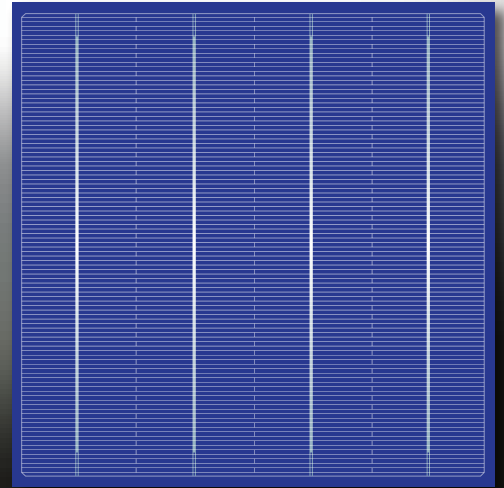


SAPPHIRE Series

M-156-4 ver.F

Multicrystalline Solar Cell



Features

- High-efficiency solar cells with an isotropically etched surface
- Silicon nitride anti-reflection coating
- Silver front contact bars and full surface aluminum back contact 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**

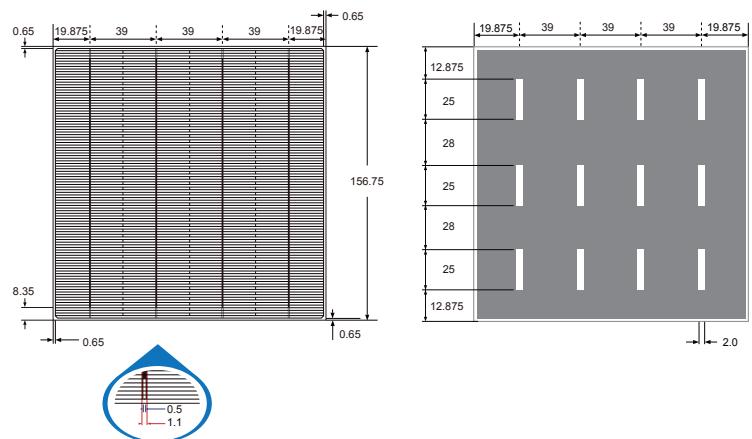
Packaging

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

Physical Characteristics

Dimension	156.75 mm x 156.75 mm ± 0.3 mm
Thickness (si)	180 μm - 20 / + 30 μm 200 μm ± 30 μm
Front Side (-)	Silicon nitride anti-reflection coating 1.1 mm silver busbar
Back Side (+)	Full surface aluminum back surface field 2.0 mm (silver) discontinuous soldering pads

Cell Layout





M-156-4 ver.F

Multicrystalline Solar Cell



Solartech
Energy Corp.

Electrical Characteristics

Class	Efficiency Range (%)	Rated Power (Wp)	*Maximum Power Current (A)	*Short Circuit Current (A)	*Maximum Power Voltage (V)	*Open Circuit Voltage (V)
190	19.0-19.1	4.668	8.636	9.165	0.539	0.639
191	19.1-19.2	4.693	8.665	9.194	0.541	0.641
192	19.2-19.3	4.718	8.695	9.224	0.542	0.642
193	19.3-19.4	4.742	8.724	9.253	0.543	0.643
194	19.4-19.5	4.767	8.757	9.286	0.545	0.645
195	19.5-19.6	4.791	8.786	9.316	0.546	0.646
196	19.6-19.7	4.816	8.810	9.339	0.548	0.647
197	19.7-19.8	4.840	8.840	9.368	0.549	0.648
198	19.8-19.9	4.865	8.869	9.398	0.550	0.649

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

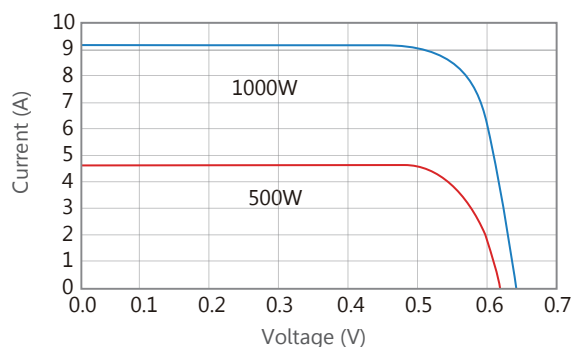
Temperature coefficients

Current (%/K)	0.0425
Voltage (%/K)	-0.3111
Power (%/K)	-0.3960

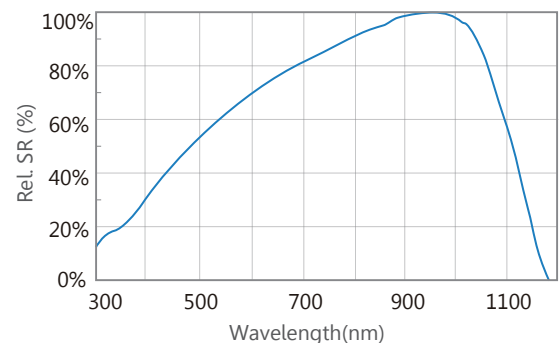
Light Intensity Dependence

Intensity [W/m ²]	V _{mpp}	I _{mpp}
1000	1.000	1.000
900	0.997	0.904
500	0.975	0.499
300	0.952	0.297
200	0.927	0.195

IV-Curve



Spectral Response



Solartech Energy Corp.



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