

# MANUFACTURING STRENGTH

The production plant of SINE ENERGY is equipped with perfect temperature and humidity control equipment. All production lines are controlled by centralized software, and each production equipment can detect and report faults online, improving production efficiency while ensuring product quality.



## Automated manufacturing

SINE ENERGY is equipped with new high-efficiency component production equipment, which is adapted to the production requirements of various advanced technologies and realizes the transition from manufacturing to "intelligent" manufacturing.

## Real-time interactive system

SINE ENERGY SAP and ERP business platforms can achieve real-time interaction, real-time planning, real-time execution, real-time reporting and analysis, and have the advantages of modernization, informationization and intelligence.

## High compatibility

The new production line of SINE ENERGY is compatible with multi-busbar cells of various sizes from 166 to 182 mm, and can be matched with 78 large-sized module. At the same time, it has an upgrade space for 210 mm super-sized cells, covering all mainstream product technologies on the market.

## R & D strength

SINE ENERGY has always been committed to the improvement of product conversion efficiency, constantly strengthening the research and development of new technologies and the improvement of production processes. With its excellent technical advantages and manufacturing level, it wholeheartedly provides customers with high-quality and high-reliability photovoltaic products.





# PHOTOVOLTAIC SYSTEM SOLUTIONS

## Ultra Solar Plant

Large and medium-sized ground photovoltaic power stations are generally large in scale, and usually use ground resources such as coastal beaches, Gobi wasteland, and open suburban areas without shading. In the west, there are more ground power stations with complementary sand and light, which combine the development of photovoltaics with desert governance and water-saving agriculture. combine. The outside of the power station is composed of grass checkered sand barriers and sand-fixing forests to form a shelter forest system. Water-saving drip irrigation facilities are installed under the photovoltaic panels, and green economic crops are planted to achieve a win-win situation of economic and ecological benefits.

### solution

- ▮ The photovoltaic grid-connected power station is fully optimized to realize the optimal configuration of system economy and reliability and ensure the maximum power generation.
- ▮ For various complex geology and landforms such as deserts, barren mountains, deep pits, rocks, etc., we provide customized support foundation construction and support installation solutions according to local conditions.
- ▮ The links of engineering design, equipment supply, construction and installation were carried out in a reasonable manner, and the construction period of the project was greatly shortened.
- ▮ Actively strive for the national on-grid electricity price subsidy, and the investment rate of return is high.



## Distributed photovoltaic power station

Distributed power stations are mainly installed on residential roofs, small commercial roofs and industrial plants. Due to the differences in various on-site environments and roof structures, it is difficult to unify the installation methods. According to engineering experience, a roof structure with higher versatility is selected for design.

### flat roof

Such power stations are mainly built on flat roofs, and are mainly installed by means of concrete foundations, chemical anchor bolts or self-weight brackets.

### pitched roof

This type of power station is built on a sloping roof building. It is mainly installed in a tiled form according to the slope of the roof. Special pendants are fixed on the roof bearing beams, sandalwood strips are installed, and finally photovoltaic modules are fixed.

### Color steel tile roof

This type of power station is built on the roof of color steel tiles. According to the different cross-sectional shapes of the color steel tiles, different special pendants are used as the foundation to fix, and then sandalwood strips and module are installed.

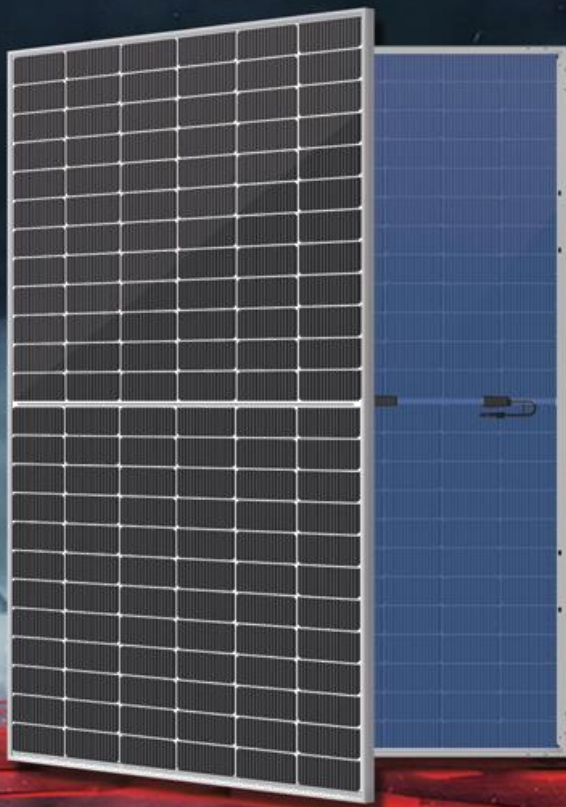
### Distributed photovoltaic power generation features:

- ▮ Simple access, high security and reliability.
- ▮ The user side is connected to the grid, mainly for self-use, and the surplus power is connected to the grid.
- ▮ Mainly built on factory roofs, public building roofs and family roofs, etc., saving land resources.
- ▮ National policy support and electricity price subsidy.
- ▮ No need for long-distance power transmission, low cost and high efficiency.
- ▮ Energy saving and environmental protection, with good economy and sociality.



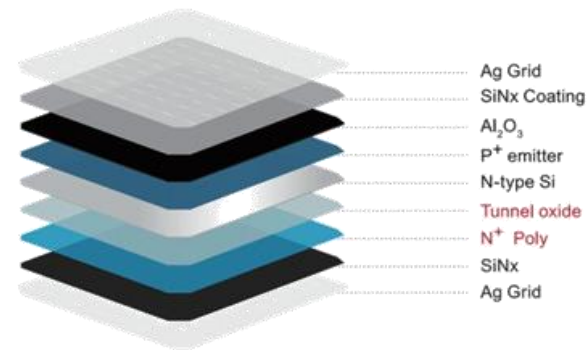
# N 全

## TOPCON cells Technology



### Advantages of N-type TOPCon cells

- Better chemical passivation and field passivation can be achieved simultaneously with polysilicon passivation Effect;
- The majority carrier is tunneled and transported through the ultrathin tunneling oxide layer, and it is possible to obtain low. The contact resistance can be significantly reduced while the metal-semiconductor recombination;

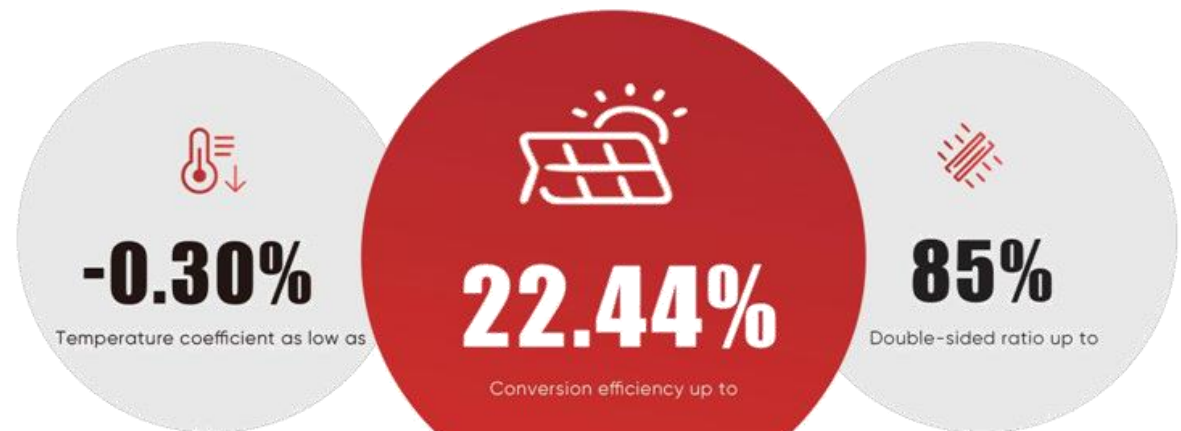


### Advantages of N-type module power generation cost

Under the same lighting conditions, N-type module can gain more additional gain than P-type module

P-type module power generation time

N-type module power generation time



# PRODUCT SERIES & FEATURES



## High conversion efficiency

The application of leading gallium-doped PERC technology, the conversion efficiency is up to 23.2%, and the first year reduction is  $\leq 2\%$



## Low light performance

The application of glass and cells surface treatment technology enables the module to obtain excellent performance in low light environment



## High reliability

First-line brand BOM material, excellent sealing and insulation, guarantee 30 years of performance, TUV Rheinland, International certifications such as CE and INMETRO, and strict quality control ensure high reliability of components



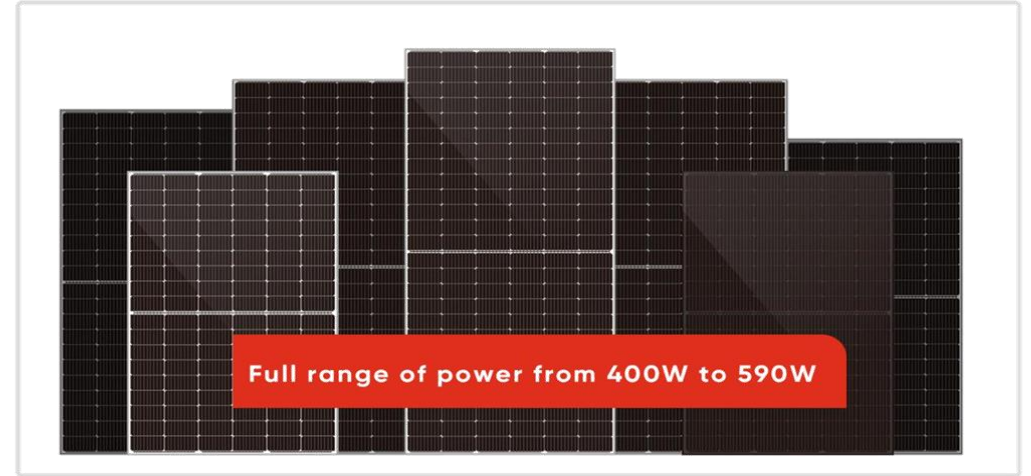
## Mechanical load design

Cutting edge design allows components to be certified for 5400Pa frontal snow load and 2400Pa wind load



## Excellent anti-PID performance

Innovative cells technology that protects components from potential difference-induced degradation



Solar panel series	Module Type	Number of cells	Component size	Efficiency
182mm	SN(400-415W)-108M	108 cell	1722*1134*30mm	21.25%
	SN(400-410W)-108MF	108 cell	1722*1134*30mm	21.00%
	SN(440-455W)-120M	120 cell	1916*1134*35mm	21.32%
	SN(490-505W)-132M	132 cell	2094*1134*35mm	21.27%
	SN(540-555W)-144M	144 cell	2279*1134*35mm	21.47%
	SN(540-555W)-144MB	144 cell	2279*1134*35mm	21.47%
	SN(580-600W)-156M	156 cell	2464*1134*35mm	21.46%
	SN(580-600W)-156MB	156 cell	2464*1134*35mm	21.46%
166mm	SN(360-380W)-120M	120 cell	1755*1038*30mm	20.86%
	SN(440-460W)-144M	144 cell	2095*1038*35mm	21.15%
210mm	SN(590-610W)-120M12	120 cell	2172*1303*35mm	21.55%
	SN(650-670W)-132M12	132 cell	2384*1303*35mm	21.57%
	SN(590-610W)-120MB12	120 cell	2172*1303*35mm	21.55%
	SN(650-670W)-132MB12	132 cell	2384*1303*35mm	21.57%

# PRODUCT DISPLAY

## ▶ 166 mm Series

### Key Features

- M6 wafer MBB half cut technology
- High efficiency cells & high module yield
- Twin panels parallel connection
- Excellent industry size compatibility, optimal size & weight for residential rooftop system & commercial projects
- Stable generation capacity and power loss guarantee
- Excellent anti-PID, sand-dust, salt-mist & ammonia resistance ability; 2400Pa wind load & 5400Pa snow load approved

UP TO

**380W**

### Mono Half Cut

#### SN(360-380W)-120M / Monofacial

Module Size : 1755\*1038\*30mm  
Weight : 19.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 36pcs/pallet, 1001pcs/40HQ



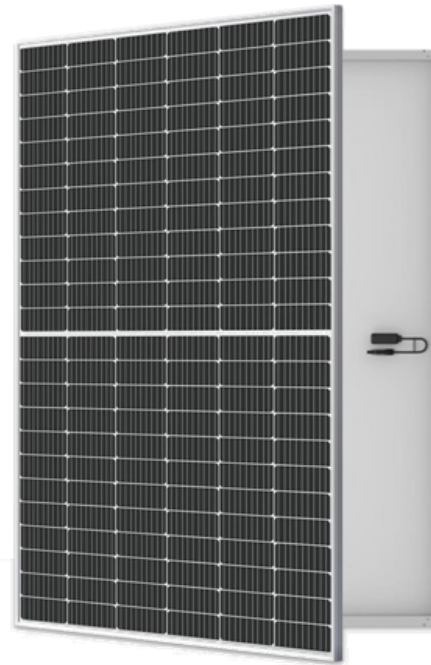
UP TO

**460W**

### Mono Half Cut

#### SN(440~460W)-144M / Monofacial

Module Size : 2095\*1038\*35mm  
Weight : 23.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 682pcs/40HQ





# PRODUCT DISPLAY

## ▶ 182 mm Series

### Key Features

- M10 wafer plus MBB half cut technology
- High efficiency cells & high module yield guarantee
- Special cells strings array layout
- Excellent industry size compatibility, suitable for ultra power plant & commercial projects, effectively reducing LCOE & transportation costs
- Stable generation capacity and power loss guarantee
- Excellent anti-PID, sand-dust, salt-mist & ammonia resistance ability; 2400Pa wind load & 5400Pa snow load approved

UP TO  
**415W**



### Mono Half Cut

#### SN(400-415W)-108M / Monofacial

Module Size : 1722\*1134\*30mm  
Weight : 20.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 36pcs/pallet, 936pcs/40HQ

UP TO  
**410W**



### Mono Half Cut

#### SN(400-410W)-108MF / Monofacial

Module Size : 1722\*1134\*30mm  
Weight : 20.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : Black KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 36pcs/pallet, 936pcs/40HQ

UP TO  
**460W**



### Mono Half Cut

#### SN(440-460W)-120M / Monofacial

Module Size : 1916\*1134\*30mm  
Weight : 22kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 36pcs/pallet, 864pcs/40HQ

UP TO  
**505W**



### Mono Half Cut

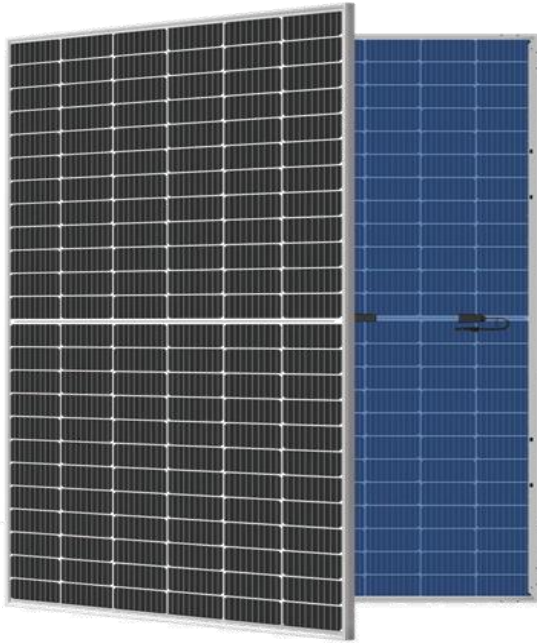
#### SN(490-505W)-132M / Monofacial

Module Size : 2094\*1134\*35mm  
Weight : 25.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 682pcs/40HQ

# PRODUCT DISPLAY

## ▶ 182 mm Series

UP TO  
**550W**



### Mono Half Cut

#### SN(540-550W)-144M / Monofacial

Module Size : 2279×1134×35mm  
Weight : 27.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 620pcs/40HQ

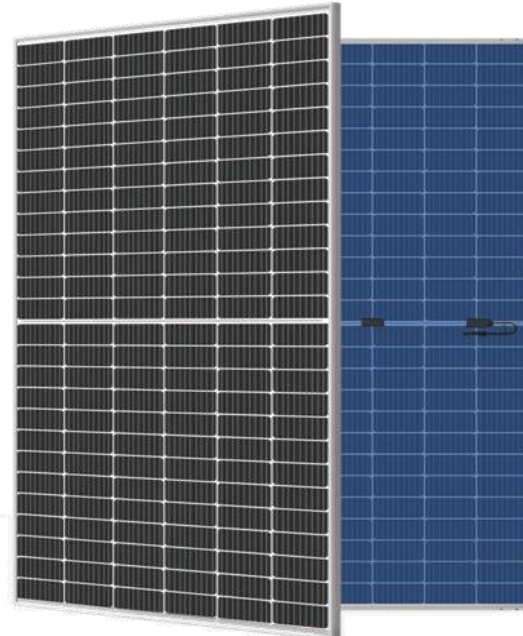
#### SN(540-550W)-144MB / Bifacial

Module Size : 2279×1134×35mm  
Weight : 27.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 620pcs/40HQ

### Key Features

- M10 wafer plus MBB half cut technology
- High efficiency cells & high module yield guarantee
- Special cells strings array layout
- Excellent industry size compatibility, suitable for ultra power plant & commercial projects, effectively reducing LCOE & transportation costs
- Stable generation capacity and power loss guarantee
- Excellent anti-PID, sand-dust, salt-mist & ammonia resistance ability, 2400Pa wind load & 5400Pa snow load approved

UP TO  
**590W**



### Mono Half Cut

#### SN(575-590W)-156M / Monofacial

Module Size : 2464×1134×35mm  
Weight : 31kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ

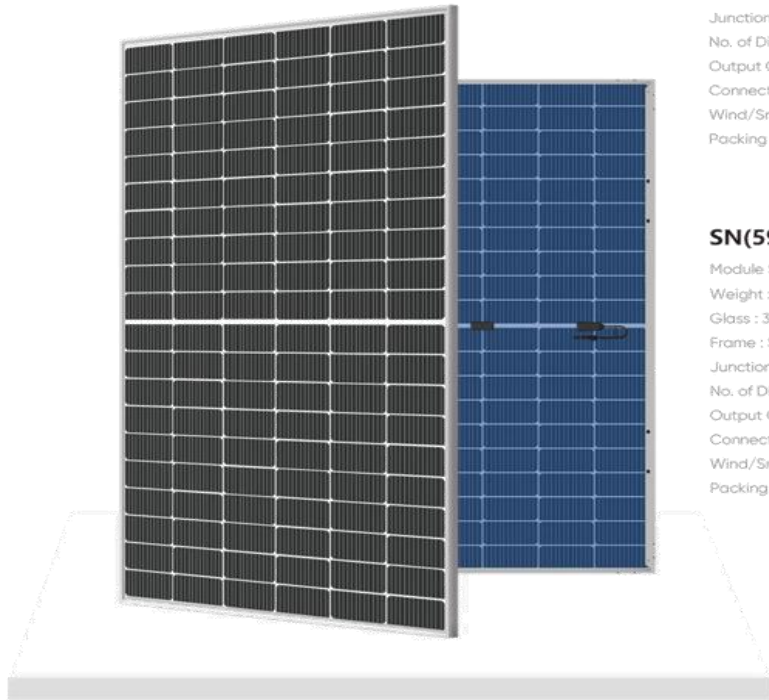
#### SN(575-590W)-156MB / Bifacial

Module Size : 2464×1134×35mm  
Weight : 31kg  
Glass : 3.2mm tempered, high transmission ART coating  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ

# PRODUCT DISPLAY

## ► 210 mm Series

UP TO  
**610W**



### Mono Half Cut

#### SN(590-610W)-120M12 / Monofacial

Module Size : 2172×1303×35mm  
Weight : 30.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ

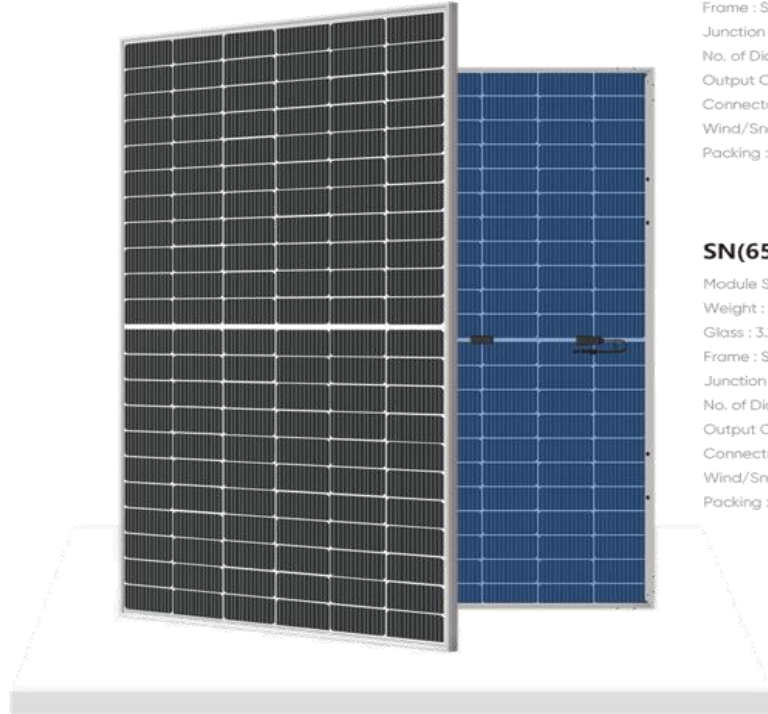
#### SN(590-610W)-120MB12 / Bifacial

Module Size : 2172×1303×35mm  
Weight : 30.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ

### Key Features

- Adopt latest 210mm half cut cells technology, upto 23.1% cells efficiency and low degradation rate
- 12bb cells with powerful optical conversion rate
- Twin panels parallel connection
- Super high power output monofacial panel
- 0~+5W power output guarantee, 1st year power degradation $\leq$ 2%, 2nd year to 25th year power degradation $\leq$ 0.6%
- Anti-PID material, sand-dust, salt-mist, and ammonia resistance, meet all kinds of different installing requirements

UP TO  
**670W**



### Mono Half Cut

#### SN(650-670W)-132M12 / Monofacial

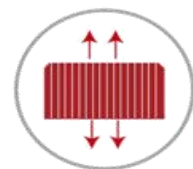
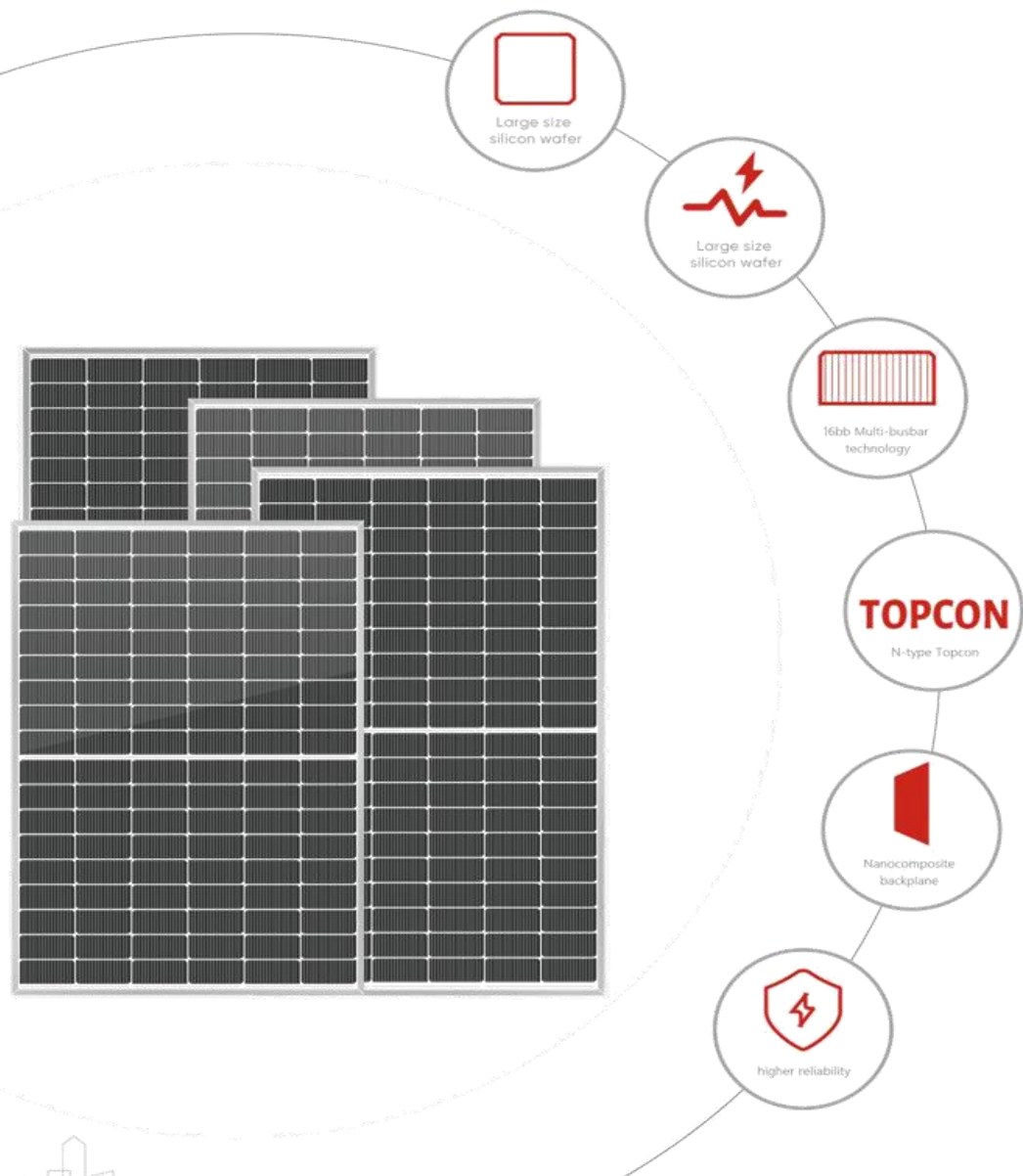
Module Size : 2384×1303×35mm  
Weight : 33.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Back Sheet : White KPF  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ

#### SN(650~670W)-132MB12 / Bifacial

Module Size : 2384×1303×35mm  
Weight : 33.5kg  
Glass : 3.2mm tempered, high transmission ART coating  
Frame : Silver Anodized Aluminium Alloy  
Junction Box : IP68  
No. of Diodes : 3pcs  
Output Cable : 4.0mm<sup>2</sup> 400/400mm (custmized available)  
Connector : MC4 Compatible (MC4 Original optional)  
Wind/Snow Load : 2400pa/5400pa  
Packing : 31pcs/pallet, 558pcs/40HQ



# TOPCON SERIES PRODUCTS



## Extra power gain

With a life cycle of at least 30 years and a bifacial design, the additional power generation is about 10%-30% higher than that of conventional modules



## Better temperature coefficient

N Type Topcon cells technology module, higher power generation in operation than conventional components



## No LETID No LID

N type topcon modules has better reliability in harsh environment and lower LID/LETID.



## Better low light response

N type Topcon solar cells makes longer life span, lower degradation and better performance in weak light conditons



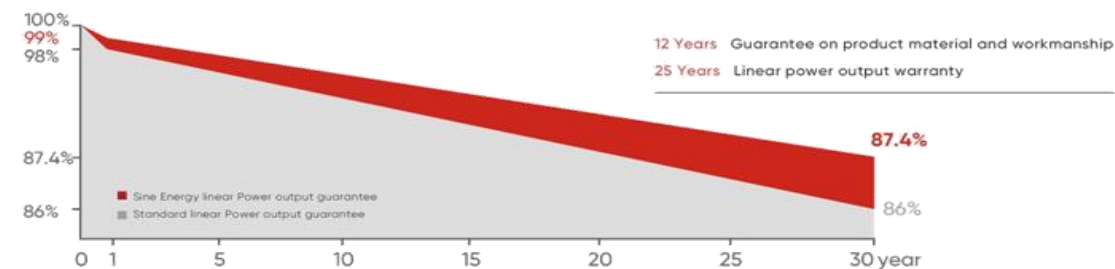
## Lower electricity cost

5-25w higher than Perc modules with the same size result in lower LCOE and O/M cost.



## PID Resistance

Selected encapsulating materials and stringent production process controls ensures highly PID resistant.



Model type	Number of cells	Component size	Conversion efficiency	weight	Glass
SN(410~430W)-108MT	108cell	1722*1134*30mm	22.02%	19.5kg	3.2mm
SN(460~480W)-120MT	120cell	1916*1134*35mm	22.09%	22.5kg	3.2mm
SN(510~530W)-132MT	132cell	2094*1134*35mm	22.32%	24kg	3.2mm
SN(560~580W)-144MT	144cell	2279*1134*35mm	22.44%	26.5kg	3.2mm
SN(560~580W)-144MTB	144cell	2279*1134*35mm	22.44%	26.5kg	3.2mm

















**Queens Solars**

*Holland Engineering*

## The necessity of building a photovoltaic smart industrial park

01

Bring together business partners and production bases in the upstream and downstream of the industrial chain to expand the scale of the enterprise and increase production capacity volume and production efficiency;

02

Introduce excellent scientific research teams and high-tech talents, reduce R&D costs, and master the most advanced technology in the industry And technology.

03

Create a large number of local employment opportunities, bring considerable tax revenue, and avoid local encounters in the future "Power shortage" affects the production and operation of other industries.



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