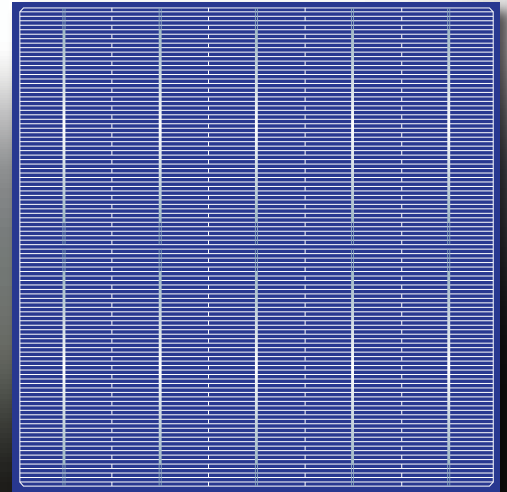




**Solartech**  
Energy Corp.

## SAPPHIRE Series

# M-156-5 ver.F



## Multicrystalline Solar Cell [Half-cut design]

### 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**

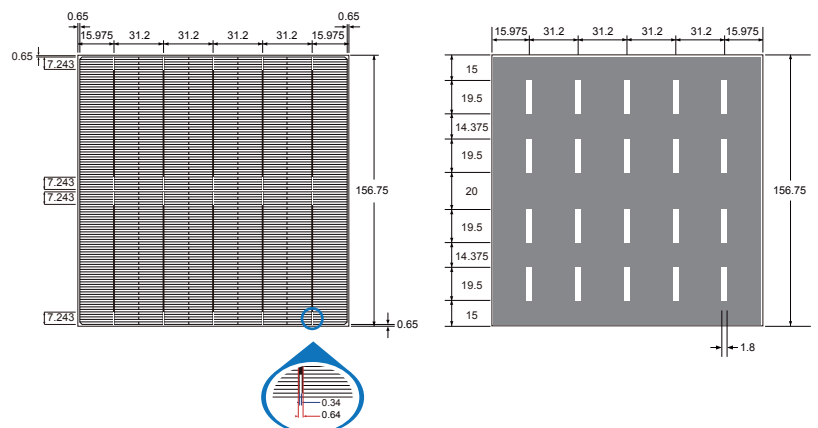
### Packaging

- 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 0.64 mm silver busbar
Back Side (+)	Full surface aluminum back surface field 1.8 mm (silver) discontinuous soldering pads

### Cell Layout





# M-156-5 ver.F



**Solartech**  
Energy Corp.

## Multicrystalline Solar Cell [Half-cut design]

### Electrical Characteristics

Class	Efficiency Range (%)	Rated Power (Wp)	*Maximum Power Current (A)	*Short Circuit Current (A)	*Maximum Power Voltage (V)	*Open Circuit Voltage (V)
188	18.8-18.9	4.619	8.719	9.254	0.532	0.630
189	18.9-19.0	4.644	8.737	9.271	0.534	0.632
190	19.0-19.1	4.668	8.756	9.288	0.535	0.633
191	19.1-19.2	4.693	8.775	9.305	0.537	0.635
192	19.2-19.3	4.718	8.793	9.322	0.538	0.637
193	19.3-19.4	4.742	8.812	9.339	0.540	0.638
194	19.4-19.5	4.767	8.831	9.356	0.541	0.640
195	19.5-19.6	4.791	8.851	9.372	0.543	0.641
196	19.6-19.7	4.816	8.867	9.388	0.545	0.643
197	19.7-19.8	4.840	8.888	9.405	0.546	0.645
198	19.8-19.9	4.865	8.908	9.422	0.548	0.646
199	19.9-20.0	4.890	8.924	9.438	0.549	0.648
200	20.0-20.1	4.914	8.943	9.458	0.551	0.649
201	20.1-20.2	4.939	8.961	9.476	0.552	0.651
202	20.2-20.3	4.963	8.980	9.493	0.553	0.652

Test condition : 1000 W / m<sup>2</sup>, AM 1.5, 25°C      Power measuring tolerance: ±1.5% rel.

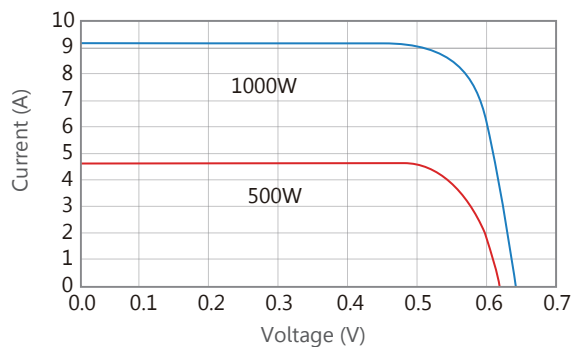
### Temperature coefficients

Current (%/K)	0.0535
Voltage (%/K)	-0.3043
Power (%/K)	-0.3718

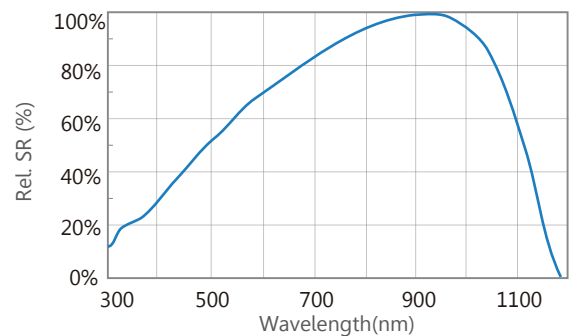
### Light Intensity Dependence

Intensity (W/m <sup>2</sup> )	Vmpp(%)	Ippp(%)
1000	100.0	100.0
900	99.8	89.9
500	97.7	49.7
300	95.5	29.7
200	93.6	19.7

### IV-Curve



### Spectral Response



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