

# PowerMax<sup>®</sup> 4.0



## High energy yield

The energy yield of PowerMax<sup>®</sup> in terms of kWh generated per installed kWp is one of the highest among all photovoltaic technologies.

## Excellent efficiency

The CIS technology has the maximum efficiency of all thin-film technologies and maximizes the installed power generation capacity (kWp) per square meter.

## Best quality

Our solar modules are manufactured in Germany by using the latest generation of fully integrated process equipment certified according to all relevant industry standards.

## Sophisticated design

The uniform black appearance with its pinstripe look is pure aesthetics. PowerMax<sup>®</sup> is one of the most elegant solar modules on the market.

## For extreme loads and all weather conditions

The module is designed for high snow load zones and withstands loads of at least 551 kg/m<sup>2</sup>. Due to their spectral sensitivity, PowerMax<sup>®</sup> modules generate electricity during sunrise and sunset, cloudy skies and fog.

## Easy installation

The aesthetic fastening is done via hidden mounting clamps. The module size and the form factor minimize the installation costs.

## Continuous performance even under shading situation

The special cell design and the integrated bypass diode ensure that the PV system still works even if one of the modules is shaded.

## High environmental sustainability

In addition to the general low resource production of CIS modules, all PowerMax<sup>®</sup> modules are free of lead and cadmium and do not need a separate recycling process.

SOLAR MODULES FOR ROOFTOP SYSTEMS  
AND SOLAR PARKS

# PowerMax®4.0

## MECHANICAL SPECIFICATIONS

PowerMax®4.0	Value
External dimensions	1,587 x 664 mm <sup>2</sup>
Thickness	38 mm
Weight	17 kg
Cell type	CIGS
Frame	none
Front cover	3.2 mm tempered glass
Junction box protection class	IP67
Dimensions of the junction boxes	70 x 64 x 13 mm <sup>3</sup>
Cable lengths (⊖ plug   ⊕ socket)	180   310 mm
Cable cross section	2.5 mm <sup>2</sup>
Connector type	LC4



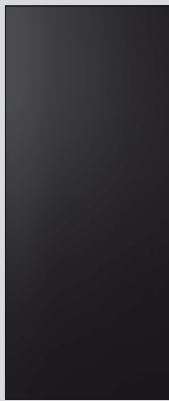
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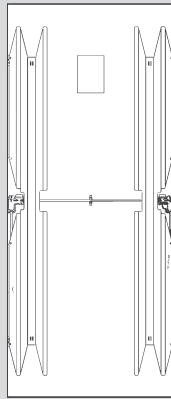
Safety Class II



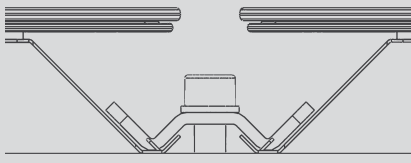
- Type approval: IEC 61646
- Safety qualification: IEC 61730:2004
- Ammonia corrosion: IEC 62716
- Salt mist corrosion: IEC 61701



664 mm



Backside of the module with backrail system



Secure mounting with AVANCIS clamps

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## ELECTRICAL SPECIFICATIONS

Data measured under standard test conditions (STC):

PowerMax®4.0	135	140	145	150
Nominal power $P_{nom}^*$	135 W	140 W	145 W	150 W
Sorting	-0/+5 W			
Module efficiency $\eta$	12.8 %	13.3 %	13.8 %	14.2 %
Aperture efficiency $\eta$	14.2 %	14.7 %	15.2 %	15.7 %
Open-circuit voltage $V_{oc}^*$	78.9 V	79.5 V	80.1 V	80.7 V
Short-circuit current $I_{sc}^*$	2.57 A	2.58 A	2.59 A	2.59 A
Voltage at mpp $V_{mpp}^*$	59.7 V	60.8 V	61.9 V	63.0 V
Current at mpp $I_{mpp}^*$	2.26 A	2.30 A	2.34 A	2.38 A
Max. over-current protection $I_r$	4.0 A			
Max. system voltage $V_{sys}$	1000 V			

Insolation intensity 1000 W/m<sup>2</sup> in the plane of the module, module temperature 25 °C and a spectral distribution of the sunlight according to the atmospheric mass (AM) 1.5.

\* Tolerance of Manufacturing: -5 %/+10 %.

Data measured at nominal module temperature (NOCT)\*\* and AM 1.5:

PowerMax®4.0	135	140	145	150
NOCT	40 °C			
Nominal power $P_{nom}$	101 W	105 W	109 W	113 W
Open-circuit voltage $V_{oc}$	75 V	76 V	76 V	77 V
Short-circuit current $I_{sc}$	2.06 A	2.06 A	2.07 A	2.07 A
Voltage at mpp $V_{mpp}$	56 V	57 V	58 V	59 V

\*\* NOCT: Module operating temperature at 800 W/m<sup>2</sup> insolation intensity in the plane of the module, air temperature 20 °C, wind speed 1 m/s and operating at mpp.

Temperature coefficients:

PowerMax®4.0	Value
Temperature coefficient $P_{nom}$	-0.39 %/°C
Temperature coefficient $V_{oc}$	-230 mV/°C
Temperature coefficient $I_{sc}$	0 mA/°C

Data measured at low light intensity:

The relative reduction in the module efficiency at a light intensity of 200 W/m<sup>2</sup> relative to 1000 W/m<sup>2</sup> at 25 °C module temperature and spectrum AM 1.5 is 6 %. At 500 W/m<sup>2</sup> the relative improvement in module efficiency is +1 %.

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