THORNOVA solar

Tangra™ S Pro HD C

435-450W

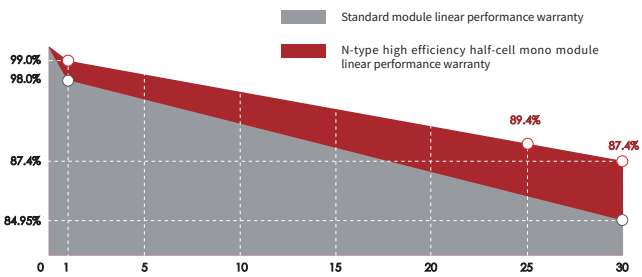
Composite Frame

N-Type High efficiency Bifacial Dual Glass Module

*Frame: Multiple colors available

- Bifacial technology enables additional energy harvesting from rear side (up to 30%)
- 30-year lifespan delivers 10-30% more power compared with conventional P-type modules
- The natural lack of LID in the N-type solar cell can increase power generation
- Excellent low irradiance performance
- Better light trapping and current collection to improve module power output and reliability
- Industry-leading, lowest thermal coefficient
- Optimized electrical design and lower operating current for reduced hot spot loss and better temperature
- Certified to withstand 2400 Pa of wind load and 5400 Pa of snow load
- 100% triple EL test, which greatly reduces the hidden cracks rate

LINEAR PERFORMANCE WARRANTY



15 years
Product quality & process guarantee

30 years
Linear power guarantee

0.40 %
Annual degradation

WARRANTY INSURANCE

Ariel Re · LLOYD'S Underwriters · Warranty partner Munich RE · 中国平安 PING AN P & C INSURANCE CO CN SZN

* Optional performance warranty insurance. Please contact our local sales staff for more information.

COMPREHENSIVE CERTIFICATES

TÜV NORD · CE · INMETRO

ISO 9001: Quality Management System

ISO 14001: Environmental Management System Standard

ISO 45001: International Occupational Health and Safety Assessment System Standard

SA8000: 2014 Social Accountability Management System

* Different markets have different certification requirements. Also, the products are under rapid innovation. Please confirm the certification status with regional sales representatives.

ELECTRICAL CHARACTERISTICS

96 cells

Model of modules	TS-BGT48(435)-G11		TS-BGT48(440)-G11		TS-BGT48(445)-G11		TS-BGT48(450)-G11	
	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Maximum power — P_{mp} (W)	435	327	440	331	445	335	450	338
Open-circuit voltage — V_{oc} (V)	34.49	32.77	34.67	32.94	34.85	33.11	35.03	33.28
Short-circuit current — I_{sc} (A)	15.90	12.84	15.95	12.88	16.00	12.92	16.05	12.96
Maximum power voltage — V_{mp} (V)	29.54	27.51	29.72	27.68	29.90	27.88	30.08	27.96
Maximum power current — I_{mp} (A)	14.73	11.89	14.81	11.96	14.89	12.02	14.97	12.09
Module efficiency — η_m (%)	21.8		22.0		22.3		22.5	

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25 ℃, Spectra at AM1.5
NMOT (Nominal Module Operating Temperature): Irradiance 800W/m², Ambient Temperature 20℃, Spectra at AM1.5, Wind at 1m/s

ELECTRICAL CHARACTERISTICS WITH DIFFERENT POWER BIN (REFERENCE TO 13.5% IRRADIANCE RATIO)

Peak Power (P_{max}) (W)	482	488	493	499
Open Circuit Voltage (V_{oc}) (V)	34.49	34.67	34.85	35.03
Short Circuit Current (I_{sc}) (A)	17.62	17.67	17.73	17.78
MPP Voltage (V_{mp}) (V)	29.54	29.72	29.90	30.08
MPP Current (I_{mp}) (A)	16.32	16.41	16.50	16.59

STRUCTURAL CHARACTERISTICS

Module size (L*W*H)	1762 x 1134 x 30 mm
Weight	24.3±1kg
Cell	96 cells, N-type monocrystalline
Front glass	2.0mm, anti-reflection coating
Back glass	2.0mm, heat strengthened glass
Frame	Black GFRP(Glass Fiber Reinforced Polymer) (Multiple colors available)
Junction box	IP68, 3 diodes
Output wire	4.0 mm²
Wire length	300mm/1200mm/customized
Connector	MC4 Compatible
Packing Specification	36pcs/pallet; 936 pcs/40'HQ

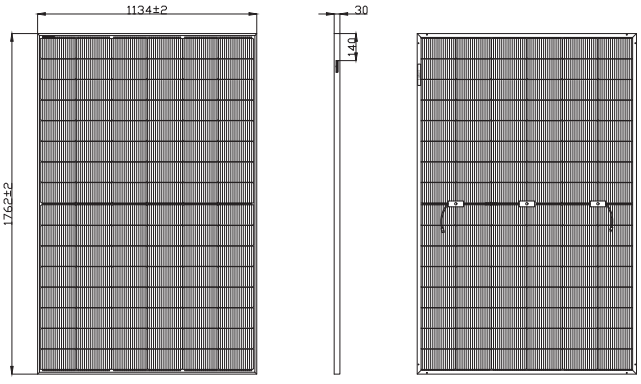
OPERATING PARAMETERS

Power tolerance (W)	(0,+5)
Maximum system voltage (V)	1500
Maximum rated fuse current (A)	30
Current operating temperature (°C)	-40~+85 °C
Mechanical load	5400 Pa❄/ 2400 Pa

TEMPERATURE PERFORMANCE RATINGS

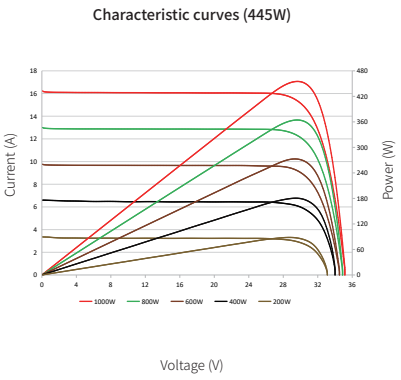
Temperature coefficient (P_{max})	-0.30 %/°C
Temperature coefficient (V_{oc})	-0.28 %/°C
Temperature coefficient (I_{sc})	+0.04 %/°C
Nominal Module Operating Temperature	43±2 °C

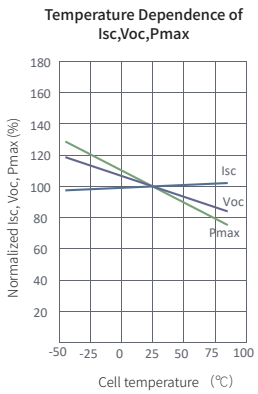
MODULE DIMENSIONS (MM)



* The unmarked tolerance is ±1 mm
Length shown in mm

* For clamp mounting only





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