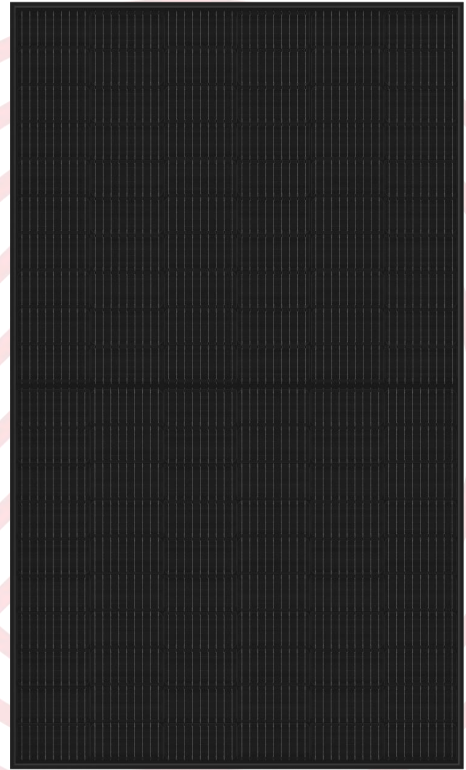


## PERC Half Cut Mono-Crystalline Black ESM 445/450/455/460/465S

0~+3% POWER TOLERANCE

High efficiency PERC P - type solar module



### Module characteristics



#### Strong Mechanical Strength

Pass the wind load test of 2400Mpa and the snow load test of 5400Mpa



#### Low attenuation rate

Good reliability and lower LID/LETID attenuation rate.



#### PID resistance

The attenuation probability of PID phenomenon is minimized through solar cell production technology optimization and robust raw material quality control



#### Harsh environmental adaptation

Good reliability and lower LID/LETID attenuation rate.



#### MBB and Half cell technique

More light utilization and current collection capabilities, effectively improving product power output and reliability



### Long and reliable quality assurance

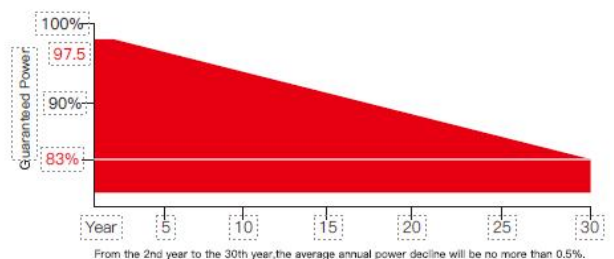
IEC61215(2016), IEC61730(2016)

ISO9001:2015: Quality management system

ISO14001:2015: Environmental management system

ISO45001:2018: Occupational health and safety management system

12 years material and workmanship warranty;  
30 years power linear warranty.

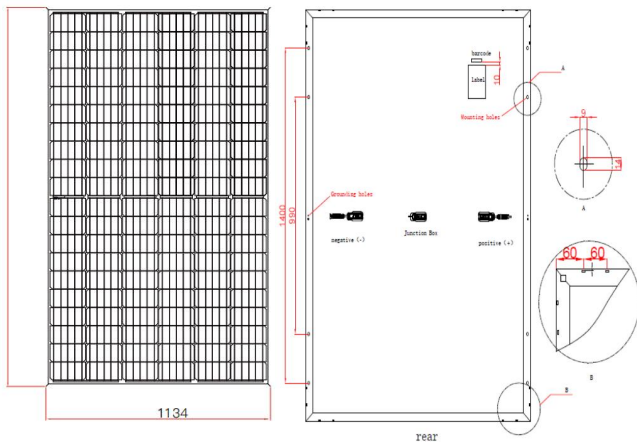


## Electrical Parameters

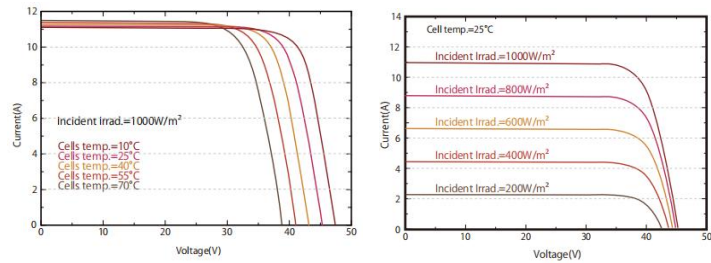
Model Type	ESM-445S		ESM-450S		ESM-455S		ESM-460S		ESM-465S	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	445	328	450	331	455	335	460	339	465	343
Open Circuit Voltage (Voc)	41.2	38.48	41.4	38.68	41.6	38.88	41.8	39.08	42.00	39.28
Short Circuit Current (Isc)	13.63	10.73	13.68	10.78	13.73	10.83	13.78	10.88	13.83	10.93
Maximum Power Voltage (Vmp)	34.4	32.14	34.6	32.34	34.8	32.5	35.0	32.74	35.4	32.94
Maximum Power Current (Imp)	12.90	10.21	12.96	10.24	13.02	10.30	13.08	10.35	13.14	10.40
Module Efficiency - $\eta_m$ (%)	20.56		20.79		21.02		21.25		21.46	
Operational Temperature	-40°C ~ +85°C									
Maximum System Voltage	1500VDC									
Maximum Series Fuse Rating	20A									
Power Tolerance	0 ~ +3%									
Temperature Coefficient of Pmax	-0.360%/°C									
Temperature Coefficient of Voc	-0.260%/°C									
Temperature Coefficient of Isc	+0.046%/°C									
Nominal Operating Cell Temperature	45 ± 2°C									
Safety Class	Class II									
Max Load (Front/back)	5400Mpa/2400Mpa									

STC: Irradiance 1000W/m<sup>2</sup> Cell temperature 25°C Atmospheric quality = 1.5  
 NOCT: Irradiance 800W/m<sup>2</sup> Ambient temperature 25°C Atmospheric quality = 1.5 Wind speed 1m/s

## Mechanical Diagrams



## Curve



## Packing Details

36pcs/pallet

40HQ: 26 pallets/container, 792pcs/container

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 EMAIL: emma.wu@einnova-solarline.com  
 Website: www.einnova-solarline.com

## Specification

Cell type	mono crystalline 182*91mm
Half-cell quantity	120pcs (6×20)
Dimension	1916×1134×30mm
Weight	23kgs±3%
Glass	3.2mm toughed and AR coated
Frame	Black Anodized Aluminum Alloy
Junction Box	IP68
Cable	1100mm (can be customized)

The company reserves the right of final right of adjustment of this file.