

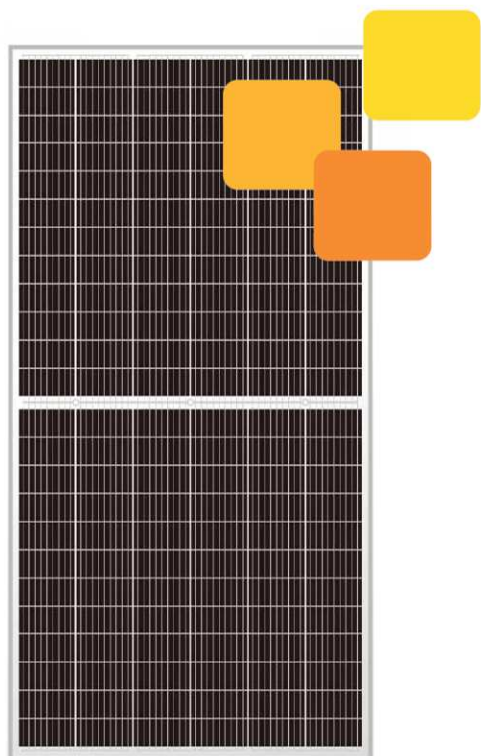
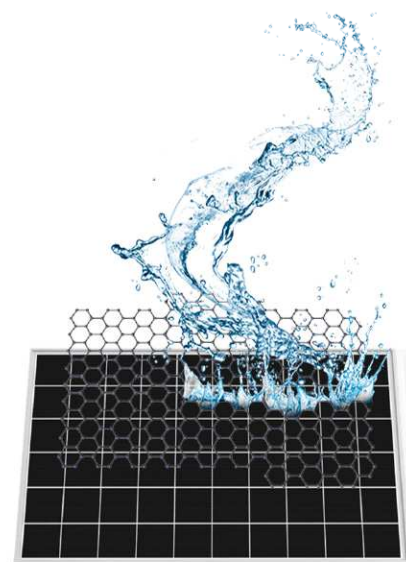
## Fotovoltaické panely určené pro přístřešky na auta model **V-PILÍŘE**

# LONGi Solar

Model **LR4-72HPH-450M**

9 Busbar, vysoká účinnost, low LID mono PERC s technologií Half-cut, single glass, rám z eloxované hliníkové slitiny.

Rozměry: 2094/1038/35mm (s rámem)



# ZNSHINESOLAR

Model **ZXM6-NHLDD144-450/M**

9 Busbar, vynikající účinnost buněk, lepší odezva slabého osvětlení, anti PID effect, bifaciální technologie

Rozměry: 2094/1038/30mm (s rámem)



# Hi-MO 4m

## LR4-72HPH 430~460M

- Suitable for ground power plants and distributed projects
- Advanced module technology delivers superior module efficiency
  - M6 Gallium-doped Wafer
  - 9-busbar Half-cut Cell
- Excellent outdoor power generation performance
- High module quality ensures long-term reliability

12

12-year Warranty for  
Materials and Processing

25

25-year Warranty for Extra  
Linear Power Output

### 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

TS62941: Guideline for module design qualification and type approval

OHSAS 18001: 2007 Occupational Health and Safety

# LONGI



**21.2%**  
MAX MODULE  
EFFICIENCY

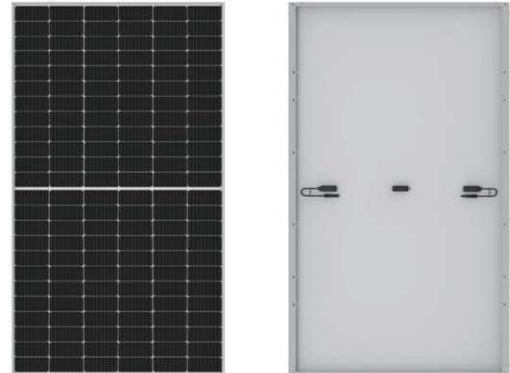
**0~+5W**  
POWER  
TOLERANCE

**<2%**  
FIRST YEAR  
POWER DEGRADATION

**0.55%**  
YEAR 2-25  
POWER DEGRADATION

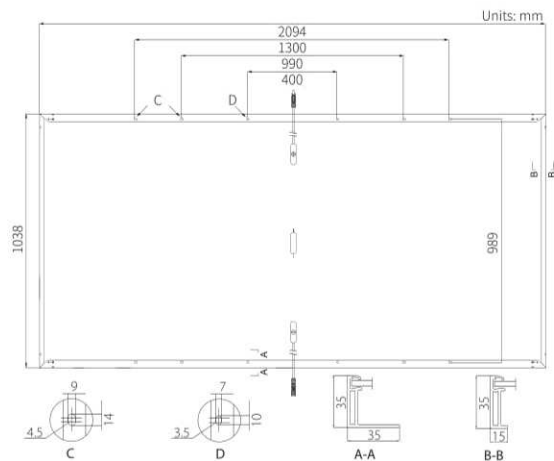
**HALF-CELL**  
Lower operating temperature

## Additional Value



## Mechanical Parameters

Cell Orientation	144 (6×24)
Junction Box	IP68, three diodes
Output Cable	4mm <sup>2</sup> , positive 400 / negative 200mm length can be customized
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight	23.3kg
Dimension	2094×1038×35mm
Packaging	30pcs per pallet / 150pcs per 20' GP / 660pcs per 40' HC



## Electrical Characteristics

STC : AM1.5 1000W/m<sup>2</sup> 25°C

Test uncertainty for Pmax: ±3%

	430	435	440	445	450	455	460
Power Class	430	435	440	445	450	455	460
Maximum Power (Pmax/W)	430	435	440	445	450	455	460
Open Circuit Voltage (Voc/V)	48.5	48.7	48.9	49.1	49.3	49.5	49.7
Short Circuit Current (Isc/A)	11.31	11.39	11.46	11.53	11.60	11.66	11.73
Voltage at Maximum Power (Vmp/V)	40.7	40.9	41.1	41.3	41.5	41.7	41.9
Current at Maximum Power (Imp/A)	10.57	10.64	10.71	10.78	10.85	10.92	10.98
Module Efficiency(%)	19.8	20.0	20.2	20.5	20.7	20.9	21.2

## Operating Parameters

Operational Temperature	-40°C ~ +85°C
Power Output Tolerance	0 ~ +5 W
Voc and Isc Tolerance	±3%
Maximum System Voltage	DC1500V (IEC/UL)
Maximum Series Fuse Rating	20A
Nominal Operating Cell Temperature	45±2°C
Protection Class	Class II
Fire Rating	UL type 1 or 2

## Mechanical Loading

Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

## Temperature Ratings (STC)

Temperature Coefficient of Isc	+0.048%/°C
Temperature Coefficient of Voc	-0.270%/°C
Temperature Coefficient of Pmax	-0.350%/°C

# ZXM6-NHLDD144 Series

Znshinesolar 9BB HALF-CELL Bifacial Light-Weight  
Double Glass Monocrystalline PERC PV Module



430W | 435W | 440W | 445W | 450W | 455W



## Excellent cells efficiency

9BB technology decreases the distance between bus bars and finger grid line which is benefit to power increase.



## Better Weak Illumination Response

More power output in weak light condition, such as haze, cloudy, and morning



## Anti PID

Limited power degradation caused by PID effect is guaranteed under strict testing condition for mass production



## High wind and snow resistance

■ 5400 Pa snow load      ■ 2400 Pa wind load



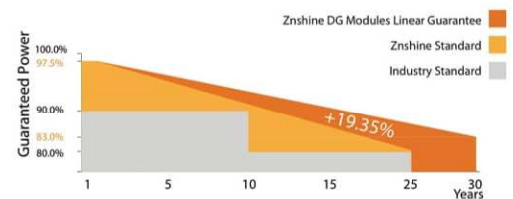
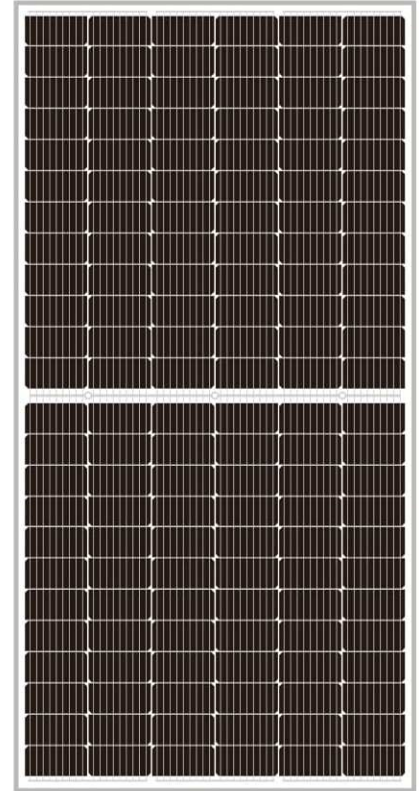
## 30 years power warranty

After 30 years our solar panel keeps at least 80% of its initial power output



## Bifacial technology

Enables additional energy harvesting from rear side(up to 25%)



★ 12 years product guarantee  
★ 30 years output guarantee

🕒 0.5% annual degradation  
over 30 years



Founded in 1988, ZnShine solar is a world's leading high-tech PV module manufacturer. With the state-of-the-art production lines, the company boasts module capacity of 6GW. Bloomberg has listed ZnShine as a global Tier 1 PV module maker. Today Znshine has distributed its sales to more than 60 countries around the globe.

**ELECTRICAL CHARACTERISTICS | STC\***

Nominal Power Watt Pmax(W)*	430	435	440	445	450	455
Power Output Tolerance Pmax(%)	0~+3	0~+3	0~+3	0~+3	0~+3	0~+3
Maximum Power Voltage Vmp(V)	41.30	41.50	41.70	41.90	42.10	42.30
Maximum Power Current Imp(A)	10.42	10.49	10.56	10.63	10.69	10.76
Open Circuit Voltage Voc(V)	49.70	49.90	50.10	50.30	50.50	50.70
Short Circuit Current Isc(A)	11.30	11.37	11.44	11.51	11.58	11.65
Module Efficiency (%)	19.78	20.01	20.24	20.47	20.70	20.93

\*STC (Standard Test Condition): Irradiance 1000W/m<sup>2</sup>, Module Temperature 25°C, AM 1.5  
 \*Measuring tolerance: ±3%

**ELECTRICAL CHARACTERISTICS | NMOT\***

Maximum Power Pmax(Wp)	322.60	326.30	329.90	333.60	337.10	340.80
Maximum Power Voltage Vmpp(V)	37.90	38.00	38.20	38.40	38.60	38.70
Maximum Power Current Impp(A)	8.52	8.58	8.63	8.69	8.74	8.80
Open Circuit Voltage Voc(V)	46.40	46.60	46.80	46.90	47.10	47.30
Short Circuit Current Isc(A)	9.13	9.18	9.24	9.30	9.35	9.41

\*NMOT(Nominal module operating temperature):Irradiance 800W/m<sup>2</sup>,Ambient Temperature 20°C,AM 1.5,Wind Speed 1m/s

**ELECTRICAL CHARACTERISTICS WITH 25% REAR SIDE POWER GAIN**

Front power Pmax/W	430	435	440	445	450	455
Total power Pmax/W	538	544	550	556	563	569
Vmp/V(Total)	41.40	41.60	41.80	42.00	42.20	42.40
Imp/A(Total)	13.00	13.08	13.16	13.24	13.33	13.41
Voc/V(Total)	49.80	50.00	50.20	50.40	50.60	50.80
Isc/A(Total)	13.65	13.73	13.81	13.89	14.44	14.52

**MECHANICAL DATA**

Solar cells	Mono PERC
Cells orientation	144 (6×24)
Module dimension	2094×1038×30 mm(With Frame)
Weight	28 kg
Glass	2.0 mm+2.0mm, High Transmission, AR Coated Heat Strengthened Glass
Junction box	IP 68, 3 diodes
Cables	4 mm <sup>2</sup> , 350 mm
Connectors	MC4-compatible

**TEMPERATURE RATINGS**

NMOT	44°C ±2°C	Maximum system voltage	1500 V DC
Temperature coefficient of Pmax	-0.36%/°C	Operating temperature	-40°C~+85°C
Temperature coefficient of Voc	-0.29%/°C	Maximum series fuse	25 A
Temperature coefficient of Isc	0.05%/°C	Maximum load(snow/wind)	5400 Pa / 2400 Pa

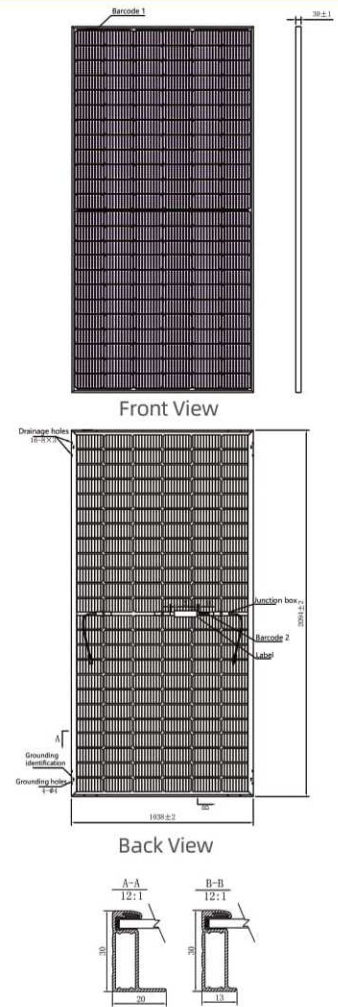
Refer.Bifacial Factor 70±5%

\*Do not connect Fuse in Combiner Box with two or more strings in parallel connection  
 \*Remark:Electrical data in this catalog do not refer to a single module and they are not part of the offer.They only serve for comparison among different module types.

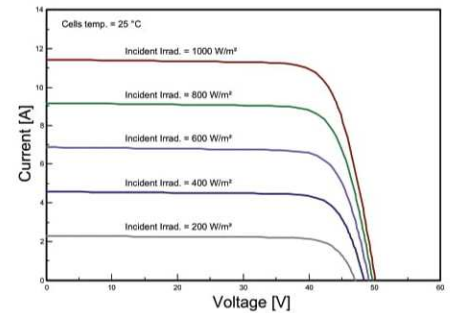
**PACKAGING CONFIGURATION**

Piece/Box	36
Piece/Container(40'HQ)	792
Piece/Container(with additional small package)	/

**DIMENSIONS(MM)**



**I-V CURVES OF PV MODULE(440W)**



**P-V CURVES OF PV MODULE(440W)**

