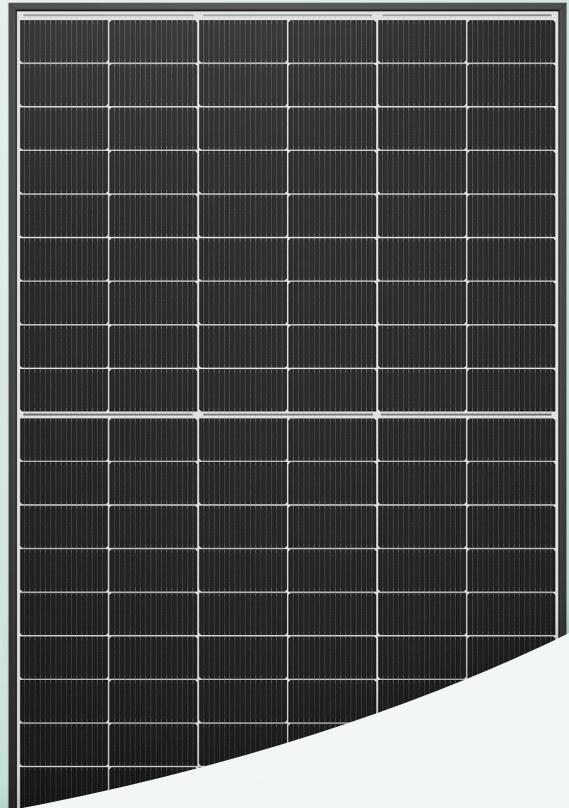


ESP-440.M.NP5 N

415~445W

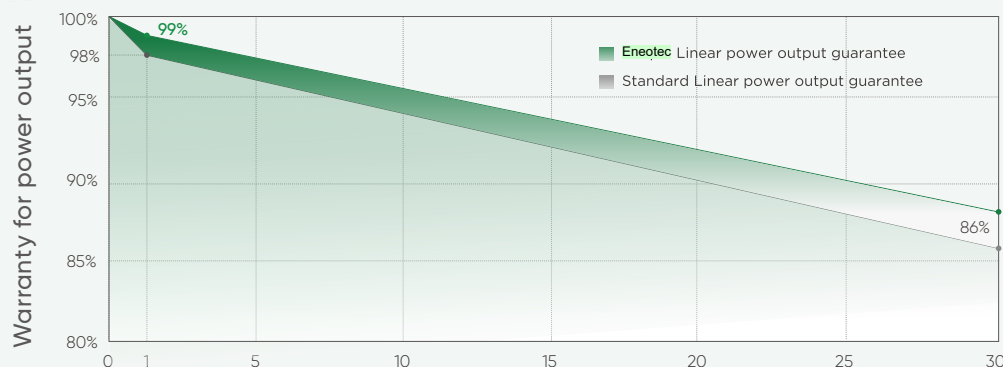
N-type TOP - Black Frame Solar Module



Quality Guarantee

25-year Materials Warranty

30-year Power Warranty



87.4%

22.79%

Max Module Eff.

0~+5W

Positive Tolerance

Complete System and Product Certifications

IEC61215/IEC61730

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO 45001: Occupational Health and Safety Management System



* 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 22.79%)

Slower power degradation enabled by Low LID Mono TOPCON technology: first year <1%, 0.40% year 2-30

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

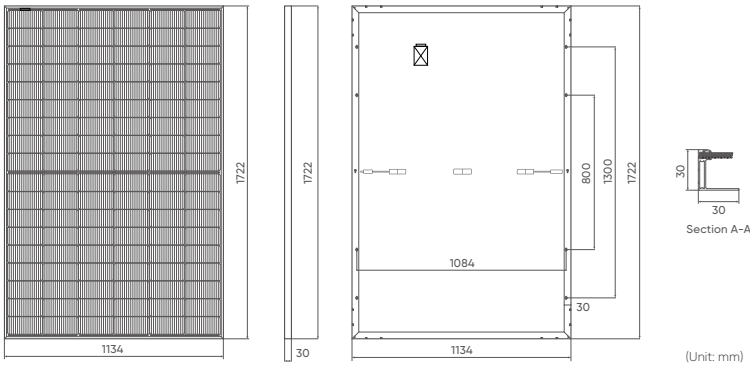
Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

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

ESP-440.M.NP5 415~445W

Design (mm)



Solar Cells	N-type Mono
No. of Cells	108(6×18)
Dimensions	1722 × 1134 × 30mm
Weight	21.0kg
Front Glass	3.2mm coated tempered glass
Frame	Anodized aluminium alloy
Junction Box	Ip68 rated (3 bypass diodes)
Output Cables	4mm ² , 300mm (+) / 300mm (-), Length can be customized
Connectors	Mc4 compatible
Mechanical load test	5400Pa
Packaging	36pcs/box, 216pcs/20'GP, 936pcs/40'HQ

Operating Module Temperature	-40°C to +85°C
Maximum System Voltage	1500 DC (IEC)
Maximum Series Fuse Rating	25A
Power Tolerance	0/+5W

Nominal Operating Temperature (NMOT)	45±2°C
Temperature Coefficient of Pmax	-0.30%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Isc	+0.046%/°C

Electrical Parameters (STC*)

Module Type: SP445M-54H	415	420	425	430	435	440	445
Maximum power (Pmax/W)	415	420	425	430	435	440	445
Open Circuit Voltage (Voc/V)	38.34	38.57	38.81	39.04	39.27	39.50	39.73
Short Circuit Current (Isc/A)	13.89	13.96	14.03	14.10	14.17	14.24	14.31
Voltage at Maximum power (Vmpp/V)	32.02	32.23	32.44	32.65	32.85	33.06	33.26
Current at Maximum Power (Imp/A)	12.96	13.03	13.10	13.17	13.24	13.31	13.38
Module Efficiency(%)	21.25	21.51	21.76	22.02	22.28	22.54	22.79

Electrical Parameters (NMOT*)

	311	315	319	323	327	331	335
Maximum power (Pmax)	311	315	319	323	327	331	335
Open Circuit Voltage (Voc/V)	36.54	36.74	36.95	37.15	37.35	37.55	37.75
Short Circuit Current (Isc/A)	11.18	11.24	11.30	11.36	11.42	11.48	11.54
Voltage at Maximum power (Vmpp/V)	29.45	29.66	29.87	30.07	30.28	30.48	30.68
Current Maximum Power (Imp/A)	10.56	10.62	10.68	10.74	10.80	10.86	10.92

1. Standard Test Conditions [STC]: irradiance 1000W/m²; AM 1.5; ambient temperature 25°C according to EN 60904-3;
2. Nominal Module Operating Temperature (NMOT): Irradiance 800W/m²; wind speed 1m/s, ambient temperature 20°C.
3. Tolerance of Pm: 0/+5W, Measuring uncertainty of power: ±3%. Performance deviation of Voc [V], Isc [A], Vm [V] and Im [A]: ±3%.

I-V Curve

