



**panda 3.0 Mini 2**

**465W**

MAXIMUM MODULE EFFICIENCY

**23.3%**

POSITIVE POWER TOLERANCE

**0~+5<sub>w</sub>**



N-type TOPCon Bifacial Module

**IMPROVED POWER  
NEVER SETTLE FOR LESS**

- Backside Yield
- Wide Applications
- Superior Yield
- Outstanding Bifaciality
- Excellent Durability



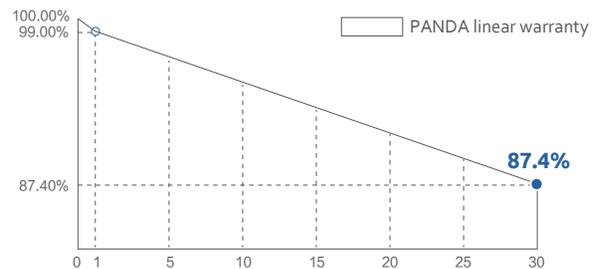
Yingli Solar Website

**QUALIFICATIONS & CERTIFICATES**

- IEC 61215, IEC 61730, CE
- ISO 9001: Quality management systems
- ISO 14001: Environmental management systems
- IEC 62941: Quality system for PV module manufacturing
- ISO 45001: Occupational health and safety management systems

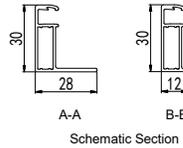
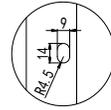
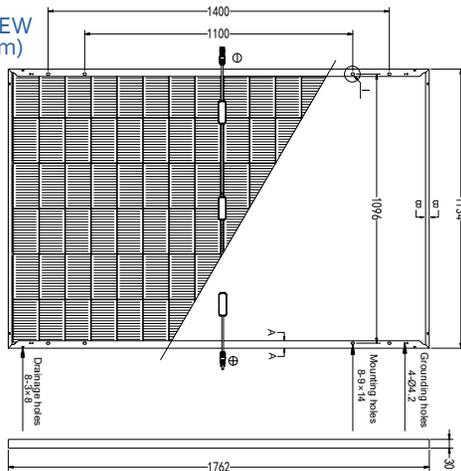


Warranty partner

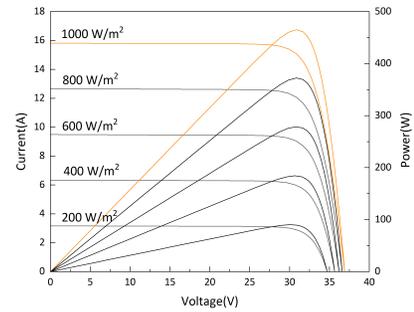


**1.00%** the 1st year power degradation  
**0.40%** annual power degradation

BACK VIEW  
(units:mm)



### I-V / P-V CURVES



Warning: Read the Installation and User Manual in its entirety before handling, installing and operating Yingli Solar modules.

### Electrical Parameters at Standard Test Conditions (STC)

Module type	YLxxxCF48 i/2 (xxx=Pmax)					
Power output*·Pmax (W)	440	445	450	455	460	465
Power output tolerances-ΔPmax (W)	0 / + 5					
Module efficiency-η <sub>m</sub> (%)	22.0	22.3	22.5	22.8	23.0	23.3
Voltage at Pmax - V <sub>mpp</sub> (V)	29.68	29.91	30.14	30.37	30.60	30.83
Current at Pmax-I <sub>mpp</sub> (A)	14.83	14.88	14.94	14.99	15.04	15.09
Open-circuit voltage*·V <sub>oc</sub> (V)	35.84	36.05	36.26	36.47	36.68	36.89
Short-circuit current*·I <sub>sc</sub> (A)	15.52	15.58	15.64	15.70	15.76	15.82

STC: 1000 W·m<sup>-2</sup> irradiance, 25°C cell temperature, AM 1.5. \*Measruing tolerance: ± 3%.

### Electrical Parameters at Nominal Operating Cell Temperature (NOCT)

Power output·Pmax (W)	335	338	342	346	350	354
Voltage at Pmax - V <sub>mpp</sub> (V)	28.31	28.53	28.75	28.97	29.19	29.41
Current at Pmax-I <sub>mpp</sub> (A)	11.82	11.86	11.91	11.95	11.99	12.03
Open-circuit voltage·V <sub>oc</sub> (V)	34.03	34.23	34.43	34.63	34.83	35.03
Short-circuit current·I <sub>sc</sub> (A)	12.50	12.55	12.60	12.65	12.70	12.75

NOCT: open-circuit module operation temperature at 800 W·m<sup>-2</sup> irradiance, 20°C ambient temperature, 1 m · s<sup>-1</sup> wind speed.

### Bifacial Electrical Parameters at Standard Test Conditions(BNPI)

Power output·Pmax (W)	488	493	499	504	510	515
Voltage at Pmax - V <sub>mpp</sub> (V)	29.68	29.91	30.14	30.37	30.60	30.83
Current at Pmax-I <sub>mpp</sub> (A)	16.43	16.49	16.55	16.61	16.66	16.72
Open-circuit voltage·V <sub>oc</sub> (V)	35.84	36.05	36.26	36.47	36.68	36.89
Short-circuit current·I <sub>sc</sub> (A)	17.20	17.26	17.33	17.40	17.46	17.53

BNPI: 1000W·m<sup>-2</sup> on the front side and 135 W·m<sup>-2</sup> on the back side , 25°C cell temperature, AM 1.5.  
Bifaciality coefficient is 80% ± 5%.

### Thermal Characteristics

Nominal operating cell temperature-NOCT(°C)	42 ± 2
Temperature coefficient of Pmax-γ (% / °C)	- 0.29
Temperature coefficient of V <sub>oc</sub> -β (% / °C)	- 0.24
Temperature coefficient of I <sub>sc</sub> -α (% / °C)	0.042

### Packaging Specifications

Number of modules per pallet	37
Number of pallets per 40' container	26
Packaging box dimensions (L / W / H)	1790 mm / 1140 mm / 1250 mm
Box weight	820 kg

### Construction Materials

Cell (material / quantity)	n-type monocrystalline silicon / 6 x 16
Glass (thickness)	1.6 mm / 1.6 mm
Frame (material)	anodized aluminum alloy
Junction box (type / protection degree)	3 bypass diodes / ≥ IP68
Cable (length / cross-sectional area)	± 1200 mm / 4 mm <sup>2</sup>

•Due to continuous innovation, research and product improvement, the specifications in this product information sheet are subject to change without prior notice.  
The specifications may deviate slightly and are not guaranteed.  
•The data do not refer to a single module and they are not part of the offer, they only serve for comparison to different module types.

### Operating Conditions

Max. system voltage	1500 V <sub>dc</sub>
Max. series fuse rating*	30 A
Operating temperature range	- 40°C~ 85°C
Max. static load, front (e.g., snow)	5400 Pa
Max. static load, back (e.g., wind)	2400 Pa
Max. hailstone impact (diameter / velocity)	25 mm / 23 m·s <sup>-1</sup>

\*Do not connect fuse in combiner box with two or more strings in parallel connection.

### General Characteristics

Dimensions (L / W / H)	1762 mm / 1134 mm / 30 mm
Weight	21.0 kg



Yingli Solar Website