



# BIPV Introduction



# Catalog

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# 1、Introduction of BIPV R&D Center



## BIPV R&D Center

BIPV R&D Center, which belongs to Macsun, located in the beautiful city-ChangZhou in JiangSu province, is founded in May,2014. It provides mainly Amorphous silicon thin film solar cells ,modules, all kinds of PV products and solutions for clients.The center has developed several types of BIPV products like types of transparency, which have passed CCC and acquired certification of Green Building.





## 二、 Introduction to BIPV



## Advantages of Macsun Solar BIPV:

Transparency

Transmittance of Thin-film Solar Module: 5%-40%

Weak-light

In case of weak light can the cells generate.

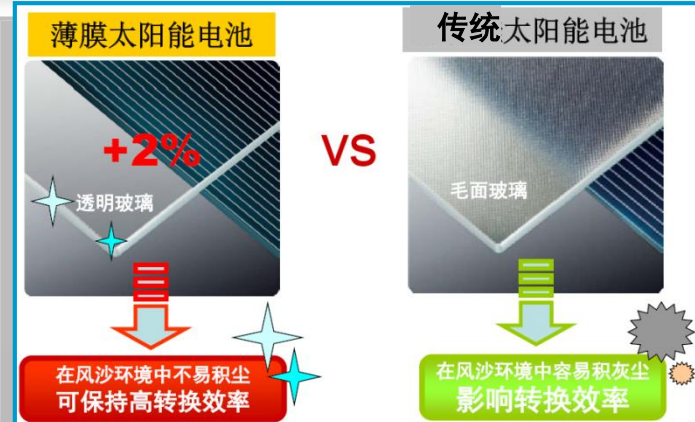
High temperature

In the case of high temperature can Hanergy generate more.

a better adaptability to environment

good-looking appearance

relatively lower cost

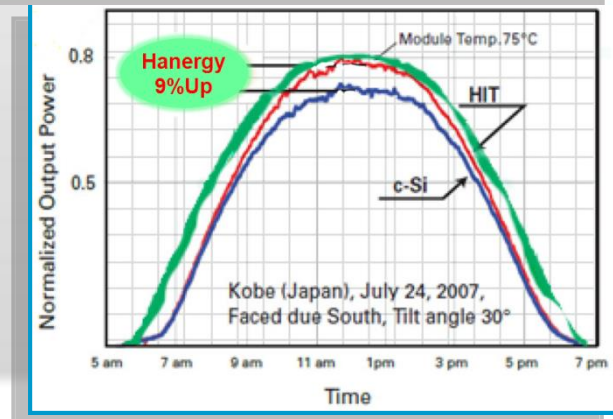


由德国权威TUV评测报告显示:



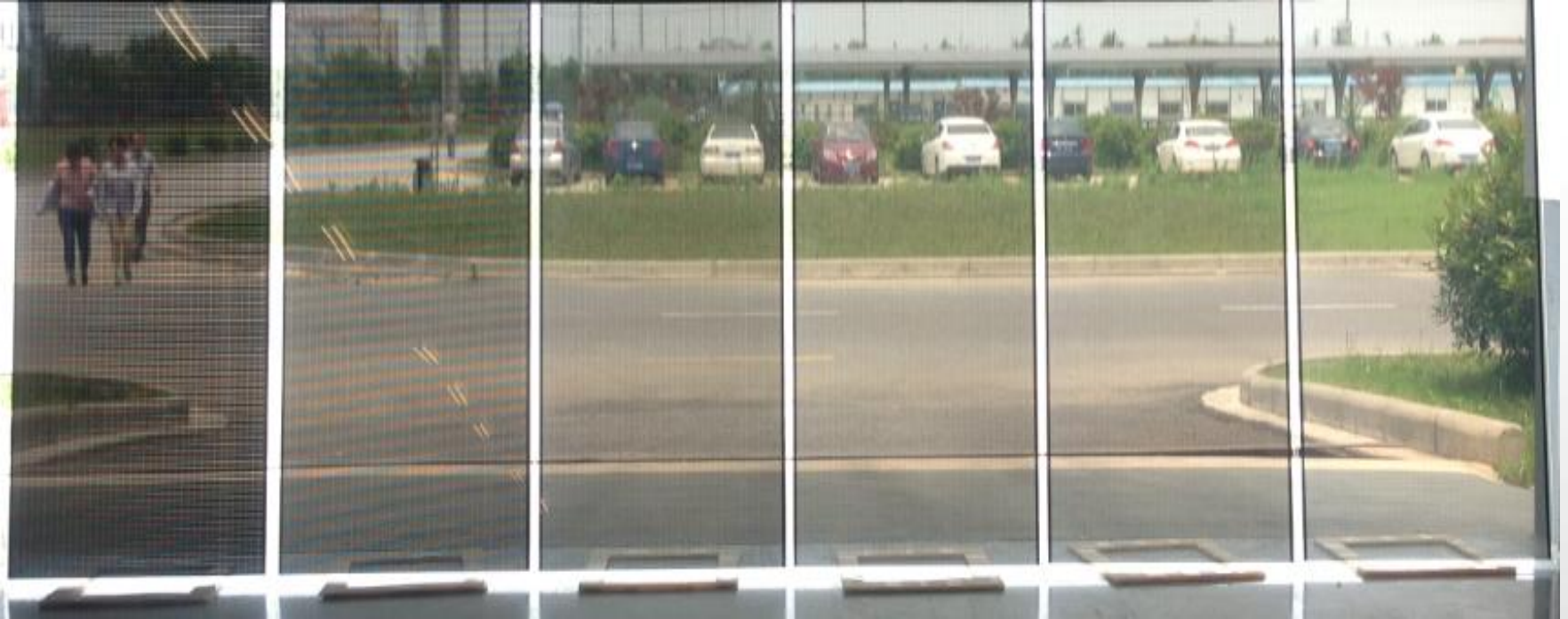
1000W 太阳能电池因温度上升所引起的功率下降对比表

温度 (°C)	非晶硅薄膜电池	其他晶体硅电池	
	*P <sub>max</sub> (W)	*P <sub>max</sub> (W) (Sanyo HIT)	*P <sub>max</sub> (W) (Other c-Si)
50	943	913	888
60	920	878	842
70	897	843	798
75	886	826	775
80	874	809	752
	*Temp. coeff.: -0.227%/°C	*Temp. coeff.: -0.348%/°C	*Temp. coeff.: -0.45%/°C, BestSolar





# BIPV products



◆ Dimension :1245\*635 (typical two-sided glass )

Module transmittance	5%	10%	15%	20%	25%	30%
Module power (W)	60	55	50	45	40	30



## 1、typical BIPV Module

MS-BT65B

### Characteristics

Substrate Materials	TCO glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池, 双玻封装背接不透光

### Performance of the light transmitting module

Maximum Power (W)	65
Voltage at Pmax (V)	70
Current at Pmax (A)	0.93
Open circuit voltage (V)	89
short circuit current (A)	1.12
Power Tolerance (W)	0/+3
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	2

### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	9.7
Weight (kg)	18.6
Module area (m <sup>2</sup> )	0.79
Junction box type	Back junction box
Thickniss of junction box (mm)	20
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Ccrosslinked materials	PVB
Front glass	3.2mmITO Glass
Rear glass	6.0mm Semi-tempered/tempered glass

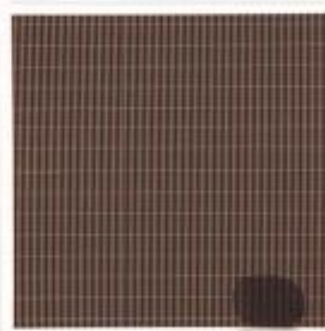
Remarks: All characteristics is depended on the production engineering





All-back contact BIPV Module			
MS-BS30/BD40/BT55TB			
<b>Characteristics</b>			
Substrate Materials	TCO glass		
Component Type	PIN硅基薄膜太阳能电池, 双玻封装侧接透光		
<b>Performance of the light transmitting module</b>			
Transmittance	40%	20%	10%
Maximum Power (W)	30	40	55
Voltage at Pmax (V)	20	46	67
Current at Pmax (A)	1.5	0.87	0.82
Open circuit voltage (V)	31	58	84
short circuit current (A)	2	1.08	0.99
Power Tolerance (W)	±1	±1.5	±2
Maximum system voltage (V)	1000		
Maximum series fuse rated current (A)	3		
<b>Temperature coefficients</b>			
Current temperature coefficient(/°C)	0.02%		
Voltage temperature coefficient(/°C)	-0.20%		
Power temperature coefficient(/°C)	-0.19%		
<b>Mechanical Specifications</b>			
Length (mm)	1245		
width (mm)	635		
Thickness (mm, not including junction box)	9.7		
Weight (kg)	18.6		
Module area (m <sup>2</sup> )	0.79		
Junction box type	Lateral junction box		
Thickniss of junction box (mm)	12.6		
Junction box (protection class)	IP67		
Length of Junction box cable (mm)	450		
Ccrosslinked materials	PVB		
Front glass	3.2mmITO Glass		
Rear glass	6.0mm Semi-tempered/tempered glass		

Remarks: All characteristics is depended on the production engineering



### 3、刻划透光组件

MS-BT51TK

#### Characteristics

Substrate Materials	TCO glass		
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池, 双玻封装侧接透光		

#### Performance of the light transmitting module

Transmittance	20%			
刻划透光线宽 (mm)	0.3	0.67	1	3
Maximum Power (W)	45	51	51	51
Voltage at Pmax (V)	64	69	69	69
Current at Pmax (A)	0.71	0.74	0.74	0.74
Open circuit voltage (V)	84	89	89	89
short circuit current (A)	0.89	0.89	0.89	0.89
Power Tolerance (W)	0/+2			
Maximum system voltage (V)	1000			
Maximum series fuse rated current (A)	2			

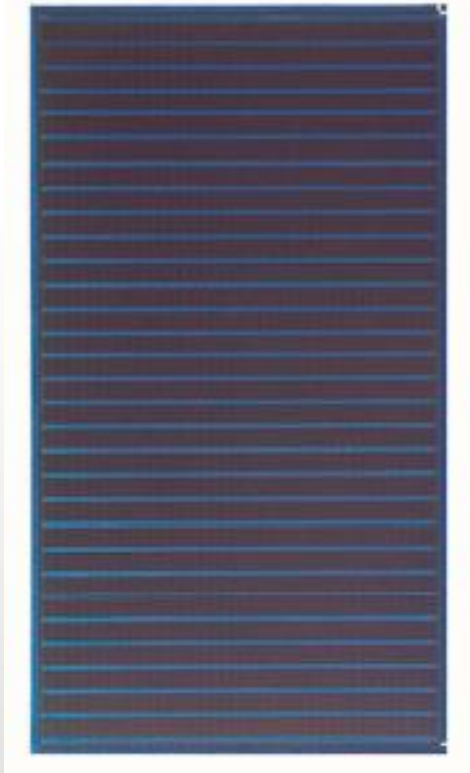
#### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

#### Mechanical Specifications

Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	9.7
Weight (kg)	18.6
Module area (m <sup>2</sup> )	0.79
Junction box type	Lateral junction box
Thickniss of junction box (mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Ccrosslinked materials	PVB
Front glass	3.2mm ITO Glass
Rear glass	6.0mm Semi-tempered/tempered glass

Remarks: All characteristics is depended on the production engineering



## 4、Colored Modules

MS-BT50C

### Characteristics

Substrate Materials	TCO glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池，双玻封装侧接彩色透光

### Performance of the light transmitting module

Colors	blue/green/yellow/orange
Transmittance	20%
Maximum Power (W)	51
Voltage at Pmax (V)	69
Current at Pmax (A)	0.74
Open circuit voltage (V)	88
short circuit current (A)	0.89
Power Tolerance (W)	0/+2
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	2

### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

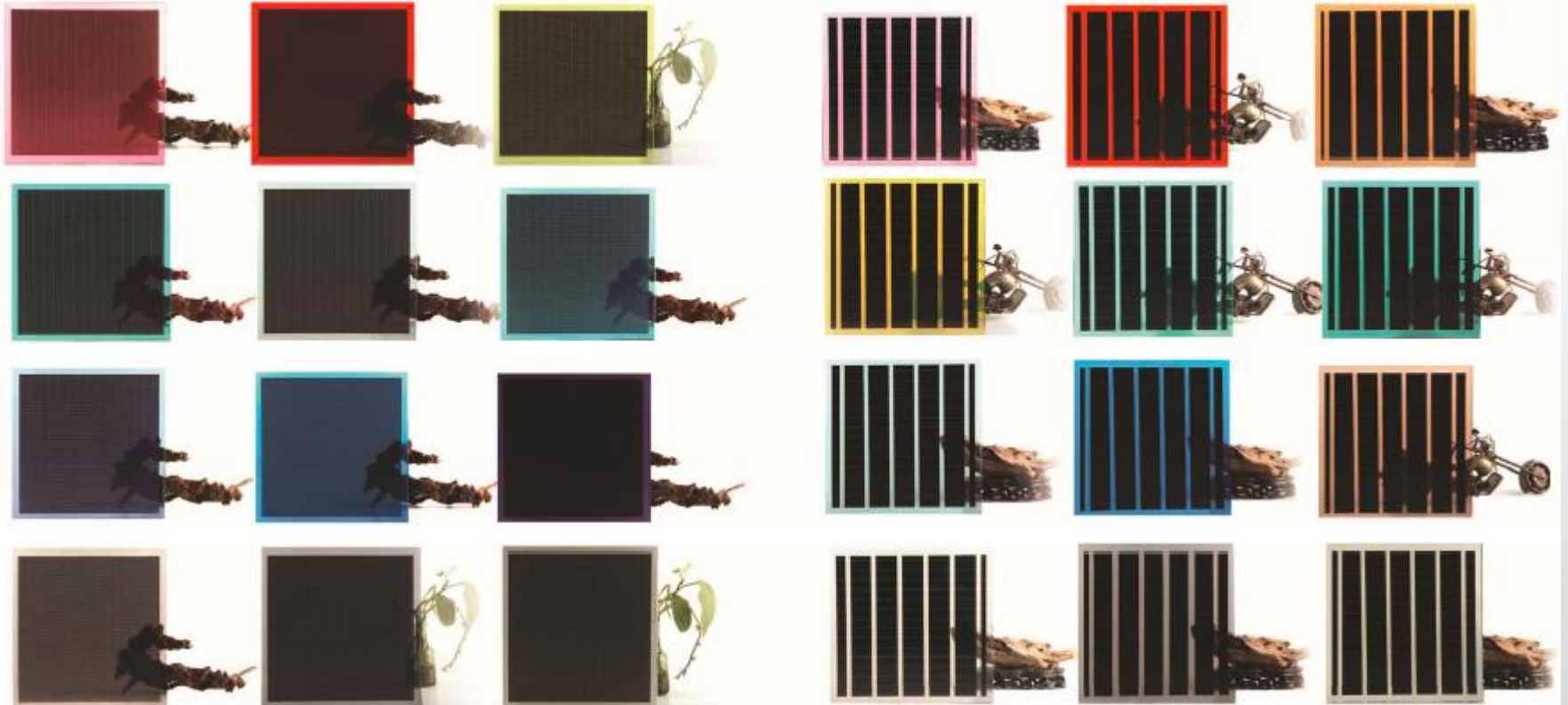
Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	9.7
Weight (kg)	18.6
Module area (m <sup>2</sup> )	0.79
Junction box type	Lateral junction box
Thickniss of junction box (mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Crosslinked materials	PVB
Front glass	3.2mm ITO Glass
Rear glass	6.0mmSemi-tempered/tempered glass

Remarks: All characteristics is depended on the production engineering

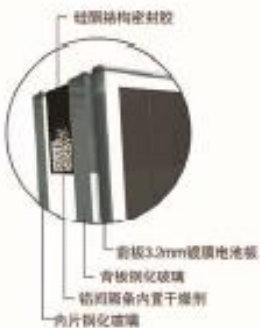


BIPV彩色系列

BIPV彩色系列



Remarks: All characteristics is depended on the production engineering



## 5、中空BIPV组件

MS-BT45Z

Characteristics	
Substrate Materials	TCO Glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池, 双玻封装侧接透光中空
Performance of the light transmitting modules	
Transmittance	20%
Maximum Power (W)	45
Voltage at Pmax (V)	64
Current at Pmax (A)	0.71
Open circuit voltage (V)	84
short circuit current (A)	0.89
Power Tolerance (W)	0/+2
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	2
Temperature coefficients	
Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%
Mechanical Specifications	
Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	27.7
Weight (kg)	30.4
Module area (m <sup>2</sup> )	0.79
Junction box type	Lateral junction box
Thickniss of junction box (mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Ccrosslinked materials	PVB
Front glass	3.2mm ITO Glass
Rear glass	6.0mmSemi-tempered/tempered glass
Hollow glass	6.0mmtempered glass

Remarks: All characteristics is depended on the production engineering



## 6、双面发电组件

MS-BT105S

<b>Characteristics</b>		
Substrate Materials	TCO Glass	
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池、PIN非晶硅单结电池, 三玻封装侧接双接线盒	
<b>Performance of modules</b>		
Electric surface	正面三叠层电池	背面单结电池
Maximum Power (W)	65	40
Voltage at Pmax (V)	70	19
Current at Pmax (A)	0.93	2.12
Open circuit voltage (V)	89	31.5
short circuit current (A)	1.12	2.82
Power Tolerance (W)	0/+3	±1
Maximum system voltage (V)	1000	
Maximum series fuse rated current (A)	5	
<b>Temperature coefficients</b>		
Current temperature coefficient(/°C)	0.02%	
Voltage temperature coefficient(/°C)	-0.20%	
Power temperature coefficient(/°C)	-0.19%	
<b>Mechanical Specifications</b>		
Length (mm)	1245	
width (mm)	635	
Thickness (mm, not including junction box)	8	
Weight (kg)	15.8	
Module area (m <sup>2</sup> )	0.79	
Junction box type	Lateral junction box	
Thickniss of junction box (mm)	12.6	
Junction box (protection class)	IP67	
Length of Junction box cable (mm)	450	
Ccrosslinked materials	EVA	
Front glass	2.5mm ITO Glass	
Middle glass	2.0mm untempered glass	
Rear glass	2.5mm ITO glass	

Remarks: All characteristics is depended on the production engineering



## 7、双面发电组件

MS-BT123S

### Characteristics

Substrate Materials	TCO Glass	
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池、PIN/PIN非晶硅锗双结叠层电池, 三玻封装侧接双接线盒	

### Performance of modules

Electric surface	正面三叠层电池	背面二叠层电池
Maximum Power (W)	65	58
Voltage at Pmax (V)	70	43
Current at Pmax (A)	0.93	1.36
Open circuit voltage (V)	89	58.5
short circuit current (A)	1.12	1.56
Power Tolerance (W)	0/+3	±1
Maximum system voltage (V)	1000	
Maximum series fuse rated current (A)	5	

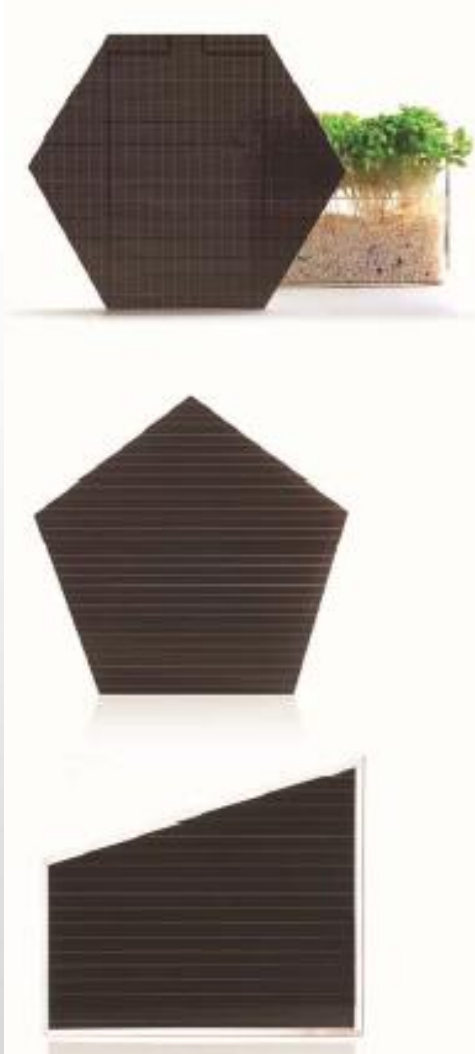
### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	8
Weight (kg)	15.8
Module area (m <sup>2</sup> )	0.79
Junction box type	Lateral junction box
Thickniss of junction box (mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Crosslinked materials	EVA
Front glass	2.5mm ITO Glass
Middle glass	2.0mm untempered glass
Rear glass	2.5mm ITO glass

Remarks: All characteristics is depended on the production engineering



## 8、异型组件

MS-BT15Y

<b>Characteristics</b>	
Substrate Materials	TCO Glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池，双玻封装侧接透光
<b>正六边形组件电性能</b>	
Transmittance	20%
Maximum Power (W)	15
Voltage at Pmax (V)	60
Current at Pmax (A)	0.25
Open circuit voltage (V)	80
short circuit current (A)	0.3
Power Tolerance (W)	0/+1
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	2
<b>Temperature coefficients</b>	
Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%
<b>Mechanical Specifications</b>	
Side length (mm)	366
Thickniss (mm, not including junction box)	7.5
Weight (kg)	6.6
Module Area (m <sup>2</sup> )	0.35
Junction box type	Lateral junction box
Junction box (protection class)(mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Ccrosslinked materials	PVB
Front glass	3.2mm ITO Glass
Rear glass	4.0mmSemi-tempered/tempered glass

Remarks: All characteristics is depended on the production engineering





## 9、Joint Module

MS-BT153TP

### Characteristics

Substrate Materials	TCO Glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池, 三玻封装四拼接

### Performance of the light transmitting module

Transmittance	20%
Maximum Power (W)	153
Voltage at Pmax (V)	62
Current at Pmax (A)	2.48
Open circuit voltage (V)	82
short circuit current (A)	3.28
Power Tolerance (W)	0/+5
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	5

### Temperature coefficient

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

Length (mm)	2540
width (mm)	1245
Thickness (mm, not including junction box)	16.2
Weight (kg)	124
Module area (m <sup>2</sup> )	3.16
Junction box type	Lateral junction box
Thickniss of junction box (mm)	12.6
Junction box (protection class)	IP67
Length of Junction box cable (mm)	1800
Crosslinked materials	PVB
Front glass	6.0mmSemi-tempered/tempered glass
Middle glass	3.2mm ITO Glass
Rear glass	6.0mm Semi-tempered/tempered glass

Remarks: All characteristics is depended on the production engineering



## 10、LOGO Module

### Characteristics

Substrate Materials	TCO Glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池, 双玻封装细线条透光

### Performance of the light transmitting module

Transmittance	40%
Maximum Power (W)	32
Voltage at Pmax (V)	63
Current at Pmax (A)	0.51
Open circuit voltage (V)	84
short circuit current (A)	0.67
Power Tolerance (W)	0/+3
Maximum system voltage (V)	1000
Maximum series fuse rated current (A)	2

### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	9.7
Weight (kg)	18.6
Module area (m <sup>2</sup> )	0.79
Junction box type	Back junction box
Thickniss of junction box (mm)	20
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Ccrosslinked materials	EVA/PVB
Front glass	3.2mm ITO Glass
Rear glass	4.0mmuntempered glass

Remarks: All characteristics is depended on the production engineering



## 11、Low Voltage Module

MS-ST44/54

### Characteristics

Substrate Materials	TCO glass
Component Type	PIN/PIN/PIN三结非晶硅锗叠层电池,

### 三并组件电性能

Maximum power (W)	44	54
Voltage at Pmax (V)	19	30
Current at Pmax (A)	2.36	1.8
Open circuit voltage (V)	30	45
short circuit current (A)	3.7	2.4
Power Tolerance (W)	0/+3	
Maximum system voltage (V)	1000	
Maximum series fuse rated current (A)	5	

### Temperature coefficients

Current temperature coefficient(/°C)	0.02%
Voltage temperature coefficient(/°C)	-0.20%
Power temperature coefficient(/°C)	-0.19%

### Mechanical Specifications

Length (mm)	1245
width (mm)	635
Thickness (mm, not including junction box)	7.5
Weight (kg)	14.4
Module area (m <sup>2</sup> )	0.79
Junction box type	Back junction box
Thickness of junction box (mm)	20
Junction box (protection class)	IP67
Length of Junction box cable (mm)	450
Crosslinked materials	EVA
Front glass	3.2mm ITO Glass
Rear glass	4.0untempered glass

Remarks: All characteristics is depended on the production engineering

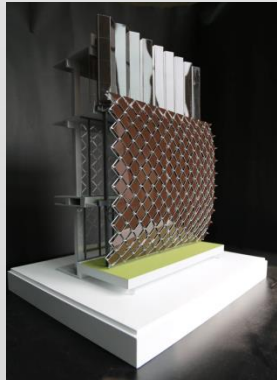
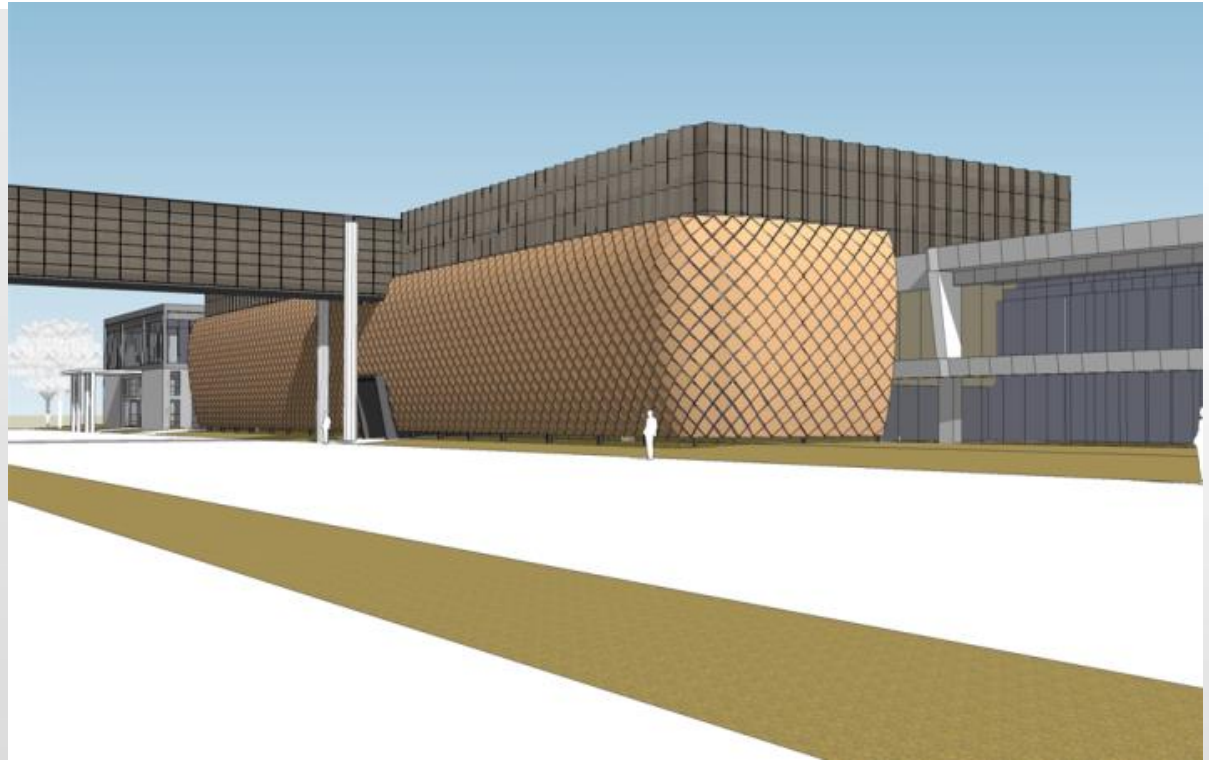


## 3、Typical Cases



## 1、The Programm of BIPV in Macsun Solar

- Installed capacity:
- 462M





Macsun Solar Clean Energy Showroom



Macsun Solar PV Car Shed



## 2、The Programm of BIPV in Macsun Solar

- Installed capacity : 72kw.





### 3、The Programm of BIPV in Shangdong

- installed capacity 60kw.







# Thank You!

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