

**Panel Elegido**

# Tiger LM 72HC

## 435-455 Watt

### MONO-FACIAL MODULE

#### P-Type

Positive power tolerance of 0~+3%

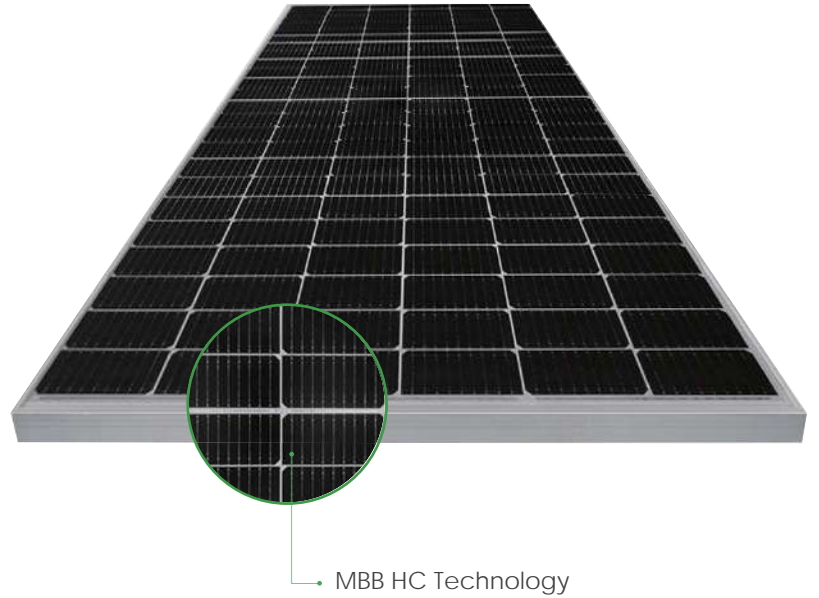
IEC61215(2016), IEC61730(2016)

ISO9001:2015: Quality Management System

ISO14001:2015: Environment Management System

ISO45001:2018

Occupational health and safety management systems



## Key Features



#### Multi Busbar Technology

Better light trapping and current collection to improve module power output and reliability.



#### Reduced Hot Spot Loss

Optimized electrical design and lower operating current for reduced hot spot loss and better temperature coefficient.



#### PID Resistance

Excellent Anti-PID performance guarantee via optimized mass-production process and materials control.



#### Enhanced Mechanical Load

Certified to withstand: wind load (2400 Pascal) and snow load (5400 Pascal).



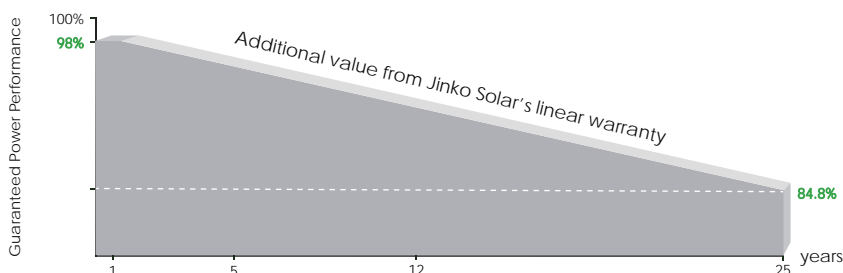
#### Durability Against Extreme Environmental Conditions

High salt mist and ammonia resistance.



POSITIVE QUALITY™  
Continuous Quality Assurance

## LINEAR PERFORMANCE WARRANTY

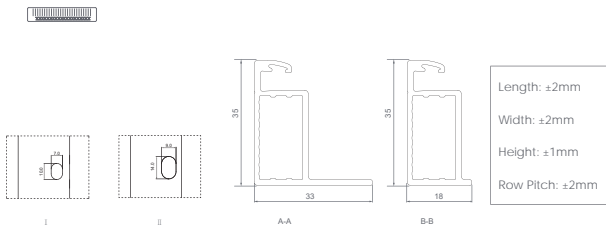
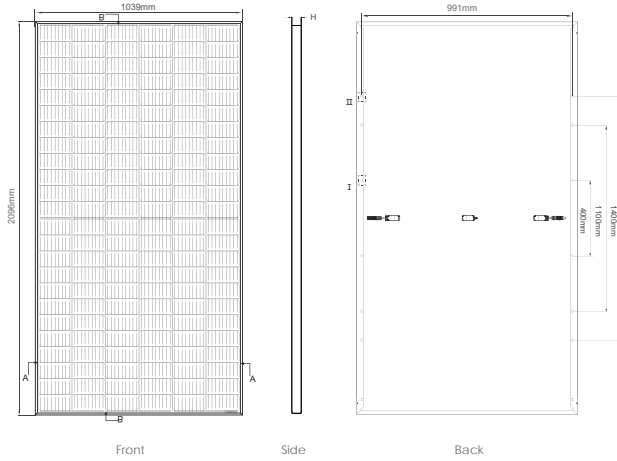


12 Year Product Warranty

25 Year Linear Power Warranty

0.55% Annual Degradation Over 25 years

## Engineering Drawings

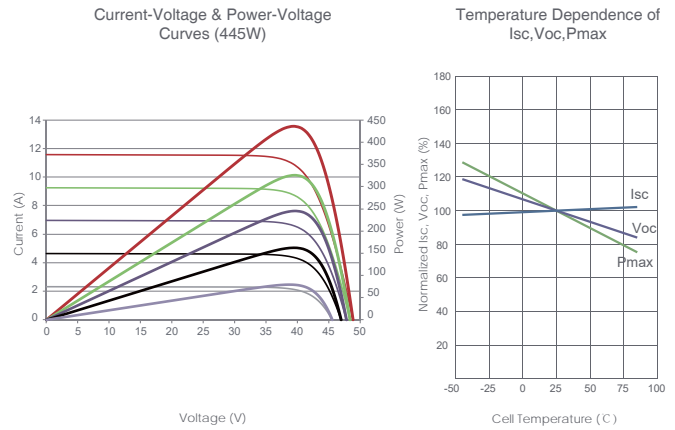


## Packaging Configuration

(Two pallets = One stack)

31pcs/pallets, 62pcs/stack, 682pcs/40'HQ Container

## Electrical Performance & Temperature Dependence



## Mechanical Characteristics

Cell Type	Mono PERC 166×166mm
No. of cells	144 (6×24)
Dimensions	2096×1039×35mm (82.52×40.91×1.38 inch)
Weight	25.1kg (55.34 lbs)
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm <sup>2</sup> (+): 290mm, (-): 145mm or Customized Length

## SPECIFICATIONS

Module Type	JKM435M-72HLM		JKM440M-72HLM		JKM445M-72HLM		JKM450M-72HLM		JKM455M-72HLM	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	435Wp	324Wp	440Wp	327Wp	445Wp	331Wp	450Wp	335Wp	455Wp	339Wp
Maximum Power Voltage (Vmp)	40.77V	37.76V	40.97V	37.89V	41.17V	38.10V	41.37V	38.31V	41.56V	38.47V
Maximum Power Current (Imp)	10.67A	8.57A	10.74A	8.64A	10.81A	8.69A	10.88A	8.74A	10.95A	8.80A
Open-circuit Voltage (Voc)	48.67V	45.84V	48.87V	46.03V	49.07V	46.22V	49.27V	46.41V	49.46V	46.59V
Short-circuit Current (Isc)	11.32A	9.14A	11.39A	9.20A	11.46A	9.26A	11.53A	9.31A	11.60A	9.37A
Module Efficiency STC (%)	19.97%		20.20%		20.43%		20.66%		20.89%	
Operating Temperature(°C)	-40 C ~ +85 C									
Maximum System Voltage	1000/1500VDC (IEC)									
Maximum Series Fuse Rating	20A									
Power Tolerance	0~+3%									
Temperature Coefficients of Pmax	-0.35%/C									
Temperature Coefficients of Voc	-0.29%/C									
Temperature Coefficients of Isc	0.048%/C									
Nominal Operating Cell Temperature (NOCT)	45±2 C									

\*STC: Irradiance 1000W/m<sup>2</sup> Cell Temperature 25°C AM=1.5  
 NOCT: Irradiance 800W/m<sup>2</sup> Ambient Temperature 20°C AM=1.5 Wind Speed 1m/s

# Paneles Comparados



\* Both 5BB and MBB modules will be supplied.

# HiKu

## SUPER HIGH POWER POLY PERC MODULE

### 395 W ~ 415 W

CS3W-395 | 400 | 405 | 410 | 415P

#### MORE POWER



24 % more power than conventional modules



Up to 4.5 % lower LCOE  
Up to 2.7 % lower system cost



Low NMOT:  $42 \pm 3$  °C  
Low temperature coefficient (Pmax):  
-0.37 % / °C



Better shading tolerance

#### MORE RELIABLE



Lower internal current,  
lower hot spot temperature



Cell crack risk limited in small region,  
enhance the module reliability



Heavy snow load up to 5400 Pa,  
wind load up to 3600 Pa



linear power output warranty



product warranty on materials  
and workmanship

#### MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001:2015 / Quality management system  
ISO 14001:2015 / Standards for environmental management system  
OHSAS 18001:2007 / International standards for occupational health & safety

#### PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730: VDE / CE / CEC AU  
IEC61701 ED2: VDE / IEC62716: VDE  
UL 1703: CSA  
Take-e-way

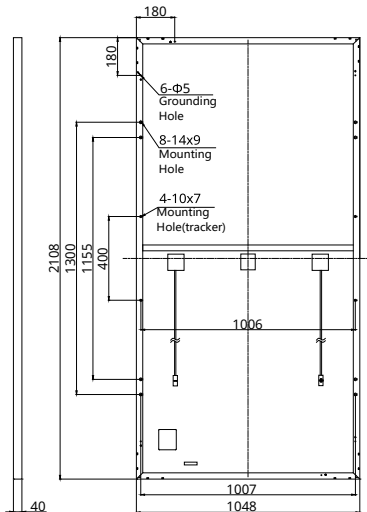


\* We can provide this product with special BOM specifically certified with salt mist, and ammonia tests. Please talk to our local technical sales representatives to get your customized solutions.

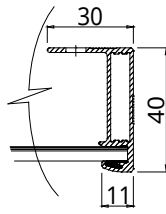
**CANADIAN SOLAR (USA), INC.** is committed to providing high quality solar products, solar system solutions and services to customers around the world. As a leading PV project developer and manufacturer of solar modules with over 30 GW deployed around the world since 2001, Canadian Solar Inc. ( NASDAQ: CSIQ) is one of the most bankable solar companies worldwide.

## ENGINEERING DRAWING (mm)

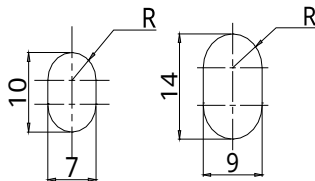
### Rear View



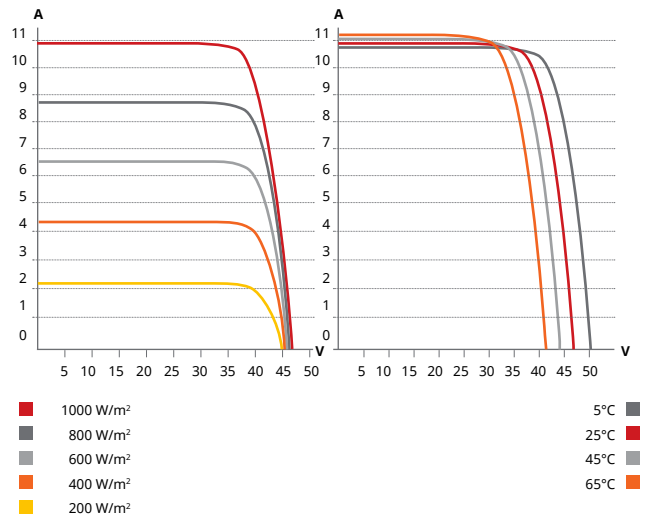
### Frame Cross Section A-A



### Mounting Hole



## CS3W-400P / I-V CURVES



## ELECTRICAL DATA | STC\*

CS3W	395P	400P	405P	410P	415P
Nominal Max. Power (Pmax)	395 W	400 W	405 W	410 W	415 W
Opt. Operating Voltage (Vmp)	38.5 V	38.7 V	38.9 V	39.1 V	39.3 V
Opt. Operating Current (Imp)	10.26 A	10.34 A	10.42 A	10.49 A	10.56 A
Open Circuit Voltage (Voc)	47.0 V	47.2 V	47.4 V	47.6 V	47.8 V
Short Circuit Current (Isc)	10.82 A	10.90 A	10.98 A	11.06 A	11.14 A
Module Efficiency	17.88%	18.11%	18.33%	18.56%	18.79%
Operating Temperature	-40°C ~ +85°C				
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)				
Module Fire Performance	TYPE 1 (UL 1703) or CLASS C (IEC 61730)				
Max. Series Fuse Rating	20 A				
Application Classification	Class A				
Power Tolerance	0 ~ + 5 W				

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C.

## ELECTRICAL DATA | NMOT\*

CS3W	395P	400P	405P	410P	415P
Nominal Max. Power (Pmax)	293 W	297 W	301 W	304 W	308 W
Opt. Operating Voltage (Vmp)	35.1 V	35.3 V	35.5 V	35.7 V	35.9 V
Opt. Operating Current (Imp)	8.35 A	8.42 A	8.48 A	8.52 A	8.58 A
Open Circuit Voltage (Voc)	44.0 V	44.2 V	44.4 V	44.6 V	44.8 V
Short Circuit Current (Isc)	8.72 A	8.78 A	8.85 A	8.90 A	8.97 A

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m<sup>2</sup> spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

\* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. Canadian Solar Inc. reserves the right to make necessary adjustment to the information described herein at any time without further notice.

Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

## MECHANICAL DATA

Specification	Data
Cell Type	Poly-crystalline
Cell Arrangement	144 [2 X (12 X 6)]
Dimensions	2108 X 1048 X 40 mm (83.0 X 41.3 X 1.57 in)
Weight	24.9 kg (54.9 lbs)
Front Cover	3.2 mm tempered glass
Frame	Anodized aluminium alloy, crossbar enhanced
J-Box	IP68, 3 bypass diodes
Cable	4 mm <sup>2</sup> (IEC), 12 AWG (UL)
Cable Length (Including Connector)	Portrait: 500 mm (19.7 in) (+) / 350 mm (13.8 in) (-); landscape: 1400 mm (55.1 in); leap-frog connection: 1670 mm (65.7 in)*
Connector	T4 series
Per Pallet	27 pieces
Per Container (40' HQ)	594 pieces

\* For detailed information, please contact your local Canadian Solar sales and technical representatives.

## TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.37 % / °C
Temperature Coefficient (Voc)	-0.29 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

## PARTNER SECTION



# ZXM6-NH156 Series

Znshinesolar 9BB **HALF-CELL** Mono PV Module

**Mono** Poly Solutions

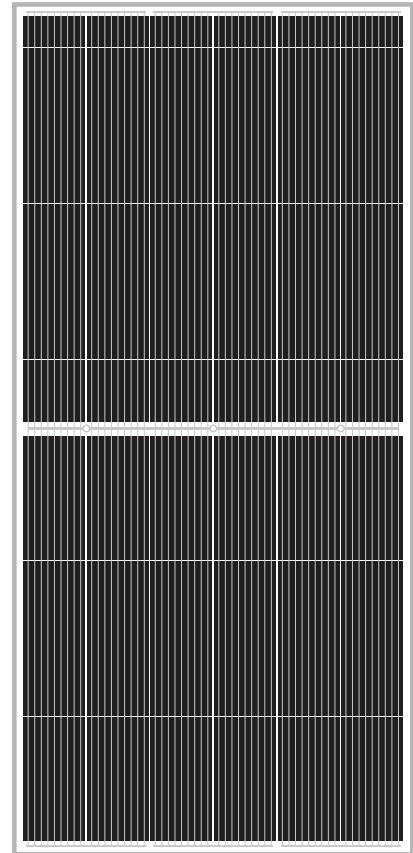
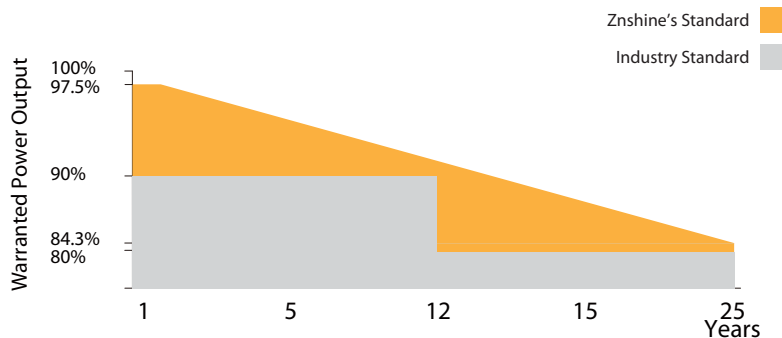
420W | 425W | 430W | 435W | 440W | 445W

Made with selected materials and components to grant quality, duration, efficiency and through outputs, the ZXM6-NH156 monocrystalline modules by ZNSHINE SOLAR represent a highly flexible solution for diverse installation types, from industrial rooftop plants to small home PV systems or large ground surfaces. This allows you to produce clean energy while reducing your energy bill.

ZNSHINE SOLAR' S ZXM6-NH156 monocrystalline solar modules are tested and approved by international acknowledged laboratories, so that we can offer our customers a reliable and price-quality optimized product. The linear warranty on product outputs further ensures increased security and return on investments over time.

**12 years product warranty/25 years output warranty**

**0.55% Annual Degradation over 25 years**



### More power output

Module RS decreases, FF (fill factor) increases, power gain is stable above 1.5%, and can be increased by 5~10W



### High Efficiency

Graphene coating can increase about 2W of the module efficiency by rising around 0.5% of the light transmission



### Anti PID

Limited power degradation of ZXM6-NH156 module caused by PID effect is guaranteed under strict testing condition for mass production



### Better Weak Illumination Response

Lower temperature coefficient and wide spectral response, higher power output, even under low-light settings



### Easy to install

The module is very light in weight so the installation is easier and transport costs are lower



### Graphene Coating

Graphene coating modules can increase power generation and self-cleaning, also can save maintenance cost



ZNShine PV-Tech Co., LTD, founded in 1988, is a world-leading high-performance PV module manufacturer, PV power station developer, EPC and power station operator. With its state-of-the-art production lines, the company boasts module output of 5GW. Bloomberg has listed ZNShine as a global Tier 1 PV manufacturer and Top 4 reliable PV supplier.

ELECTRICAL PROPERTIES | STC\*

Module Type	ZXM6-NH156 -420/M	ZXM6-NH156 -425/M	ZXM6-NH156 -430/M	ZXM6-NH156 -435/M	ZXM6-NH156 -440/M	ZXM6-NH156 -445/M
Nominal Power Watt Pmax(W)	420	425	430	435	440	445
Power Output Tolerance Pmax(%)	0~+3	0~+3	0~+3	0~+3	0~+3	0~+3
Maximum Power Voltage Vmp(V)	44.2	44.5	44.8	45.1	45.4	45.7
Maximum Power Current Imp(A)	9.51	9.56	9.60	9.65	9.70	9.74
Open Circuit Voltage Voc(V)	53.0	53.3	53.6	53.9	54.2	54.5
Short Circuit Current Isc(A)	10.06	10.10	10.14	10.18	10.22	10.27
Module Efficiency (%)	19.21	19.44	19.67	19.90	20.12	20.35

\*STC (Standard Test Condition): Irradiance 1000W/m<sup>2</sup>, Module Temperature 25°C, AM 1.5  
 \*The data above is for reference only and the actual data is in accordance with the practical testing

ELECTRICAL PROPERTIES | NMOT\*

Maximum Power Pmax(Wp)	312.6	316.2	319.6	323.4	327.1	330.6
Maximum Power Voltage Vmpp(V)	40.9	41.2	41.5	41.8	42.1	42.3
Maximum Power Current Impp(A)	7.64	7.67	7.70	7.74	7.77	7.82
Open Circuit Voltage Voc(V)	49.3	49.6	49.9	50.1	50.4	50.7
Short Circuit Current Isc(A)	8.12	8.16	8.19	8.22	8.25	8.30

\*NMOT(Nominal module operating temperature):Irradiance 800W/m<sup>2</sup>,Ambient Temperature 20°C,AM 1.5,Wind Speed 1m/s  
 \*The data above is for reference only and the actual data is in accordance with the practical testing

TEMPERATURE RATINGS

NMOT	44°C ±3°C
Temperature coefficient of Pmax	-0.36%/°C
Temperature coefficient of Voc	-0.29%/°C
Temperature coefficient of Isc	0.05%/°C

\*Do not connect Fuse in Combiner Box with two or more strings in parallel connection

WORKING CONDITIONS

Maximum system voltage	1500 V DC
Operating temperature	-40°C~+85°C
Maximum series fuse	20 A
Maximum load(snow/wind)	5400 Pa / 2400 Pa

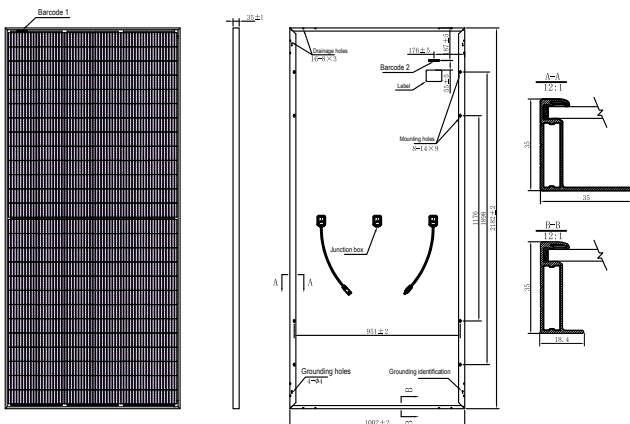
MECHANICAL DATA

Solar cells	Mono 158.75*79.375mm
Cells orientation	156 (6×26)
Module dimension	2182×1002×35 mm
Weight	24 kg
Glass	3.2mm heat strengthened glass
Junction box	IP 68, 3 diodes
Cables	4 mm <sup>2</sup> ,350 mm
Connectors	MC4-compatible

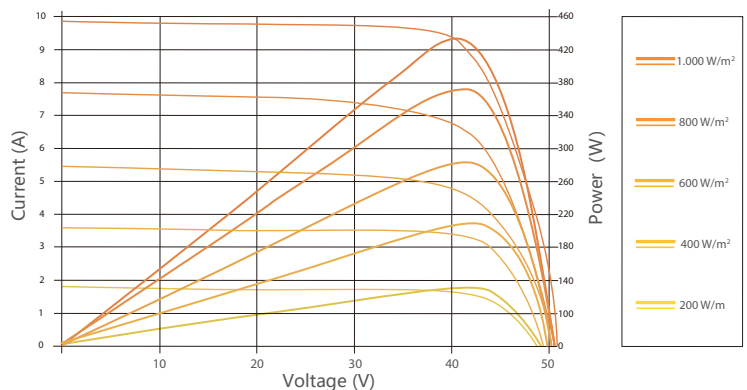
PACKAGING INFORMATION

Packing Type	40' HQ
Piece/Box	30
Piece/Container	650/700

DIMENSION OF THE PV MODULE (mm)



I-V CURVES OF THE PV MODULE





# ZXM7-SP144 Series

Znshinesolar 10BB HALF-CELL  
Monocrystalline PERC PV Module



520W | 525W | 530W | 535W | 540W



## Excellent cells efficiency

MBB 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



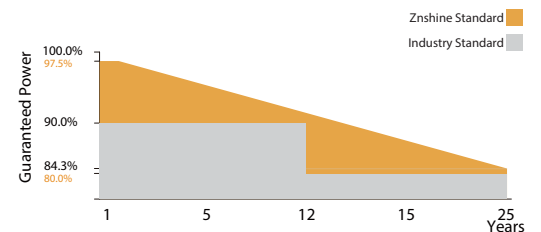
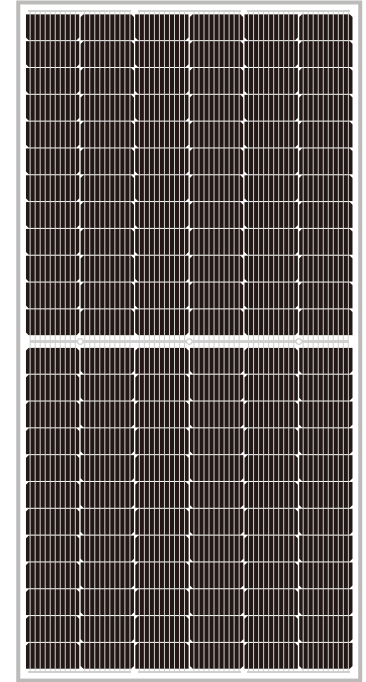
## 25 years power warranty

After 25years our solar panel keeps at least 80% of its initial power output



## Higher lifetime Power Yield

2.5% first year degradation, 0.55% linear degradation



12 years product warranty  
25 years output warranty



0.55% Annual Degradation  
over 25 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)*	520	525	530	535	540
Power Output Tolerance Pmax(%)	0~+3	0~+3	0~+3	0~+3	0~+3
Maximum Power Voltage Vmp(V)	40.60	40.80	41.00	41.20	41.40
Maximum Power Current Imp(A)	12.82	12.88	12.94	13.00	13.05
Open Circuit Voltage Voc(V)	48.90	49.10	49.30	49.50	49.70
Short Circuit Current Isc(A)	13.54	13.60	13.66	13.72	13.78
Module Efficiency (%)	20.34	20.54	20.74	20.93	21.13

\*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)	388.90	392.60	396.30	400.00	403.50
Maximum Power Voltage Vmpp(V)	37.80	38.00	38.20	38.30	38.50
Maximum Power Current Imp(A)	10.29	10.34	10.39	10.43	10.48
Open Circuit Voltage Voc(V)	45.70	45.90	46.10	46.20	46.40
Short Circuit Current Isc(A)	10.93	10.98	11.03	11.08	11.13

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

**MECHANICAL DATA**

Solar cells	Mono PERC
Cells orientation	144 (6×24)
Module dimension	2256×1133×40 mm(With Frame)
Weight	28.5 kg
Glass	3.2mm, High Transmission, AR Coated Tempered Glass
Junction box	IP 68, 3 diodes
Cables	4 mm <sup>2</sup> ,350 mm
Connectors	MC4-compatible

**TEMPERATURE RATINGS**

**WORKING CONDITIONS**

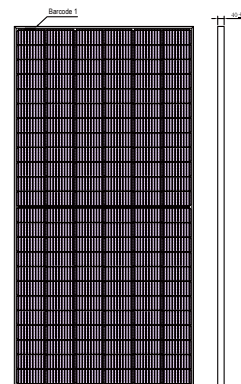
NMOT	44°C ±2°C	Maximum system voltage	1500 V DC
Temperature coefficient of Pmax	-0.35%/°C	Operating temperature	-40°C~+85°C
Temperature coefficient of Voc	-0.29%/°C	Maximum series fuse	25 A
Temperature coefficient of Isc	0.05%/°C	Maximum load(snow/wind)	5400 Pa / 2400 Pa

\*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.

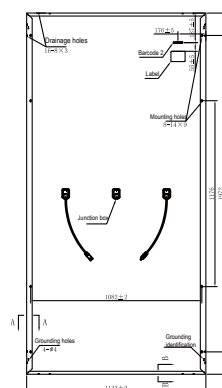
**PACKAGING CONFIGURATION**

Piece/Box	27
Piece/Container <sub>(40'HQ)</sub>	540
Piece/Container <sub>(with additional small package)</sub>	/

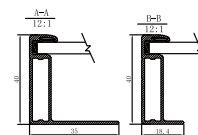
**DIMENSIONS(MM)**



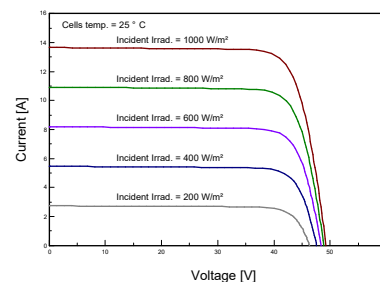
Front View



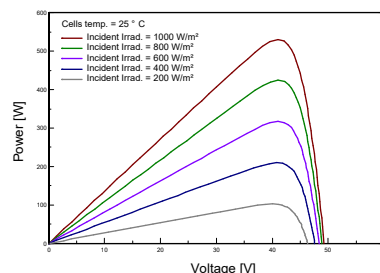
Back View



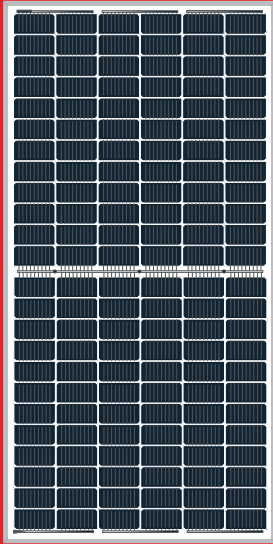
**I-V CURVES OF PV MODULE(530W)**



**P-V CURVES OF PV MODULE(530W)**



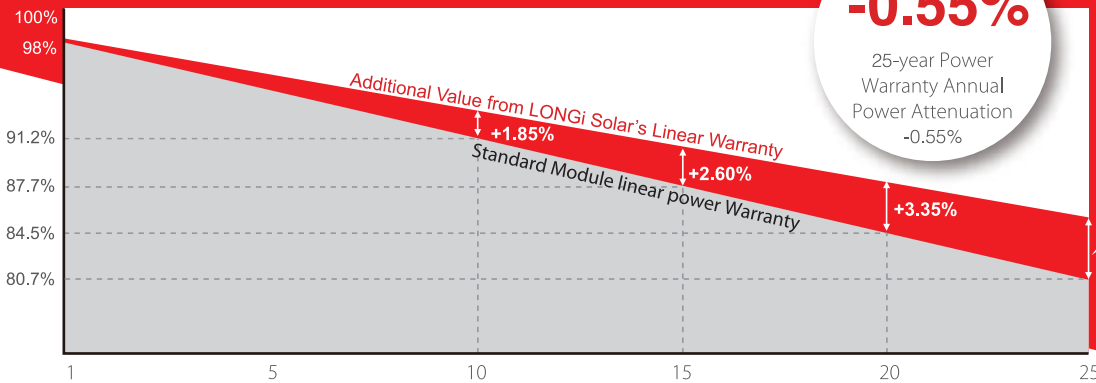
# LR4-72HPH 425~455M



**High Efficiency  
Low LID Mono PERC with  
Half-cut Technology**

\*Both 6BB & 9BB are available

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



**-0.55%**

25-year Power  
Warranty Annual  
Power Attenuation  
-0.55%

**+4.10%**

## 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



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

**Positive power tolerance** (0 ~ +5W) guaranteed

**High module conversion efficiency** (up to 20.9%)

**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

# LONGi

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China  
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

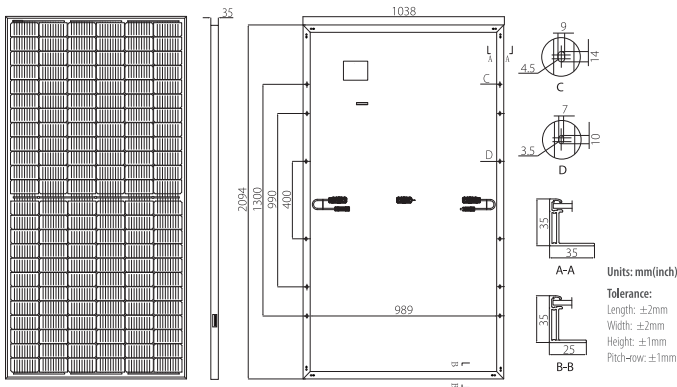
Note: Due to continuous technical innovation, R&D and improvement, technical data above mentioned may be of modification accordingly. LONGi have the sole right to make such modification at anytime without further notice; Demanding party shall request for the latest datasheet for such as contract need, and make it a consisting and binding part of lawful documentation duly signed by both parties.

\* These Modules are not offered, distributed or supplied to Germany by the LONGi Group.  
LONGi Solar Technologie GmbH does not offer, distribute or supply those Modules in Germany or any other country.

20200401V11

# LR4-72HPH 425~455M

## Design (mm)



## Mechanical Parameters

Cell Orientation: 144 (6×24)  
Junction Box: IP68, three diodes  
Output Cable: 4mm<sup>2</sup>, 300mm in length,  
length can be customized  
Glass: Single glass  
3.2mm coated tempered glass  
Frame: Anodized aluminum alloy frame  
Weight: 23.5kg  
Dimension: 2094×1038×35mm  
Packaging: 30pcs per pallet  
150pcs per 20'GP  
660pcs per 40'HC

## 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  
Safety Class: Class II  
Fire Rating: UL type 1 or 2

## Electrical Characteristics

Test uncertainty for Pmax: ±3%

Model Number	LR4-72HPH-425M		LR4-72HPH-430M		LR4-72HPH-435M		LR4-72HPH-440M		LR4-72HPH-445M		LR4-72HPH-450M		LR4-72HPH-455M	
Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax/W)	425	317.4	430	321.1	435	324.9	440	328.6	445	332.3	450	336.1	455	339.8
Open Circuit Voltage (Voc/V)	48.3	45.3	48.5	45.5	48.7	45.7	48.9	45.8	49.1	46.0	49.3	46.2	49.5	46.4
Short Circuit Current (Isc/A)	11.23	9.08	11.31	9.15	11.39	9.21	11.46	9.27	11.53	9.33	11.60	9.38	11.66	9.43
Voltage at Maximum Power (Vmp/V)	40.5	37.7	40.7	37.9	40.9	38.1	41.1	38.3	41.3	38.5	41.5	38.6	41.7	38.8
Current at Maximum Power (Imp/A)	10.50	8.42	10.57	8.47	10.64	8.53	10.71	8.59	10.78	8.64	10.85	8.70	10.92	8.75
Module Efficiency(%)	19.6		19.8		20.0		20.2		20.5		20.7		20.9	

STC (Standard Testing Conditions): Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25 C, Spectra at AM1.5

NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20 C, Spectra at AM1.5, Wind at 1m/s

## Temperature Ratings (STC)

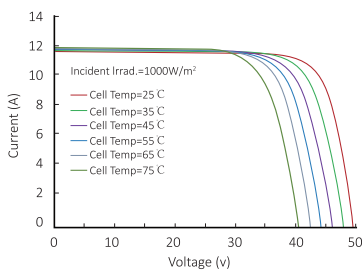
Temperature Coefficient of Isc	+0.048%/C
Temperature Coefficient of Voc	-0.270%/C
Temperature Coefficient of Pmax	-0.350%/C

## Mechanical Loading

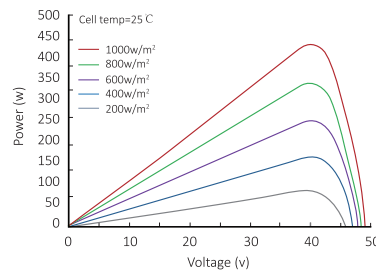
Front Side Maximum Static Loading	5400Pa
Rear Side Maximum Static Loading	2400Pa
Hailstone Test	25mm Hailstone at the speed of 23m/s

## I-V Curve

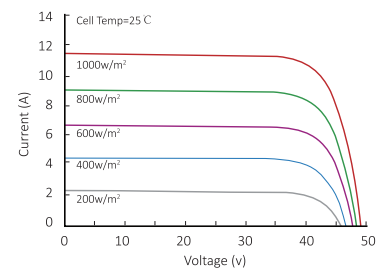
Current-Voltage Curve (LR4-72HPH-440M)



Power-Voltage Curve (LR4-72HPH-440M)



Current-Voltage Curve (LR4-72HPH-440M)



# LONGi

Room 801, Tower 3, Lujiazui Financial Plaza, No.826 Century Avenue, Pudong Shanghai, 200120, China  
Tel: +86-21-80162606 E-mail: module@longi-silicon.com Facebook: www.facebook.com/LONGi Solar

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