



TCL Solar Panels

HSM-ND48-DR - 430-450 W

- N-type bifacial double glass module with advanced TOPCon technology for higher efficiency
- Glass on glass design for enhanced durability and long-term performance
- High power output with up to 450W for maximum energy yield
- Maximum efficiency of up to 22.5% for strong overall performance
- Full black module for a clean, uniform rooftop appearance and improved aesthetic integration
- Reliable and convenient to install with high-strength frame and heat strengthened glass
- Excellent thermal resistance and temperature performance for improved energy generation
- 25 year product warranty and 30 year linear performance warranty for long-term reliability

TCL Solar HSM-ND48-DR - 430-450 W

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EFFICIENCY: Up to 22.5%

Electrical Data, Front STC Characteristics ¹					
	HSM-ND48-DR450	HSM-ND48-DR445	HSM-ND48-DR440	HSM-ND48-DR435	HSM-ND48-DR430
Nominal Power (P _{nom}) ²	450 W	445 W	440 W	435 W	430 W
Power Binning	3/0%	3/0%	3/0%	3/0%	3/0%
Panel Efficiency	22.5%	22.3%	22.0%	21.8%	21.5%
Rated Voltage (V _{mpp})	30.13 V	29.93 V	29.74 V	29.54 V	29.34 V
Rated Current (I _{mpp})	14.94 A	14.87 A	14.80 A	14.73 A	14.66 A
Open-Circuit Voltage	35.56 V	35.36 V	35.16 V	34.96 V	34.76 V
(V _{oc}) ² Short-Circuit Current (I _{sc}) ²	16.06 A	15.99 A	15.92 A	15.85 A	15.78 A
BNPI Data ³					
Nominal Power (P _{max}) ²	493 W	488 W	482 W	477 W	471 W
Open-Circuit Voltage	35.80 V	35.61 V	35.39 V	35.21 V	34.98 V
(V _{oc}) ² Short-Circuit Current (I _{sc}) ²	17.48 A	17.42 A	17.33 A	17.26 A	17.18 A
Bifacial Gain ⁴					
P _{max} with 5% Bifacial Gain	473 W	467 W	462 W	457 W	452 W
I _{sc} with 5% Bifacial Gain	16.86 A	16.79 A	16.72 A	16.64 A	16.57 A
P _{max} with 10% Bifacial	495 W	490 W	484 W	479 W	473 W
Gain I _{sc} with 10% Bifacial	17.67 A	17.59 A	17.51 A	17.44 A	17.36 A

Electrical Data	
Bifaciality (φ _{Pmax} /φ _{Isc})	80% +/-5%
Bifaciality (φ _{Voc})	98% +/-2%
Maximum System Voltage	1500 V IEC
Testing Temperature	-40°C to +85°C
Operation Temperature	-40°C to +70°C (IEC TS 63126)
Maximum Series Fuse	30 A
Power Temp. Coef.	-0.29% / °C
Voltage Temp. Coef.	-0.25% / °C
Current Temp. Coef.	0.045% / °C

Mechanical Data	
Solar Cells	N-Type TOPCon
Glass	2.0 mm + 2.0 mm, high transmission heat strengthened glass, AR coating on front glass
Junction Box	IP-68, 3 bypass diodes
Connector	Stäubli MC4-EVO2
Weight	24.5 kg
Max. Load ⁵	Wind: 2400 Pa, 245 kg/m ² front & back Snow: 5400 Pa, 550 kg/m ² front
Impact Resistance	25 mm diameter hail at 23 m/s
Frame	Black Anodized Aluminum Alloy

Packaging Configuration	
Number of modules per pallet	36
Number of pallets per 40ft HQ container	26
Number of modules per container	936

Tests And Certifications	
Standard Tests	IEC61215, IEC 61730
Fire Rating	Class A (IEC 61730-2 / UL 790)
Protection Class	Class II (IEC 61140)
Quality Certs	ISO 9001:2015, ISO 14001:2015
EHS Compliance	ISO 45001-2018, Recycling Scheme

