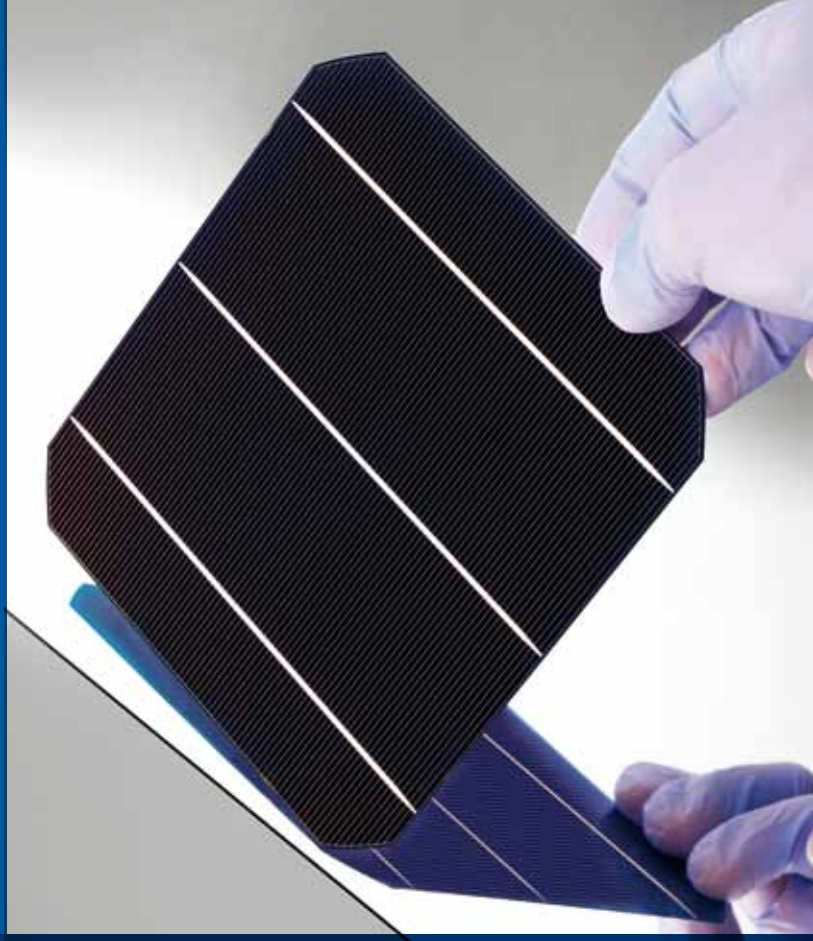
Module Performing up to* 10 Wp more



# CBM3 BiSoN M

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

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

## 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, developed in collaboration with the **ISC Konstanz** R&D Institute (Germany). The **CBM3-M** Solar Cell is optimized for glass-white backsheet 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**
20,4% 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.



MegaCell™ NEXT SOLAR GENERATION

# CBM3 BiSoN M

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

### 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. ($I_{SC}$, $V_{OC}$)*

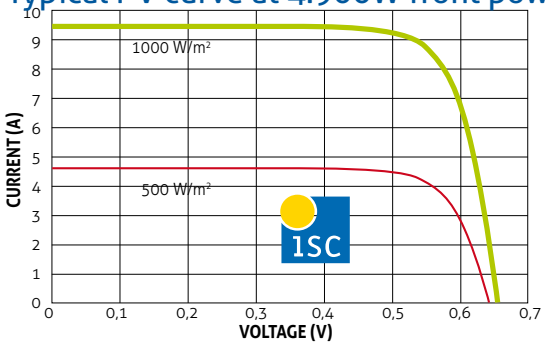
### Typical 60 cells module's peak power generation with different cell-to-module (CTM) loss

| Pmpp [W] | Efficiency [%] | CTM 0% [W] | CTM 1% [W] | CTM 2% [W] |
|---|---|---|---|---|
| **4,700** | 19,24 | **282,0** | 279,2 | 276,4 |
| **4,750** | 19,44 | **285,0** | 282,2 | 279,3 |
| **4,800** | 19,65 | **288,0** | 285,1 | 282,2 |
| **4,825** | 19,75 | **289,5** | 286,6 | 283,7 |
| **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 |

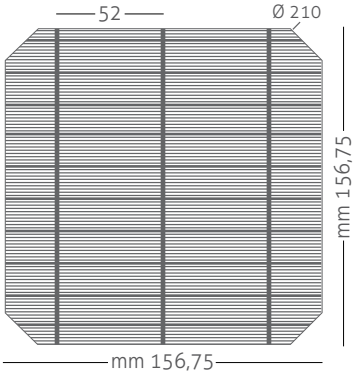
### Physical Characteristics

| | Front | Back |
|---|---|---|
| **Product** | Monocrystalline Silicon Cell using N type wafer | |
| **Dimensions** | 156,75 x 156,75 +/- 0,5 mm | |
| **Materials** | Alkaline texturized surface<br>Blue & Light Blue silicon nitride AR coating | |
| **Bus bar** | **Positive pole** (+),<br>three bus bar 1,50 +/- 0,1mm<br>Distance axis: 52 mm | **Negative pole** (-),<br>three bus bar 1,50 +/- 0,1 mm<br>Distance axis: 52 mm |
| **Thickness (Si)** | 180 - 200 +/-20 µm | |

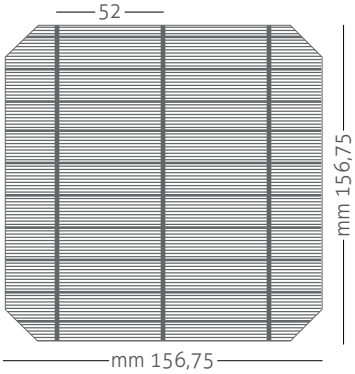
### Typical I-V curve at 4.900W front power cell




### 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).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