

HY SOLAR

STOCK CODE | 603185

Product Handbook

PV Wafers & PV Cells

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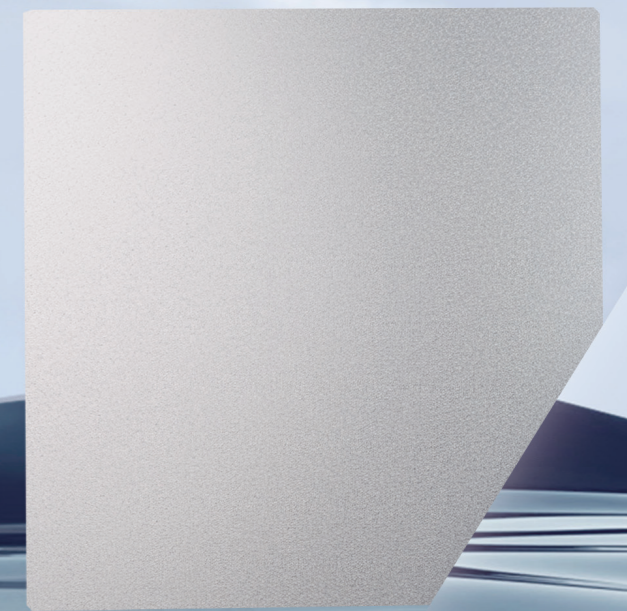
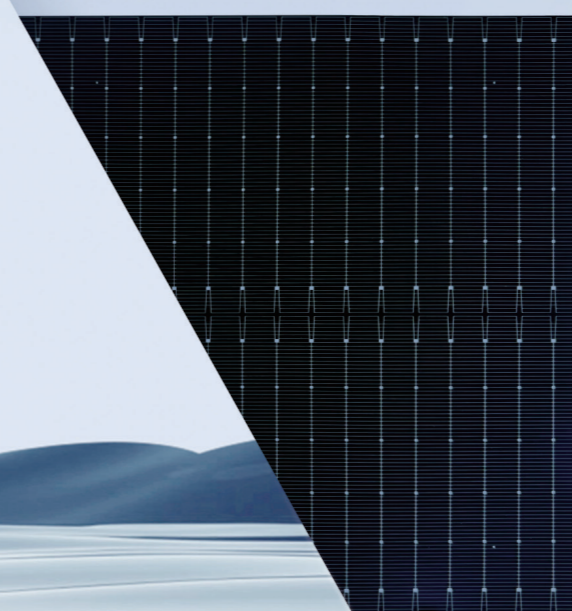
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Hongyuan Green Energy Co., Ltd. (referred to as HY SOLAR) was founded in 2002, with its global headquarters in Wuxi, China. The company was listed on the main board of the Shanghai Stock Exchange in 2018 (stock code: 603185). As a global green energy innovation industrial group, its core businesses span three major sectors: high-end equipment, the full photovoltaic (PV) industry chain, and energy storage. Through comprehensive vertical integration and technological innovation, the company has built a core competitive edge in the global green energy industry.

With nearly RMB 30 billion in total assets, the company operates six modern industrial bases across key regions such as Inner Mongolia and Jiangsu. Its large-scale production capacity includes 150,000 metric tons of industrial silicon, 100,000 metric tons of polysilicon, 55GW of silicon wafers, 26GW of PV cells, 26GW of PV modules, and 5GWh of energy storage. This enables fully vertically integrated PV production and coordinated development across full-scenario energy storage applications. In 2026, the company joined forces with Suntech to enhance industrial chain collaboration and technological innovation, accelerating its international strategic expansion. Regional headquarters have now been established in Singapore, Germany, the UAE, Australia, Brazil, and other countries, with business operations covering nearly 100 countries and regions worldwide — creating an international operating system rooted in local markets and radiating globally.

Leveraging its leading industrial footprint, robust technological capabilities, and sustainable development strength, the company has been repeatedly recognized on authoritative lists such as the China Top 500 Manufacturing Enterprises, Global Top 500 New Energy Enterprises, and Hurun China Top 100 Private Energy Companies. It has also received honors including the Forbes China Sustainable Innovation Enterprise Award, with its brand influence and industry standing solidly positioned at the forefront of the global green energy sector.

Looking ahead, HY SOLAR will deeply implement its “Technology-driven HY, Smart Service” development strategy, uphold the corporate vision of “**Making energy cleaner, Making the world better**” and drive industrial upgrading through technological innovation. With a global footprint powering a green future, the company is committed to becoming a world-class new energy innovation group defined by technological empowerment, green leadership, and smart synergy — contributing HY SOLAR’s strength to the global energy transition and sustainable development.

2002^{Year}

HYSOLAR
Established in

8

Global and
Regional Headquarters

6

Core R&D and intelligent
manufacturing bases

Capacity Breakdown by Segment (as of end-2025)



Silicon Wafer Advantages



Fully Automated Integrated Packaging

Minimal human intervention



Fully Automated Sorting

Adoption of advanced domestic fully automated sorting systems
Precise wafer classification and grading



AGV Warehouse Integration

One-click inventory management



Silicon Wafer Advantages

Self-developed high-end production equipment
Specialized crystalline silicon processing systems
Long-standing industry leadership in market share
No. 1 domestic market share for silicon carbide slicing machines



Rigorous Quality Assurance

Comprehensive quality management system
Strict inspection standards
Manual secondary visual inspection
100% quality guarantee



Ultra-low Oxygen Content

Ultra-low carbon content
High minority carrier lifetime
Excellent resistivity uniformity

Cell Product Advantages



Grading Standards

Strict grading standards
Reduced loss in module encapsulation



Temperature Coefficient

Lower temperature coefficient
Increased power output and lifespan



Visual Standards

Rigorous appearance criteria
Higher module production yield



Anti-PID

Excellent PID resistance
Stable long-term efficiency



Module Power Generation

Bifacial light absorption and multi-cut cell technology
Increased power generation

Certifications & Quality Systems

ISO 9001, ISO 14001, ISO 45001, ISO 50001,
Carbon Footprint Certification, GB/T 29490-2023, IP Compliance

MES-integrated SPC Control

Compatible with all product models
Intelligent sorting by color and appearance features
100% visual & EL inspection

Automated Monitoring & Alerts

Online PL detection, Online visual/EL inspection

Full Digital Monitoring

Real-time data collection and automated alerts for critical parameters and SPC (Statistical Process Control) via MES (Manufacturing Execution System) integration

Mono N-Type Silicon Wafer(M10R)

182.2x183.75



Geometric Parameter

Side length Short Side:182.2±0.25mm,Long Side:183.75±0.25mm

Diagonal 256±0.25mm

Thickness 130±8μm

Arc length projection 1.99±0.5mm

Electrical Properties

Resistivity 0.9-1.6Ω·cm

Minority carrier ≥1300μs

Oxygen content ≤10.5ppma

Carbon content ≤1ppma

Material Properties

Growth method CZ

Orientation <100>±2°

Surface Performance

TTV ≤20

Warpage ≤40

Line mark ≤13

Edge collapse Depth≤0.3mm, length≤0.5mm, no more than one Place

Cracks and perforations Invisible by visual inspection

Silicon wafer surface Clean, free of oil, soap, glue and other residues

Mono N-Type Silicon Wafer (G12R)

182.3x210



Geometric Parameter

Side length	Short Side:182.3±0.2mm,Long Side:210±0.2mm
Diagonal	272±0.25mm
Thickness	130±8μm
Arc length projection	182 Length:4.72±0.5mm 210 Length:4.07±0.5mm

Electrical Properties

Resistivity	0.9-1.6Ω·cm
Minority carrier	≥1300μs
Oxygen content	≤10.5ppma
Carbon content	≤1ppma

Material Properties

Growth method	CZ
Orientation	<100>±2°

Surface Performance

TTV	≤20
Warpage	≤40
Line mark	≤13
Edge collapse	Depth≤0.3mm, length≤0.5mm, no more than one Place
Cracks and perforations	Invisible by visual inspection
Silicon wafer surface	Clean, free of oil, soap, glue and other residues

Mono N-Type Silicon Wafer(G12)

210X210



Geometric Parameter

Side length	210±0.25mm
Diagonal	295±0.25mm
Thickness	130±8μm
Arc length projection	1.41±0.5mm

Electrical Properties

Resistivity	0.9-1.6Ω·cm
Minority carrier	≥1300μs
Oxygen content	≤10.5ppma
Carbon content	≤1ppma

Material Properties

Growth method	CZ
Orientation	<100>±2°

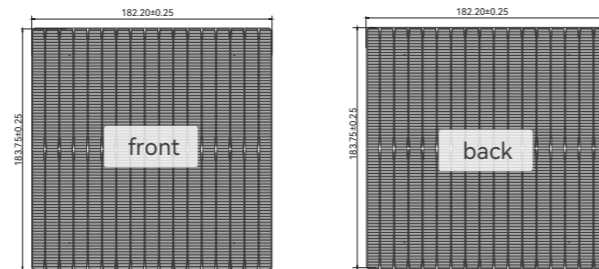
Surface Performance

TTV	≤20
Warpage	≤40
Line mark	≤13
Edge collapse	Depth≤0.3mm, length≤0.5mm, no more than one Place
Cracks and perforations	Invisible by visual inspection
Silicon wafer surface	Clean, free of oil, soap, glue and other residues

N-Type TOPCon Bifacial Solar Cell (M10R)

182.2*183.75-16BB-194F-196F **24.8%~25.7%**

Cell Appearance



Appearance And Structure

Dimension	182.2x183.75mm, Tolerance ±0.25 mm
Diagonal	256mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	16 Main Busbars(Silver) 194 Finger Busbar(Silver)
Back(-)	16 Main Busbars(Silver) 196 Finger Busbar(Silver)

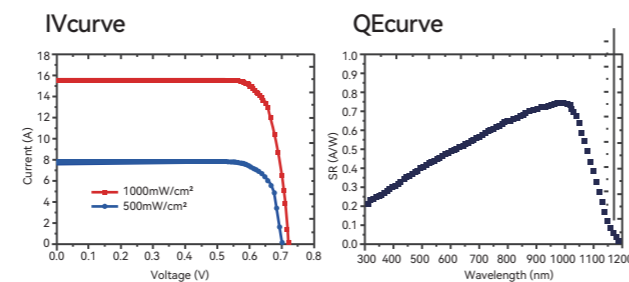
Thermal Ratings

Temperature coefficient of Pmax	-(0.30±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.7	8.60	0.634	13.568	0.726	13.843
25.6	8.57	0.633	13.537	0.725	13.821
25.5	8.54	0.632	13.505	0.724	13.800
25.4	8.50	0.631	13.473	0.723	13.784
25.3	8.47	0.630	13.441	0.722	13.766
25.2	8.43	0.629	13.409	0.721	13.750
25.1	8.40	0.628	13.377	0.720	13.739
25.0	8.37	0.627	13.345	0.719	13.724
24.9	8.33	0.626	13.313	0.718	13.713
24.8	8.30	0.625	13.281	0.717	13.702



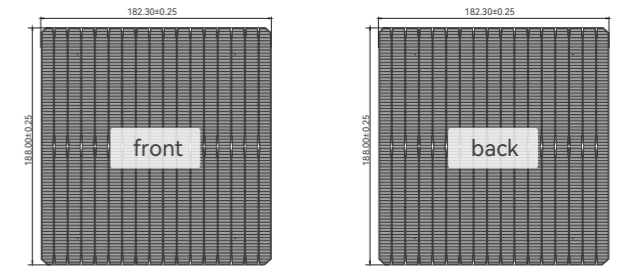
Light Induced Degradation Test

Using xenon lamp (Irradiance of 1000 W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

N-Type TOPCon Bifacial Solar Cell (10A8N)

182.3*188-16BB-196F-198F **24.8%~25.7%**

Cell Appearance



Appearance And Structure

Dimension	182.3x188mm, Tolerance ±0.25 mm
Diagonal	256mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	16 Main Busbars(Silver) 196 Finger Busbar(Silver)
Back(-)	16 Main Busbars(Silver) 198 Finger Busbar(Silver)

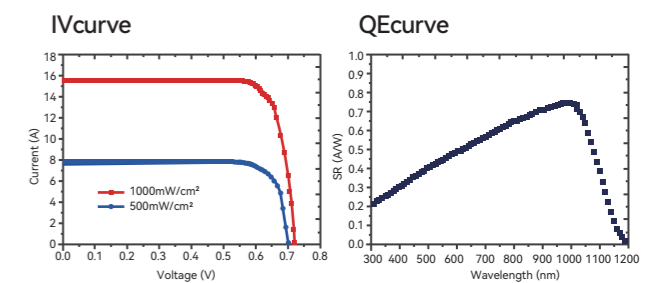
Thermal Ratings

Temperature coefficient of Pmax	-(0.30±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.7	8.80	0.634	13.879	0.724	14.175
25.6	8.76	0.633	13.847	0.723	14.146
25.5	8.73	0.632	13.814	0.722	14.117
25.4	8.70	0.631	13.782	0.721	14.089
25.3	8.66	0.630	13.750	0.720	14.058
25.2	8.63	0.629	13.717	0.719	14.032
25.1	8.59	0.628	13.684	0.718	14.005
25.0	8.56	0.627	13.652	0.717	13.985
24.9	8.53	0.626	13.619	0.716	13.967
24.8	8.49	0.625	13.586	0.715	13.950



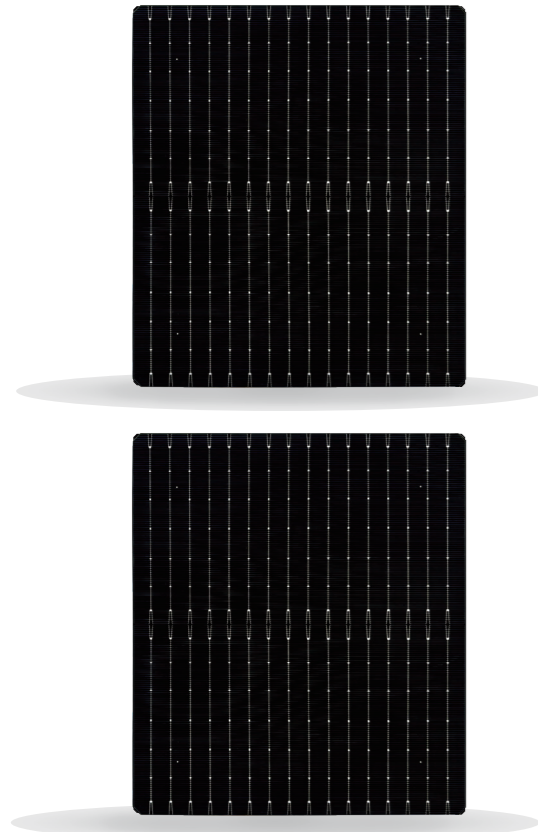
Light Induced Degradation Test

Using xenon lamp (Irradiance of 1000W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

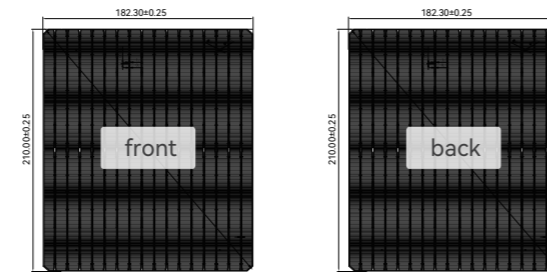
N-Type TOPCon Bifacial Solar Cell (G12R)

182.3*210-16BB-236F-228F

24.9%~25.8%



Cell Appearance



Appearance And Structure

Dimension	182.3X210mm, Tolerance ±0.25 mm
Diagonal	272mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	16 Main Busbars(Silver) 236 Finger Busbar(Silver)
Back(-)	16 Main Busbars(Silver) 228 Finger Busbar(Silver)

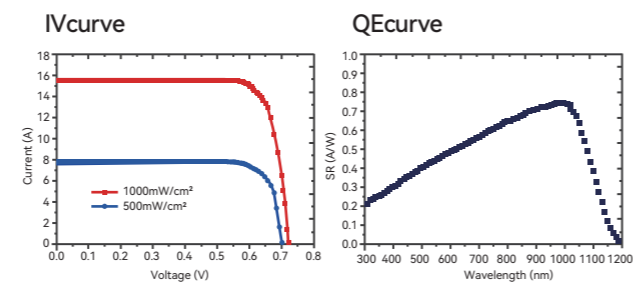
Thermal Ratings

Temperature coefficient of Pmax	-(0.30±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.8	9.86	0.635	15.531	0.725	15.850
25.7	9.82	0.634	15.495	0.724	15.823
25.6	9.79	0.633	15.459	0.723	15.793
25.5	9.75	0.632	15.423	0.722	15.761
25.4	9.71	0.631	15.387	0.721	15.730
25.3	9.67	0.630	15.351	0.720	15.695
25.2	9.63	0.629	15.314	0.719	15.666
25.1	9.59	0.628	15.278	0.718	15.636
25.0	9.56	0.627	15.241	0.717	15.614
24.9	9.52	0.626	15.205	0.716	15.593



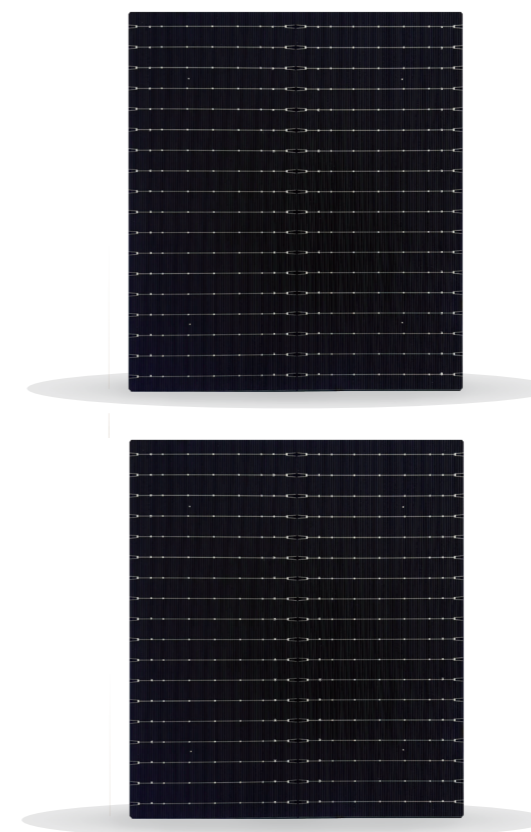
Light Induced Degradation Test

Using xenon lamp (Irradiance of 1000 W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

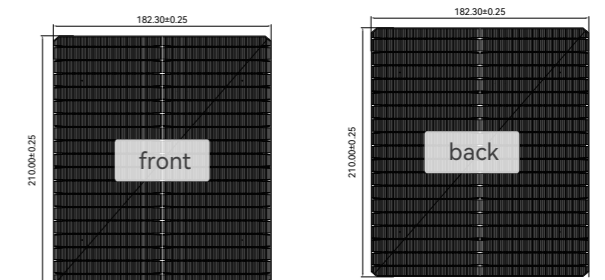
N-Type TOPCon Bifacial Solar Cell (G12R)

182.3*210-18BB 206F-208F

24.9%~25.8%



Cell Appearance



Appearance And Structure

Dimension	182.3X210mm, Tolerance ±0.25 mm
Diagonal	272mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	18 Main Busbars(Silver) 206 Finger Busbar(Silver)
Back(-)	18 Main Busbars(Silver) 208 Finger Busbar(Silver)

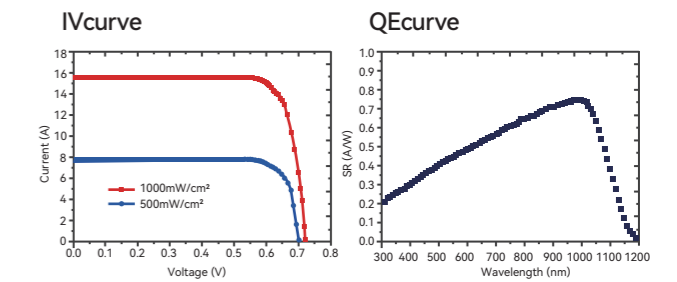
Thermal Ratings

Temperature coefficient of Pmax	-(0.30±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.8	9.85	0.635	15.515	0.725	15.835
25.7	9.81	0.634	15.479	0.724	15.806
25.6	9.78	0.633	15.443	0.723	15.776
25.5	9.74	0.632	15.407	0.722	15.744
25.4	9.70	0.631	15.371	0.721	15.713
25.3	9.66	0.630	15.334	0.720	15.679
25.2	9.62	0.629	15.298	0.719	15.649
25.1	9.58	0.628	15.262	0.718	15.620
25.0	9.55	0.627	15.225	0.717	15.598
24.9	9.51	0.626	15.188	0.716	15.577



Light Induced Degradation Test

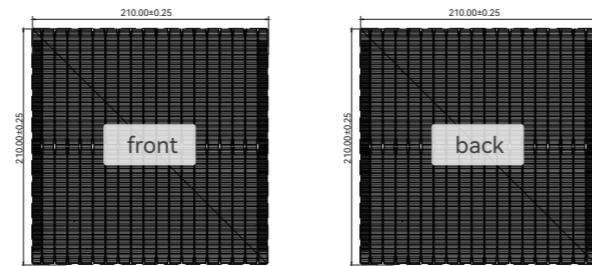
Using xenon lamp (Irradiance of 1000 W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

N-Type TOPCon Bifacial Solar Cell (G12)

210*210-18BB-186F-192F

24.9%~25.8%

Cell Appearance



Appearance And Structure

Dimension	210X210mm, Tolerance ±0.25 mm
Diagonal	295mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	18 Main Busbars(Silver) 186 Finger Busbar(Silver)
Back(-)	18 Main Busbars(Silver) 192 Finger Busbar(Silver)

Thermal Ratings

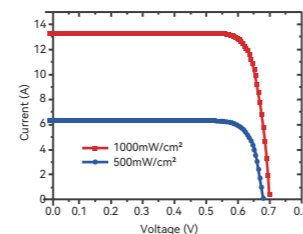
Temperature coefficient of Pmax	-(0.31±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

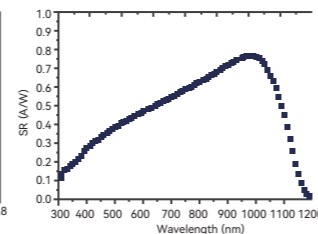
[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.8	11.38	0.635	17.916	0.725	18.665
25.7	11.33	0.634	17.875	0.724	18.649
25.6	11.29	0.633	17.834	0.723	18.610
25.5	11.24	0.632	17.777	0.722	18.566
25.4	11.20	0.631	17.745	0.721	18.526
25.3	11.16	0.630	17.713	0.720	18.486
25.2	11.11	0.629	17.665	0.719	18.442
25.1	11.07	0.628	17.626	0.718	18.389
25.0	11.02	0.627	17.581	0.717	18.347
24.9	10.98	0.626	17.540	0.716	18.300

IVcurve



QEcurve



Light Induced Degradation Test

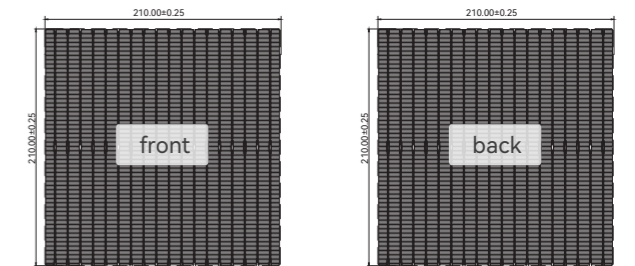
Using xenon lamp (Irradiance of 1000W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

N-Type TOPCon Bifacial Solar Cell (G12)

210*210-18BB-236F-228F

25.0%~25.9%

Cell Appearance



Appearance And Structure

Dimension	210X210mm, Tolerance ±0.25 mm
Diagonal	295mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	18 Main Busbars(Silver) 236 Finger Busbar(Silver)
Back(-)	18 Main Busbars(Silver) 228 Finger Busbar(Silver)

Thermal Ratings

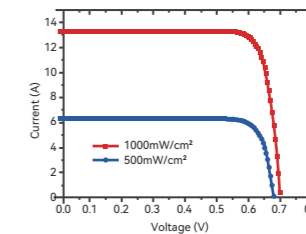
Temperature coefficient of Pmax	-(0.31±0.02)%/°C
Temperature coefficient of Isc	+(0.046±0.015)%/°C
Temperature coefficient of Voc	-(0.261±0.030)%/°C

Positive Electrical Performance Parameters

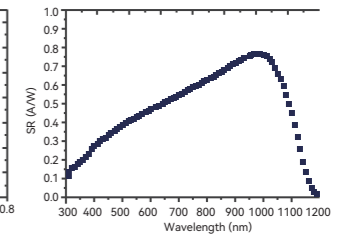
[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
25.9	11.42	0.636	17.957	0.726	18.671
25.8	11.38	0.635	17.916	0.725	18.665
25.7	11.33	0.634	17.875	0.724	18.649
25.6	11.29	0.633	17.834	0.723	18.610
25.5	11.24	0.632	17.777	0.722	18.566
25.4	11.20	0.631	17.745	0.721	18.526
25.3	11.16	0.630	17.713	0.720	18.486
25.2	11.11	0.629	17.665	0.719	18.442
25.1	11.07	0.628	17.626	0.718	18.389
25.0	11.02	0.627	17.581	0.717	18.347

IVcurve



QEcurve

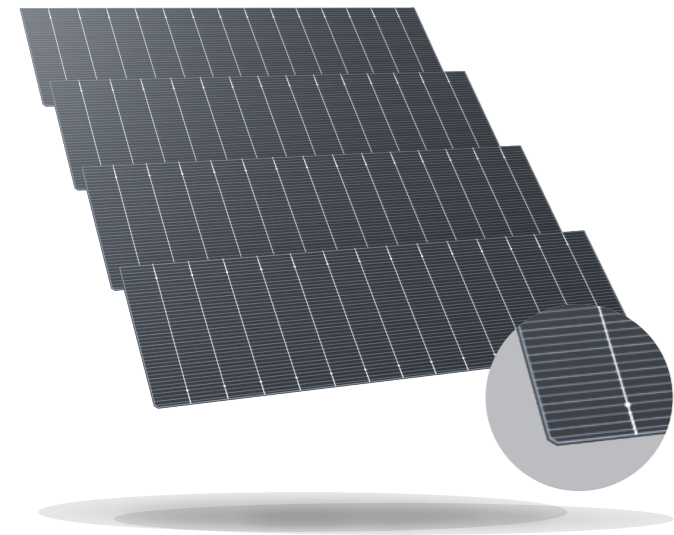


Light Induced Degradation Test

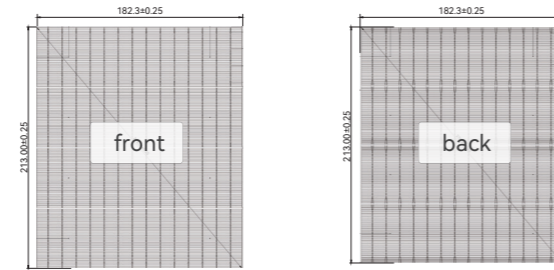
Using xenon lamp (Irradiance of 1000W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

N-Type TOPCon Bifacial Solar Cell (213R/4)

182.3*53.25-14BB-66F-76F **25.3%~26.2%**



Cell Appearance



Appearance And Structure

Dimension	182.3X53.25mm, Tolerance ±0.25 mm
Diagonal	278.68mm, Tolerance ± 0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	14 Main Busbars(Silver) 66 Finger Busbar(Silver)
Back(-)	14 Main Busbars(Silver) 76 Finger Busbar(Silver)

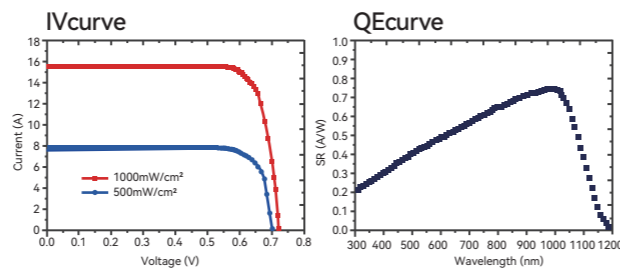
Thermal Ratings

Temperature coefficient of Pmax	-(0.26±0.02)%/°C
Temperature coefficient of Isc	+(0.050±0.015)%/°C
Temperature coefficient of Voc	-(0.20±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
26.2	2.543	0.639	3.980	0.729	4.054
26.1	2.534	0.638	3.971	0.728	4.047
26.0	2.524	0.637	3.962	0.727	4.040
25.9	2.514	0.636	3.953	0.726	4.033
25.8	2.504	0.635	3.944	0.725	4.026
25.7	2.495	0.634	3.935	0.724	4.018
25.6	2.485	0.633	3.926	0.723	4.011
25.5	2.475	0.632	3.917	0.722	4.002
25.4	2.466	0.631	3.907	0.721	3.994
25.3	2.456	0.630	3.898	0.720	3.986

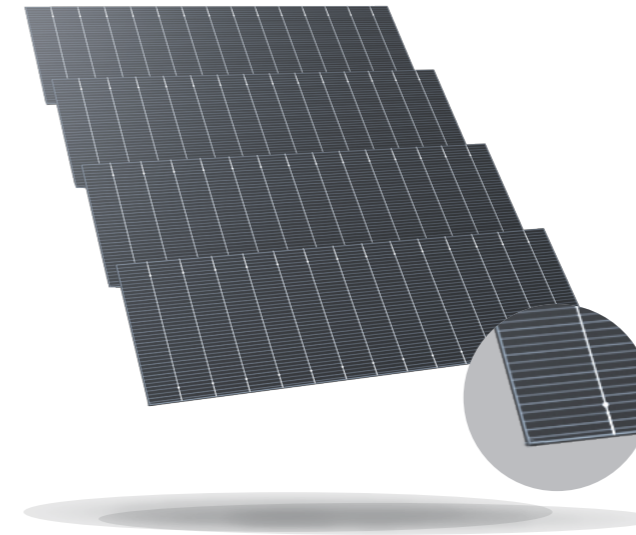


Light Induced Degradation Test

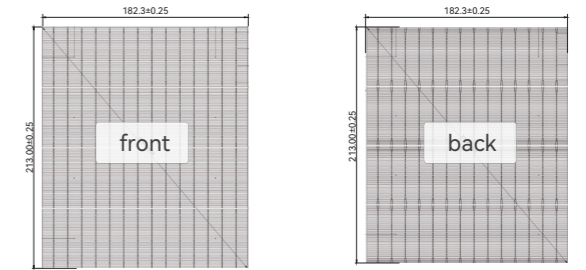
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N-Type TOPCon Bifacial Solar Cell (213R/4)

182.3*53.25-14BB-66F-76F **25.3%~26.2%**



Cell Appearance



Appearance And Structure

Dimension	182.3X53.25mm, Tolerance ±0.25 mm
Diagonal	278.68mm, Tolerance ±0.25 mm
Thickness	130μm, Tolerance ±10% μm
Front(+)	14 Main Busbars(Silver) 66 Finger Busbar(Silver)
Back(-)	14 Main Busbars(Silver) 76 Finger Busbar(Silver)

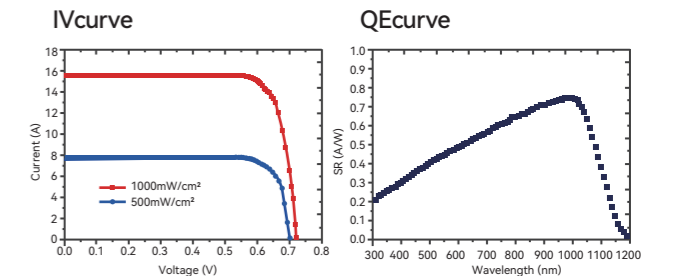
Thermal Ratings

Temperature coefficient of Pmax	-(0.26±0.02)%/°C
Temperature coefficient of Isc	+(0.050±0.015)%/°C
Temperature coefficient of Voc	-(0.20±0.030)%/°C

Positive Electrical Performance Parameters

[Standard test conditions: irradiance 1000 W/m², standard solar spectrum Am1.5g, 25 °C]

Conversion efficiency (%)	Maximum output power (W)	Maximum output voltage (V)	Maximum output current (A)	Open circuit voltage (V)	Short-circuit current (A)
26.2	2.543	0.639	3.980	0.729	4.054
26.1	2.534	0.638	3.971	0.728	4.047
26.0	2.524	0.637	3.962	0.727	4.040
25.9	2.514	0.636	3.953	0.726	4.033
25.8	2.504	0.635	3.944	0.725	4.026
25.7	2.495	0.634	3.935	0.724	4.018
25.6	2.485	0.633	3.926	0.723	4.011
25.5	2.475	0.632	3.917	0.722	4.002
25.4	2.466	0.631	3.907	0.721	3.994
25.3	2.456	0.630	3.898	0.720	3.986

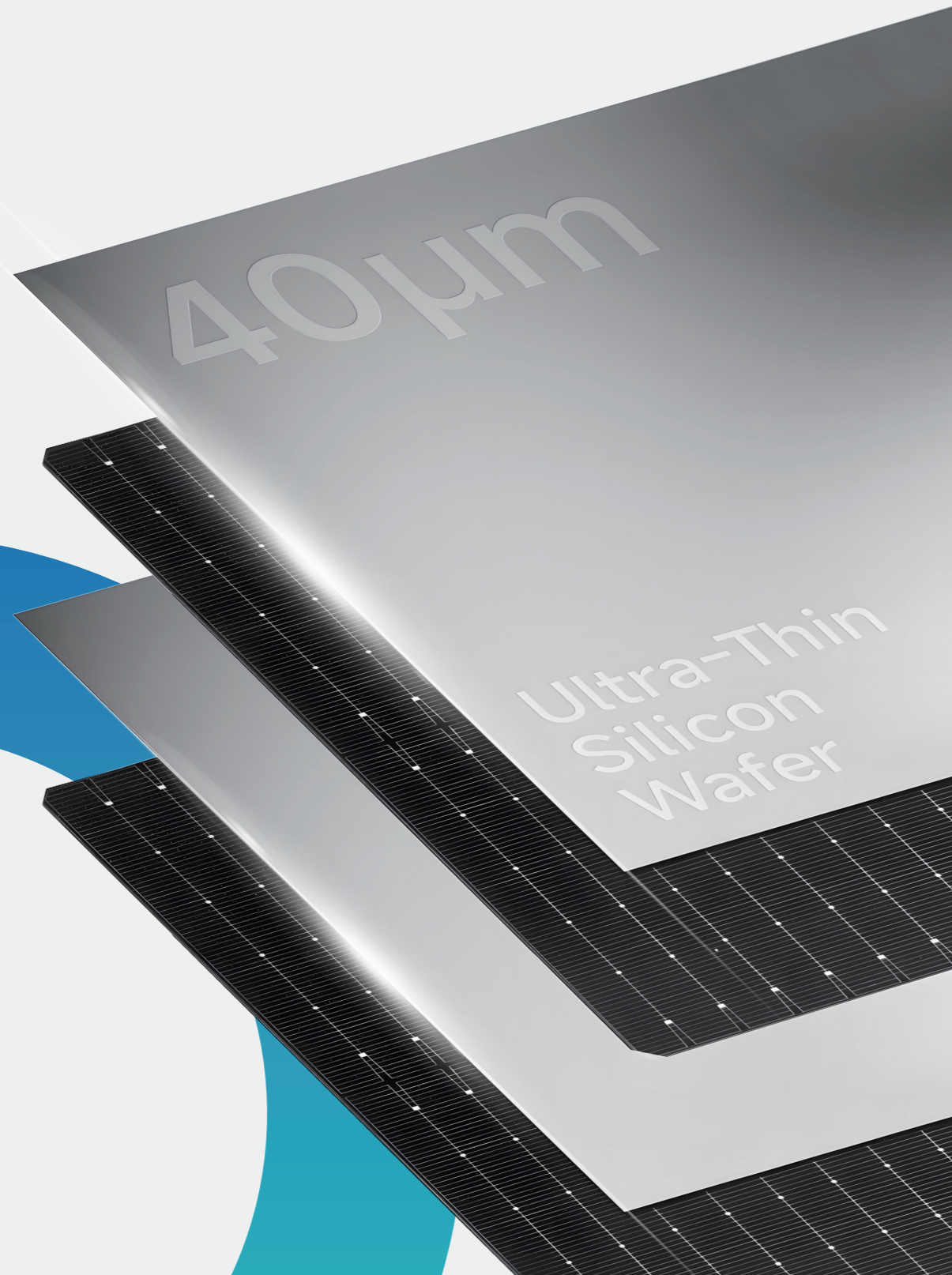


Light Induced Degradation Test

Using xenon lamp (Irradiance of 1000W/m², with spectrum AM 1.5) to irradiate test cells, after a total irradiation of 5kWh/m² the degradation of maximum output efficiency of cells is ≤0.8%

From Wafer Design to Cell Efficiency

Integrated as One
Optimized for Performance



**ALL IN ONE
ALL IN CONTROL**