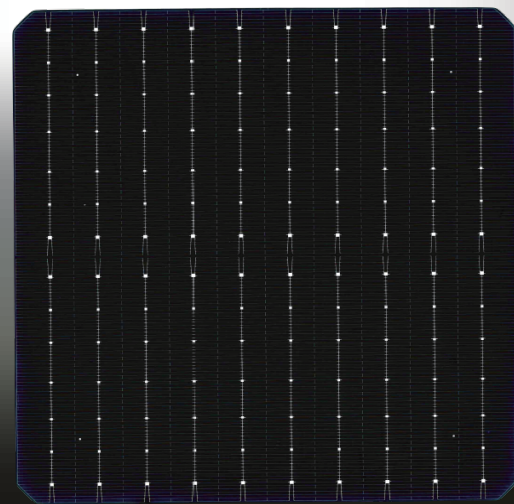


NSEY Ultra-Efficient

Black23 Series

Mono Crystalline Solar Cell (Bi-Facial - Black23)



Features

- Ultra-Efficient solar cells with an anisotropically etched surface
- Silicon nitride anti-reflection coating
- Silver front contact bars and aluminum local back surface field

Performance and Quality

- Proper handling from incoming inspection through production, outgoing inspection and packaging
- 100% checked for reverse current and visual appearance
- Calibrated against Fraunhofer ISE
- RoHS compliance
- **100% PID Resistance**

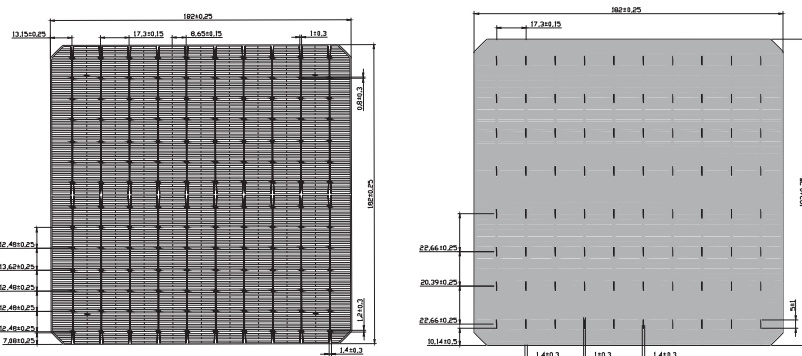
Packaging

- Minimize the risk of broken cells with special design
- Label with product information

Physical Characteristics

Dimension	182 mm x 182 mm \pm 0.5 mm
Cell's Thickness (si)	150 μ m \pm 30 μ m
Front Side (-)	Silicon nitride anti-reflection coating 1.0 mm \pm 0.3 mm silver pad
Back Side (+)	Aluminum local back surface field 1.4 mm \pm 0.3 mm (silver) discontinuous soldering pads

Cell Layout



Electrical Characteristics

Class	Efficiency Range (%)	Rated Power (Wp)	*Maximum Power Current (A)	*Short Circuit Current (A)	*Maximum Power Voltage (V)	*Open Circuit Voltage (V)
226	22.6-22.7	7.461	12.908	13.621	0.578	0.681
227	22.7-22.8	7.494	12.921	13.633	0.580	0.683
228	22.8-22.9	7.527	12.933	13.646	0.582	0.685
229	22.9-23.0	7.560	12.945	13.659	0.584	0.687
230	23.0-23.1	7.593	12.957	13.672	0.586	0.689
231	23.1-23.2	7.626	12.969	13.685	0.588	0.691
232	23.2-23.3	7.659	12.981	13.698	0.590	0.693
233	23.3-23.4	7.692	12.993	13.711	0.592	0.695
234	23.4-23.5	7.725	13.005	13.724	0.594	0.697
235	23.5-23.6	7.758	13.017	13.737	0.596	0.699

Test condition : 1000 W / m², AM 1.5, 25°C Power measuring tolerance: ±1.5% rel.

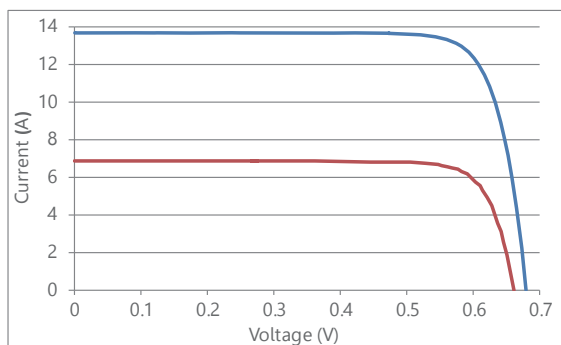
Temperature coefficients

Current (%/K)	0.0411
Voltage (%/K)	-0.2809
Power (%/K)	-0.3441

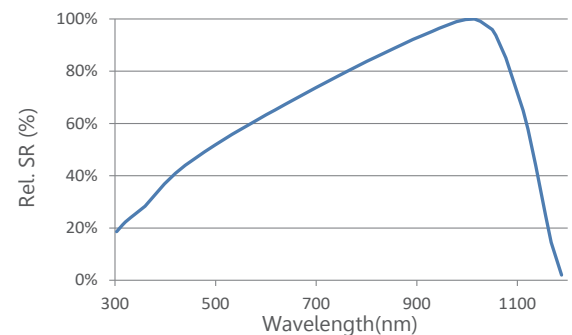
Light Intensity Dependence

Intensity [W/m ²]	Vmpp	I _{mpp}
1000	1.000	1.000
900	0.998	0.900
500	0.979	0.499
300	0.960	0.299
200	0.941	0.199

IV-Curve



Spectral Response



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