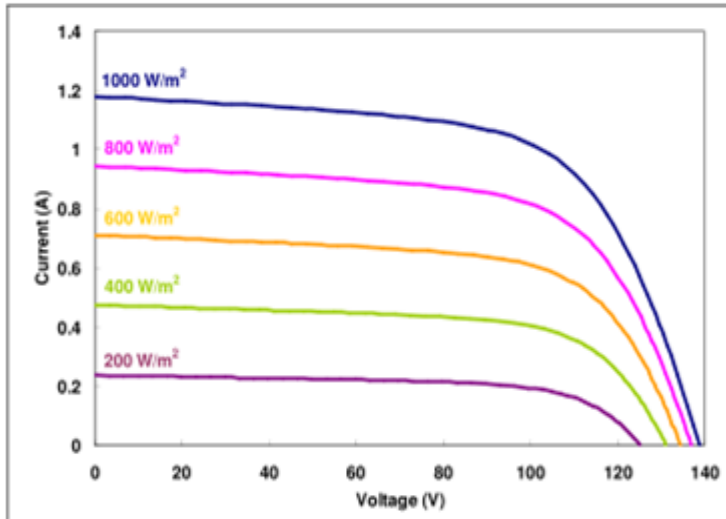
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Electronic tolerance is  $\pm 10\%$  except Pmpp.



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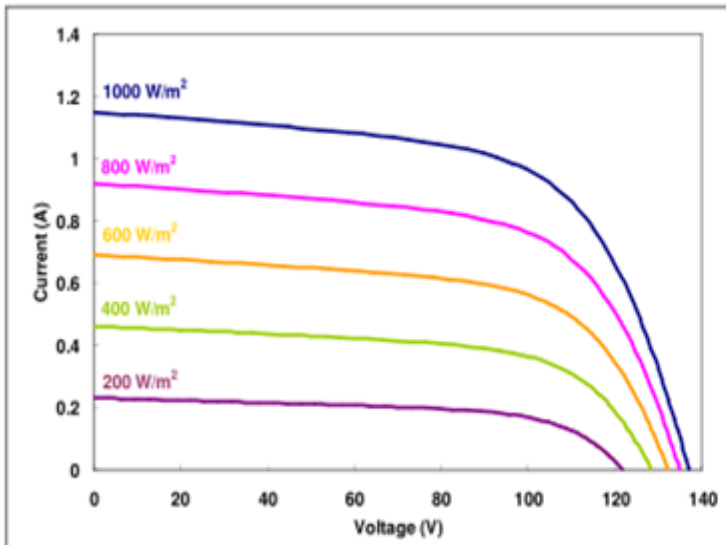
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Model:BP-M-WD100 (100Wp)

Irradiance [W/m <sup>2</sup> ]	P <sub>mpp</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]
1000	103	104	0.99	139	1.18
800	82	105	0.79	137	0.94
600	62	104	0.59	135	0.71
400	41	103	0.39	131	0.47
200	19	100	0.20	125	0.24



Model : BP-M-WD95 ( 95Wp )

Irradiance [W/m <sup>2</sup> ]	P <sub>mpp</sub> [W]	V <sub>mpp</sub> [V]	I <sub>mpp</sub> [A]	V <sub>oc</sub> [V]	I <sub>sc</sub> [A]
1000	97	103	0.94	137	1.15
800	77	103	0.74	135	0.92
600	56	102	0.55	132	0.69
400	36	100	0.37	128	0.46
200	17	95	0.18	122	0.23



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## Application:

### ➤ PV System

Thin film can face all sides with better performance, Grid connected,  
Centralized project with lowest cost and high return

Ground mounted  
PV system



Commercial  
Rooftop PV  
system



Residential  
Rooftop PV  
system



### ➤ BIPV

Integrated on greenhouse, Take better use of lands, Fully integrated on  
roof or façade, Semi-transparent or transparent façade

BIPV agriculture  
greenhouse



BIPV



BIPV



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## ➤ PV Plant



Capacity: 3.7MW  
Type: Ground Mounted  
Location: Schonewalde,  
Germany



Capacity: 285KW  
Type: Rooftop  
Location: California America



Capacity: 1MW  
Type: Ground Mounted  
Location: Bolangir India



Capacity: 1MW  
Type: Ground Mounted  
Location: Yunnan, China



Capacity: 92.16KW  
Type: Rooftop  
Location: Dusseldorf,  
Germany



Capacity: 92.16KW  
Type: Rooftop  
Location: Dusseldorf,  
Germany



Capacity: 485KW  
Type: Rooftop  
Location: Magdeburg  
Germany



Capacity: 648KW  
Type: Rooftop  
Location: Oldenburg  
Germany