



T5 Pro Residential Solar Panel

N-type Monofacial

Double Glass Module

HSM-HHK-NM465~470

470W

Maximum Power Output

Up to 23.5% efficiency



One-third cut,
shingled cell design



Ammonia
corrosion certified*



Framed
glass-glass



Salt mist
corrosion certified*

High energy yield

Excellent thermal resistance and
temperature coefficient

Outstanding power generation performance

High lifetime energy production

The shingled-cell design helps to keep
cell temperatures low to produce
more power over time

Aesthetic experience

Full black module for uniform rooftop integration

Comprehensive warranty coverage

25-year Product warranty

30-year Linear power coverage

99.0% minimum warranted output at Year 1

Maximum annual degradation 0.35%



Comprehensive Products and System Certificates



IEC 61215 / IEC 61730 ISO 9001:2015 ISO 45001:2018 ISO 14001:2015

Learn more about TCL Solar panels
www.tclsolar.com/resources

Made in China
TCL Zhonghuan Energy Technology (Jiangsu) Co., Ltd.
*Certification currently in progress

Measurement Tolerance: Pmax (W) $\pm 3\%$; Voc (V) $\pm 3\%$; Isc (A) $\pm 4\%$ * STC: Irradiance 1000W/m², Cell Temperature 25°C, AM1.5

Electrical Parameters (STC*)

Maximum Power	Pmax (W)	465	470
Open Circuit Voltage	Voc (V)	54.19	54.59
Short Circuit Current	Isc (A)	10.87	10.91
Maximum Power Voltage	Vmp (V)	45.70	46.10
Maximum Power Current	Imp (A)	10.18	10.20
Module Efficiency	(%)	23.3	23.5

Temperature Coefficient

Nominal Module Operating Temperature* $42 \pm 2^\circ\text{C}$ *NMOT: Irradiance 800W/m², Ambient Temperature 20°C, Wind Speed 1m/sTemperature Coefficient of Isc $+0.05\%/^\circ\text{C}$ Temperature Coefficient of Voc $-0.22\%/^\circ\text{C}$ Temperature Coefficient of Pmax $-0.26\%/^\circ\text{C}$

Operating Parameters

Testing Temperature $-40 \sim +85^\circ\text{C}$ Operation Temperature -40°C to $+70^\circ\text{C}$ (IEC TS 63126)

Maximum System Voltage 1500V DC

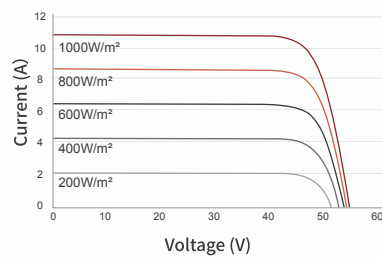
Maximum Series Fuse Rating 30A

Safety Protection Class II

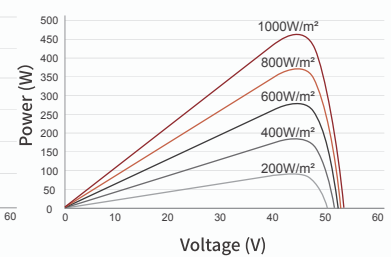
Fire Rating Class C

Curve Graph

I-V Curves (465W)



P-V Curves (465W)



Engineering Drawing

[Unit: mm]

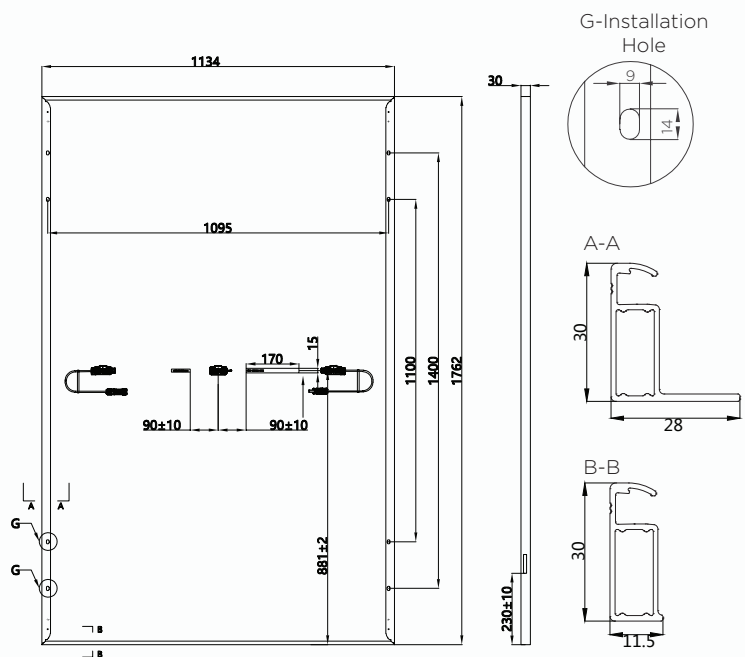
Mechanical Data

* Please refer to installation manual for details

No. of Cells	144pcs (6x24)
Dimension	1762 × 1134 × 30 mm
Weight	24.5kg $\pm 3\%$
Front Glass	2.0mm, Heat Strengthened, AR coating Glass
Back Glass	2.0mm, Heat Strengthened Glass
Frame	Black Anodized Aluminium Alloy
J-Box	IP68, 3 bypass diodes
Cables	4.0mm ² , +1200mm, -1200mm (can be customized)
Maximum Static Load	Front: 5400Pa/Back: 2400Pa*
Connectors	Stäubli MC4-EVO2A

Packaging Configuration

Modules per Pallet	36pcs
Modules per 40'HQ Container	936pcs
Pallets per 40'HQ Container	26pcs

Please read the safety and installation instructions. Visit www.tclsolar.com/resources1 Tier1 BloombergNEF based on <https://taiyangnews.info/topmodules/top-solarmodules-listing-january-2026>.2 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.3 Measurement tolerance is Pmax $\pm 3\%$, Voc $\pm 3\%$, Isc $\pm 4\%$

4 Test load as per IEC 61215-2 is equal to design load with safety factor = 1.5. See "Safety and Installation Instructions" for details.