



深圳市泰晶太阳能科技有限公司

MACSUN SOLAR ENERGY TECHNOLOGY CO., LIMITED

WWW.MACSUNSOLAR.COM
WWW.SOLARENERGY86.COM
WWW.MACSUNSOLAR.CN

COMPANY PROFILE

关于泰晶



深圳市泰晶太阳能科技有限公司是一家专业生产太阳能组件的先进企业。公司是拥有先进的全自动生产线、电池片分选测试仪器、全自动串焊机、自动排版机、全自动层压机，先进的EL测试仪器等设备。我们采用优质电池片、EVA、TPT、钢化玻璃、硅胶等原材料进行生产。公司成功研制出的掺镓硅片，能使光伏组件的衰减率在10年内控制在5%以下，20年内控制在10%以下，显著缩短了客户对太阳能电站的投资回报期和发电效率。泰晶太阳能的太阳能电池片达到8GW的产能，太阳能组件达到6GW的产能。我们采用国际先进的生产设备和工艺技术来生产硅片、电池片和组件，自动焊接机和带EL自动检测仪的自动封装线，使产品的质量和产量得到可靠保证！

作为新能源产业的一员，泰晶人在追求发展的同时，十分注重产品质量和品牌建设，重视环境与经济协调发展，为客户创造价值并履行社会责任。企业目前已通过ISO9001、ISO14001、OHSMS18001认证，公司产品通过TUV、UL、MCS和KEMCO等国际权威机构的认证，并通过多家保险公司的审核，建立了良好的合作关系。我们严格遵循“绿色使命”，我们参加了作为光伏循环的一部分，欧洲国际光伏组织PV CYCLE积极致力于建立废旧太阳能组件的自愿收集和回收系统。为了确保您对光伏组件的投资安全，泰晶的产品都经过独立的质量实验室的检测，确保了客户的利益。

我们拥有人力资本和原材料双重价格优势，产品远销欧洲、北美、澳大利亚、非洲和其它亚洲国家。公司位于中国经济最发达的珠江三角洲地区—深圳现代工业园内，这里环境优美、风景秀丽、地理条件优越。交通十分便捷。离香港很近。我们在深圳和香港都有自己的仓库。欢迎国内外客户参观来访。

Macsun Solar is a brand-new PV factory founded in 2004, under the flag of the Ruixin Group (since 1986), Macsun Solar has built a vertically integrated solar product value chain, with an overall annual capacity of approximately 8GW of Solar Cells and 6GW of solar panels. The company has a number of experienced professionals who have been engaged in the fields of solar photovoltaic product development, production and marketing for years.

The company has furthermore established technical research cooperation with couples of colleges and universities as well as research institutes, therefore it enjoys strong technical support, which enables its product technical indexes could maintain the leading position domestically. The company owns production lines for solar cell, solar module and system application products, and main products include solar module, solar street light, solar power generation system, etc.

Technological innovation is essential to our position as a leading global renewable energy provider. At Macsun Solar, our R&D team focuses on the research and development of next generation PV technologies with a constant commitment to product quality and reliability as well as to cost structure optimization.

With a diversified customer base in the global PV market, Macsun Solar delivers its solar modules and PV solutions worldwide. Our success is built on the trust of our customers and partners in our services, products and the mutually beneficial business modes.

Macsun Solar is committed to be socially and environmentally responsible for global carbon emissions. We constantly strive to reduce our own impact on the environment, and to find new solutions so that clean energy from the sun becomes available to an increasing number of people worldwide.



MS-SC15BB-G12

245-252 Series

Heterojunction Solar Cell
Great Performace With N-type Wafers

HJT Solar cell is a new generation superior bifacial solar cell model made out of N-type wafer, which combines merits of crystalline silicon and thin film technology to form single composite structure. As one of most effective cell passivation technology in the market. HJT ensures solar cells deliver high efficiency and great power even in hot climate.

Higher Cell Efficiency

- Phosphorus fettering combines with nano-crystalline process to guarantee higher cell efficiency.
- Ultra-low temperature coefficient ensures more power output in high temperature environment.
- No LID, No PID, lead to zero degradation.

Maximum Module Power

- 15 Busbar Technology combines half-cell design to deliver high energy output for maximum cost savings
- Bifacial constructure ensures more sunlight captured and converted into power on back side.
- Extreme low LID and PID supports reliability and longevity.
- Low LCOE cost by HJT solar system



Front Side

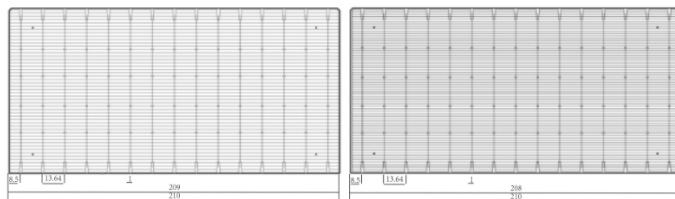


Back Side

The specification and key features described in this datasheet may be deviated slightly and not guaranteed. Macsun Solar reserves the right to make any adjustment to the information described here at any time Without notice. Please always obtain the latest version of the datasheet from our website www.macsunsolar.com, or asking our sales for help. This datasheet could be considered as part of the contract if necessary, to make sure the products delivered is the same as order.

Mechanical Characteristics

Product	HJT Monocrystalline solar cell
Format	15BB, N-type, 210mm*105mm ±0.25mm
Average Thickness (Si)	130μm ±20μm
Front Surface(-)	15 soldering pads (silver) Dark blue anti-reflecting ITO coating (Indium tin oxide)
Back Surface(+)	15 soldering pads (silver) Dark blue anti-reflecting ITO coating (Indium tin oxide)

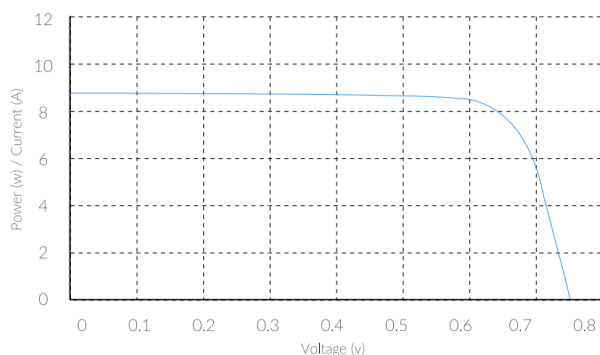


ELECTRICAL CHARACTERISTICS (STC)

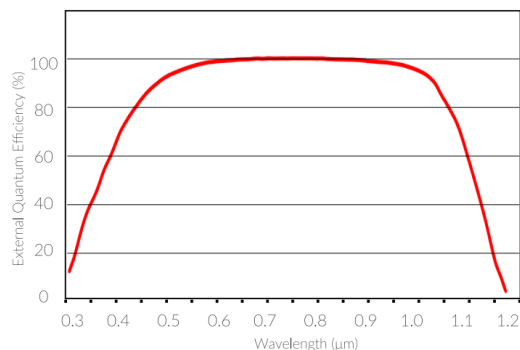
Power Class			MS-G12-245	MS-G12-246	MS-G12-247	MS-G12-248	MS-G12-249	MS-G12-250	MS-G12-251	MS-G12-252
Maximum Power	P _{mp}	[W]	5.40	5.42	5.45	5.47	5.49	5.51	5.53	5.56
Short Circuit Current	I _{sc}	[A]	8.68	8.67	8.68	8.69	8.70	8.70	8.72	8.72
Open Circuit Voltage	V _{oc}	[V]	0.743	0.744	0.744	0.745	0.745	0.746	0.746	0.746
Efficiency	η	[%]	24.5	24.6	24.7	24.8	24.9	25.0	25.1	25.2

*PERFORMANCE AT STANDARD TEST CONDITIONS, STC: 1000 W/ m², 25 °C, AM 1.5 G

TYPICAL CURRENT/POWER-VOLTAGE CURVES (25.0%)



SPECTRAL RESPONSE



PACKING SPECIFICATIONS

pcs/box	box/carton	pcs/carton
120	18	2160

TEMPERATURE COEFFICIENTS

Power (P _{max})	-0.26%/K
Current (I _{sc})	+0.055%/K
Voltage (V _{oc})	-0.27%/K

Remind of Storage

If the sealing foil around the cell boxes is damaged, broken or opened, we suggest that:

- Store the cells in dry and clean place at room temperature
- Process the cells within 10 days after opening the seal.

深圳市泰晶太阳能科技有限公司

地址: 深圳市宝安区松岗芙蓉路8号鑫伟润高新产业园

网址: www.macsun solar.com

邮箱: info@macsun solar.com



Macsun Solar Energy Technology Co., Ltd.

Add: Xinweirun Industrial Park, Furong Rd., Songgang Str., Baoan Dist., Shenzhen

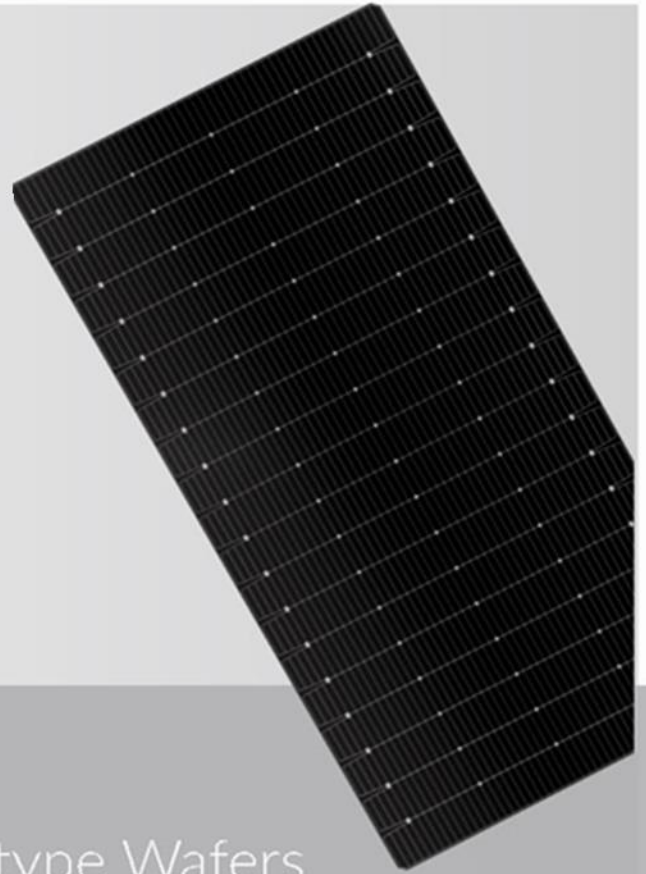
Web: www.macsun solar.com

E-mail: sales@macsun solar.com

MS-SC18BB-G10

245-252

Series

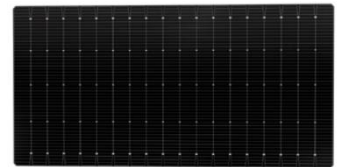


Heterojunction Solar Cell
Great Performace With N-type Wafers

HJT Solar cell is a new generation superior bifacial solar cell model made out of N-type wafer, which combines merits of crystalline silicon and thin film technology to form single composite structure. As one of most effective cell passivation technology in the market, HJT ensures solar cells deliver high efficiency and great power even in hot climate.

Higher Cell Efficiency

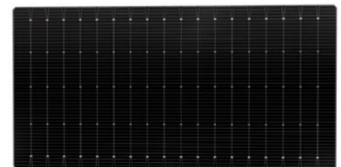
- Phosphorus fettering combines with double-sided microcrystal process to guarantee higher cell efficiency.
- Ultra-low temperature coefficient ensures higher and more power output in high temperature environment.
- No LID, No PID, lead to zero degradation.



Front Side

Maximum Module Power

- Half silicon ingot cutting wafer and SMBB technology to deliver higher energy output and lower power loss.
- The Natural bifacial symmetrical structure of HJT cell can effectively improve the power generation capacity on cell's backside.
- No LID and No PID effectively extends the PV module life.
- PV systems with Low LCOE with HJT modules

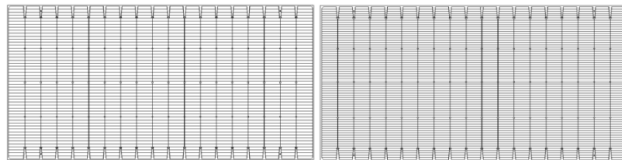


Back Side

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Mechanical Characteristics

Product	HJT Monocrystalline solar cell
Format	18BB, N-type, 182mm*91.75mm±0.25mm
Average Thickness (Si)	130μm ±13μm
Front Surface(-)	18 soldering pads (silver) Dark blue anti-reflecting ITO coating (Indium tin oxide)
Back Surface(+)	18 soldering pads (silver) Dark blue anti-reflecting ITO coating (Indium tin oxide)

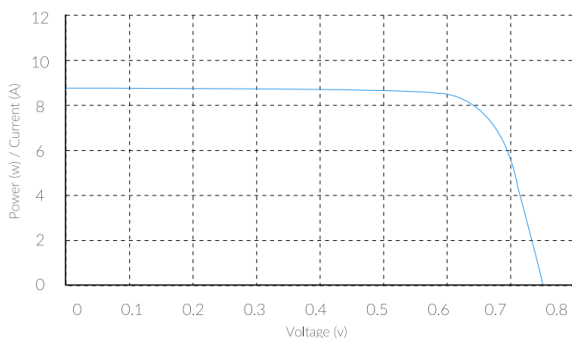


ELECTRICAL CHARACTERISTICS (STC)

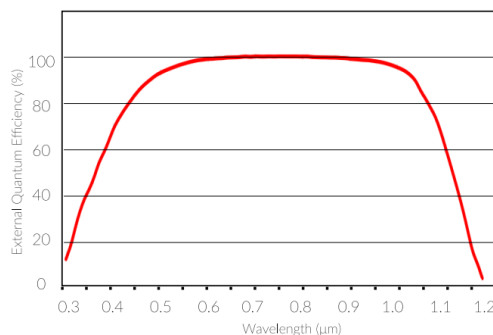
Power Class			MS-G10-245	MS-G10-246	MS-G10-247	MS-G10-248	MS-G10-249	MS-G10-250	MS-G10-251	MS-G10-252
Maximum Power	P _{mp}	[W]	4.10	4.12	4.14	4.15	4.17	4.18	4.19	4.21
Short Circuit Current	I _{sc}	[A]	6.53	6.54	6.55	6.56	6.57	6.58	6.59	6.60
Open Circuit Voltage	V _{oc}	[V]	0.747	0.747	0.747	0.747	0.747	0.748	0.748	0.748
Efficiency	η	[%]	24.5	24.6	24.7	24.8	24.9	25.0	25.1	25.2

*PERFORMANCE AT STANDARD TEST CONDITIONS, STC: 1000 W/m², 25 C, AM 1.5 G

TYPICAL CURRENT/POWER-VOLTAGE CURVES (25.0%)



SPECTRAL RESPONSE



PACKING SPECIFICATIONS

pcs/box	box/carton	pcs/carton
132	18	2376

TEMPERATURE COEFFICIENTS

Power (P _{max})	-0.26%/K
Current (I _{sc})	+0.055%/K
Voltage (V _{oc})	-0.27%/K

Remind of Storage

If the sealing foil around the cell boxes is damaged, broken or opened, we suggest that:

- Store the cells in dry and clean place at room temperature
- Process the cells within 10 days after opening the seal.

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网址: www.macsunsolar.com

邮箱: info@macsunsolar.com



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E-mail: sales@macsunsolar.com

TOPCon SOLAR CELL

MADE FOR TRIMAX^{series}

SC182MTB16

产品特征 Geometry Characteristics

- 产品型号: 182 单晶双面电池
Product model: 182 mono-crystalline Bifacial solar cell
- 尺寸规格: 182.2mmx182.2mm±0.5mm, Φ 247.28mm±0.5mm
Geometry: 182.2mmx182.2mm±0.5mm, Φ 247.28mm±0.5mm
- 电池厚度: 130μm±13μm
Cell thickness: 130μm±13μm
- 正面: 16 主栅, 正 12 段, 132 栅, 主栅宽度 0.036±0.02mm
Front design: 16 busbars, 12 pads, 132 fingers, busbar width 0.036±0.02mm
- 背面: 16 主栅, 背 12 段, 134 栅, 主栅宽度 0.036±0.02mm
Rear design: 16 busbars, 12 pads, 134 fingers, busbar width 0.036±0.02mm

产品特点 Product Characteristics

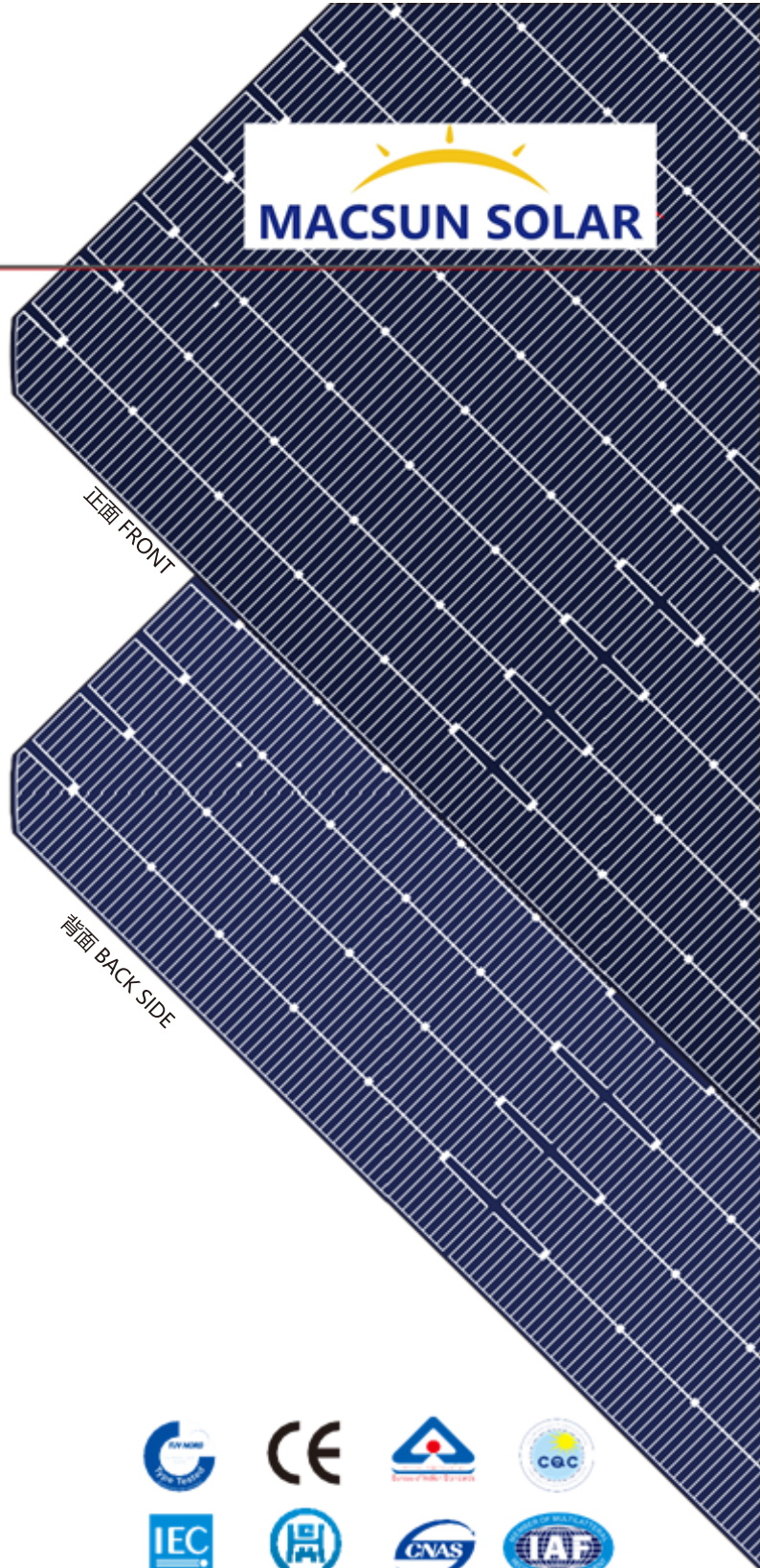
- 高转换效率, 正面效率≥24.5%
High efficiency, $\eta_a \geq 24.5\%$
- 双面率≥80%
Bifacial rate up to 80%
- 光致衰减为 "0"
Light-induced Degradation is "0"
- 卓越的抗 PID 性能
Superior anti-PID performance
- 功率温度系数低至-0.32%/K
Temperature coefficient of Power as low as -0.32%/K
- 200W/m² 弱光下相对转换效率≥97%
Relative conversion efficiency $\geq 97\%$ under low light (200W/m²)
- 封损更低, 更适合高效组件
Lower Cell to Module (CTM) Loss Rate, more suitable for high-efficiency module

品质管控 Quality Control

- 效率测试的准确性控制在±0.1%
The accuracy of the efficiency test is controlled within $\pm 0.1\%$
- 电性能、外观、EL 100%全自动检验
Electrical performance, appearance, EL 100% automatic inspection
- 校准片溯源到 Fraunhofer ISE
Calibration cells are traceable to Fraunhofer ISE

温度系数 Temperature Coefficients

- 电流温度系数 TkCurrent: 0.045%/K
- 电压温度系数 TkVoltage: -0.25%/K
- 功率温度系数 TkPower: -0.32 %/K



Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
OHSAS 18001: Occupational Health and Safety Management System

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网址: www.macsunsolar.com

邮箱: info@macsunsolar.com

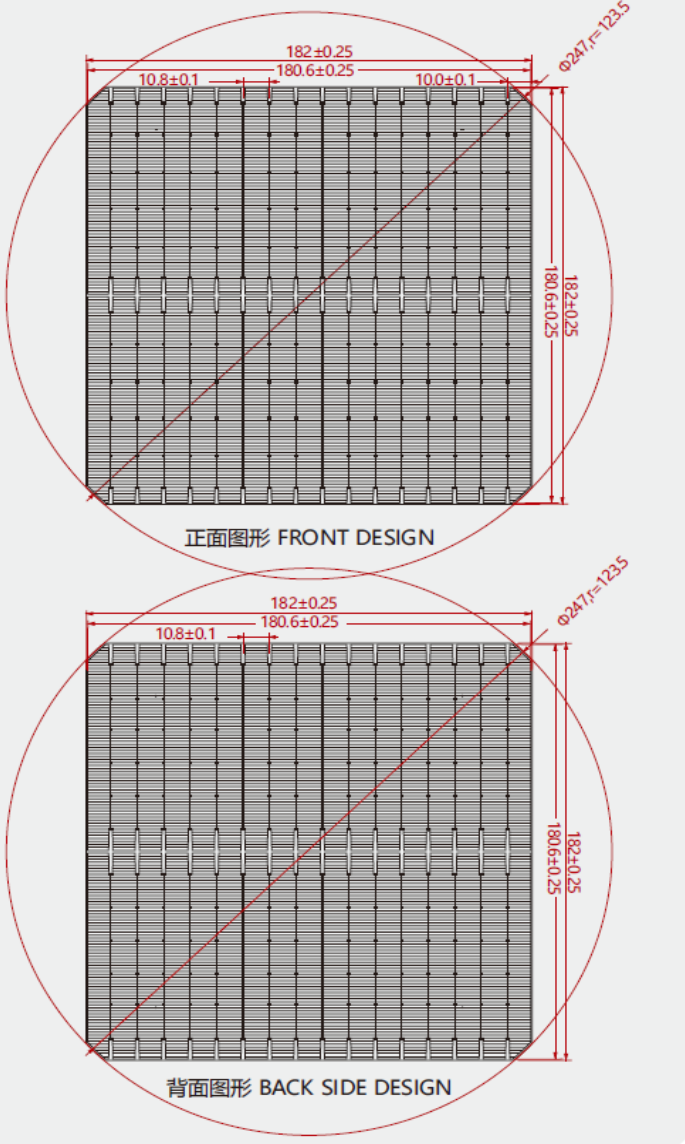


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Web: www.macsunsolar.com E-mail: info@macsunsolar.com

电池图形及尺寸 Cell graphics and sizes

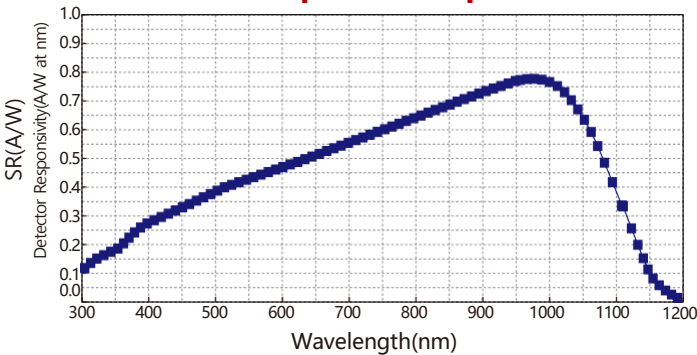


电性能特征 Electrical characteristics

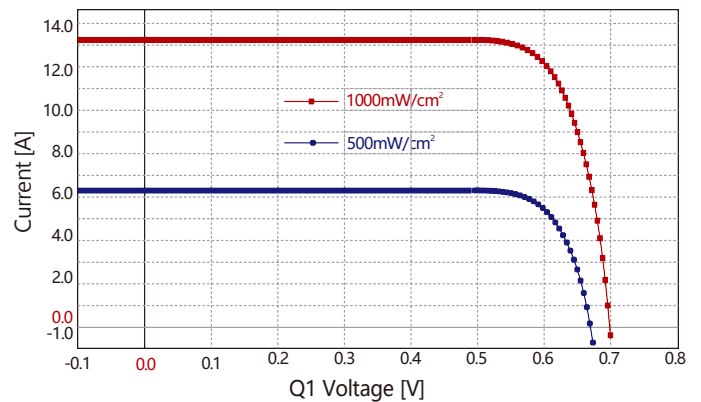
Eff(%)	Power Pmpp(W)	Max. Power Current Impp(A)	Short Circuit Current Isc(A)	Max. Power Voltage Vmpp(V)	Open Circuit Voltage Voc(V)	FF(%)
25.1	8.30	13.279	13.766	0.625	0.713	84.50
25.0	8.27	13.252	13.748	0.624	0.712	84.47
24.9	8.23	13.212	13.741	0.623	0.711	84.31
24.8	8.20	13.185	13.729	0.622	0.709	84.22
24.7	8.16	13.119	13.730	0.622	0.709	83.81
24.6	8.13	13.098	13.716	0.621	0.709	83.69
24.5	8.10	13.062	13.708	0.620	0.707	83.54
24.4	8.06	13.007	13.705	0.620	0.707	83.23
24.3	8.02	12.985	13.694	0.618	0.706	82.92
24.2	7.99	12.951	13.689	0.617	0.705	82.86
24.1	7.97	12.921	13.646	0.617	0.705	82.85
24.0	7.93	12.875	13.624	0.616	0.704	82.68
23.9	7.89	12.831	13.575	0.615	0.704	82.57
23.8	7.86	12.781	13.541	0.615	0.705	82.34
23.7	7.82	12.735	13.506	0.614	0.705	82.12

*标准测试条件下(Under standard test condition): 1000W/ m², AM 1.5G, 25°C
 图示说明(Illustration):23.7%—实际范围(actual range)23.7%~23.8% 规范和数据只供参考, 如有更改另行说明通知

光谱响应 Spectral response



IV 曲线 I-V Curve



深圳市泰晶太阳能科技有限公司
 地址: 深圳市宝安区松岗芙蓉路8号鑫伟润
 高新产业园
 网址: www.macsunsolar.com
 邮箱: info@macsunsolar.com



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 Add: Xinweirun Industrial Park, Furong Rd., Songgang Str., Baoan Dist., Shenzhen, China
 Web: www.macsunsolar.com E-mail: info@macsunsolar.com



P-Type Mono Bifacial Cell

MS-MSC182-10D10B



Product Feature

- High conversion efficiency $\geq 23.3\%$
 - Bifaciality $\geq 70\%$
 - LID (Light Induced Degradation) $\leq 2.5\%$
 - High resistance of PID (Potential Induced Degradation)
 - Power temperature coefficient $\leq -0.35\%/K$
 - Weak light response ($200W/m^2$) $\geq 95\%$
 - Lower CTM loss, better for the high efficiency module
-



Quality Control

- Efficiency test accuracy is $\pm 0.1\%$
 - 100% automatic inspection of IV/EL/Appearance
 - Calibration Cell source to Fraunhofer ISE
-



Management System Certification

- ISO 9001:2015 Quality Management System
 - ISO 14001:2015 Environmental Management System
 - ISO 45001:2018 Occupational Health and Safety Management System
-

Product Features

Dimension	182mmx182mm±0.25mm, Φ247mm±0.25mm
Cell Thickness	175μm±20μm
Front side	Adopt 10 bus bars two-slice structure, pad point width 1.0mm-1.5mm, 136±10 fingers, and the front side is covered with SiN anti-reflection film
Back side	The back bus bars is 1.9 ±0.4mm, covering the fingers

Temperature Coefficients

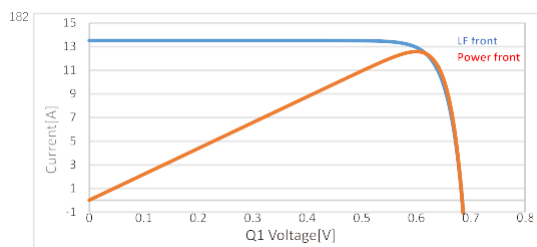
Current Temperature Coefficient	Tkcurrent: +0.048 %/K
Voltage Temperature Coefficient	Tkvoltage: -0.28 %/K
Power Temperature Coefficient	Tkpower: -0.35 %/K

Electrical Data

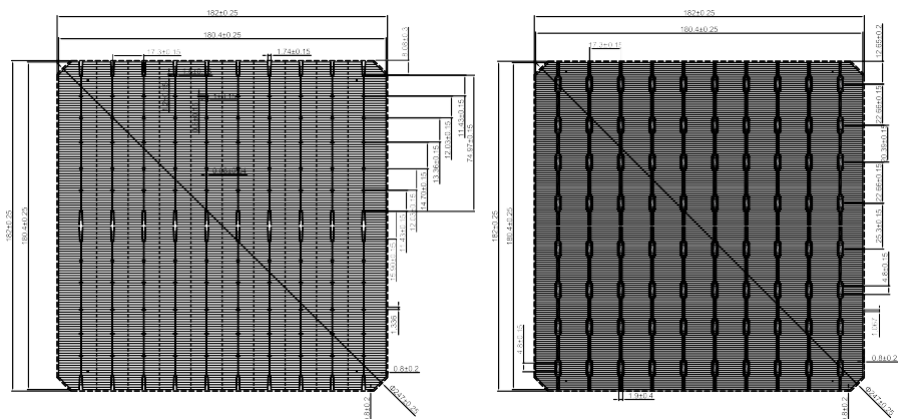
Eff(%)	Pmpp(W)	Ump(V)	I _{mp} (A)	U _{oc} (V)	I _{sc} (A)	FF(%)
23.3	7.69	0.613	12.549	0.690	13.583	82.08
23.2	7.66	0.612	12.515	0.689	13.568	81.93
23.1	7.63	0.611	12.482	0.688	13.551	81.80
23.0	7.59	0.611	12.428	0.688	13.498	81.77
22.9	7.56	0.610	12.394	0.687	13.479	81.65
22.8	7.53	0.610	12.340	0.687	13.449	81.47
22.7	7.49	0.608	12.326	0.686	13.419	81.41
22.6	7.46	0.607	12.292	0.686	13.407	81.13
22.5	7.43	0.607	12.238	0.685	13.397	80.95
22.4	7.40	0.606	12.204	0.685	13.388	80.64
22.3	7.36	0.605	12.169	0.684	13.358	80.58

● Standard Test Conditions: 1000W/ m², AM 1.5, 25°C Specifications and data are only for reference.

IV Curve



Dimension



Front side

Rear side

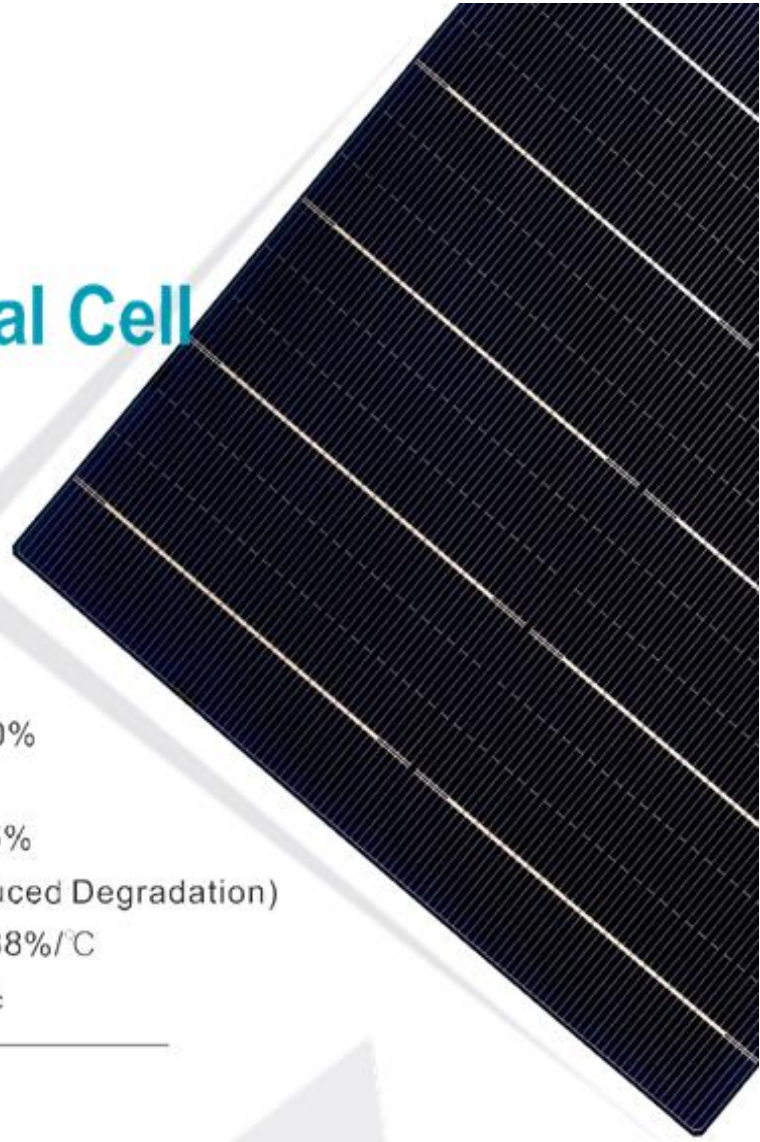
Spectral Response (SR)

Intensity(W/m ²)	U _{oc}	I _{sc}
1000	1.000	1.000
800	0.991	0.801
600	0.989	0.601
400	0.962	0.402



P-Type Mono Bifacial Cell

MS-MSC158-5D5B



Product Feature

- High conversion efficiency, Up to 23.0%
- Bifaciality ratio $\geq 70\%$
- LID (Light Induced Degradation) $\leq 2.5\%$
- High resistance of PID (Potential Induced Degradation)
- Power temperature coefficient $\leq -0.38\%/^{\circ}\text{C}$
- Weak light response ($200\text{W}/\text{m}^2$) $\geq 95\%$



Quality Control

- Efficiency test accuracy is $\pm 0.1\%$
- 100% automatic inspection of IV/EL/Appearance
- Calibration Cell source to Fraunhofer ISE



Management System Certification

- ISO 9001:2015 Quality Management System
- ISO 14001:2015 Environmental Management System
- ISO 45001:2018 Occupational Health and Safety Management System

Product Features

Dimension	158.75mmx158.75mm±0.25mm, Φ223.0mm±0.25mm
Cell Thickness	180μm±20μm
Front side	0.7±0.15mm wide bus bars, 108 finger grids, SiN
Back side	2.9±0.3mm wide discontinuous soldering pads, 150 Aluminum fingers, SiN

Temperature Coefficients

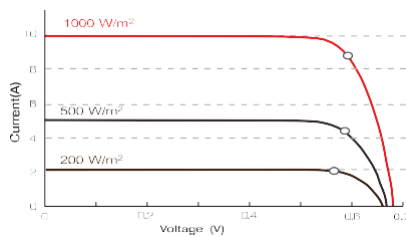
Current Temperature Coefficient	Tkcurrent: +0.048 %/K
Voltage Temperature Coefficient	Tkvoltage: -0.31 %/K
Power Temperature Coefficient	Tkpower: -0.38 %/K

Electrical data

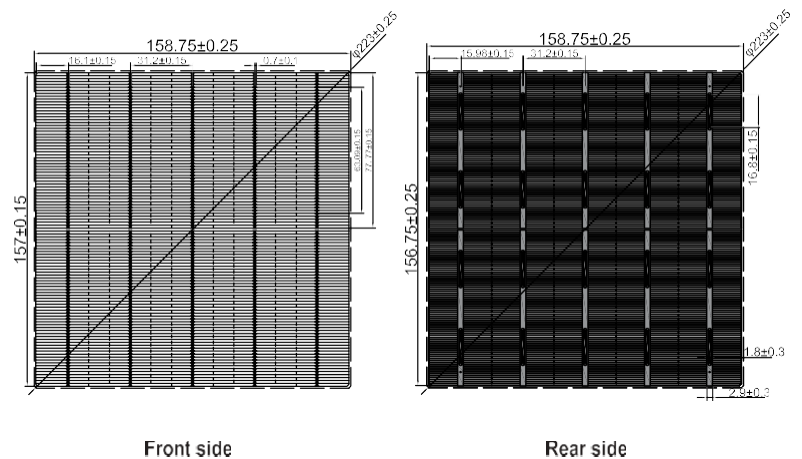
Eff(%)	Pmpp(W)	Ump(V)	Imp(A)	Uoc(V)	Isc(A)	FF(%)
23.0	5.80	0.597	9.708	0.691	10.380	80.82
22.9	5.77	0.595	9.698	0.690	10.360	80.74
22.8	5.75	0.593	9.689	0.689	10.340	80.66
22.7	5.72	0.591	9.679	0.688	10.320	80.58
22.6	5.69	0.589	9.669	0.687	10.300	80.50
22.5	5.67	0.587	9.659	0.686	10.280	80.41
22.4	5.64	0.585	9.649	0.685	10.260	80.33
22.3	5.62	0.583	9.639	0.684	10.240	80.24
22.2	5.59	0.581	9.629	0.683	10.220	80.16
22.1	5.57	0.579	9.618	0.682	10.200	80.07
22.0	5.54	0.577	9.608	0.681	10.180	79.98

• Standard Test Conditions: 1000W/m², AM 1.5, 25°C Specifications and data are only for reference.

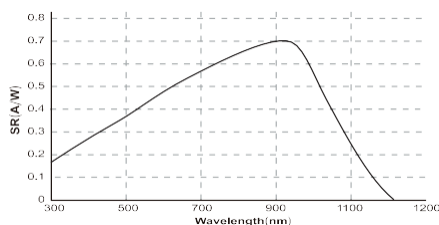
IV Curve



Dimension



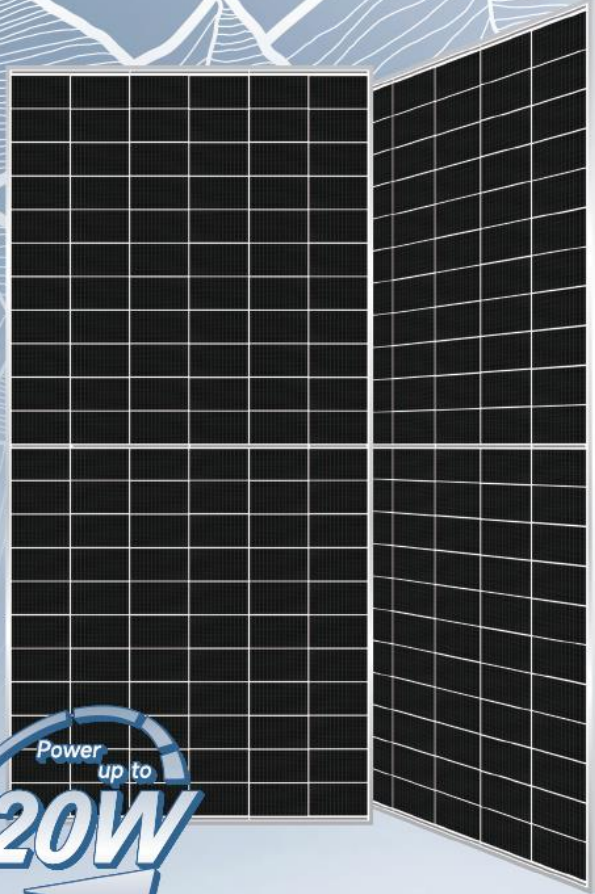
Spectral Response(SR)



Himalaya G12 Series 700-720W

132-cell Bifacial HJT Half Cell
Double-glass Solar Module

Power
up to
720W



HJT Technology

Combining gettering process and $\mu\text{c-Si}$ technology to ensure higher cell efficiency and higher module power.



-0.24%/°C Pmax temperature coefficient

More stable power generation performance and even better in hot climate.



SMBB design with Half-Cut Technology

Shorter current transmission distance, less resistive loss and higher cell efficiency.



Up to 90% Bifaciality

Natural symmetrical bifacial structure bringing more energy yield from the backside.



Sealing with PIB based sealant

Stronger water resistance, greater air impermeability to extend module lifespan.



Higher reliability

Industrial leading product and performance warranty, ensuring modules' consistent outstanding performance.



Suitable for Utility project

Lower BOS cost, lower LCOE.

WARRANTY

Product
Warranty **15**
years

Linear
Power
Warranty **30**
years



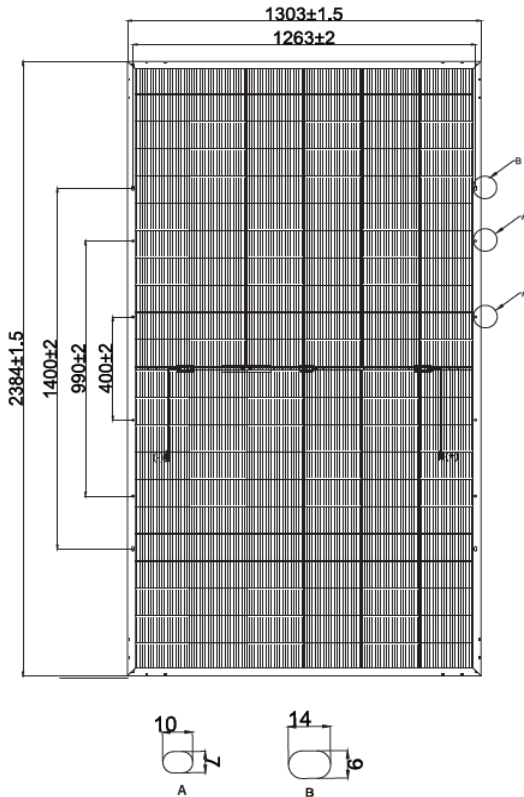
Himalaya G12 Series 700-720W

132-cell Bifacial HJT Solar Half Cell Module

- BloombergNEF Tier 1 PV module manufacturer
- Reinsurance underwritten by Ariel Re

Engineering Drawings

Unit: mm



Electrical Characteristics (STC*)

HS-210-B132	DS700	DS705	DS710	DS715	DS720
Maximum Power (Pmax)	700W	705W	710W	715W	720W
Module Efficiency (%)	22.53%	22.70%	22.86%	23.02%	23.18%
Optimum Operating Voltage (Vmp)	42.10V	42.25V	42.39V	42.54V	42.68V
Optimum Operating Current (Imp)	16.63A	16.69A	16.75A	16.81A	16.87A
Open Circuit Voltage (Voc)	50.13V	50.29V	50.44V	50.59V	50.74V
Short Circuit Current (Isc)	17.43A	17.49A	17.55A	17.61A	17.67A
Operating Module Temperature	-40 to +85 °C				
Maximum System Voltage	DC1500V (IEC)				
Maximum Series Fuse	35A				
Power Tolerance	0~+5W				
Bifaciality	85% ± 5%				

*STC: Irradiance 1000 W/m², cell temperature 25 °C, AM=1.5. Tolerance of Pmax is within +/- 3%.

BSTC**

Maximum Power (Pmax)	770W	775W	780W	785W	790W
Optimum Operating Voltage (Vmp)	42.10V	42.25V	42.39V	42.54V	42.68V
Optimum Operating Current (Imp)	18,29A	18,35A	18,41A	18,46A	18,51A
Open Circuit Voltage (Voc)	50.13V	50.29V	50.44V	50.59V	50.74V
Short Circuit Current (Isc)	19,17A	19,22A	19,28A	19,33A	19,39A

**BSTC: Front side irradiation 1000W/m², back side reflection irradiation 135W/m², AM=1.5, ambient temperature 25 °C.

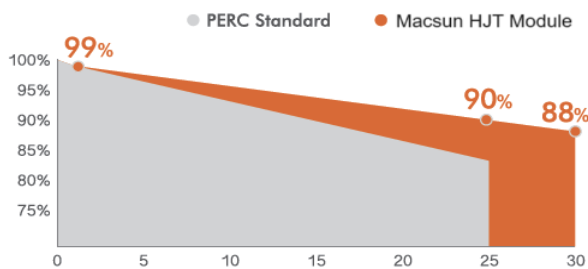
Temperature Characteristics

Nominal Operating Cell Temp. (NOCT)	44 °C ± 2 °C
Temperature Coefficient of Pmax	-0.24%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

Safety & Warranty

Safety Class	Class II
Product Warranty	15 yrs Workmanship
Performance Warranty	30 yrs Linear Warranty*

* Less than 1% attenuation in the 1st year, the annual attenuation from the 2nd year is no more than 0.375%, and the power is no less than 88% until the 30th year.



* Refer to Macsun Solar standard warranty for details

Mechanical Characteristics

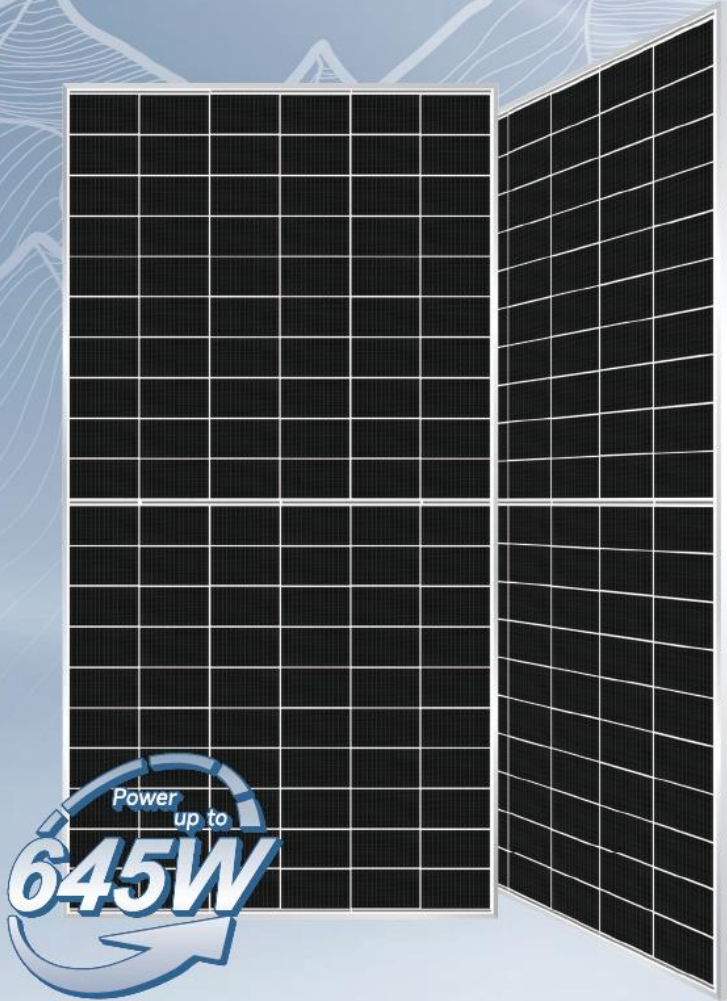
Cell Type	HJT Mono 210 × 105mm
Cell Connection	132 (6 × 22)
Module Dimension	2384 × 1303 × 35 mm
Weight	38.7 kg
Junction Box	IP68
Output Cable	4mm ² , 300mm in length, length can be customized / UV resistant
Connectors Type	MC4/ MC4-Evo2A/ PV-H4/Z4S-abcd/ ST4
Frame	Anodised aluminum alloy
Front Load	5400 Pa
Rear Load	2400 Pa
Glass Thickness	Double glass, 2.0mm

Shipping Configurations

Container Size	HC
Pallets Per Container	40*
Modules Per Pallet (pcs)	18
Modules Per Container (pcs)	31
Modules Per Container (pcs)	558

Himalaya G12 Series 625-645W

120-cell Bifacial HJT Half Cell
Double-glass Solar Module



HJT 2.0 Technology

Combining gettering process and single-side $\mu\text{-Si}$ technology to ensure higher cell efficiency and higher module power.



-0.24%/°C Pmax temperature coefficient

More stable power generation performance and even better in hot climate.



SMBB design with Half-Cut Technology

Shorter current transmission distance, less resistive loss and higher cell efficiency.



Up to 90% Bifaciality

Natural symmetrical bifacial structure bringing more energy yield from the backside.



Sealing with PIB based sealant

Stronger water resistance, greater air impermeability to extend module lifespan.



Higher reliability

Industrial leading product and performance warranty, ensuring modules' consistent outstanding performance.



Suitable for Utility project

Lower BOS cost, lower LCOE

WARRANTY

Product
Warranty **15**
years

Linear
Power
Warranty **30**
years



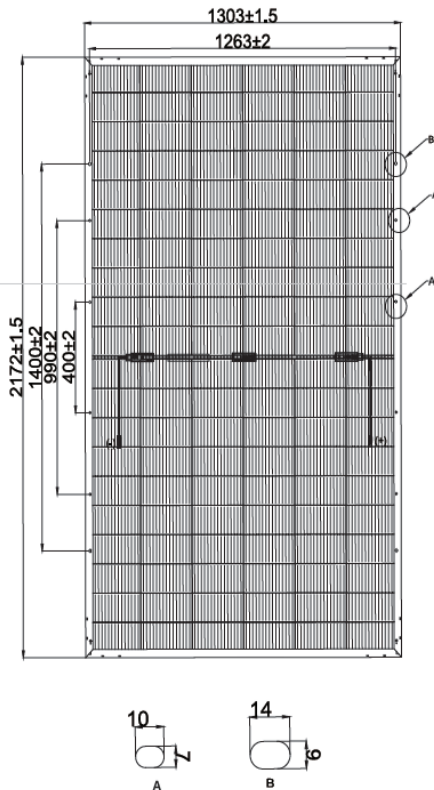
Himalaya G12 Series 625-645W

120-cell Bifacial HJT Half Cell Solar Module

- BloombergNEF Tier 1 PV module manufacturer
- Reinsurance underwritten by Ariel Re

Engineering Drawings

Unit: mm



Electrical Characteristics (STC*)

HS-210-B120	DS625	DS630	DS635	DS640	DS645
Maximum Power (Pmax)	625W	630W	635W	640W	645W
Module Efficiency (%)	22.08%	22.26%	22.44%	22.61%	22.79%
Optimum Operating Voltage (Vmp)	37.86V	38.03V	38.19V	38.35V	38.51V
Optimum Operating Current (Imp)	16.51A	16.57A	16.63A	16.69A	16.75A
Open Circuit Voltage (Voc)	45.13V	45.30V	45.48V	45.65V	45.82V
Short Circuit Current (Isc)	17.31A	17.37A	17.43A	17.49A	17.55A
Operating Module Temperature	-40 ~ +85 °C				
Maximum System Voltage	DC1500V (IEC)				
Maximum Series Fuse	35A				
Power Tolerance	0~+5W				
Bifaciality	85% ± 5%				

*STC: Irradiance 1000 W/m², cell temperature 25 °C, AM=1.5. Tolerance of Pmax is within +/- 3%.

BSTC**

Maximum Power (Pmax)	690W	695W	700W	705W	710W
Optimum Operating Voltage (Vmp)	37.86V	38.03V	38.19V	38.35V	38.51V
Optimum Operating Current (Imp)	18.23A	18.28A	18.33A	18.39A	18.44A
Open Circuit Voltage (Voc)	45.13V	45.30V	45.48V	45.65V	45.82V
Short Circuit Current (Isc)	19.11A	19.16A	19.21A	19.27A	19.32A

**BSTC: Front side irradiation 1000W/m², back side reflection irradiation 135W/m², AM=1.5, ambient temperature 25 °C.

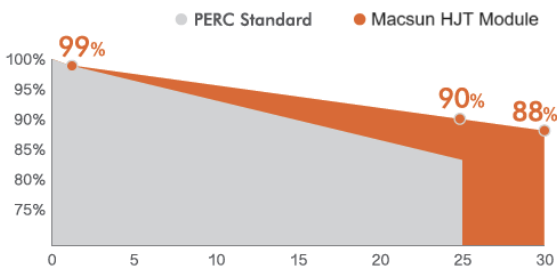
Temperature Characteristics

Nominal Operating Cell Temp. (NOCT)	44 °C ± 2 °C
Temperature Coefficient of Pmax	-0.24%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

Safety & Warranty

Safety Class	Class II
Product Warranty	15 yrs Workmanship
Performance Warranty	30 yrs Linear Warranty*

* Less than 1% attenuation in the 1st year, the annual attenuation from the 2nd year is no more than 0.375%, and the power is no less than 88% until the 30th year.



* Refer to Macsun Solar standard Warranty for details

Mechanical Characteristics

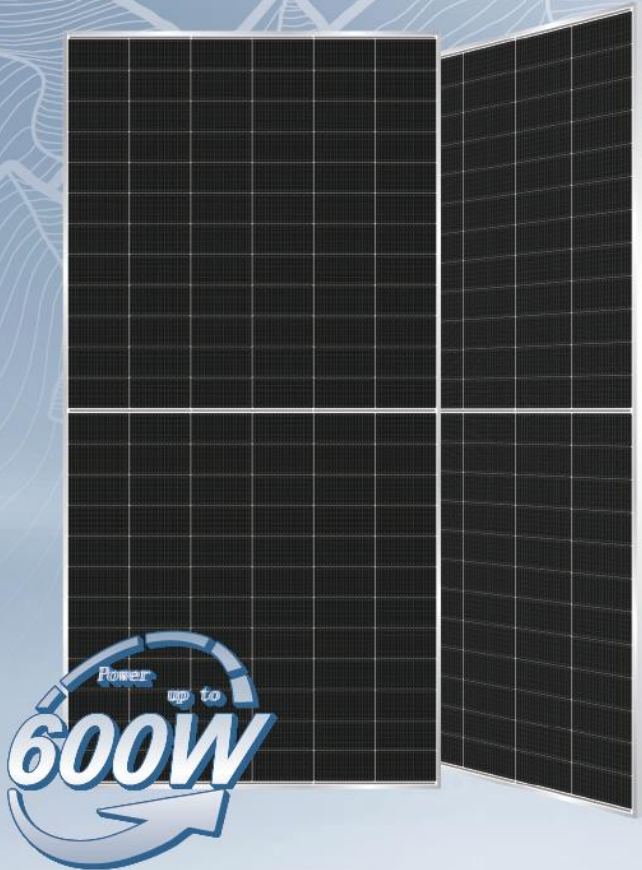
Cell Type	HJT Mono 210 × 105mm
Cell Connection	120 (6 × 20)
Module Dimension	2172 × 1303 × 35 mm
Weight	35.3 kg
Junction Box	IP68
Output Cable	4mm ² , 300mm in length, length can be customized / UV resistant
Connectors Type	MC4/ MC4-Evo2A/ PV-H4/Z4S-abcd/ ST4
Frame	Anodised aluminum alloy
Front Load	5400 Pa
Rear Load	2400 Pa
Glass Thickness	Double glass, 2.0mm

Shipping Configurations

Container Size	HC
Pallets Per Container	40'
Modules Per Pallet (pcs)	18
Modules Per Container (pcs)	31
Modules Per Container (pcs)	558

Himalaya G10 Series 580-600W

144-cell Bifacial HJT Half Cell
Double-glass Solar Module



HJT 3.0

Combining gettering process and double-sided $\mu\text{-Si}$ to maximize cell efficiency and module power.



-0.24%/°C Pmax temperature coefficient

More stable power generation performance and even better in hot climate.



Small Chamfer Design

Bigger power generation area on the solar cell, increasing 1% cell power of single piece.



SMBB design with Half-Cut Technology

Shorter current transmission distance, less resistive loss and higher cell efficiency.



Up to 90% Bifaciality

Natural symmetrical bifacial structure bringing more energy yield from the backside.



Sealing with PIB based sealant

Stronger water resistance, greater air impermeability to extend module lifespan.



Higher reliability

Industrial leading product and performance warranty, ensuring modules' consistent outstanding performance.



Suitable for Utility Solar projects

WARRANTY

Product
Warranty **15**
years

Linear
Power
Warranty **30**
years



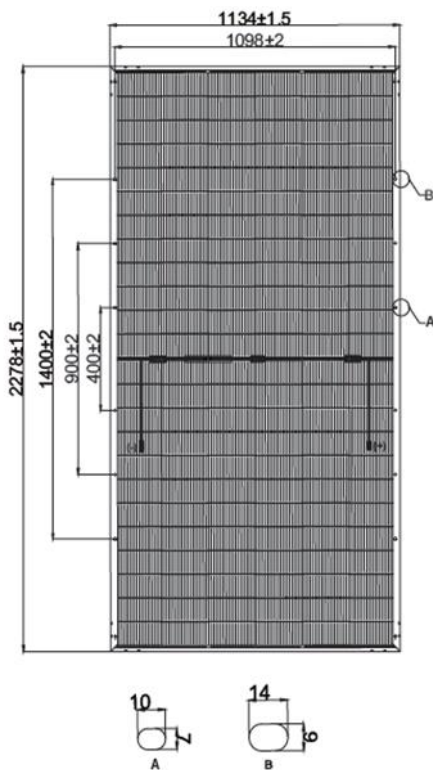
Himalaya G10 Series 580-600W

144-cell Bifacial HJT Half Cell Solar Module

- BloombergNEF Tier 1 PV module manufacturer
- Reinsurance underwritten by Ariel Re

Engineering Drawings

Unit: mm



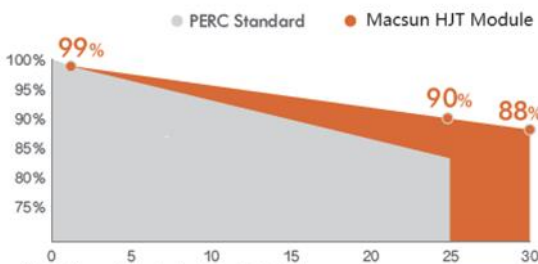
Temperature Characteristics

Nominal Operating Cell Temp. (NOCT)	44 °C ± 2 °C
Temperature Coefficient of Pmax	-0.24%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

Safety & Warranty

Safety Class	Class II
Product Warranty	15 yrs Workmanship
Performance Warranty	30 yrs Linear Warranty*

* Less than 1% attenuation in the 1st year, the annual attenuation from the 2nd year is no more than 0.375%, and the power is no less than 88% until the 30th year.



* Refer to Macsun Solar standard warranty for details

Electrical Characteristics (STC*)

HS-182-B144	DS580	DS585	DS590	DS595	DS600
Maximum Power (Pmax)	580W	585W	590W	595W	600W
Module Efficiency (%)	22.45%	22.65%	22.84%	23.03%	23.23%
Optimum Operating Voltage (Vmp)	45.00V	45.21V	45.42V	45.63V	45.84V
Optimum Operating Current (Imp)	12.89A	12.94A	12.99A	13.04A	13.09A
Open Circuit Voltage (Voc)	53.92V	54.12V	54.31V	54.50V	54.70V
Short Circuit Current (Isc)	13.35A	13.40A	13.45A	13.50A	13.55A
Operating Module Temperature	-40 to +85 °C				
Maximum System Voltage	DC1500V (IEC)				
Maximum Series Fuse	25A				
Power Tolerance	0~+5W				
Bifaciality	85% ± 5%				

*STC: Irradiance 1000 W/m², cell temperature 25 °C, AM=1.5. Tolerance of Pmax is within ± 3%.

BSTC**

Maximum Power (Pmax)	640W	645W	650W	655W	660W
Optimum Operating Voltage (Vmp)	45.00V	45.21V	45.42V	45.63V	45.84V
Optimum Operating Current (Imp)	14.23A	14.27A	14.32A	14.36A	14.40A
Open Circuit Voltage (Voc)	53.92V	54.12V	54.31V	54.50V	54.70V
Short Circuit Current (Isc)	14.73A	14.77A	14.82A	14.86A	14.91A

**BSTC: Front side irradiation 1000W/m², back side reflection irradiation 135W/m², AM=1.5, ambient temperature 25 °C.

Mechanical Characteristics

Cell Type	HJT Mono 182 × 91.75mm
Cell Connection	144 (6 × 24)
Module Dimension	2278 × 1134 × 30 mm
Weight	32 kg
Junction Box	IP68
Output Cable	4mm ² , 300mm in length, length can be customized / UV resistant
Connectors Type	MC4-Evo 2A/ PV-H4/ Z4S-abcd/ ST4
Frame	Anodised aluminum alloy
Front Load	5400 Pa
Rear Load	2400 Pa
Glass Thickness	Double glass, 2.0mm

Shipping Configurations

Container Type	HC
Container Size	40'
Pallets Per Container	20
Modules Per Pallet (pcs)	36
Modules Per Container (pcs)	720

MS-N Series

N-type i-TOPCon bifacial dual glass
Monocrystalline module

PRODUCT: **MS-NSP**
PRODUCT RANGE: **675-700W**

700W

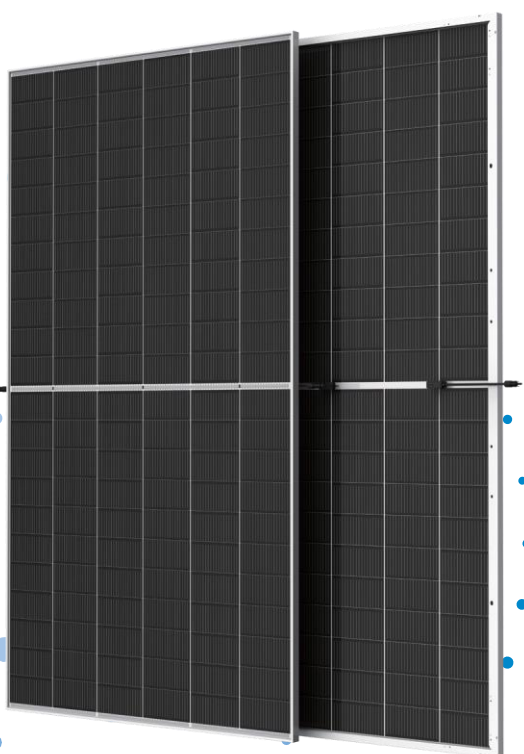
MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

22.5%

MAXIMUM EFFICIENCY



High customer value

- The star of LCOE (Levelized Cost Of Energy). Higher string power feature effectively reduces BOS (Balance of System) and LCOE
- More energy harvest with cutting-edge N-type i-TOPCon technology
- Designed for compatibility with existing mainstream system components



High power up to 700W

- Up to 22.5% module efficiency with high density interconnect technology
- SMBB (Super multi-busbar) technology for better light trapping effect, lower series resistance and improved current collection



High reliability

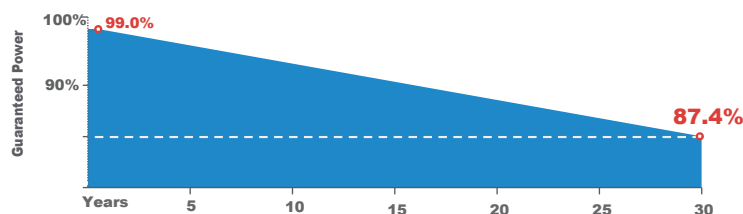
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent product bifaciality and low irradiation performance, validated by 3rd party
- Lower degradation: 1% first year, 0.4% annually thereafter
- Lower temperature coefficient (-0.30%)
- Up to 30% additional power gain from back side depending on albedo

Macsun Solar's MS-N Bifacial Dual Glass Performance Warranty

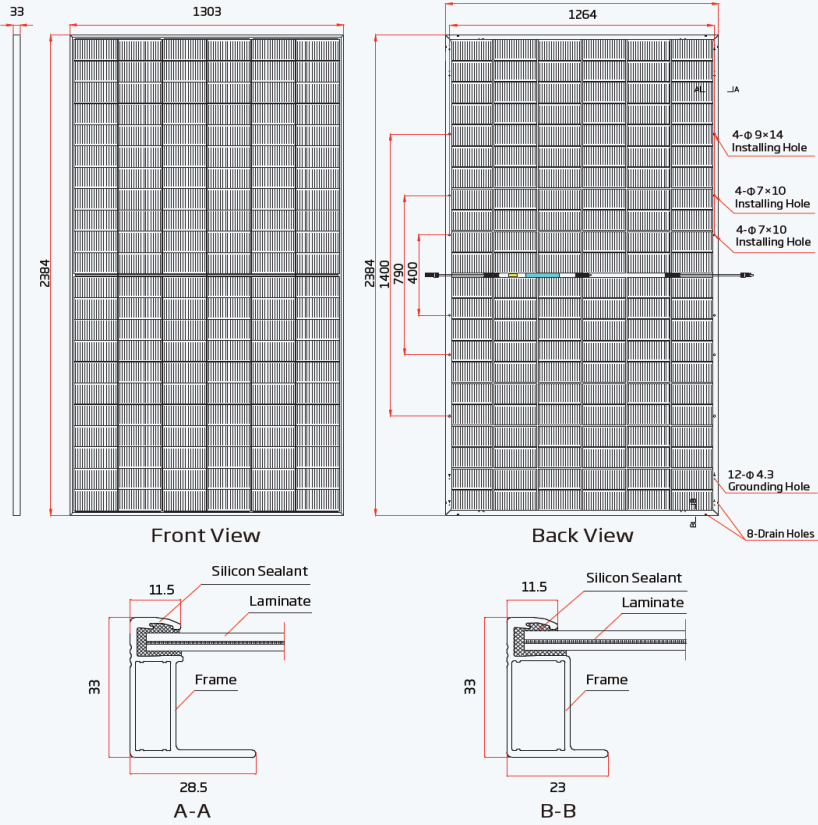


Comprehensive Products and System Certificates

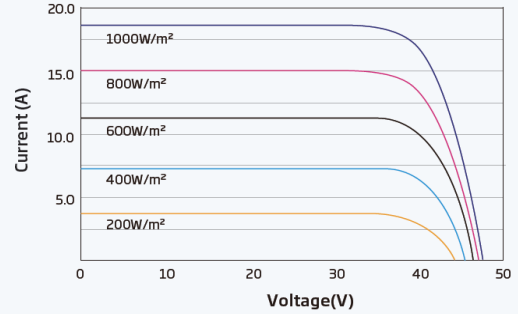


IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System

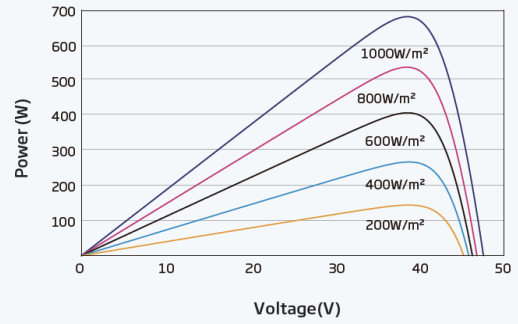
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE(690W)



P-V CURVES OF PV MODULE(690 W)



MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×33 mm (93.86×51.30×1.30 inches)
Weight	38.3 kg (84.4 lb)
Front Glass	2.0mm(0.08inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0 mm(0.08 inches), Heat Strengthened Glass (White Grid Glass)

Frame	33mm(1.30 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm2 (0.006 inches2) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4 PLUS / TS4*

*Please refer to regional datasheet for specified connector.

ELECTRICAL DATA(STC&NOCT)

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts-P_{MAX} (Wp)*	675	514	680	517	685	521	690	526	695	530	700	534
Power Tolerance-P_{MAX} (W)	0 ~ +5											
Maximum Power Voltage-V_{MPP} (V)	39.4	37.0	39.6	37.2	39.8	37.3	40.1	37.7	40.3	37.8	40.5	38.0
Maximum Power Current-I_{MPP} (A)	17.12	13.89	17.16	13.91	17.19	13.94	17.23	13.96	17.25	14.02	17.29	14.05
Open Circuit Voltage-V_{OC} (V)	47.2	44.7	47.4	44.9	47.7	45.2	47.9	45.4	48.3	45.8	48.6	46.0
Short Circuit Current-I_{SC} (A)	18.14	14.62	18.18	14.65	18.21	14.67	18.25	14.71	18.28	14.73	18.32	14.76
Module Efficiency η_m (%)	21.7		21.9		22.1		22.2		22.4		22.5	

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m2, Ambient Temperature 20°C, Wind Speed 1m/s. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Backside Power Gain												
Total Equivalent power -P_{MAX} (Wp)	709	743	714	748	719	754	725	759	730	765	735	770
Maximum Power Voltage-V_{MPP} (V)	39.4	39.4	39.6	39.6	39.8	39.8	40.1	40.1	40.3	40.3	40.5	40.5
Maximum Power Current-I_{MPP} (A)	17.98	18.83	18.02	18.88	18.05	18.91	18.09	18.95	18.11	18.98	18.15	19.02
Open Circuit Voltage-V_{OC} (V)	47.2	47.2	47.4	47.4	47.7	47.7	47.9	47.9	48.3	48.3	48.6	48.6
Short Circuit Current-I_{SC} (A)	19.05	19.95	19.09	20.00	19.12	20.03	19.16	20.08	19.19	20.11	19.24	20.15

Power Bifaciality: 90±5%.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.30%/°C
Temperature Coefficient of V_{OC}	-0.24%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85° C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	35A

WARRANTY

- 12 year Product Workmanship Warranty
- 30 year Power Warranty
- 1% first year degradation
- 0.40% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

- Modules per box: 33 pieces
- Modules per 40' container: 594 pieces

MS-N Series

N-type i-TOPCon bifacial dual glass
Monocrystalline module

PRODUCT: **MS-NSP**

POWER RANGE: **585-610W**

610W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

22.6%

MAXIMUM EFFICIENCY



High customer value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance of System) cost, shorter payback time
- More energy harvest with cutting-edge N-type i-TOPCon technology
- Designed for compatibility with existing mainstream system components
- Higher container space utilization effectively reduces the freight cost



High power up to 610 W

- Up to 22.6% module efficiency with high density interconnect technology
- SMBB (Super multi-busbar) technology for better light trapping effect, lower series resistance and improved current collection



High reliability

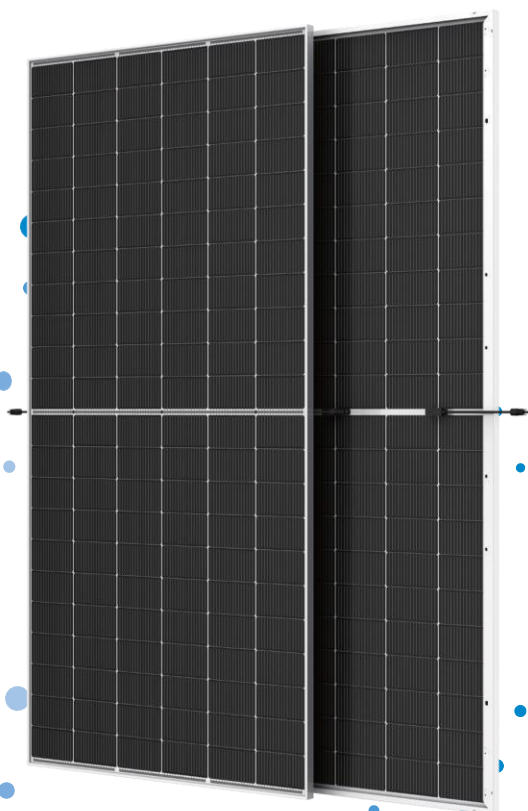
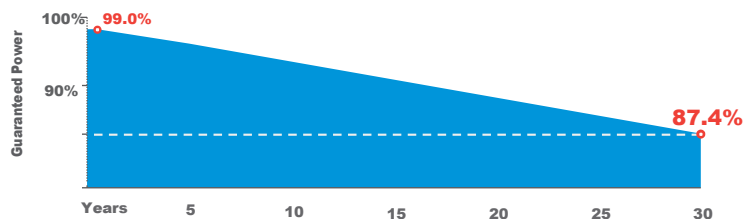
- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- Lower degradation : 1% first year , 0.4% annually thereafter
- Lower temperature coefficient (-0.29%/°C)
- Up to 30% additional power gain from back side depending on albedo

Macsun Solar's Vertex Bifacial Dual Glass Performance Warranty



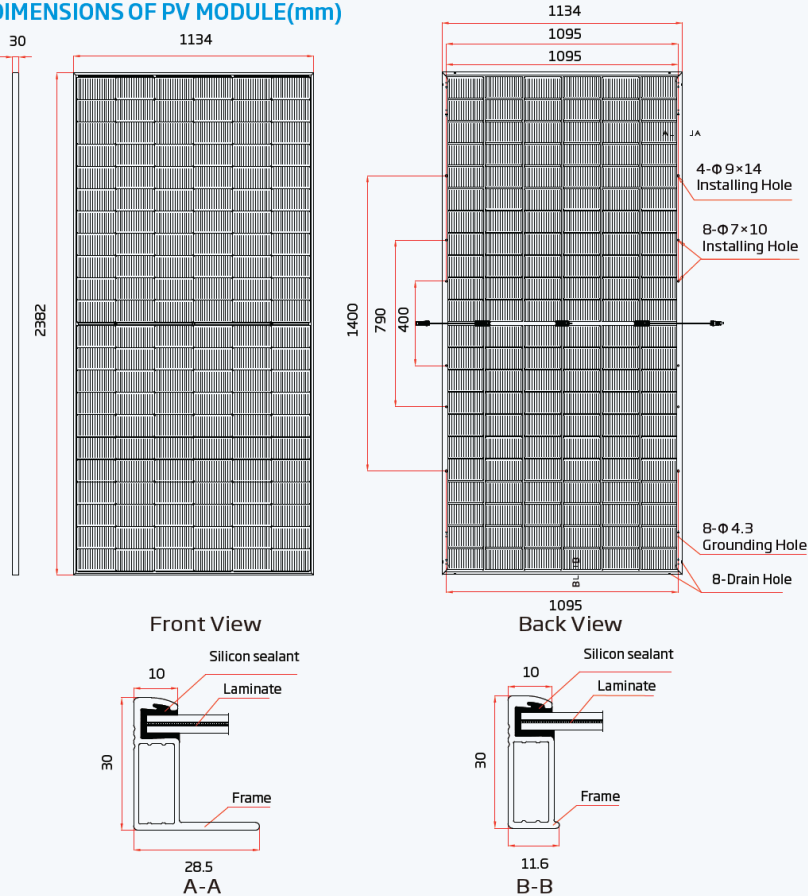
Comprehensive Products and System Certificates



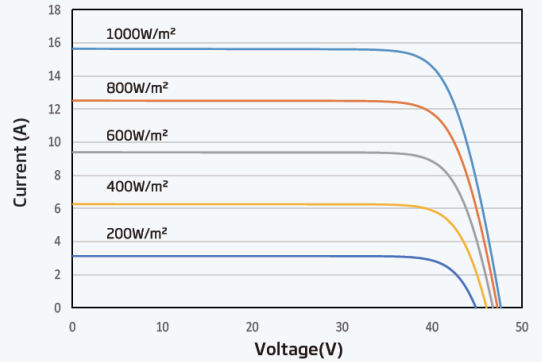
IEC61215/IEC61730/IEC61701/IEC62716
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Greenhouse Gases Emissions Verification
 ISO45001: Occupational Health and Safety Management System

MS-N series N-type i-TOPCon bifacial dual glass Monocrystalline module

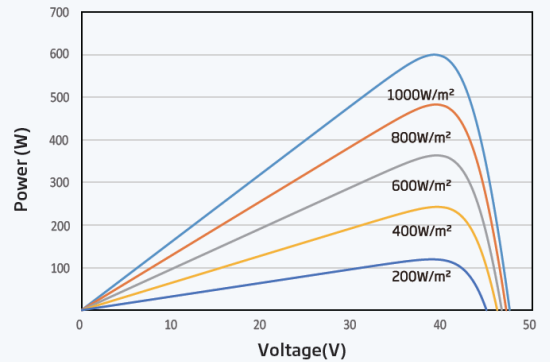
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE (600 W)



P-V CURVES OF PV MODULE (600 W)



MECHANICAL DATA

Solar Cells	N-type Monocrystalline
No. of cells	132 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	33.7kg (74.31lb)
Front Glass	2.0mm(0.08inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0mm(0.08inches), Heat Strengthened Glass (White Grid Glass)

Frame	30mm(1.18 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm2 (0.006 inches2) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4 PLUS / TS4*

*Please refer to regional datasheet for specified connector.

ELECTRICAL DATA(STC&NOCT)

Testing Condition	STC		NOCT		STC		NOCT		STC		NOCT		STC		NOCT	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts- P_{MAX} (Wp)*	585	447	590	450	595	454	600	459	605	462	610	466				
Power Tolerance- P_{MAX} (W)	0 ~ +5															
Maximum Power Voltage- V_{MPP} (V)	39.5	37.2	39.7	37.4	40.0	37.6	40.3	37.9	40.5	38.1	40.8	38.3				
Maximum Power Current- I_{MPP} (A)	14.82	12.02	14.86	12.05	14.89	12.07	14.91	12.11	14.94	12.13	14.96	12.16				
Open Circuit Voltage- V_{OC} (V)	47.5	45.1	47.8	45.4	48.1	45.7	48.4	46.0	48.7	46.2	49.0	46.5				
Short Circuit Current- I_{SC} (A)	15.68	12.64	15.72	12.67	15.76	12.69	15.80	12.73	15.83	12.75	15.86	12.78				
Module Efficiency η_m (%)	21.7		21.8		22.0		22.2		22.4		22.6					

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m2, Ambient Temperature 20°C, Wind Speed 1m/s. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

Backside Power Gain	5%		10%		5%		10%		5%		10%		5%		10%	
	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Total Equivalent power- P_{MAX} (Wp)	614	644	620	649	625	655	630	660	635	666	641	671				
Maximum Power Voltage- V_{MPP} (V)	39.5	39.5	39.7	39.7	40.0	40.0	40.3	40.3	40.5	40.5	40.8	40.8				
Maximum Power Current- I_{MPP} (A)	15.56	16.30	15.60	16.35	15.63	16.38	15.66	16.40	15.69	16.43	15.71	16.46				
Open Circuit Voltage- V_{OC} (V)	47.5	47.5	47.8	47.8	48.1	48.1	48.4	48.4	48.7	48.7	49.0	49.0				
Short Circuit Current- I_{SC} (A)	16.46	17.25	16.51	17.29	16.55	17.34	16.59	17.38	16.62	17.41	16.65	17.45				

Power Bifaciality: 80±5%.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of P_{MAX}	-0.29%/°C
Temperature Coefficient of V_{OC}	-0.24%/°C
Temperature Coefficient of I_{SC}	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85° C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	35A

WARRANTY

12 year Product Workmanship Warranty
 30 year Power Warranty
 1% first year degradation
 0.40% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 36 pieces
 Modules per 40' container: 720 pieces

FullBlackMono-Crystalline

430W~450W

0~+5W POWER TOLERANCE

- High efficiency N - type Double glass black grid solar module
- Stronger properties, PID resistance, reduced hot spot loss
- Better temperature coefficient
- Harsh environmental adaptation
- Full black module, aesthetic appearance
- Bifacial module, more powergeneration

25 years material warranty **25**

30 years power linear warranty **30**

108

HALF-CUT
CELLS

182
x188
mm

RECTANGULAR
CELLS

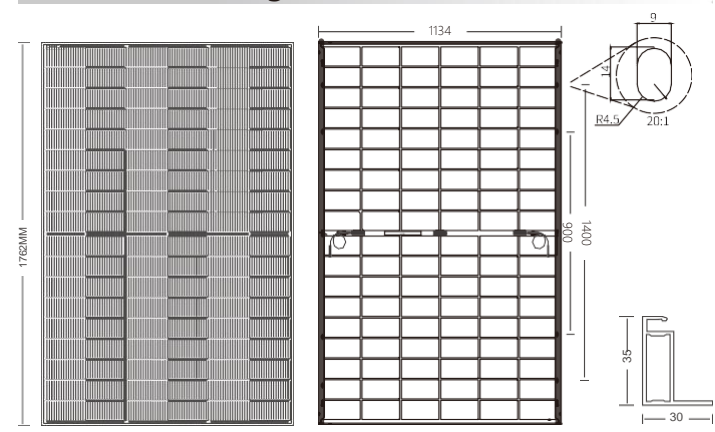


22.5% MAXIMUM CONVERSION	0~+5W POWER TOLERANCE	0.4% 0.4% PER YEAR OVER 30 YEARS	Half-Cut Module LOWER TEMPERATURE COEFFICIENT
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Specification

Cell Type	Mono Crystalline 16BB
No. of Cells	108 [2x(6x9)] pcs
Dimension	1762x1134x30mm
Weight	25.0kg±3%
Front Glass	2.0mm
Back Glass	2.0mm
Frame	Black Anodized Aluminum Alloy
Junction Box	IP68
Cable Length	300mm,1200mm(can be customized)

Mechanical Diagrams



Length: ±2mm Width: ±2mm Thickness: ±1mm Hole pitch: ±2mm

Packing Standard

36pcs/pallet
40HQ: 26 pallets/container, 936pcs/container

Electrical Parameters At STC

Module Type	MSP430HT-5	MSP435HT-5	MSP440HT-5	MSP445HT-5	MSP450HT-5
Peak Power-Pmax (W)	430	435	440	445	450
Open Circuit Voltage-Voc (V)	38.83	39.13	39.42	39.7	39.98
Short Circuit Current-Isc (A)	14.01	14.07	14.13	14.19	14.25
Maximum Power Voltage-Vmp(V)	32.23	32.49	32.74	32.99	33.23
Maximum Power Current-mp(A)	13.34	13.39	13.44	13.49	13.54
Module Efficiency - nm(%)	21.5	21.8	22.0	22.3	22.5

Electrical Parameters At NOCT

	325	329	333	336	340
Maximum Power-Pmax(W)					
Open Circuit Voltage-Voc (V)	36.89	37.17	37.45	37.72	37.98
Short Circuit Current-Isc (A)	11.21	11.26	11.3	11.35	11.4
Maximum Power Voltage-Vmp (V)	30.46	30.7	30.94	31.18	31.4
Maximum Power Current-Imp (A)	10.67	10.71	10.75	10.79	10.83

Operating Parameters

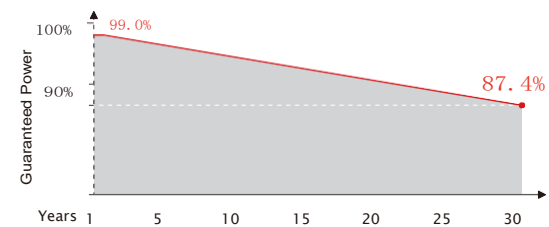
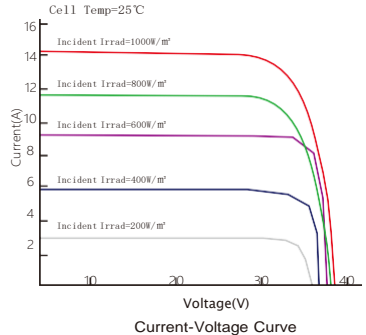
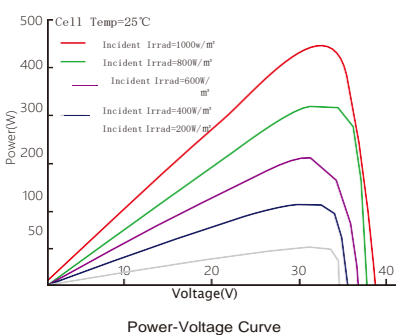
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	25A
Nominal Operating Cell Temperature	42±2°C
Operational Temperature	-45°C~+85°C
Safety Class	Class II

Temperature Coefficient (STC Test)

Temperature Coefficient of Isc	+0.04%/°C
Temperature Coefficient of Voc	-0.24%/°C
Temperature Coefficient of Pmax	-0.29%/°C

Load Capacity

Max Load Front	5400Pa
Max Load Back	2400Pa
Through Hail Testing	25mm Diameter, Impact Speed 23m/s



STC: Irradiance:1000W/m² | Battery temperature: 25°C | Atmospheric=1.5
NOCT: Irradiance:800W/m² | Ambien temperature: 20°C | Atmospheric=1.5 | Wind speed 1m/s

Xinweirun Industrial Park, Furong Rd., Songgang Str., Baoan Dist., Shenzhen, China
www.macsun solar.com



HALF-CELL BIFACIAL MODULE

TYPE: MSMXXXS - D66/Pmh+

POWER OUTPUT
650-670W

MAX EFFICIENCY
21.6%



Features



High module conversion efficiency
Module efficiency up to **21.6%** achieved through advanced cell technology and manufacturing process



Lower operating temperature
Lower operating temperature and temperature coefficient increases the power output



Macsun Solar current sorting process
Up to **2%** power loss caused by current mismatch could be diminished by current sorting technique to maximize system power output



Extended wind and snow load tests
Module certified to withstand extreme wind (2400 Pascal) and snow loads (5400 Pascal) *

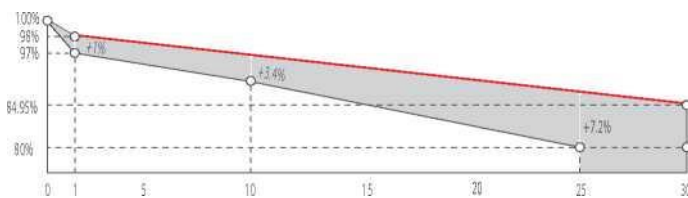


Excellent weak light performance
More power output in weak light condition, such as cloudy, morning and sunset



Withstanding harsh environment
Reliable quality leads to a better sustainability even in harsh environment like desert, farm and coastline

Industry-leading Warranty



- First year power degradation: 2%
- Annual degradation: 0.45%
- Product warranty: 12 years
- Linear warranty: 30 years

Certifications and Standards

CE IEC 61730 IEC 61215
SA 8000 Social Responsibility Standards
ISO 9001 Quality Management System
ISO 14001 Environment Management System
ISO 45001 Occupational Health and Safety
IEC TS 62941 Guideline for module design qualification and type approval



Munich RE  ****

* Please refer to Macsun Solar Standard Module Installation Manual for details.
* Please refer to Macsun Solar Limited Warranty for details.

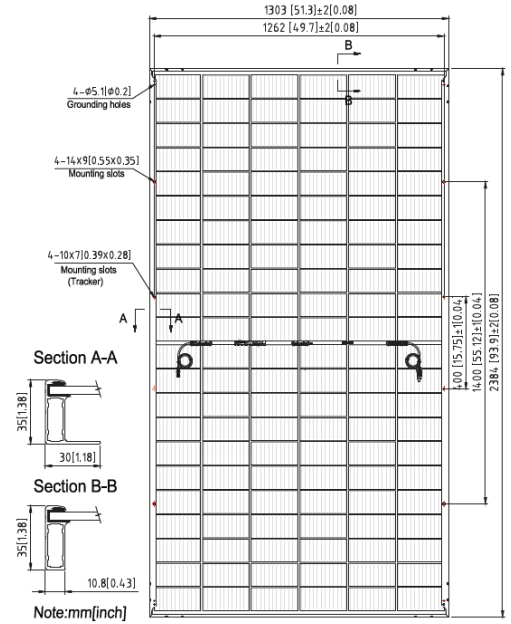
WEEE only for EU market.
* Macsun Solar reserves the right to the final interpretation of the warranty by Munich Re.

MSMXXXS - D66/Pmh+ 650-670W

Mechanical Characteristics

Solar Cell	Monocrystalline silicon 210 mm
No. of Cells	132 (6 X 22)
Dimensions	2384 X 1303 X 35 mm (93.9 X 51.3 X 1.4 inches)
Weight	39.9 kgs (88.0 lbs.)
Front \ Back Glass	2.0+2.0 mm (0.079+ 0.079inches) semi-tempered glass
Output Cables	4.0 mm ² , (-) 350 mm and (+) 160 mm in length or customized length
Junction Box	IP68 rated (3 bypass diodes)
Operating Module Temperature	-40 °C to +85 °C
Maximum System Voltage	1500 V DC (IEC)
Maximum Series Fuse Rating	30 A
Power Tolerance	0/+5 W
Refer. Bifaciality Factor	(70 ± 5)%
Packing Configuration	558 Pieces per container / 40 ' HC

For tracker installation, please turn to Macsun Solar for mechanical load information.



Electrical Characteristics

Module Type	MSM670S-D66/Pmh+		MSM665S-D66/Pmh+		MSM660S-D66/Pmh+		MSM655S-D66/Pmh+		MSM650S-D66/Pmh+	
	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Testing Condition	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Maximum Power (Pmax/W)	670	505.5	665	501.7	660	497.9	655	494.1	650	490.3
Optimum Operating Voltage (Vmp/V)	38.45	35.8	38.25	35.7	38.05	35.6	37.85	35.4	37.65	35.2
Optimum Operating Current (Imp/A)	17.43	14.10	17.39	14.07	17.35	13.99	17.31	13.96	17.27	13.92
Open Circuit Voltage (Voc/V)	46.45	43.7	46.25	43.5	46.05	43.4	45.85	43.2	45.65	43.0
Short Circuit Current (Isc/A)	18.43	14.87	18.39	14.84	18.35	14.76	18.31	14.73	18.27	14.70
Module Efficiency (%)	21.6		21.4		21.2		21.1		20.9	

STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5; NMOT: Irradiance 800 W/m², ambient temperature 20 °C, AM=1.5, wind speed 1 m/s; Tolerance of Pmax is within +/- 3%;

Different Rearside Power Gain Reference to 660S Front

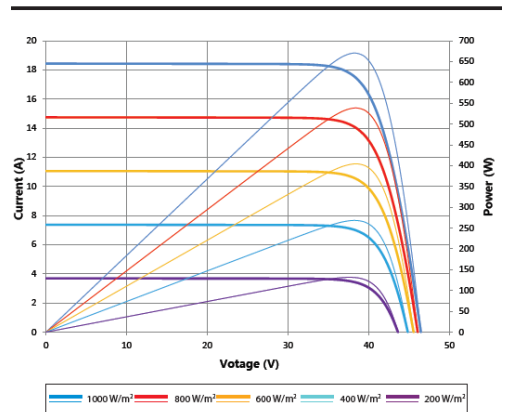
Rearside Power Gain	5%	15%	25%
Maximum Power at STC (Pmax)	693.0	759.0	825.0
Optimum Operating Voltage (Vmp/V)	38.1	38.1	38.2
Optimum Operating Current (Imp/A)	18.22	19.95	21.69
Open Circuit Voltage (Voc/V)	46.1	46.1	46.2
Short Circuit Current (Isc/A)	19.27	21.10	22.94
Module Efficiency (%)	22.3	24.4	26.6

Temperature Characteristics

Nominal Module Operating Temperature (NMOT)	42 ± 2 °C
Temperature Coefficient of Pmax	-0.34%/°C
Temperature Coefficient of Voc	-0.26%/°C
Temperature Coefficient of Isc	0.050%/°C

Information on how to install and operate this product is available in the installation instruction. All values indicated in this data sheet are subject to change without prior announcement. The specifications may vary slightly. All specifications are in accordance with standard EN 50380. Color differences of the modules relative to the figures as well as discolorations of the modules which do not impair their proper functioning are possible and do not constitute a deviation from the specification.

Graphs Current-Voltage & Power-Voltage (670S)



120 HALF-CELL MONOFACIAL MODULE

580-600W

MSMXXS - D60/Wmh



Features



High module conversion efficiency

Module efficiency up to 21.2% achieved through advanced cell technology and manufacturing process



Macsun Solar current sorting process

Up to 2% power loss caused by current mismatch could be diminished by current sorting technique to maximize system power output



Excellent weak light performance

More power output in weak light condition, such as cloudy, morning and sunset



Lower operating temperature

Lower operating temperature and temperature coefficient increases the power output



Extended wind and snow load tests

Module certified to withstand extreme wind (2400 Pascal) and snow loads (5400 Pascal) *



Withstanding harsh environment

Reliable quality leads to a better sustainability even in harsh environment like desert, farm and coastline

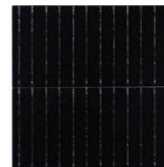
Certifications and standards:
IEC 61215, IEC 61730, conformity to CE



Trust Macsun Solar to Deliver Reliable Performance Over Time

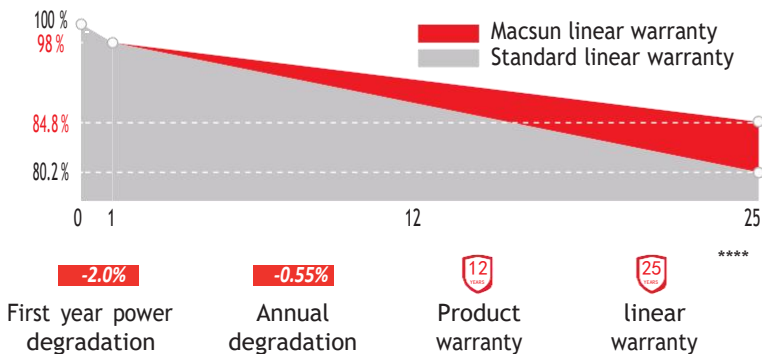
- World-class manufacturer of crystalline silicon photovoltaic modules
- Rigorous quality control meeting the highest international standards: ISO 9001, ISO 14001 and ISO17025
- Regular independently checked production process from international accredited institute/company
- Tested for harsh environments (IEC 61701, IEC 62716, DIN EN 60068-2-68) ***
- Long-term reliability tests
- 2 × 100% EL inspection ensuring defect-free modules

HD technology + Half-Cell



Half-cell with MBB design decreases internal resistance while boosts power output; narrowed inter-cell gap through flexible welding technology contributes to the module's compact dimension.

Industry-leading Warranty based on nominal power



IP68 Rated Junction Box



The Macsun Solar IP68 rated junction box ensures an outstanding waterproof level, supports installations in all orientations and reduces stress on the cables.

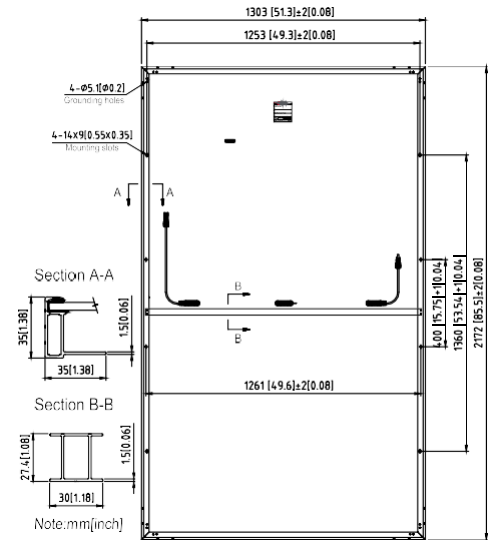
* Please refer to Macsun Solar Standard Module Installation Manual for details.
 ** WEEE only for EU market. *** Please refer to Macsun Solar Product Near-coast Installation Guide for details.
 **** Please refer to Macsun Solar Limited Warranty for details.

STC	MSMXXXS-D60/Wmh				
Maximum Power at STC (Pmax)	600W	595W	590W	585W	580W
Optimum Operating Voltage (Vmp)	34.65V	34.45V	34.25V	34.05V	33.85V
Optimum Operating Current (Imp)	17.32A	17.28A	17.23A	17.19A	17.14A
Open Circuit Voltage (Voc)	41.85V	41.65V	41.45V	41.25V	41.05V
Short Circuit Current (Isc)	18.31A	18.27A	18.22A	18.18A	18.13A
Module Efficiency	21.2%	21.0%	20.8%	20.7%	20.5%
Operating Module Temperature	-40 °C to +85 °C				
Maximum System Voltage	1500 V DC (IEC)				
Maximum Series Fuse Rating	35 A				
Power Tolerance	0/+5 W				

STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5;
Tolerance of Pmax is within +/- 3%;
For tracker installation, please turn to Macsun Solar for mechanical load information.

NMOT	MSMXXXS-D60/Wmh				
Maximum Power at NMOT (Pmax)	452.5W	448.9W	445.0W	441.4W	437.5W
Optimum Operating Voltage (Vmp)	32.4V	32.2V	32.0V	31.9V	31.7V
Optimum Operating Current (Imp)	13.97A	13.94A	13.89A	13.86A	13.81A
Open Circuit Voltage (Voc)	39.4V	39.2V	39.1V	38.9A	38.7V
Short Circuit Current (Isc)	14.73A	14.70A	14.66A	14.63V	14.59A

NMOT: Irradiance 800 W/m², ambient temperature 20 °C, AM=1.5, wind speed 1 m/s.



Temperature Characteristics

Nominal Module Operating Temperature (NMOT)	42 ± 2 °C
Temperature Coefficient of Pmax	-0.36%/°C
Temperature Coefficient of Voc	-0.304%/°C
Temperature Coefficient of Isc	0.050%/°C

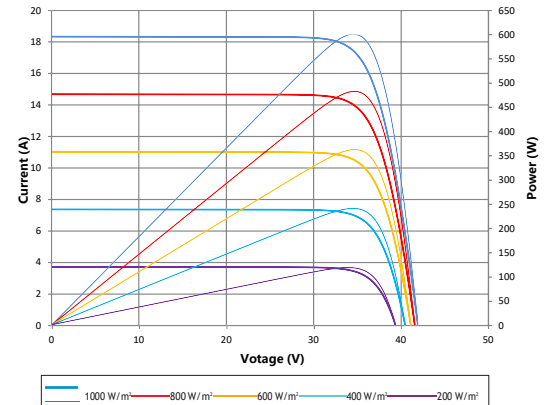
Mechanical Characteristics

Solar Cell	Monocrystalline silicon 210 mm
No. of Cells	120 (6 × 20)
Dimensions	2172 × 1303 × 35 mm (85.5 × 51.3 × 1.4 inches)
Weight	31.5 kgs (69.4 lbs.)
Front Glass	3.2 mm (0.126 inches)
Frame	Anodized aluminium alloy
Junction Box	IP68 rated (3 bypass diodes)
Output Cables	4.0 mm ² , Portrait: (-) 350 mm and (+) 160 mm in length or customized length
Connectors	MC4 EVO2, Cable 01S

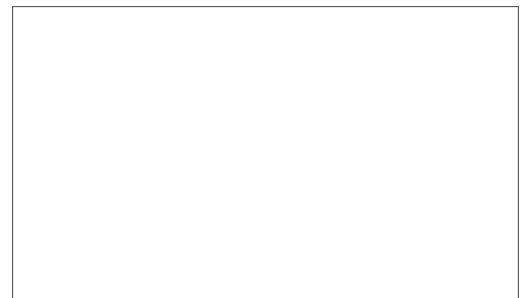
Packing Configuration

Container	40' HC
Pieces per container	558

Current-Voltage & Power-Voltage Curve (600S)



Dealer information



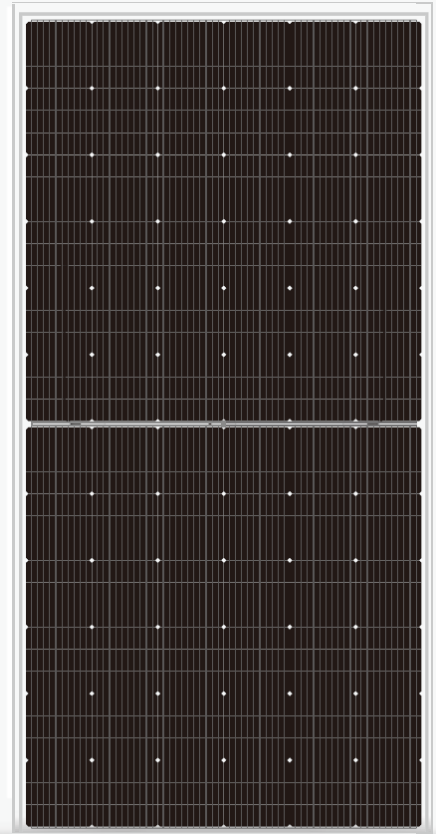
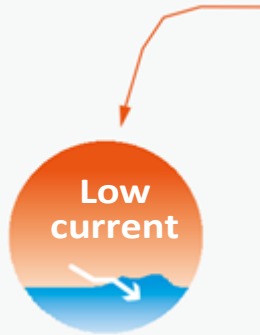
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MS-M72X10/BF

0~+5W

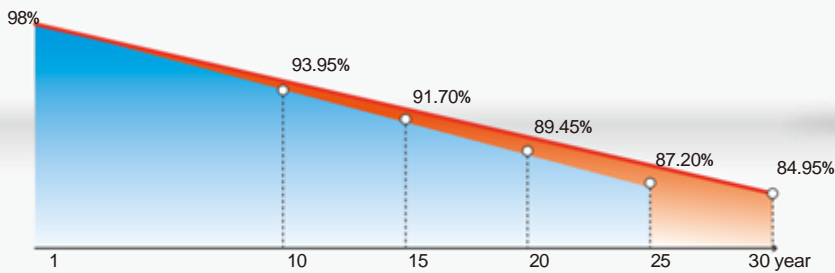
525~550W

1/3 cut High Efficiency PV Module



Quality Guarantee

12-Year material & technology warranty
30-Year linear power output warranty



Macsun solar linear power output guarantee
Standard linear power output guarantee



Technology & Process Upgrade

Three piece design, less occlusion effect, higher power



Super Performance & Stable Returns

Low hot spot & anti-PID, Ensure continuous, stable and efficient power generation



Various Application Scenarios

Strong weather resistance, easy installation in deserts, coastal areas, mountains and various roofs



Better Compatibility

Well compatibility in system, Lower LCOE

Comprehensive

Products and System Certificates



IEC 61215 / IEC 61730 / CE / INMETRO

OHSAS 18001-

2007/International standards for occupational health & safety

ISO 14001-

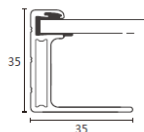
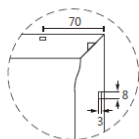
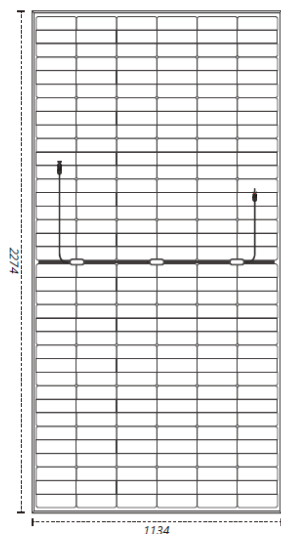
2015/Standards for environmental management system

ISO 9001-

2015/Quality management system

MS-M72X10/BF 525~550W

Design



Mechanical Specification

Cells Type

Mono 182×60.7mm

Weight

28.9kg

Output Cable

(Including connector)

No. of Cells

Glass

Junction box

Connector

Dimension (L×W×T)

2274×1134×35mm

Packing

31pcs/pallet, 620pcs/40HQ

4.0mm², 300/400mm in length,

length can be customized

216 (6×36)

3.2mm High Transmission, Antireflection Coating

IP68, 3 Bypass Diodes

MC4 Compatible

Operating Parameters

Maximum system voltage

1000V/1500V DC

Operating Temperature

-40 ~ +85°C

Maximum series fuse rating

25A

Snow load, frontside

5400Pa

Wind load, backside

2400Pa

Nominal operating cell temperature

45°C±2°C

Application level

Class A

STC-Electrical Characteristics

Module Type	MS-M72X10/BF					
Maximum Power (Pmax)	525W	530W	535W	540W	545W	550W
Open-circuit Voltage (Voc)	73.7V	73.9V	74.1V	74.3V	74.5V	74.7V
Maximum Power Voltage (Vmp)	62.0V	62.2V	62.4V	62.6V	62.8V	63.0V
Short-circuit Current (Isc)	9.01A	9.07A	9.13A	9.19A	9.25A	9.31A
Maximum Power Current (Imp)	8.47A	8.52A	8.57A	8.63A	8.68A	8.73A
Module Efficiency (%)	20.36%	20.55%	20.75%	20.94%	21.13%	21.33%
Temperature Coefficient of Isc	0.05%/°C					
Temperature Coefficient of Voc	-0.31%/°C					
Temperature Coefficient of Pmax	-0.35%/°C					

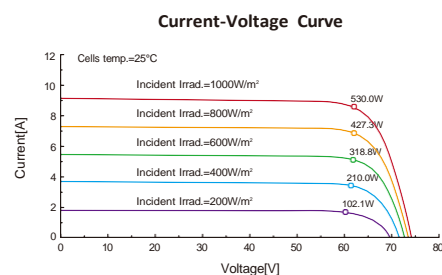
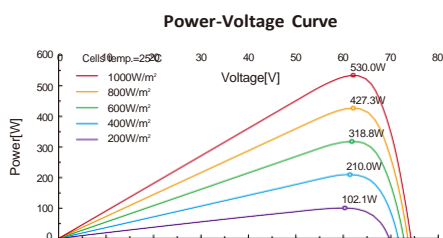
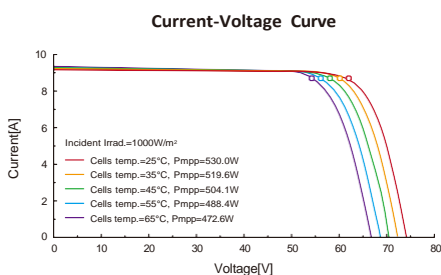
Standard Test Environment : Irradiance 1000W/m², Cell temperature 25°C, Spectrum AM1.5

NOCT-Electrical Characteristics

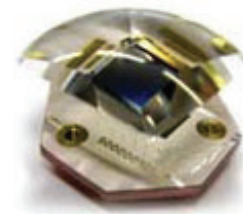
Maximum Power (Pmax)	391W	394W	398W	402W	405W	409W
Open-circuit Voltage (Voc)	69.1V	69.3V	69.5V	69.7V	69.9V	70.1V
Maximum Power Voltage (Vmp)	58.2V	58.3V	58.5V	58.7V	58.9V	59.1V
Short-circuit Current (Isc)	7.28A	7.33A	7.37A	7.42A	7.47A	7.52A
Maximum Power Current (Imp)	6.72A	6.76A	6.80A	6.84A	6.88A	6.92A

Standard Test Environment : Irradiance 800W/m², Ambient temperature 20°C, Spectrum AM1.5, Wind speed 1m/s

I-V Curve (MS-M72X10/BF-530W)



Module Performance 组件规格、性能	
Module Efficiency 组件效率	~28% power efficiency 光电效率
Weight (kg)/Module 重量(kg)/单个组件	25
Module Dimension (m) 模组尺寸	1.48×0.61×0.25
Solar Cell Dimension (mm2) 电池片尺寸	10×10
Concentration Ratio 聚光倍数	1000 times 1000倍
Angle Tolerance (degree) 角度容忍度(°)	+/- 1.2
Open-circuit Voltage (V) 开路电压	24
Short-circuit Current (A) 短路电流	9.47

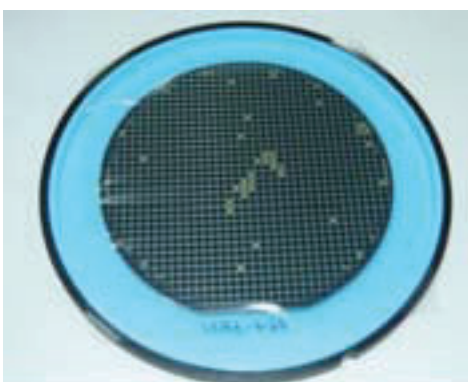
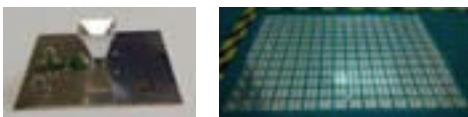


Module Thermal Performance 组件温度参数	
T Coefficient (Voltage) 电压温度参数	0.21 V/°C
T Coefficient (Current) 电流温度参数	0.00037 A/°C
T Coefficient (Power) 功率温度参数	-0.165% /°C

MS-HCPV-120W Concentrated Photovoltaic (HCPV) Solar Modules 120W

MS-HCPV-120W 高倍聚光太阳能组件 120W

FEATURES 特点



- 芯片面积小，热输入量小，贴装容易，不需要强制散热
胶厚度薄，材料用量少，变形量小
焦距短，模组薄，用材省，成本低，运输方便
重量轻，支架与追日系统设计难度降低
一致性高，适合标准化自动化大批量生产，且人工投入少

- MACSUN SOLAR HCPV achieves a high efficiency of solar radiation energy harvesting and conversion and improves the adaptability of the module to the environment through the unique design of Fresnel lens and delicate design of secondary optical device.

- A) Light concentration efficiency: relying on the self-designed lens, the average light concentration efficiency of the Fresnel lens has exceeded 85% and even up to 89% maximally, which is far more than that of the products of the similar kinds;
- B) Radiation distributing performance: by introducing secondary optical elements, the unevenness of radiation energy distributed on the chip surface has been greatly reduced, burden on partial of the chip been reduced, the overall conversion efficiency of the chip been enhanced, and working life of the chip been effectively extended;
- C) Temperature adaptability: the impact on the laser efficiency of optical system from low and high temperature has been reduced due to the combinational optimization of Fresnel lens and secondary optical device, and the conversion efficiency of the module has been improved

either at high or low temperature;

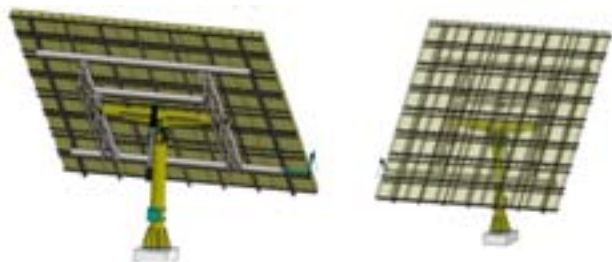
D) Thickness of the module: the thickness of the module has been reduced to only about 100mm through optimization of the optical design, which has lowered the transportation cost and installation difficulty;

E) Light transmittance performance: because the front and back of the module are both made of glass, the scattered light can penetrate the module, which enhances the light at the shade of the module and does good to the plant growth inside the environment.

Flat Dual-Axis Trackers / Automatic Solar Tracking System

平双轴跟踪器/全自动太阳能跟踪系统

FEATURES 特点



- 阳光能源有最好的转换时，直接对太阳能电池的角度，一般的光伏模块，例如有更广泛的接受光角度的规范，使CPV具有更窄的接受角度。太阳能跟踪系统是一种装置，定向的方向朝向太阳的太阳能电池板/组件，这样做可以得到最好的能量转换。这里是一个不同的跟踪器相对于安装纬度有关的固定型，它们的输出增益%更高。由于接受角度窄，CPV一般要求双轴跟踪精度高（DA），而光伏PV发电可以安装在单轴（SA）和双轴（DA）跟踪器上。
- Dual axis tracker can be used to mount PV & CPV modules.

PV Module in general requires less accurate light-source, typically within 10 degree range, whereas the higher efficiency HCPV modules requires 0.5 ~ 1 degree of accuracy depends on the design. Our systems make use of light-sensor tracking + historic tracking (auxiliary); when light source is unstable.

DAT is expected to increase output efficiency by 25- 45%. Our MS-ST 400 series for example can produce up to 15kw with tracking precision within 0.2°.

ELECTRICAL CHARACTERISTICS 太阳能控制器电性能

型号 Model	MS-ST400	MS-ST300	MS-ST200
最大安装面积 Max. Aperture Area	52 m ²	22 m ²	6 m ²
预估可安装容量 Estimate OP Power	7~15kWp	3~7kWp	1-3kWp
模组承载重量 Total Module Weight	1500kg	760kg	180kg
支架重量(不含模组) Bracket Weight (exclusive Module)	2000kg	500kg	200kg
追日方法 Tracking Method	混合式(光传感器为主, 历史轨迹为辅) Hybrid (Light sensor as main, historic track as auxillary)		
支架材质 Bracket Material	热浸镀锌钢, 铝轨 Galvanized steel; Aluminum rail		
追日精度 Tracking Accuracy	≤0.1° (Using Green Mountain Device, generally 0.1° under good weather condition)		
方位角容许范围 Azimuth Angle Range	270° / 450°		
仰角容许范围 Tilting Angle Range	-5° ~ 80°		
保护装置 Protection	软体: 极限保护程序/ 硬体: 马达内建极限保固开关 Software: Limit setting / Hardware: Limit Switch		
抗风设计 Anti-Gale Wind	依各地环境条件(依设置地点50年一遇风荷载标准) Setting depends on site location (Using condition once every 50 years as standard)		
保固 Warrantee Period	传动机构18个月, 跟踪器结构5年 Actuator & Transmission 18 Month, Tracking Structure 5 Years		

SOLAR TRACKING SYSTEM APPLICATIONS 太阳能跟踪系统应用



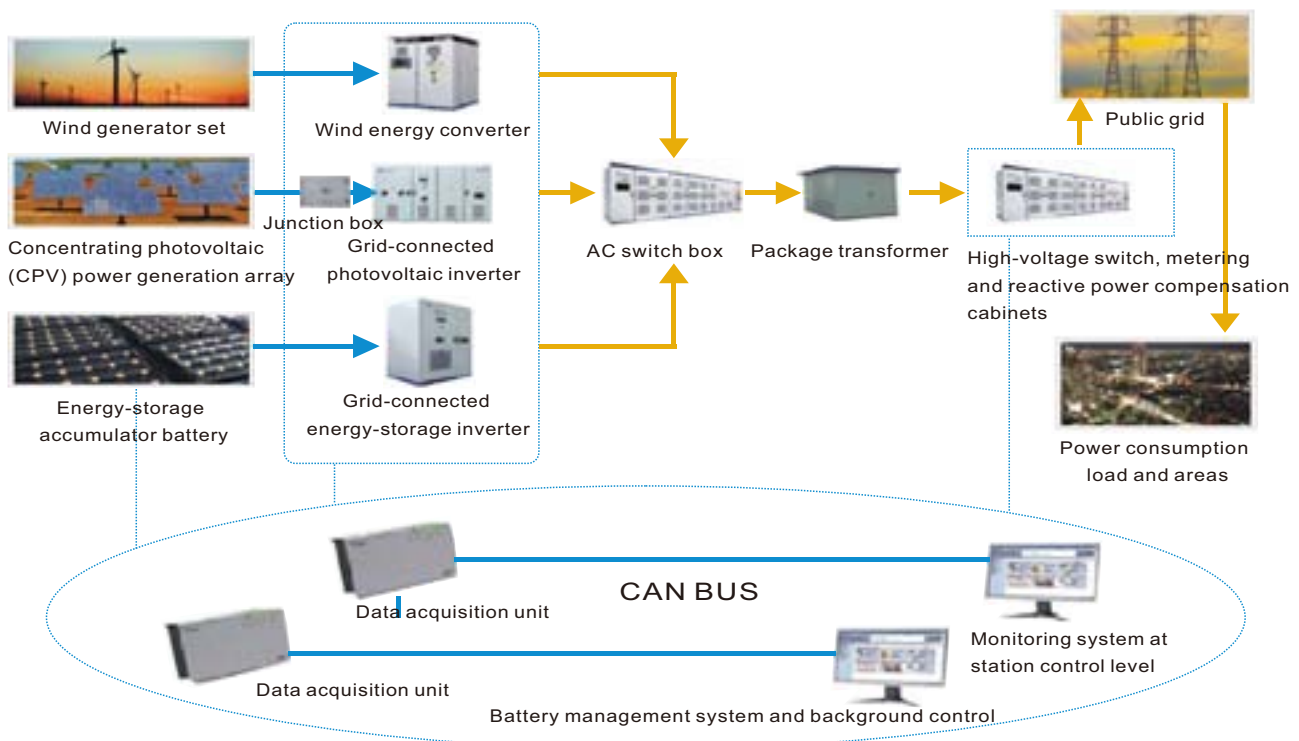
Wind Solar Storage Power System Integrated Overall Solution 新能源整体解决方案

Structural of WSS Units 风光储能发电系统各单元子系统结构

- 风力并网发电系统 Grid-connected wind power system
- 太阳能并网发电系统 Grid-connected solar power system
- 储能并网系统 Grid-connected energy-storage system
- 风光储能一体化监控控制系统等 Integrated monitoring control system of wind, solar and energy-storage systems

Application fields 应用领域

- 10-30
Capable of supplying quality clean electric energy to town communities, and villages and towns with a population of 100-300 thousands as an independent substation;
- 能实现为一些大中型工业企业提供生产和生活电源；
Capable of being power supply to production and living of some large- and medium-sized industrial enterprises;
- 能实现为军工设施、军工场所、边防哨所、军事基地等提供电源；
Capable of being power supply to military industry facilities, military industry locations, border posts, military bases and so on;
- 能实现为海岛、边远地区等提供电源；
Capable of being power supply to islands, outlying areas and so on;
- 能建造装机容量规模更大的风光储综合发电站，或者多个中小型风光储综合发电站集中或者分布式的发电并网应用，将优质电能直接输送公共电网。
Capable of setting up hybrid wind, solar and energy-storage power stations of larger scale of installed capacity, or centralized or distributed grid-connected power generation of many small- and medium-sized hybrid wind, solar and energy-storage power stations to directly deliver the quality electric energy to the public grid.



Solar Power Plants / Solar Power System Projects

太阳能发电站/ 太阳能并网系统工程项目 >>>



中国深圳 Shenzhen, China, 10KWp
 大楼平台固定, 与市电互补示范
 Roof-Mounted & Grid-Tied
 2009 年 06 月建成
 Completion Year in June,2009



捷克 Czech Republic, 450KWp
 地面固定并网
 Ground-Mounted & Grid-Tied
 2010 年 10 月建成
 Completion Year: Oct.,2010



意大利 Italy, 13.34KWp
 屋顶并网
 Roof-Mounted & Grid-Tied
 2011 年 04 月建成
 Completion Year: April,2011



意大利 Italy, 99.36KWp
 市电并网, 使用自动追踪系统
 Grid-Tied,with solar tracking system
 2011 年 04 月建成
 Completion Year: April,2011



上海 Shanghai, 20KWp
 大楼平台固定, 与市电互补示范
 Roof-Mounted & Grid-Tied
 2012 年 06 月建成
 Completion Year: June, 2012



山东 Shandong, 10KWp
 太阳能车棚
 Solar Car Shelter & Grid-Tied
 2013 年 10 月建成
 Completion Year: October, 2013



青海,海南 Hainan, Qinghai, 20MWp
 市电并网, 使用薄膜太阳能组件
 Grid-Tied, with Thin Film Solar Panels
 2014 年 04 月建成
 Completion Year: April, 2014



南京 Nanking, 20KWp
 大楼平台固定, 与市电互补示范
 Roof-Mounted & Grid-Tied
 2015 年 02 月建成
 Completion Year: February, 2015



内蒙古 Inner Mongolia, 1MWp
 聚光太阳能, 太阳能跟踪系统, 市电并网
 CPV Solar System, Tracking System & Grid-Tied
 2015 年 11 月建成
 Completion Year: November, 2015

Exhibition Promotions 国内外展会推广



Speech of President 董事长致辞



对太阳能行业的深厚感情，让我决定进一步投身于开发太阳能新产品的事业中去，为各界朋友排忧解难、提供便利，共图发展，研发出更高品质的太阳能产品，这是我的初衷。

深圳市泰晶太阳能科技有限公司成立十几年来，我始终坚持对朋友要诚信以待，对客户要奉为上宾，对企业要用心经营，对员工要关怀备至。这些信念指引着我的行动，也为我赢得了忠实的员工、优秀的客户，成为公司发展壮大不可或缺的宝贵财富。

今后，深圳市泰晶太阳能科技有限公司愿继续与各界朋友携手并进、与全体员工共同努力，为中国生产的品牌太阳能产品的发展做出更大的贡献！

For the feeling of Solar Energy industry, let me desire to invest more in the Solar Energy venture. Serve well to every friend from different areas, offer more convenient for every customer, and develop together with our partners. All those are my goals.

After the company set up many years ago, I always keep the faith: Keep integrity to friends, treat customers as god, manage the enterprise wholehearted and take care our employee carefully. That faith leads my action, and it helps me hold the loyal employee and super customers. The faith has to be the wealth to take the company developing quickly.

In the future, with all our Macsun Solar people's hard work, I would like to continue to develop our company together with every friend, to contribute more in the Solar Energy business.



用太阳能照亮全世界 Solar Your World!

深圳市泰晶太阳能科技有限公司

地址 深圳市宝安区松岗街道潭头社区芙蓉路8号鑫伟润高新产业园
 邮编 518105
 邮箱 sales@macsunsolar.cn
 电话 +86-755-8981 6120 | 8981 8305
 网址 www.macsunsolar.cn

Macsun Solar Energy Technology Co., Limited

A Xinweirun Industrial Park, Furong Path, Songgang Town,
 Baoan District, Shenzhen, 518105, China.
 E sales@macsunsolar.com | sales@solarenergy86.com
 T +86-755-8981 6120 | 8981 8305
 W www.macsunsolar.com | www.solarenergy86.com



Macsun Solar Wechat
泰晶太阳能公众号



Macsun Solar Sales Wechat
泰晶太阳能客服微信