TONGWEI SOLAR CELL DATASHEET

Monocrystalline 210x105 18BB HJT Bifacial Solar Cell

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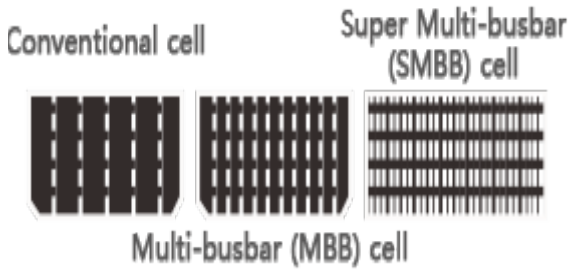
Silicon Heterojunction (HJT) solar cells are manufactured by low temperature process with fewer manufacturing procedures, and are featuered high efficiency, high stability, no LID, no PID, low temperature coefficient, etc. It is also an excellent bifacial solar cell, with no color difference between front and back, a bifaciality of up to 90% and obvious advantages of back power generation. The finished product of Tongwei 210 series solar cell is half-cell, which can reduce the cutting cost of modules and avoid the power loss caused by module cutting

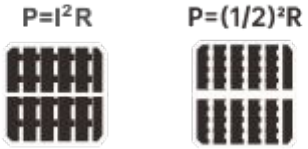
Tongwei has established 3 national first-class PV technology R&D centers and set up scientific research and technology teams led by industry experts, and is working to deepen the industry-university-research cooperation with universities and research institutes at home and abroad. Tongwei focuses on the cutting-edge technologies and independently developed first 1GW 210mm TNC mass production line and first large-size advanced metalization test line in the industry, and has been developing pilot test lines for new cells and mainstream module technologies. Tongwei has been injecting vitality into the industry development through continuous innovation.

Tongwei PV Technology System focused on the R&D and mass production of new technologies and new products (such as TNC and HJT) to further enhance the R&D and development of cross-generation and cutting-edge technologies in the industry (including HBC, perovskite, laminated cells/modules, PV+energy storage and other technologies). In the future, Tongwei will continue to consolidate our strengths of technological innovation, further enhance our overall competitiveness. While providing efficient and high-quality products for upstream and downstream partners, Tongwei will also contribute to the development of green energy and build a sustainable new ecology of the PV industry



Multi-busbar - reduced strings increase output, dense wires reduce losses

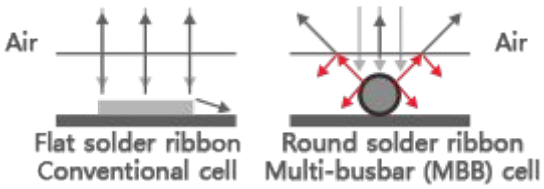
The grid lines are densely distributed, and the stress is uniform with SMBB design, Significantly reduce BOM cost, and the output power is 1-2W higher than that of MBB



Half-cell cut - reduce flow and loss Current density is reduced by 1/2, internat power loss is reduced to 1/4 of conventional modules, and the rated output power is increased by 5-10w

Shading, not compromising energy Up-down symmetrical parallel module design, effectively reduce current mismatch due to shading. The power output is increased by 50%

Lossless Cutting Lossless laser cutting technology, no mechanical damage, smooth cutting surface without burrs. Low cell cracking risks, micro-cracking is reduced by more than 50%



New Solder Ribbon Adopt round-shaped solder ribbon, low shading area, Multiple reflections of incident light, power increased by 1-2W

High-Density Encapsulation Technology The 210 Series adopts advanced high-density encapsulation technology to ensure the perfect balance of efficiency and reliability. Module efficiency increased by more than 0.15%

Technical data and design

Dimensions	210mm*210mm± 0.25mm	TkVoltage：-0.36 %/K
Thickness	180±20μm	TkCurrent：+0.07%/K
Front(-)	12*0.06±0.04mmbusbar (silver), 174±15 fingers Blue (dark blue) color antireflective film (silicon nitride composite film	TkPower：-0.38%/K
Back(+)	Back electrode width (silver) 1.4 ±0.5mm, back surface covered by fingers 150 fingers on the back, anti-broken grid design	Rsh≥35Ω，Irev2≤0.5A

Light intensity reliability

Intensity(W/m²)	1000	900	800	600	400
Uoc	1.000	0.996	0.991	0.988	0.962
Isc	1.000	0.903	0.803	0.602	0.403

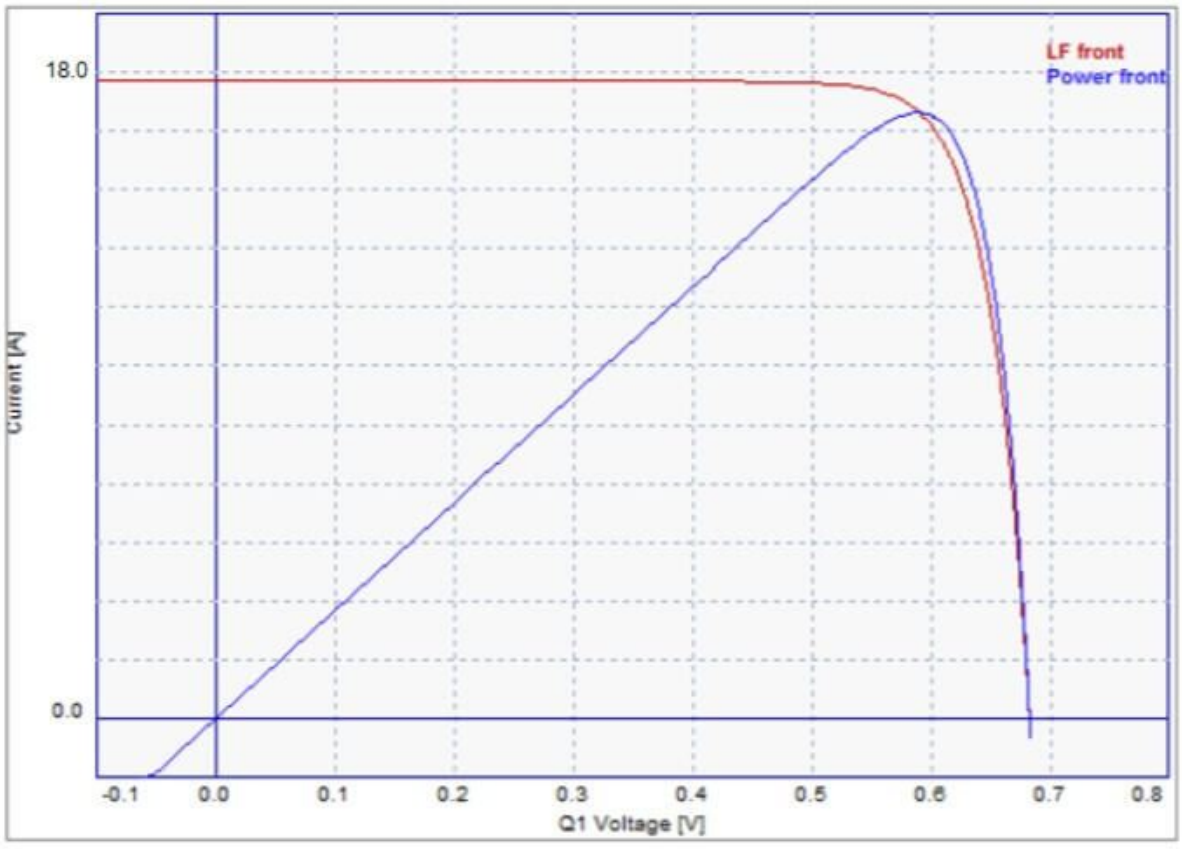
* Taking the Voc(Isc) tested at 1000W/m2 as the standard, test the decrease of Voc (Isc) with the light intensity.

Solderability

Minimum peeling strength	≥1.1N/mm

Results may vary depending on electrode, welding method, and conditions.

IV curve



Front electrical performance distribution

Efficiency code	Efficiency Eff(%)	Maximum output power Pmpp(W)	Maximum power point voltage Vmpp(V)	Maximum power point current Impp(A)	Open-circuit voltage Uoc(V)	Short-circuit current Isc(A)	Fill factor FF(%)
TW-210M-250	25.00	5.51	0.675	8.166	0.7487	8.573	85.89
TW-210M-249	24.90	5.49	0.674	8.145	0.7484	8.560	85.78
TW-210M-248	24.80	5.47	0.673	8.123	0.7482	8.551	85.47
TW-210M-247	24.70	5.45	0.672	8.116	0.7478	8.553	85.24
TW-210M-246	24.60	5.43	0.671	8.093	0.7472	8.542	85.11
TW-210M-245	24.50	5.41	0.670	8.076	0.7470	8.541	84.80
TW-210M-244	24.40	5.39	0.668	8.061	0.7469	8.541	84.46
TW-210M-243	24.30	5.37	0.667	8.046	0.7465	8.536	84.24
TW-210M-242	24.20	5.35	0.666	8.033	0.7461	8.530	84.01
TW-210M-241	24.10	5.32	0.664	8.024	0.7456	8.526	83.76
TW-210M-240	24.00	5.30	0.661	8.017	0.7452	8.521	83.51
TW-210M-239	23.90	5.28	0.659	8.011	0.7448	8.517	83.25
TW-210M-238	23.80	5.26	0.657	8.003	0.7444	8.513	83.00
TW-210M-237	23.70	5.24	0.655	7.991	0.7440	8.507	82.74
TW-210M-236	23.60	5.22	0.654	7.976	0.7437	8.504	82.48
TW-210M-235	23.50	5.19	0.653	7.956	0.7433	8.502	82.19
TW-210M-234	23.40	5.17	0.652	7.932	0.7428	8.502	81.90
TW-210M-233	23.30	5.15	0.652	7.898	0.7427	8.502	81.56

Standard test conditions:1000W/m², AM1.5, 25℃
The above technical parameters are subject to technical changes and tests, and TW Solar reserves the right of final interpretation.

Back electrical performance distribution

Efficiency code	Efficiency Eff(%)	Maximum output power Pmpp(W)	Maximum power point voltage Vmpp(V)	Maximum power point current Impp(A)	Open-circuit voltage Uoc(V)	Short-circuit current Isc(A)	Fill factor FF(%)
TW-210M-225	>23.1	5.10	0.659	7.752	0.749	8.094	84.01
TW-210M-213	22.9-23.0	5.08	0.658	7.736	0.748	8.075	83.96
TW-210M-212	<22.9	5.05	0.657	7.678	0.747	8.082	83.63

Standard test conditions:1000W/m², AM1.5,

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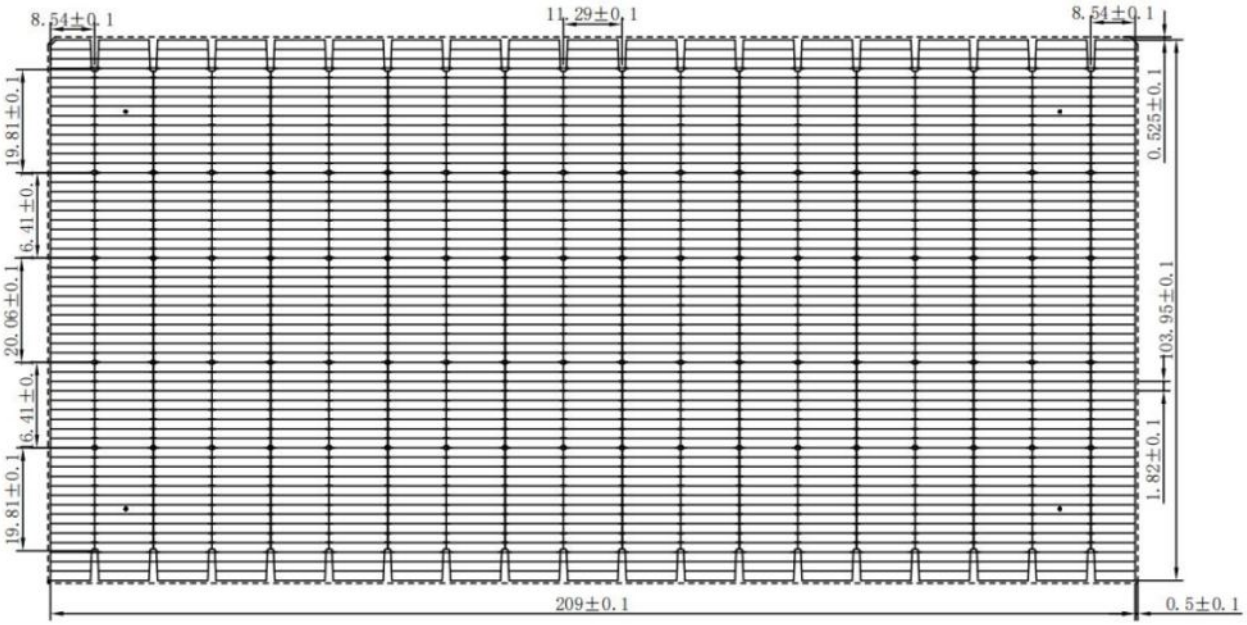
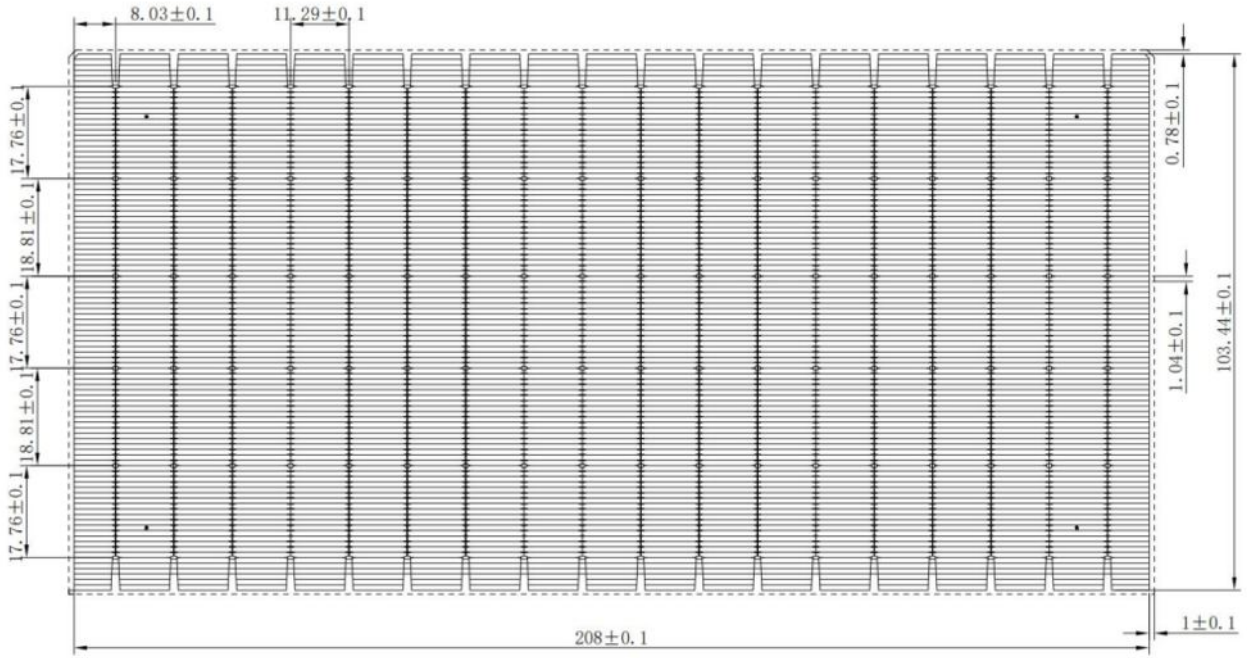
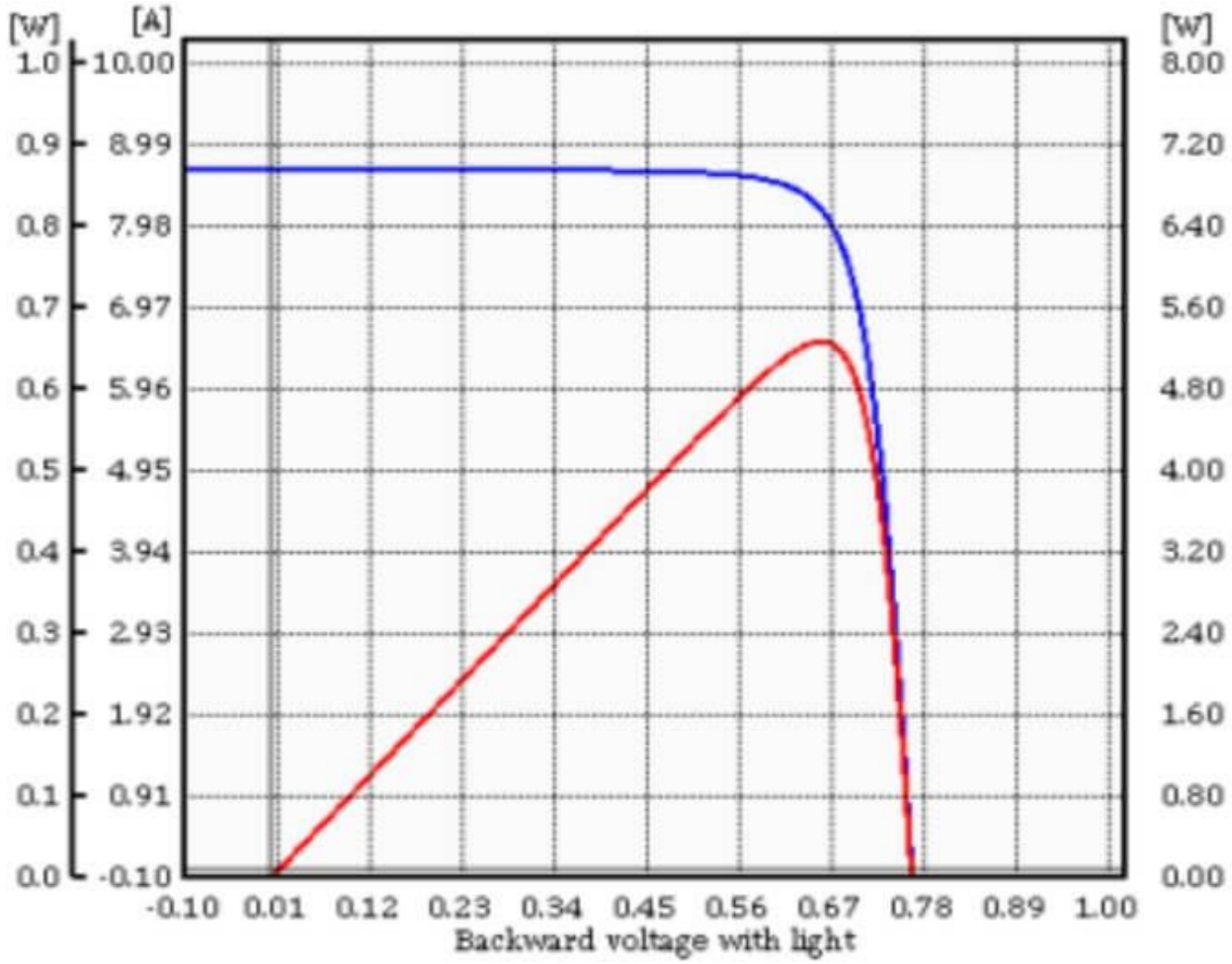

8.54±0.1
11.29±0.1
8.54±0.1
19.81±0.1
6.41±0.1
20.06±0.1
6.41±0.1
19.81±0.1
0.525±0.1
103.95±0.1
1.82±0.1
209±0.1
0.5±0.1


8.03±0.1
11.29±0.1
17.76±0.1
18.81±0.1
17.76±0.1
18.81±0.1
17.76±0.1
0.78±0.1
1.04±0.1
103.44±0.1
208±0.1
1±0.1



Front spectral response (external quantum efficiency)