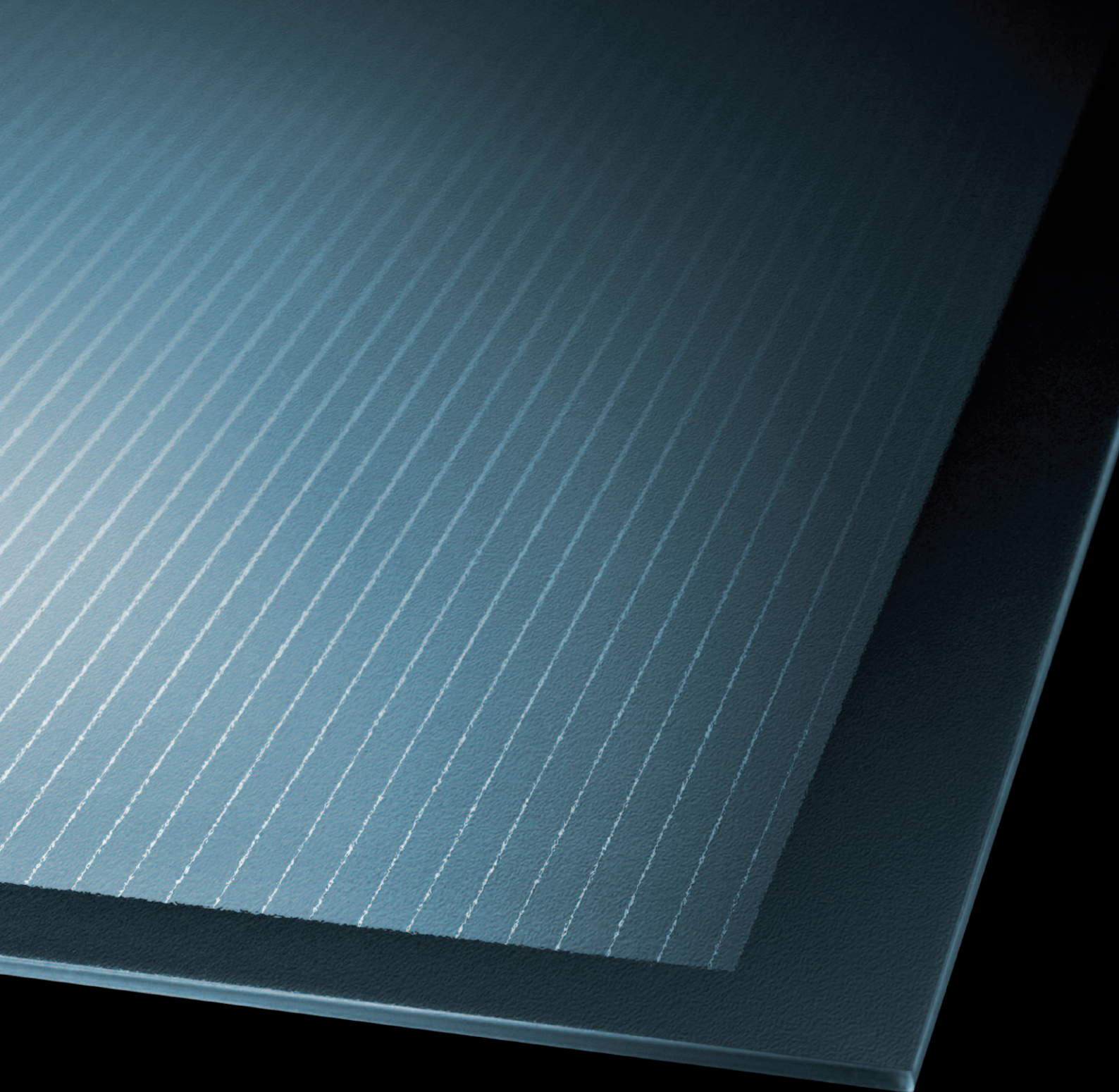


# *PowerMax*<sup>®</sup>

## PREMIUM CLASS PHOTOVOLTAICS



ENGLISH

A CNBM COMPANY

  
**AVANCIS**  
ADVANCED SOLAR POWER

# PowerMax® 3.5



## PREMIUM CLASS PHOTOVOLTAICS

Our successful flagship is the brand PowerMax®. PowerMax® modules offer a high energy yield (kWh per kWp), possible due to broad spectral sensitivity, proven low-light-performance, a low temperature sensitivity as well as an excellent tolerance against partial shadowing.

The latest product generation, PowerMax® 3.5, not only meets the highest technical requirements, it is also the most economic and aesthetic one on the market. An innovative CIS product design and a fully integrated industrial production process provide the basis of this success.

As an integral part of the production line, more than 140 quality and process monitoring check points guarantee consistent performance. Our production is certified according to all relevant industry standards.

Rely on quality: modules designed and made in Germany.

**Find out more and become part of the bright future of CIS photovoltaics!**

## PRODUCT ADVANTAGES AT A GLANCE



**HIGH ENERGY YIELD:**  
The energy yield of PowerMax® in terms of kWh generated per installed kWp is one of the highest among all photovoltaic technologies.



**FOR MAXIMUM EXPOSURE:**  
The module is designed for maximum snow load zones and withstands loads of up to 551 kg/m².



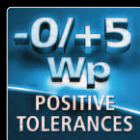
**EXCELLENT EFFICIENCY:**  
The CIS technology has the maximum efficiency of all thin-film technologies and maximizes the installed power generation capacity (kWp) per square meter.



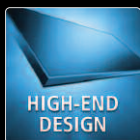
**EASY INSTALLATION:**  
An aesthetic array design is easily achieved via hidden mounting clamps. The module size and the form factor minimize installation costs.



**BEST QUALITY:**  
Our solar modules are made in Germany using the latest generation equipment and are certified according to all relevant industry standards.



**POSITIVE TOLERANCES:**  
Plus-sorting for the nominal power classes ensure the modules outperform their specification.



**SOPHISTICATED DESIGN:**  
The uniform black appearance with its pinstripe look is pure aesthetics. PowerMax® is one of the most elegant solar modules on the market.



**LONG TERM WARRANTIES:**  
We grant a product warranty for 10 years and a performance guarantee for 25 years. For details please see our warranty terms.



# ONE MODULE FITS ALL APPLICATIONS



## **ROOFTOP SOLAR SYSTEMS** FOR RESIDENTIAL CUSTOMERS

Solar systems with CIS technology provide high yields and outstanding designs on private homes. Generate your own clean power and reduce your electricity costs.



## **BUILDING INTEGRATED PHOTOVOLTAICS** FOR ARCHITECTS, HOMEOWNERS AND ENTREPRENEURS

Building-integrated photovoltaic systems, such as solar façades or in-roof systems, are advanced and smart building elements generating sustainable power and reducing the overall energy consumption of your building.





**LARGE ROOFTOP SYSTEMS**  
FOR COMMERCIAL AND INDUSTRIAL CLIENTS

From warehouses and industrial sites to office buildings, attractive earnings can be gained from large roof areas. Reduce your electricity costs permanently, become independent from fossil fuels and blackouts. Turn your roof into a profit center.



**GROUND-MOUNTED POWER PLANTS**  
FOR INVESTORS

Generating solar power across a large area also means using this area as efficiently as possible. Solar power plants with CIS photovoltaic modules offer high yield returns at minimized cost. Maximum yields and best quality are the greatest possible security for your long-term investment.



# AVANCIS – THE AVANT-GARDE OF PHOTOVOLTAICS



## ADVANCED SOLAR POWER

AVANCIS is a pioneer in CIS photovoltaics and has extensive experience with commercial series production of CIS solar modules. Since the early 1980s we have been researching and developing high-performance CIS solar modules.

Since 2014, Avancis is part of CNBM, and by means of our new EPC business unit, we reshaped from a solar manufacturer to a vertically integrated PV company. In other words: from glass to module to PV systems we cover the whole value added chain for PV by offering high quality products and turn-key project solutions.

With our innovation history and several world records in terms of energy conversion efficiency, we offer a proven track record. Located in Germany we stand for advanced technology, quality, performance and aesthetics.

## CIS: THE MOST EFFICIENT THIN-FILM SOLAR TECHNOLOGY

Studies show that CIS is the most efficient of all thin-film technologies. In the lab, CIS has already attained efficiency levels of above 21 % – AVANCIS itself regularly achieves new world records in efficiency, the latest in 2014 with 16.6 % for a prototype module.

Thanks to our strong partners, we have made CIS technology competitive in a very short time and we are working tirelessly to make our innovative solar modules even more cost-effective and powerful.

## ADVANTAGES OF A CIS SYSTEM: MORE kWh PER kWp

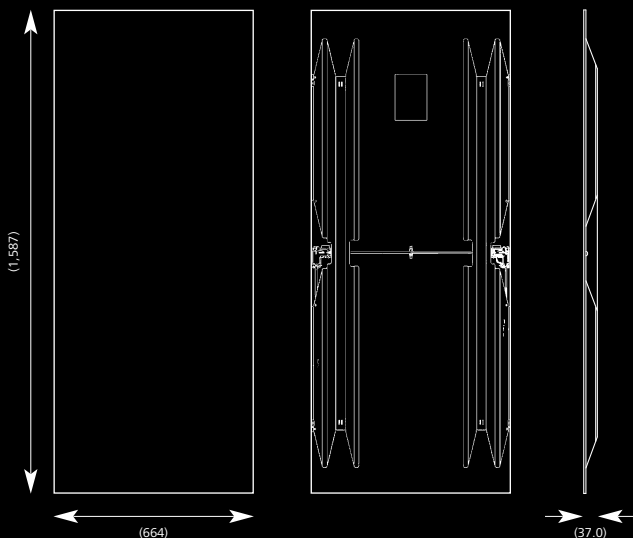
- **Highest efficiency among all thin-film technologies**
- **Maximum energy yields through broad spectral response**
- **Excellent low light performance under diffuse light, at sunrise and sunset**
- **Greater temperature stability due to a low temperature coefficient**
- **Best shadowing tolerance due to strip-like cell design**
- **Cost advantages in production due to economic use of materials and energy**
- **Guaranteed quality through vertical integration (from glass to module)**
- **Environmentally benign: Cd- and Pb-free, short energy payback time**
- **Elegant design, best suited among all photovoltaic technologies for aesthetic building integrations**

# PowerMax® 3.5

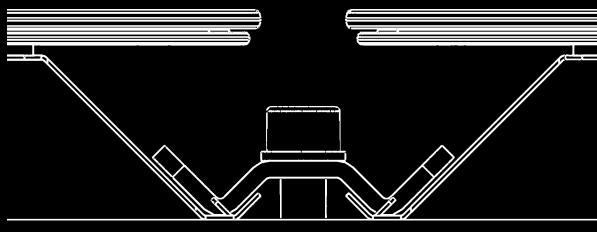


## DIMENSIONS

Front, rear and side views (from left to right)



Cross section through glass, rail and clamp



Dimensions in mm



- Qualified, IEC 61646 (pending)
- Safety tested, IEC 61730 (pending)

## MECHANICAL SPECIFICATIONS

PowerMax® 3.5	Value
External dimensions	1,587 x 664 mm <sup>2</sup>
Thickness	37.0 mm
Weight	16 kg
Junction box protection class	IP65
Dimensions of the junction boxes	70 x 64 x 13 mm <sup>3</sup>
Cable lengths (⊖ plug   ⊕ socket)	170   300 mm
Cable cross section	2.5 mm <sup>2</sup>
Connector type	LC4

## ELECTRICAL SPECIFICATIONS

Data measured under standard test conditions (STC)\*:

PowerMax® 3.5	120	125	130	135	140
Nominal power $P_{nom}$	120 W	125 W	130 W	135 W	140 W
Tolerance of nominal power $\Delta P_{nom}$	-0/+5%	-0/+4%	-0/+4%	-0/+4%	-0/+4%
Module efficiency $\eta^*$	11.4 %	11.9 %	12.3 %	12.8 %	13.3 %
Aperture efficiency $\eta$	12.6 %	13.1 %	13.6 %	14.2 %	14.7 %
Open-circuit voltage $V_{oc}$	57.4 V	58.0 V	58.6 V	59.2 V	59.8 V
Short-circuit current $I_{sc}$	3.35 A	3.35 A	3.35 A	3.35 A	3.36 A
Voltage at mpp $V_{mpp}$	41.2 V	42.4 V	43.7 V	44.9 V	46.1 V
Current at mpp $I_{mpp}$	2.92 A	2.95 A	2.98 A	3.01 A	3.04 A
Limiting reverse current $I_r$	5.0 A	5.0 A	5.0 A	5.0 A	5.0 A
Max. system voltage $V_{sys}$ (IEC)	1000 V	1000 V	1000 V	1000 V	1000 V
Max. system voltage $V_{sys}$ (UL)	600 V	600 V	600 V	600 V	600 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.

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

PowerMax® 3.5	120	125	130	135	140
NOCT	40 °C	40 °C	40 °C	40 °C	40 °C
Nominal power $P_{nom}$	90 W	94 W	97 W	101 W	105 W
Open-circuit voltage $V_{oc}$	54.4 V	55.0 V	55.6 V	56.2 V	56.8 V
Short-circuit current $I_{sc}$	2.68 A	2.68 A	2.68 A	2.68 A	2.69 A
Voltage at mpp $V_{mpp}$	38.6 V	39.8 V	41.1 V	42.3 V	43.5 V

\* 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 open-circuit condition.

Temperature coefficients:

PowerMax® 3.5	Value
Temperature coefficient $P_{nom}$	-0.39 %/°C
Temperature coefficient $V_{oc}$	-170 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 %.

For more information about handling, installation and operation of PowerMax® modules, refer to the installation, operating and safety manual for AVANCIS PowerMax® photovoltaic modules.

The measurement accuracy of  $P_{nom}$  is  $\pm 3.5$  %. As a result of ongoing research and product improvements, the specifications in this product data sheet are subject to changes without prior publication. This data sheet is not allowed to be used for deriving any rights, and AVANCIS does not accept any liability with regard to and resulting from the use of information contained herein. Installation equipment is not supplied with the product.

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