

**Mysolar**

New Energy, Smart Living



## N-TYPE HJT Solar Panel Introduction

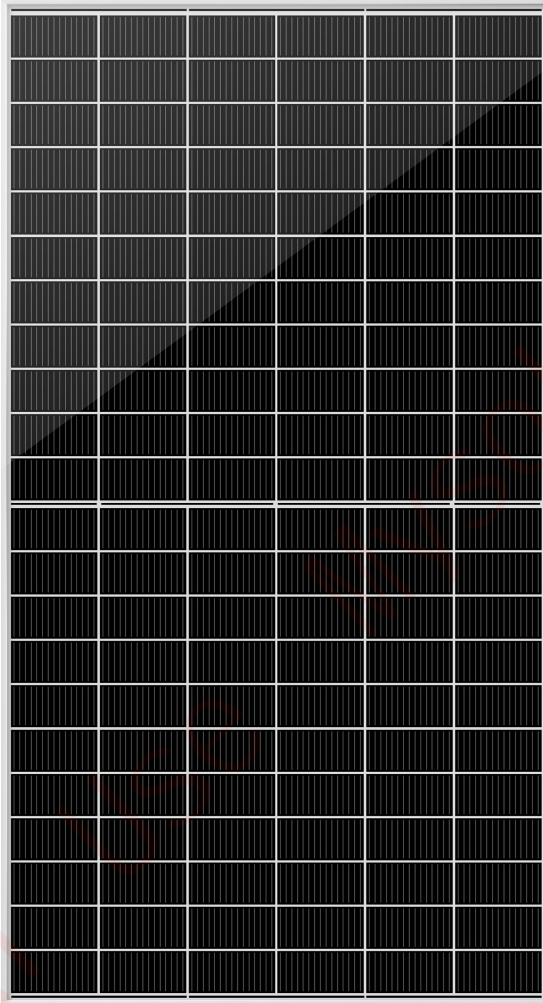
**Mysolar Manufacturing (Shanghai) Co.,Ltd.**

Edition: 2022. Nov



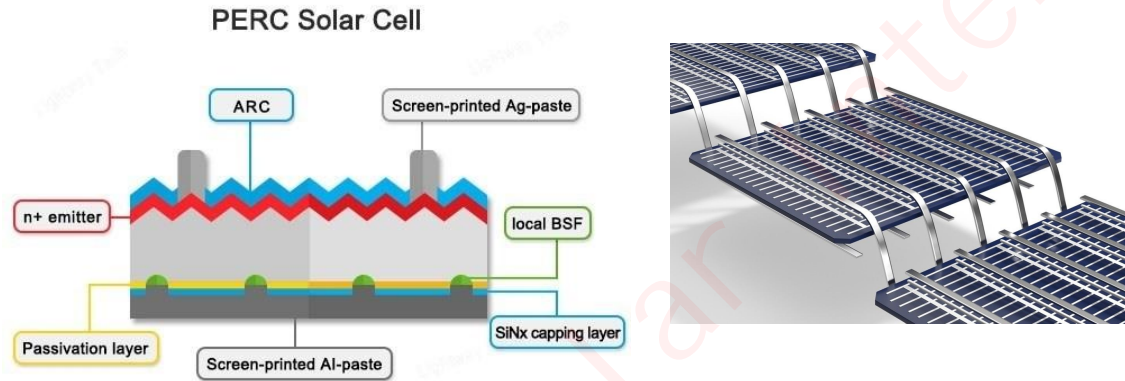
Mysolar is a **Mamibot**<sup>®</sup> company, all rights reserved by **Mamibot**

## Mysolar HJT Solar Panel Advantages



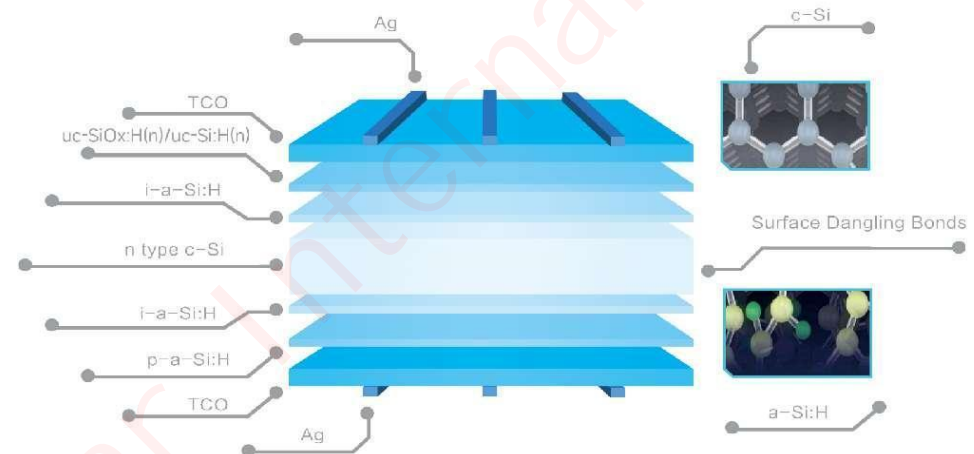
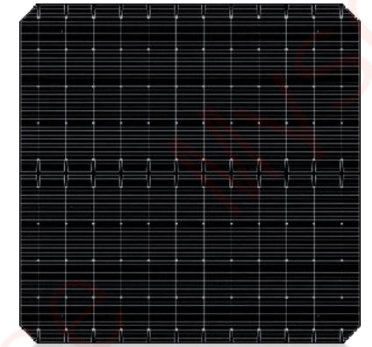
- \* Super high power output, up to 710W in lab and 700W in mass production with dimension 2384\*1303\*35mm
- \* Super high efficiency of solar modules, up to **22.86% for 710W**
- \* Saving a big amount of money on Bos: up to **7%**
- \* Delivering up to **10%** more power output
- \* Less annual degradation: only **1%** for the first year, and **0.25%** from the 2nd year
- \* Lower temperature co-efficient: **-0.26%/°C**, which means HJT panels generate up to 3.5% more electricity than general mono perc panels
- \* No LID effect, as the N-type wafer does not have a B-O bond.
- \* A much better low-light output that contributes a 1% more power gain
- \* Less Micro-crack risks as the processing temperature of HJT cells is lower than 250°C
- \* Much higher bifacility (up to **95%**) on HJT cells compared to mono perc cells, which means HJT bifacial panels can generate 3.5-6% more power per watt than N-type/PERC bifacial
- \* Bifacial HJT panels can have 7-13% more yield than mono facial perc panels and 3.5-6% more yield than bifacial mono perc panels
- \* The longest warranty: 30 years limited product warranty plus 30 years linear performance warranty (@91.75% of the nominal power output in the 30th year)

## Differences between HJT cells and perc cells



**PERC ( Passive Emmitter Rear Contact)** is a new technology aimed to achieve higher energy conversion efficiency by adding a dielectric passivation layer on the rear of the cell. The structure of a PERC solar cell from front to rear: Screen-printed Silver paste front contact; Anti-Reflective Coating (ARC); Silicon wafers that form the P-N junction; Local Aluminum Back Surface Field (Al-BSF); Dielectric passivation layer; SiNx Capping Layer; and Screen-printed Aluminum paste layer.

**HJT ( Heterojunction technology)** cells combined the advantages of c-si and thin film technologies, with excellent light absorption and passivation effects, super efficiency and power output. It increase conversion efficiency and power output to the highest level. The natural bifacial symmetrical structure of HJT cells can effectively improve the power generation capacity on module's backside.



HJT is not only N-type, it's much more than N-type

## N-Type HJT vs Other Cells Tech

Wafer	Tech Roadmap	Cell Effi R&D (%)	Compatibility to Current Equipments	Equipment Costs	Processing Difficulty	Production Processes	Mass Production Status
<b>P-type</b>	Upgrade PERC	24.03	PERC + SE Compatible, easy to remodel	Low	Monofacial: lower difficulty less processes Bifacial: hard	10+	In Production
	<b>HJT</b>	<b>26.81</b>	<b>Partially compatible</b>	<b>Higher</b>	<b>Less processes, symmetrical design, thinfilm technology</b>	<b>4</b>	<b>Few in production</b>
<b>N-type</b>	IBC	25+	Partially compatible	Very High	Complicated process, very difficult, lack of module equipment	20+	200MW at present
	TOPCON	24.58	Compatible with N-PERT production line if 3~5 processes added	High	Hard	12	Plan > 50GW
	N-PERT	23.5+	Partially compatible with PERC	Lower	Less processes, not difficult	10+	1-2GW at present
	Tandem/C ombinated Cell tech	28+	HJT+IBC = HBC HJT + Perovskite = Tandem	Combination of 2 tech	Very high	25+	Very small

**Production Process and Cell efficiency**

### N-Type HJT

**Four steps for HJT Processing**

- Clearing Texturing
- Bifacial CVD
- Bifacial PVD
- Screen Printing



### Other Cells Tech

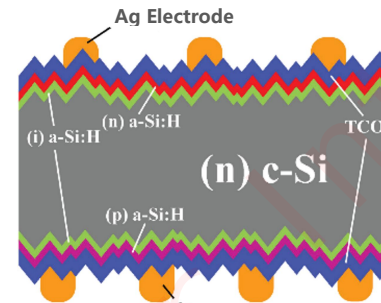
At least 10 steps for processing



### N-Type HJT

**Current 24.40-24.75%**

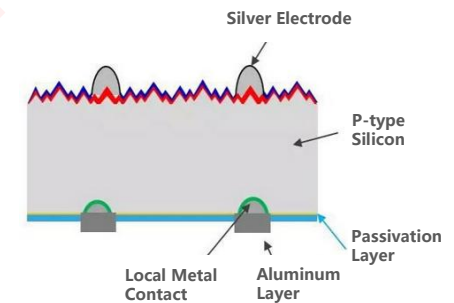
Starting in mass production with 24.75%, reaching 27% in 2023, with more possibility for higher results



### PERC Cells

**Current 22.5-23.5%**

Mature technology and reaching the limitation of 24.5%. No further technical breakthrough





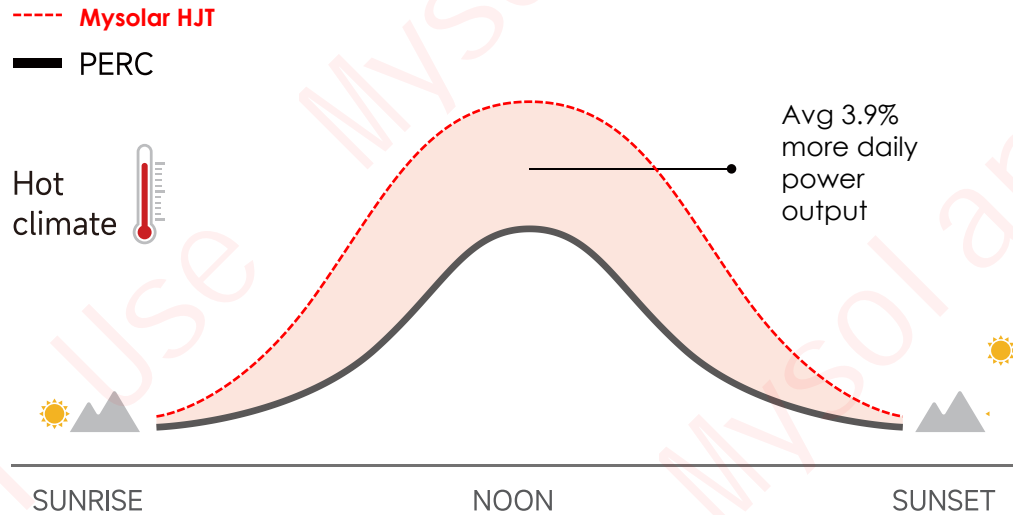
**Extreme Temp. Co-efficient**

Industry Leading

**-0.26%/°C**

**Temp. Co-efficient**

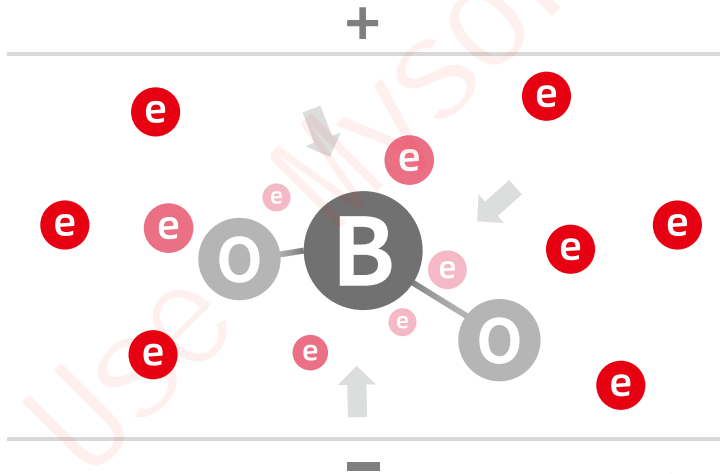
The -0.26%/°C Temperature coefficient means Mysolar's HJT solar panels can generate up to 3.9% MORE electricity than PERC panels in a hot climate.



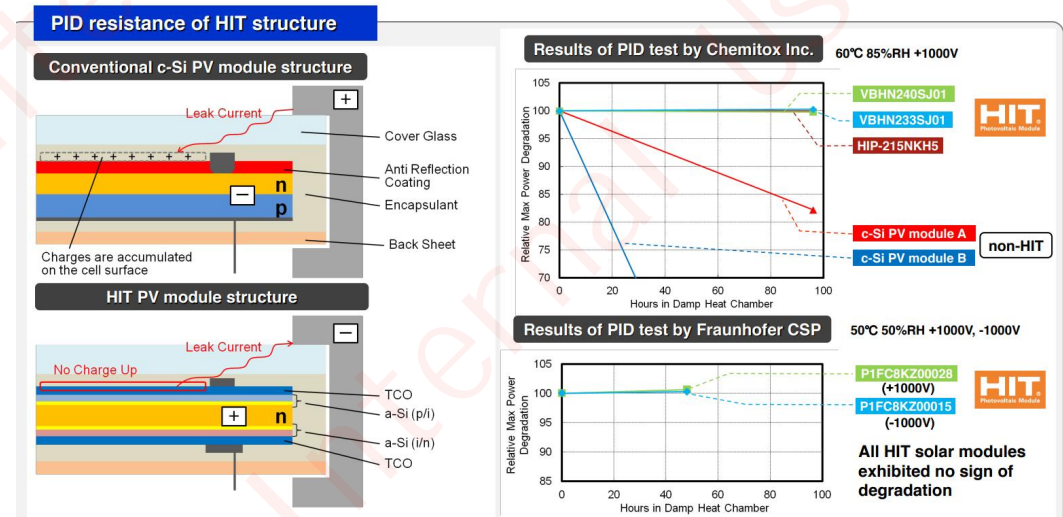
Product	Temp Coefficient %/°C	Maximum power 550W, the efficiency loss under 65°C	Efficiency loss in a hot weather
Mono	-0.45	99W	18.0%
Mono PERC	-0.38	83.6W	15.2%
<b>Mysolar HJT</b>	<b>-0.26</b>	<b>57.2W</b>	<b>10.4%</b>

**No B-O Band, No PID/LID**

The conventional perc solar cells have B-O bands, which caused LID in application.

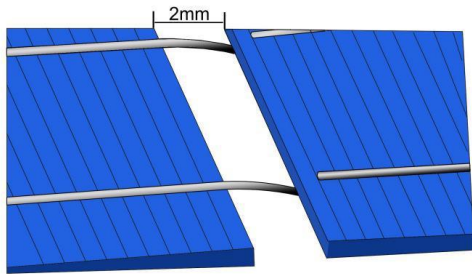


Surface layer of HJT cell is TCO without insulating layer which does not cause accumulation of charges, prevent the potential-induced degradation, and avoid PID for the modules. As the N-type wafer does not have B-O bond, it results zero LID effect and guarantees the module's durability and yield. HJT cells are also applicable to Shingled Technology.



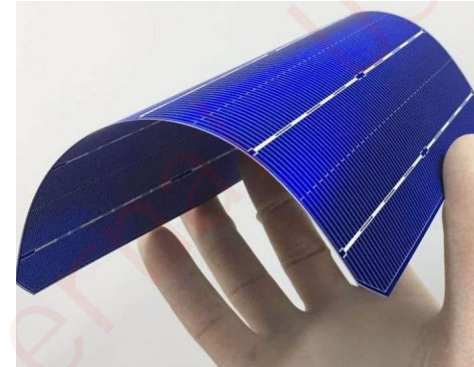
\*Resource from Panasonic HIT PID Resistance Study

**Better Reliability, More Power Output**



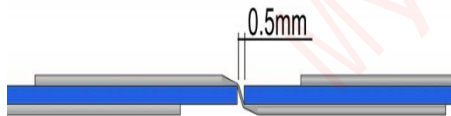
**Conventional PERC Cells:**

250-300°C Temperature  
Big gap between cells, lower efficiency and possible micro-cracks



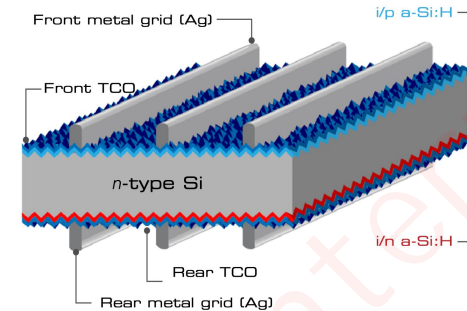
**HJT Cells:**

≤250°C Temperature in cells production;  
with less micro-crack risks;  
Applicable to SHINGLED technology with overlaid cells to eliminate gap and busbar;  
SMBB to save cost and increase efficiency.



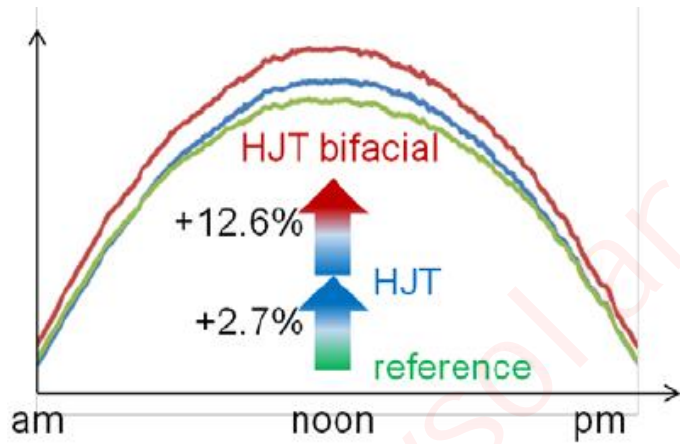
**Half-cut MBB Panel:**

250-300°C Temperature  
Small gap between cells, higher metal thermal effect with possible micro-cracks



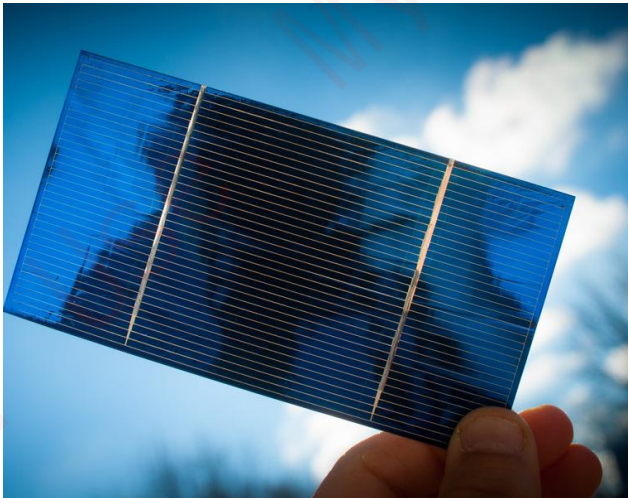


**Super Bifaciality up to 95%**



**Mysolar HJT panel:**

The HJT cell is a kind of N-type cell with naturally symmetrical bifacial structure. It's born with high bifaciality up to 95% without any extra processing. General Perc cells has up to 70% bifaciality only. Which means, with the same size of bifacial module, Mysolar's HJT bifacial module can gain up to 6% higher power output than PERC bifacial modules. The closer to the equator, the more yield the panels will get.



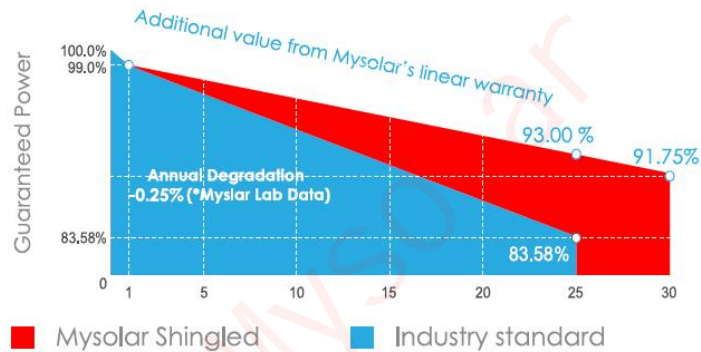
**Comparison of Mysolar HJT panels and other modules**

Wafer	Model	Panel Effi (%)	Dimension	Front Side Power	Bifaciality	Rear side Power (Albedo 20%)	Total Power
<b>HJT</b>	Mysolar MS700N-HJTGB	22.53	2384*1303*35mm	700W	95%	133W	833W
<b>N-type TopCon</b>	JKM625N-78HL4	22.35	2465×1134×35mm	625W	80%	100W	725W
<b>Shingled PERC</b>	MS670M6-DB69	21.60	2384*1303*35mm	670W	70%	93.8W	763.8W
<b>N-TYPE</b>	CS7N-660MB-AG 6	21.25	2384*1303*35mm	660W	70%	92.4W	752.4W
<b>N-type TopCon</b>	JW-HD144N-575	22.26	2278mm*1134mm*30mm	575W	80%	92W	667W
<b>HJT</b>	SKA611HDGD C 690	22.22	2384x1303x33mm	690W	90%	124.2W	814.2W

**Less Degradation and Longer Warranty**

**LINEAR PERFORMANCE WARRANTY**

30 Year Product Warranty · 30 Year Linear Power Warranty

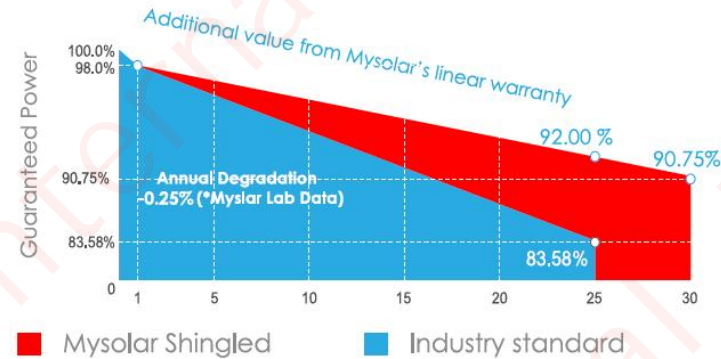


**Mysolar HJT bifacial Panels:**

- 30 years Product Warranty
- 30 years Linear Warranty
- 1st year degradation 1%
- 30th year 91.75% @nominal power

**LINEAR PERFORMANCE WARRANTY**

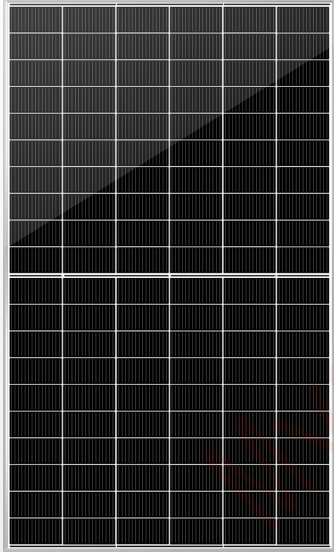
30 Year Product Warranty · 30 Year Linear Power Warranty



**Mysolar Shingled Solar Panels:**

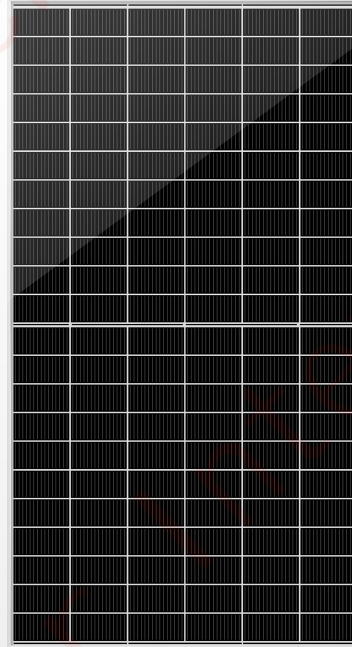
- 30 years Product Warranty
- 30 years Linear Warranty
- 1st year degradation 2%
- 30th year 90.75% @nominal power

## Mysolar HJT Models



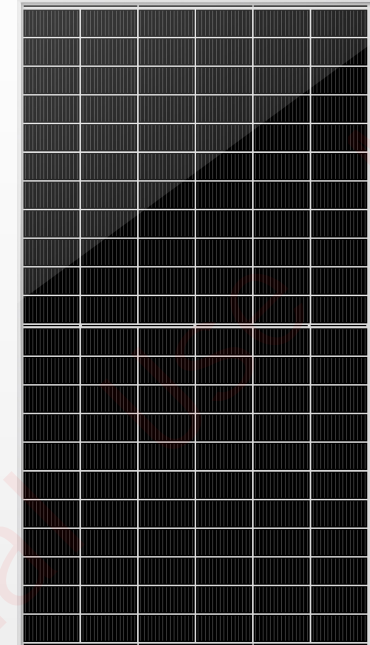
**GOLD Series**

210\*210mm  
635W Bifacial  
2172\*1303\*35MM  
Efficiency up to 22.44%



**GOLD Series**

210\*210mm  
695W Bifacial  
2384\*1303\*35mm  
Efficiency up to 22.37%



**GOLD Series**

210\*210mm  
700W Bifacial  
2384\*1303\*35mm  
Efficiency up to 22.53%





**Contact us:**

sales@mamibot.com www.imsolar.com  
USA: 001 518 960 9889 China: 0086 21 6214 7369

Mysolar Manufacturing (Shanghai) Co.,Ltd.  
Mysolar Manufacturing USA Inc.

# Thank you!

