



\* Up to 4% more of extra power generated at STC



# CBM4<sub>M</sub> BiSoN

## High Efficiency Bifacial N-type Monocrystalline Silicon Solar Cell, optimized for Glass-White Backsheet applications

### Production Technology and Properties

The new photovoltaic frontier is called **BiSoN**, the **bifacial** high efficiency N-type monocrystalline silicon solar cell up to **20,7%** front efficiency, developed in collaboration with the **ISC Konstanz** R&D Institute (Germany). The **CBM3-M** Solar Cell is optimized for glass-white backsheets applications and it is able to generate extra power up to 4% (measured at STC during flash testing phase).



**Bifacial**  
Made with bifacial technology



**High Efficiency**  
20,7% front efficiency



**Compatible with Standard Modules Machineries**  
100% compatible with common module assembly lines



**Internal Reflection Contribution**  
Up to 4% of extra power measured on the module during flash test phase (at STC)



**N-Type**  
N-type monocrystalline silicon solar cell



**Low Insolation**  
Excellent performance at low insolation due to the high shunt resistance, measured on each cell



**Fill Factor**  
High Fill Factor and low series resistance to reduce the cell to module losses



**LID near zero**  
It doesn't suffer LID-effect (Light Induced Degradation) that is near 0% instead of 2-3% occurring to all p-type cells



**Hot Spot Protect**  
100% measurement of insulation resistance in dark condition to prevent the Hot Spot



**Fraunhofer ISE**  
Cells calibrated by Fraunhofer ISE



**Electrical Performance**  
Stable Electrical performance over time



**High Reliability**  
With guaranteed -0/+0,025W positive power tolerance



**Made In Italy**  
Engineered and produced in Italy

### Production and quality control

- 100% Quality control of the wafers used in production, performed at each step of the production process, from raw wafer acceptance test to the electrical testing of the cell.
- Use of a MES System for total control, traceability and production improvement.
- Soft handling production to reduce the microcrack generation, breakage rate and mechanical stress.
- Innovative integrated treatment system with zero discharge capable to recover 97% of the waste process water.

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### Front STC\* electrical characteristics

Pmpp** [W]	Efficiency [%]	Isc [A]	Voc [V]	Impp [A]	Vmpp [V]	FF
4,750	19,44	9,70	0,641	8,98	0,529	0,764
4,800	19,65	9,71	0,642	9,02	0,532	0,770
4,850	19,85	9,72	0,644	9,03	0,537	0,774
4,875	19,95	9,73	0,645	9,04	0,539	0,777
4,900	20,06	9,73	0,646	9,05	0,541	0,779
4,925	20,16	9,76	0,647	9,07	0,543	0,780
4,950	20,26	9,76	0,648	9,08	0,545	0,782
5,000	20,47	9,78	0,650	9,13	0,548	0,787
5,050	20,67	9,79	0,652	9,19	0,550	0,792

Most available Power classes

\*STC (1000 W/m<sup>2</sup>, AM 1,5 - 25°C) IEC 60904-3 Ed.2  
 \*\* High Reliability with guaranteed -0/+0,025 W positive power tolerance  
 Measurement tolerances: ± 1.5 % rel. (P<sub>MPPT</sub>); ± 5 % rel. (I<sub>SC</sub>, V<sub>OC</sub>)

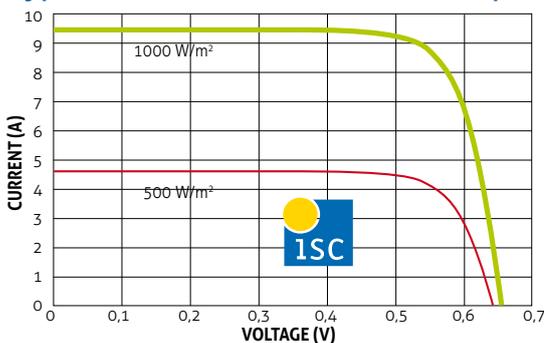
### Typical 60 cells module's peak power generation with different cell-to-module (CTM) loss

4,750	19,44	285,0	282,2	279,3
4,800	19,65	288,0	285,1	282,2
4,850	19,85	291,0	288,1	285,2
4,875	19,95	292,5	289,6	286,7
4,900	20,06	294,0	291,1	288,1
4,925	20,16	295,5	292,5	289,6
4,950	20,26	297,0	294,0	291,1
5,000	20,47	300,0	297,0	294,0
5,050	20,67	303,0	300,0	296,9

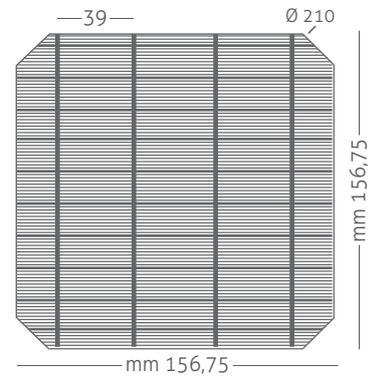
### Physical Characteristics

	Front	Back
Product	Monocrystalline Silicon Cell using N type wafer	
Dimensions	156,75 x 156,75 +/- 0,5 mm	
Materials	Alkaline texturized surface Blue & Light Blue silicon nitride AR coating	
Bus bar	Positive pole (+), four bus bar 1,00 +/- 0,1mm Distance axis: 39 mm	Negative pole (-), four bus bar 1,00 +/- 0,1 mm Distance axis: 39 mm
Thickness (Si)	180 - 200 +/- 20 µm	

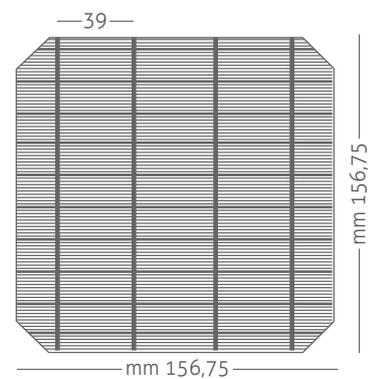
### Typical I-V curve at 4.950W front power cell



### Layout front



### Layout rear



### Temperature coefficients

- Current + 0.041 % / °C
- Voltage - 0.280 % / °C
- Power - 0.397 % / °C

### Processing recommendation

Solder joint Copper ribbons coated with:

- 15 - 25 µm:
- 60 % Sn / 38 % Pb / 2 % Ag or 60 % Sn / 40 % Pb

Cells per bypass diode:

- Maximum 24 cells per bypass diode.

### Storage remarks

Keep the cells at room temperature and in a dry and clean atmosphere (25°C ± 5°C).