

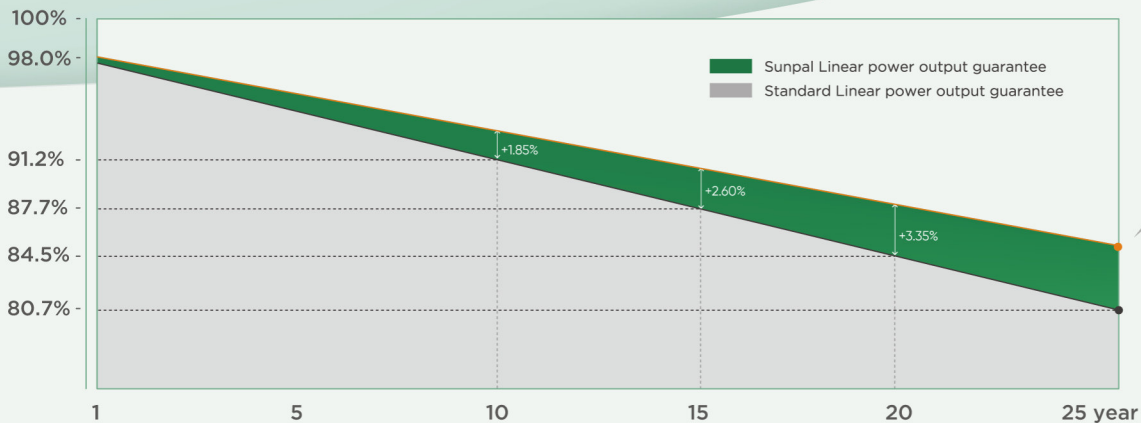
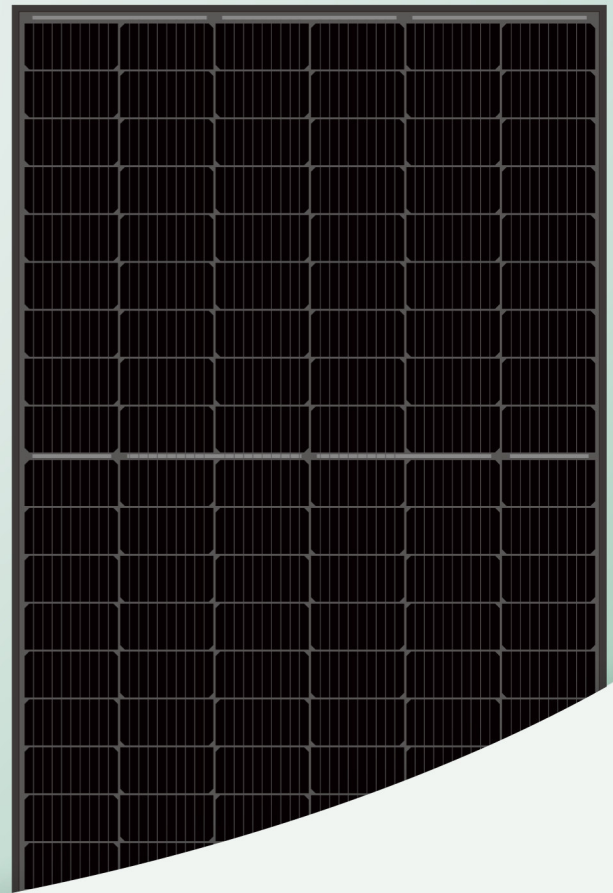
Solar Module

405~425W

182mm Cells MonoAll Black
PERC with MBB & Half-cut
Technology

Quality Guarantee

12-year Warranty for Materials and Processing
25-year Warranty for Extra Linear Power Output



84.80%

21.76%

Max Module Eff.

0~+5W

Positive Tolerance

Complete System and Product Certifications

IEC 61215, IEC 61730, UL 61730
ISO 9001:2008: ISO Quality Management System
ISO 14001: 2004: ISO Environment Management System
OHSAS 18001: 2007 Occupational Health and Safety



* Specifications subject to technical changes and tests. Sunpal Solar reserves the right of interpretation.

Positive power tolerance (0~+5W) guaranteed

High module conversion efficiency (up to 21.76%)

Slower power degradation enabled by Low LID Mono PERC technology: first year <2%, 0.55% year 2-25

Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

PXENERGY.DE
P.X Invest GmbH
Speicherhof 207
28217 Bremen

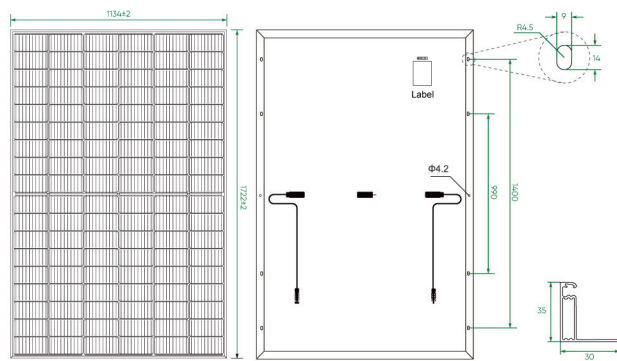
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Solar Module

ALL BLACK 405~425W

Design (mm)



*Units: mm *Tolerance: ±2mm

Cell Orientation	108 (2x54)
Junction Box	IP68, three diodes
Output Cable	4mm ² , 300mm in length, length can be customized
Glass	Single glass 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	20.5kg±3%
Dimension	1722×1134×30mm
Packaging	36pcs per pallet 936pcs per 40'GP

Operational Temperature	-40°C~+85°C
Power Output Tolerance	0~+5W
Voc & Isc Tolerance	±3%
Max. System Voltage	DC1500V(IEC/UL)
Max. Series Fuse Rating	25A
NOCT	45±2°C
Safety Class	II
Fire Rating	UL type 1 or 2
Max. Static Load(Front)	5400Pa
Max. Static Load(Back)	2400Pa

Electrical Characteristics

Model Number	SP405M-54HB		SP410M-54HB		SP415M-54HB		SP420M-54HB		SP425M-54HB	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	405	302	410	306	415	310	420	314	425	318
Open Circuit Voltage (Voc/V)	37.06	34.98	37.14	35.06	37.22	35.14	37.3	35.22	37.38	35.3
Short Circuit Current (Isc/A)	13.85	11.19	13.92	11.25	13.99	11.31	14.06	11.37	14.13	11.43
Voltage at Maximum Power (Vmp/V)	30.52	28.58	30.62	28.74	30.72	28.9	30.82	29.06	30.92	29.22
Current at Maximum Power (Imp/A)	13.27	10.57	13.39	10.65	13.51	10.73	13.63	10.81	13.75	10.89
Module Efficiency(%)	20.75		21		21.26		21.51		21.76	
Temperature Coefficient of Isc					+0.04%/°C					
Temperature Coefficient of Voc					-0.25%/°C					
Temperature Coefficient of Pmax					-0.34%/°C					

143 €

145 €

147 €

149 €

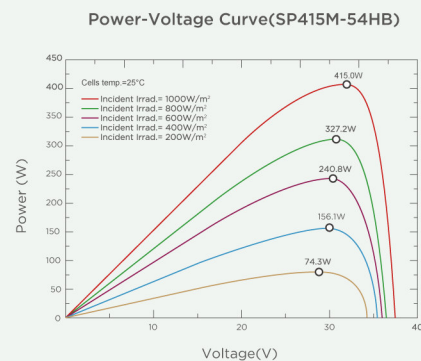
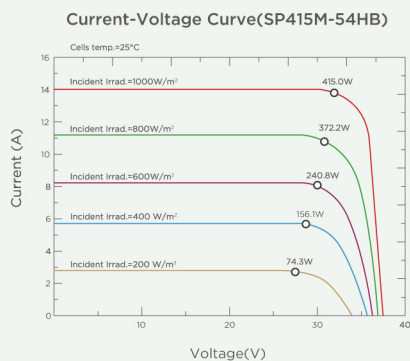
150 €

* STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25°C, Spectra at AM1.5

* NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/S

*Test uncertainty for Pmax: ±3%

I-V Curve



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