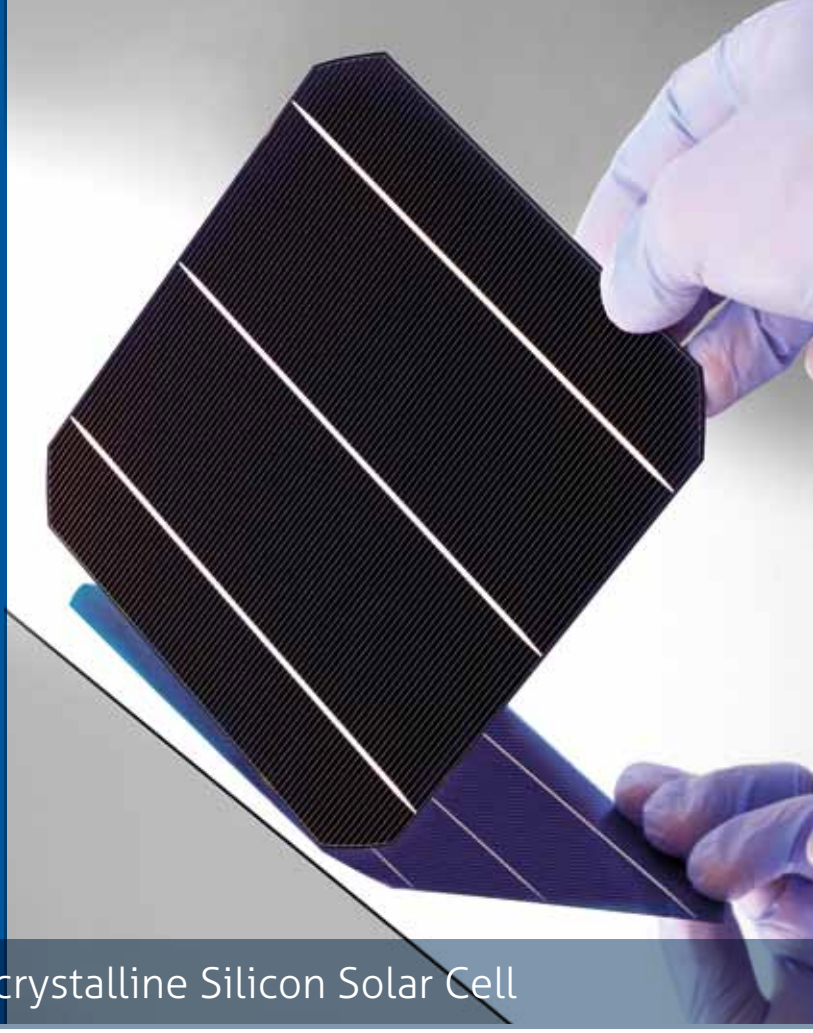
CBM3 BiSoN



High Efficiency Bifacial N-type Monocrystalline Silicon Solar Cell

Production Technology and Properties

The new photovoltaic frontier is called **BiSoN**, the **bifacial** high efficiency N-type monocrystalline silicon solar cell up to **20,4%** front efficiency (**25,5%** efficiency with **30% rear side contribution**) developed in collaboration with the **ISC Konstanz** R&D Institute (Germany).

Bifacial
88% of bifaciality factor ($\varepsilon_{ff\ rear} = \varepsilon_{ff\ front} \times 0{,}88$)

High Efficiency
20,4% front efficiency, 25,5% total efficiency with 30% rear side contribution

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

Electrical Performance
Stable Electrical performance over time

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

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

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

Fraunhofer ISE
Cells calibrated by Fraunhofer ISE

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.

MegaCell™
NEXT SOLAR GENERATION

CBM3 BiSoN

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Front STC* electrical characteristics

Pmpp** [W]	Efficiency [%]	Isc [A]	Voc [V]	Impp [A]	Vmpp [V]	FF
4,700	19,24	9,44	0,648	8,72	0,539	0,769
4,750	19,44	9,45	0,650	8,76	0,542	0,773
4,800	19,65	9,49	0,651	8,79	0,546	0,776
4,825	19,75	9,52	0,652	8,82	0,547	0,777
4,850	19,85	9,54	0,653	8,85	0,548	0,779
4,875	19,95	9,55	0,653	8,88	0,549	0,782
4,900	20,06	9,57	0,653	8,91	0,550	0,784
4,925	20,16	9,59	0,653	8,93	0,551	0,786
4,950	20,26	9,61	0,654	8,97	0,552	0,789

Most available Power classes

**STC (1000 W/m² , AM 1,5 - 25°C) IEC 60904-3 Ed.2*
*** High Reliability with guaranteed -0/+0,025 W positive power tollerance*
Measurement tolerances: ± 1.5 % rel. (P_{MPP}); ± 5 % rel. (I_{SC}, V_{OC})

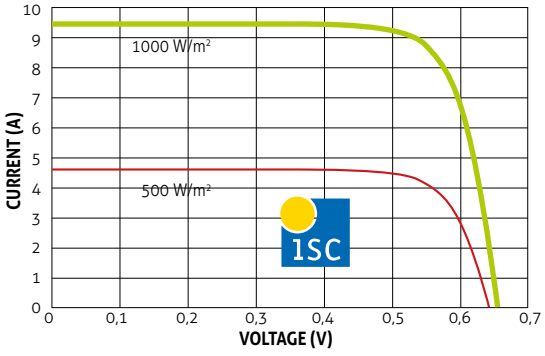
Typical rear side contribution for a 4,900 Wp cell (front)

Additional irradiation from rear side (% of front side illumination)	10%	15%	20%	25%	30%
Bifacial gain	**8,80%**	**13,2%**	**17,6%**	**22,0%**	**26,4%**
Equivalent efficiency	**21,83%**	**22,71%**	**23,59%**	**24,47%**	**25,36%**
Pmpp (front + back)	5,33	5,55	5,76	5,98	6,19
Isc (front + back)	10,4	10,8	11,3	11,7	12,1

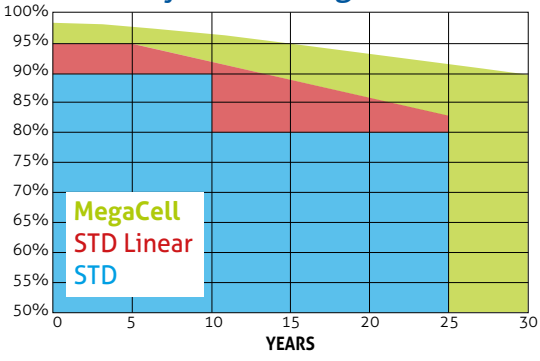
Physical Characteristics

	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** (+), three bus bar 1,50 +/- 0,1mm Distance axis: 52 mm	**Negative pole** (-), three bus bar 1,50 +/- 0,1 mm Distance axis: 52 mm
Thickness (Si)	180 - 200 +/-20 µm	

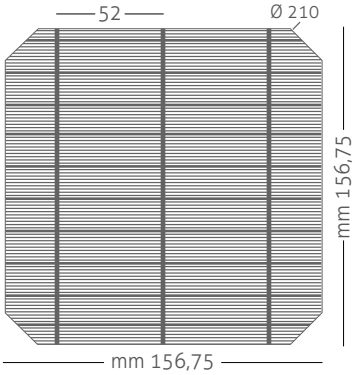
Typical I-V curve at 4,900W front power cell



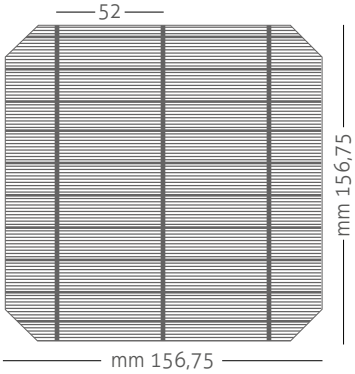
Expected glass-glass module warranty when using BiSoN cells



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).

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