

JA Solar Part 2- Technical Advantages & Products

2016/3/7



Product portfolio

JA Solar's products meet the requirements of the various end market segments.

Residential

- Rooftop installation or BIPV.
- Usually around 5kW.
- Small area, aesthetics, ensure the owner will sleep soundly.



Commercial and industrial

- Rooftop installation or BIPV.
- Usually between 30 kW – several MW.
- Limited roof space, BOS-sensitive, keep O&M costs low.



Utility scale

- Ground installation.
- Capacity usually between a few hundred kW to multiple MW.
- Cost for land, BOS-sensitive, keep O&M costs low.



Special applications

- Hot and humid environment, seaside, waterfront or desert.

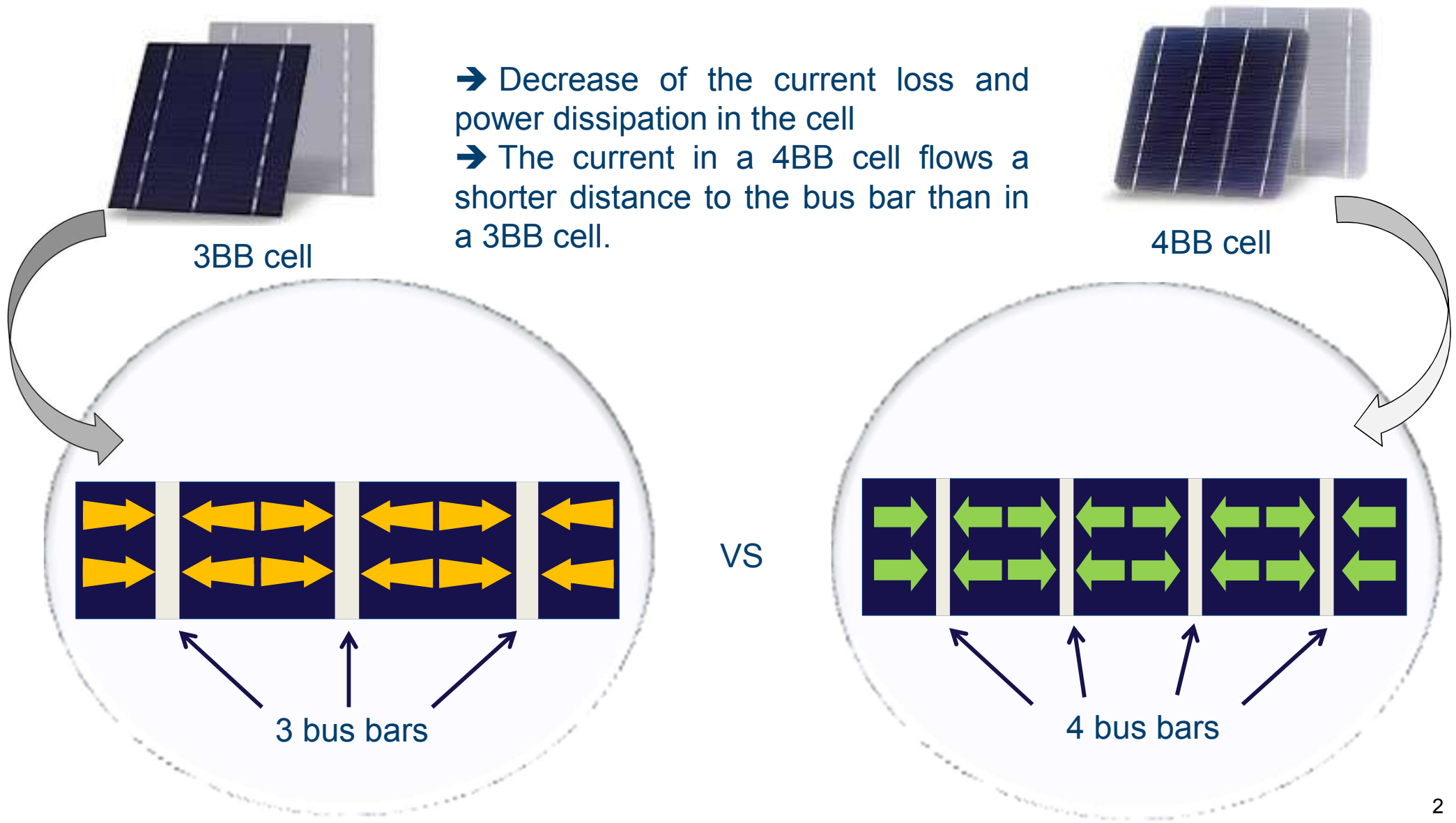


High efficiency solar cell technology

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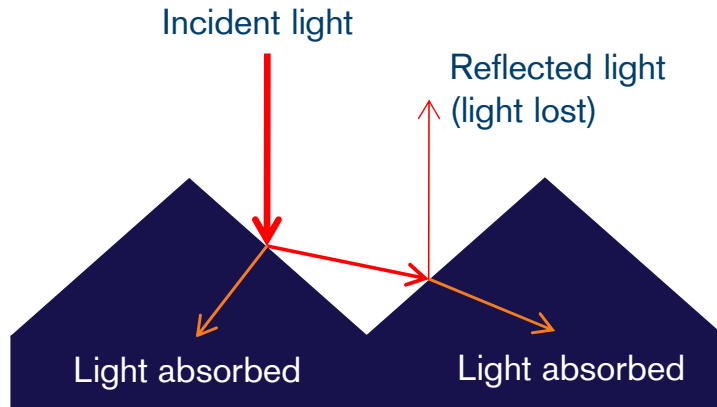
4-bus-bar cell technology

- Decrease of the current loss and power dissipation in the cell
- The current in a 4BB cell flows a shorter distance to the bus bar than in a 3BB cell.



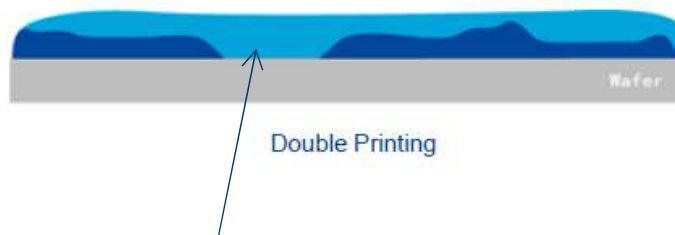
High efficiency solar cell technology

PERCIUM, RIECIUM : light trapping technology



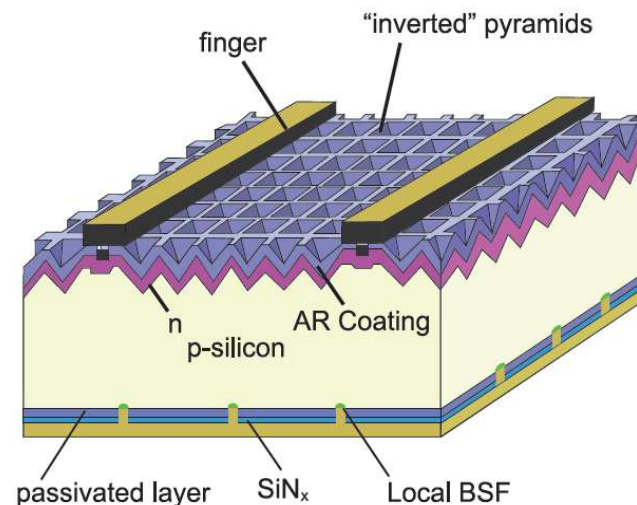
The PERCIUM and RIECIUM cells use the light trapping technology to increase efficiency. Their inverted-pyramid shaped cells allow the light to bounce a few times on the cell structure so the volumes of absorbed light gets optimized..

Double printing technology



Double printing avoids the risk of finger interruption and power losses in the cell.

PERCIUM technology

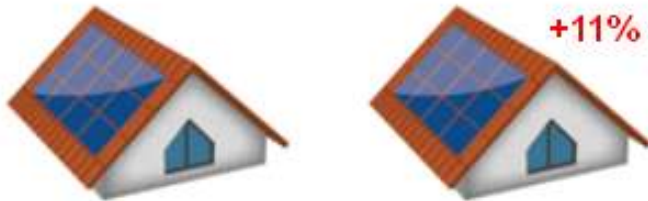


BSF passivated layer acts as a mirror, the light path length in the cell is increased.

Product portfolio

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PERCIUM modules

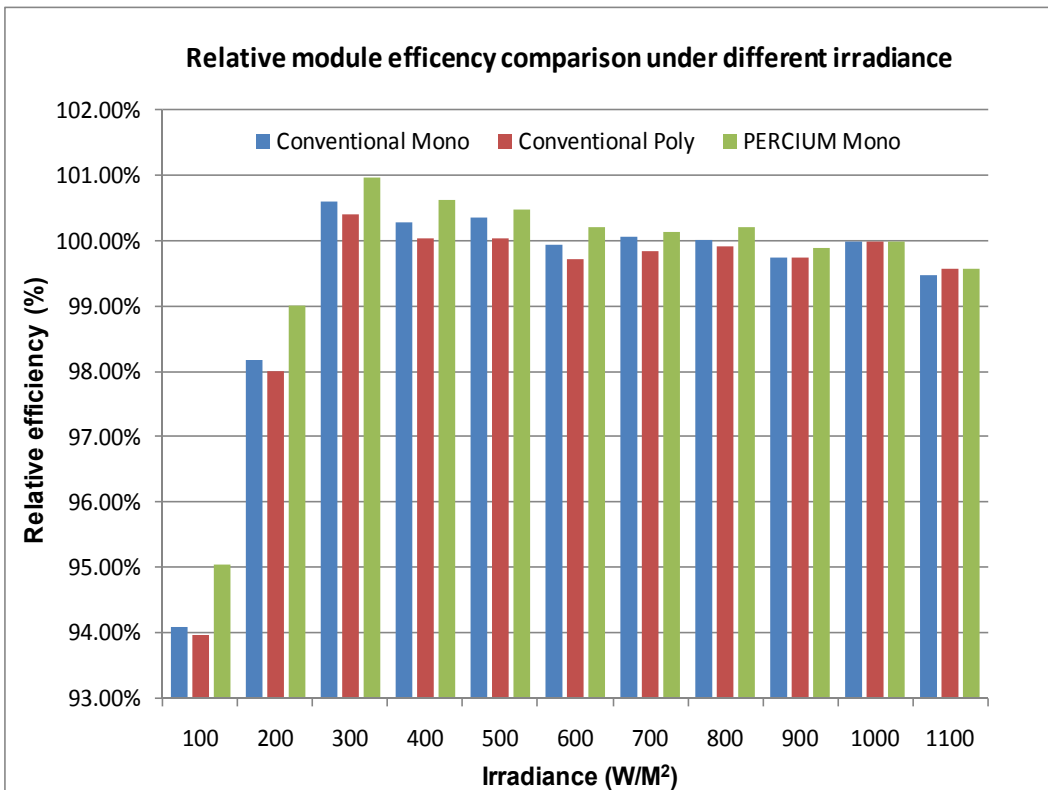


Industry average vs JAM6(K)-60/PR

Additional Features

PERCIUM

- Mono crystalline modules with **285/290W** power rating.



- Optimization of the power installed on the roof, maximization of the amount of energy generated (more kWh, more kWh/kWp)

- Financial advantages: lower BOS cost, lower transportation and installation cost, lower payback period, higher profit

RESIDENTIAL

COMMERCIAL & INDUSTRIAL

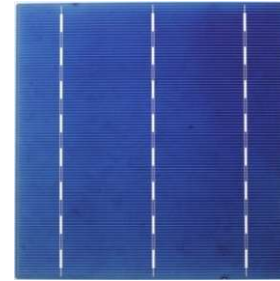
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RIECIUM modules



Additional Features



Conventional Multi cell



RIECIUM cell

- Uniform color appearance similar to mono modules.
- Highly efficient poly cells thanks to enhanced light trapping technology.
- Poly crystalline modules with **270/275W** power rating.



- Passed 500-hour Potential Induced Degradation (PID) test conducted by TÜV SÜD (about 3×IEC standard).

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UTILITY SCALE

Product portfolio

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All black modules



Additional Features

- Outstanding aesthetics due to the use of black back sheet, dark cells and black frame.
- Seamless integration into the roof's appearance.

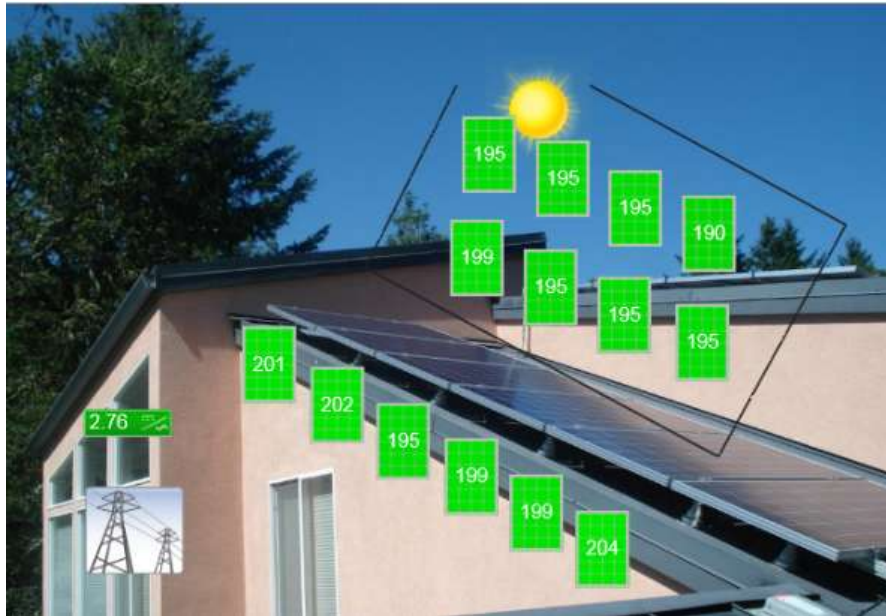


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Smart modules



Monitoring interface

Additional Features

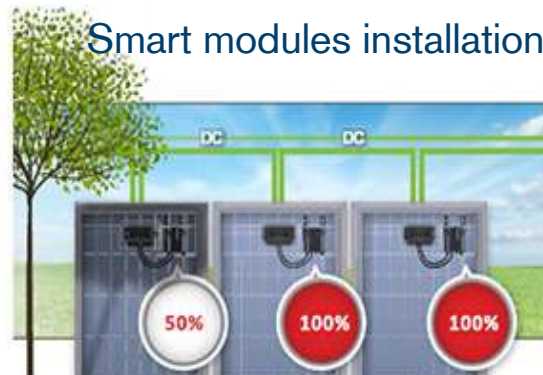


- Monitor the performance of installed modules in real time.
- Maximize energy gain (up to 20% more energy) by reducing effects of partial shading or module mismatch.
- Voltage module safety shut down feature, electrocution prevention, failures and fire safety.

Conventional System



Smart modules installation



- Longer string

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Mainstream Cypress modules



Additional Features



- Mono crystalline modules with 275/280W power rating.
- Poly crystalline modules with 265/270W power rating.
- Superior performance under low irradiance conditions.

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UTILITY SCALE

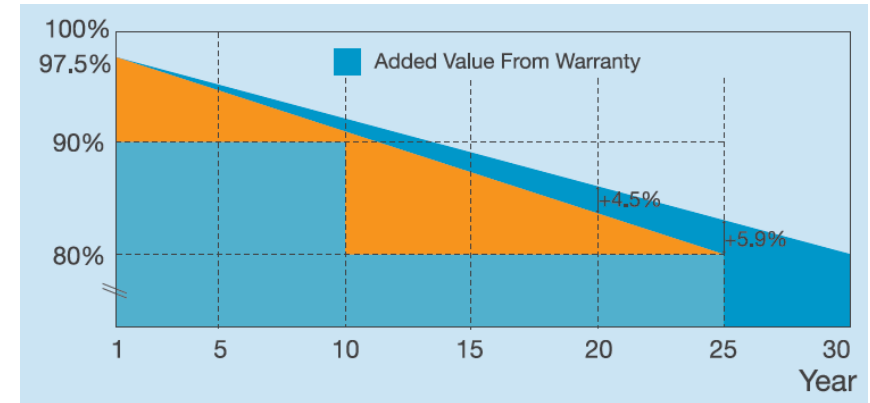
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Double glass modules



Additional Features



- 30-year warranty: 0.50%/year degradation coefficient.
- Can be used for IEC 1500V maximum system voltage.
- Built to last in harsh environments such as deserts, seaside and water front.
- 10% shipping cost reduction

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UTILITY SCALE

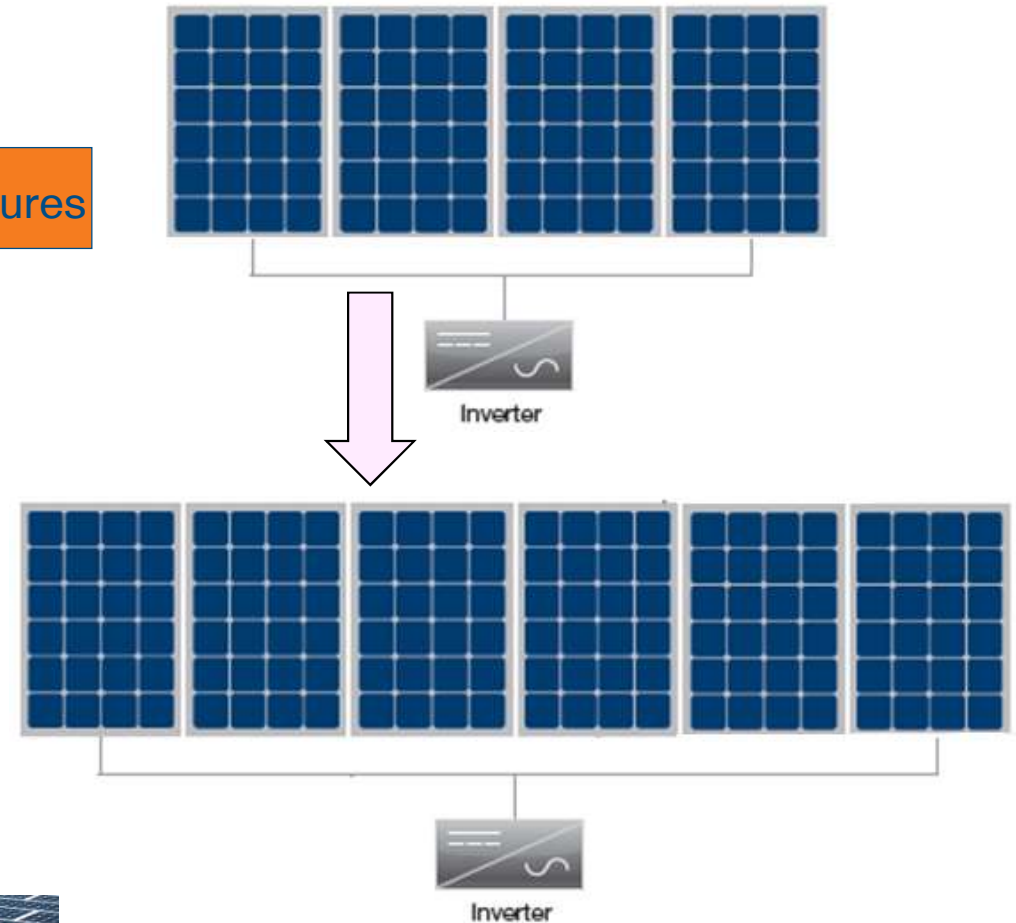
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1500V modules

- Designed for IEC 1500V system applications
 - 50% longer strings
 - Less component utilization: cables, combiner boxes, fuses, inverters and transformers
 - ➔ Lower investment cost: up to 2% reduction.
 - ➔ Lower operation cost: up to 40% reduction.
- [GTM Research: cost savings \$0.05/W]

Additional Features



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UTILITY SCALE

Sea side/water front modules with selected BOM



Example of lake floating project

Additional Features





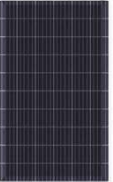

- Assembled using special selected BOM in order to block salty mist and corrosive moisture.
- Passed double IEC 61701 Class 6 salt mist test.
- Excellent PID resistance property due to the special BOM materials used.

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Product portfolio

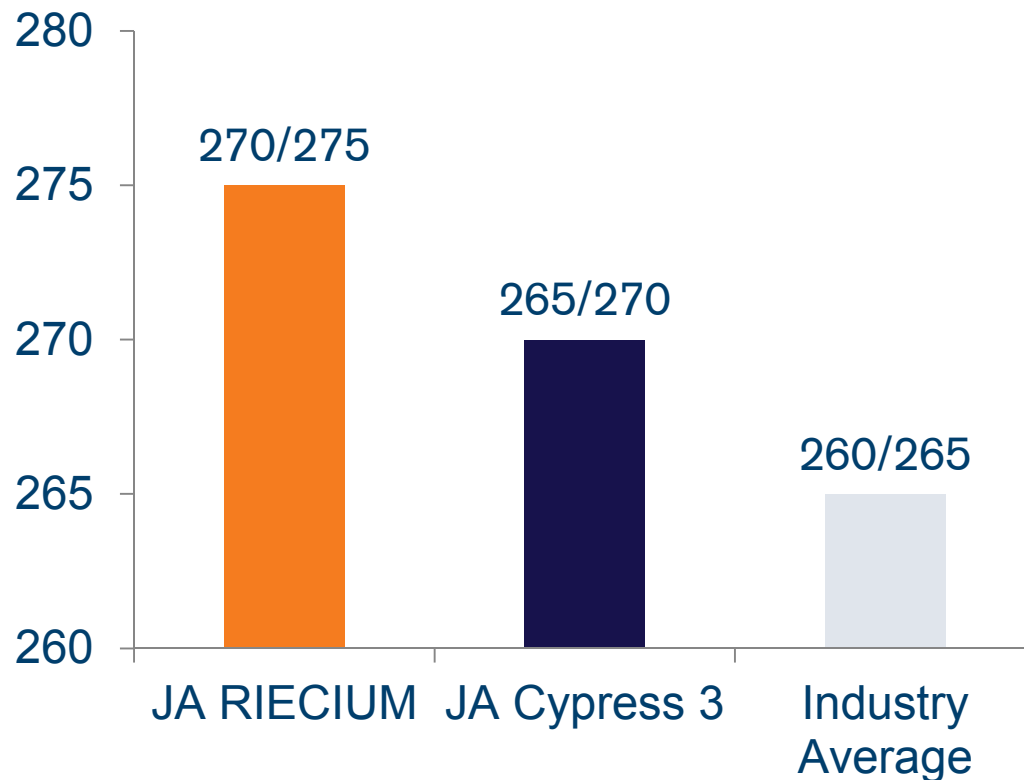
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	RESIDENTIAL	COMMERC & IND	UTILITY SCALE
 PERCIUM High efficiency mono crystalline module	✓	✓	
 RIECIUM High efficiency poly crystalline module		✓	✓
 All black module	✓		
 Smart module: SolarEdge and Tigo optimizers	✓	✓	
 Cypress 3 Mainstream poly and mono modules	✓	✓	✓
 Double Glass/1500V		✓	✓

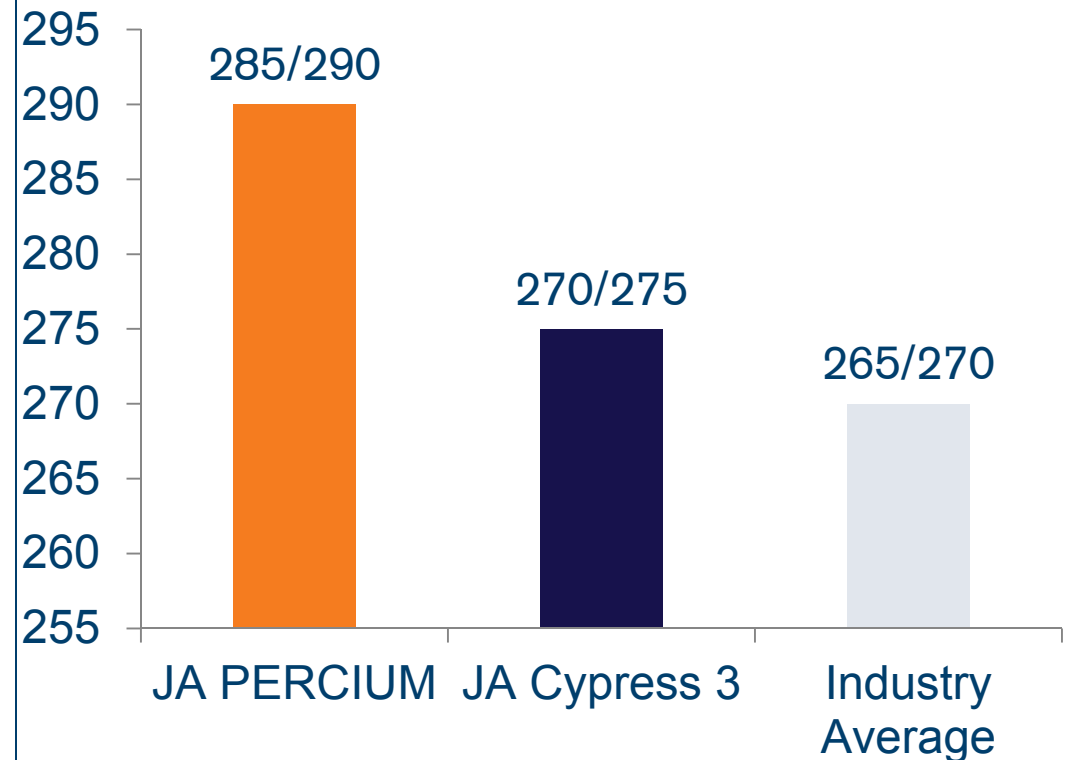
High performance

Thanks to their advanced technology, the JA Solar modules perform significantly better than the industry average.

Poly Module Power (W)



Mono Module Power (W)



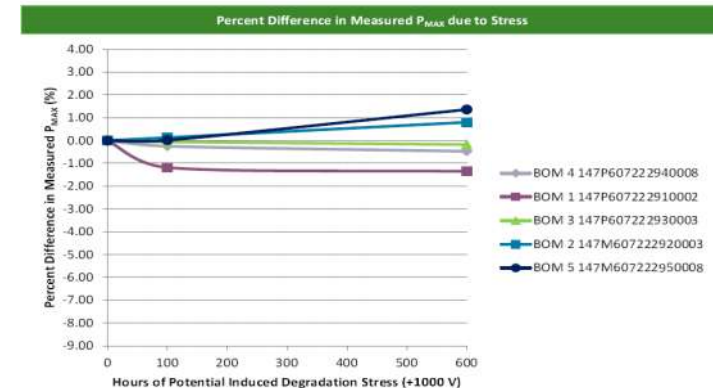
JA Solar out-performs competitors' modules by at least 5-10 watts in terms of power rating.

High reliability- additional tests

- All the modules are certified IEC 61215, IEC 61730, CE, PV Cycle compliant.
- All the modules passed stringent PID test (96 hours, 85°C, 85% humidity) according to the IEC62804 standard → operation in hot and humid environments over their 25-year life span
- Additional reliability tests done once per year on the standard BOM module types by authorized laboratories (e.g. TUV Rheinland or PVEL).

Example of result: PID test **600 hours**

→ Less than 2% difference in power
(IEC standard: 96h; failed criteria: power difference more than 5%)



→ Representative testing for applications in all regions (e.g. tropical, hot&dry and windy regions)

- Thresher test: about 3xIEC standard - equivalent to 20 years of real life conditions.

IEC Standard texts	Thresher test
Thermal cycling, 200 cycles	Thermal cycling, 600 cycles
Damp heat 1000 hour	Damp heat 3000 hour
UV 15KWH	UV 45KWH
Humidity freeze 10 cycles	Humidity freeze 30 cycles
Hot spot endurance 5 hour	Hot spot endurance 20 hour

Reference projects

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Commercial roof top project

Switzerland – 1.1 MW



Residential project

UK – 3.9 kW



Residential project

Netherlands – 6.2 kW



Industrial roof mounted project

UK – 245 kW



Reference projects

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Residential project

Netherlands – 1.65 kW per installation



Utility ground mount project

UK – 20MW



Carport project

France – 1.5MW



Installation of JA modules

Netherlands



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Thank you

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HARVEST THE SUNSHINE
Premium Cells Premium Modules