

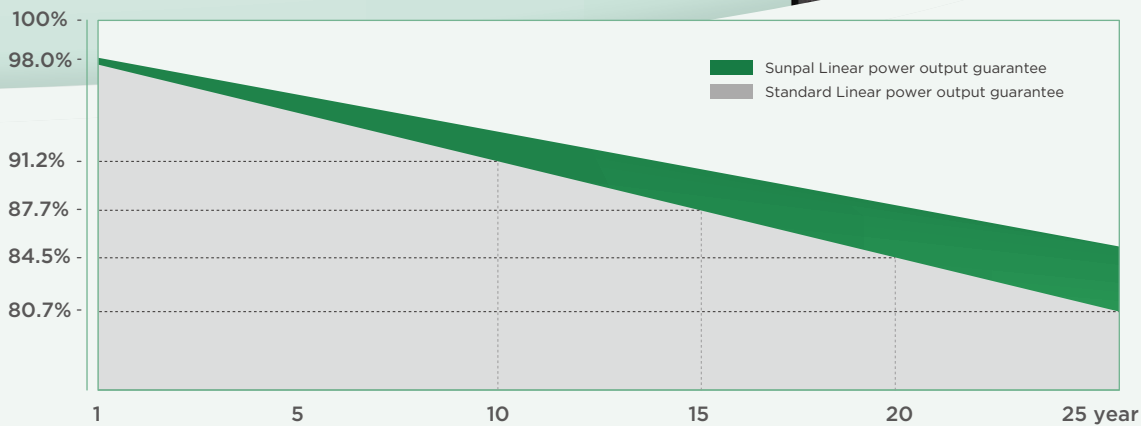
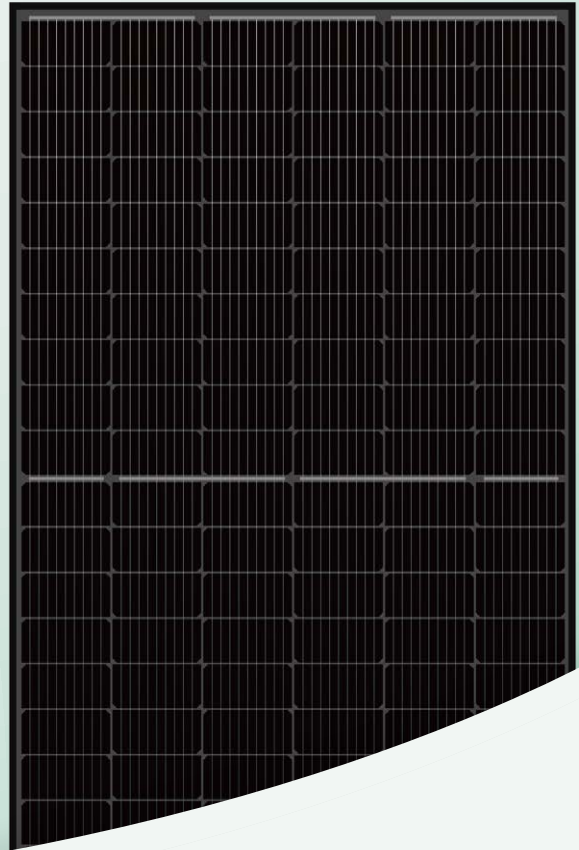
HiMAX 5 ALL BLACK

435~455W

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

Quality Guarantee

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



21.05%
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 21.05%)

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



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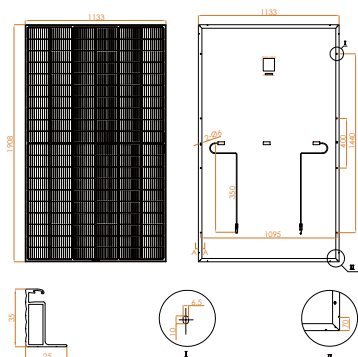
Q Sunpal Solar

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Design (mm)



Cell Orientation	120 (6x20)
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:	24.0kg±3%
Dimension	1908×1133×35mm
Packaging	31pcs per pallet 744pcs per 40'ft Container

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	SP435M-60HB		SP440M-60HB		SP445M-60HB		SP450M-60HB		SP455M-60HB	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	435	323.74	440	327.46	445	331.18	450	334.9	455	338.63
Open Circuit Voltage (Voc/V)	41.38	39.06	41.44	39.12	41.50	39.17	41.56	39.23	41.62	39.29
Short Circuit Current (Isc/A)	13.41	10.83	13.55	10.94	13.67	11.04	13.81	11.15	13.95	11.26
Voltage at Maximum Power (Vmp/V)	34.16	31.78	34.21	31.83	34.26	31.87	34.31	31.92	34.36	31.97
Current at Maximum Power (Imp/A)	12.74	10.19	12.87	10.29	12.99	10.39	13.12	10.49	13.25	10.6
Module Efficiency(%)	20.13		20.36		20.59		20.82		21.05	
Temperature Coefficient of Isc						+0.050%/°C				
Temperature Coefficient of Voc						-0.280%/°C				
Temperature Coefficient of Pmax						-0.360%/°C				

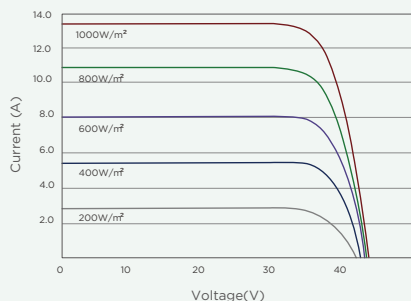
* STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25°C, Spectra at AM1.5

* 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

I-V CURVES OF PV MODULE(445W)



P-V CURVES OF PV MODULE(445W)

