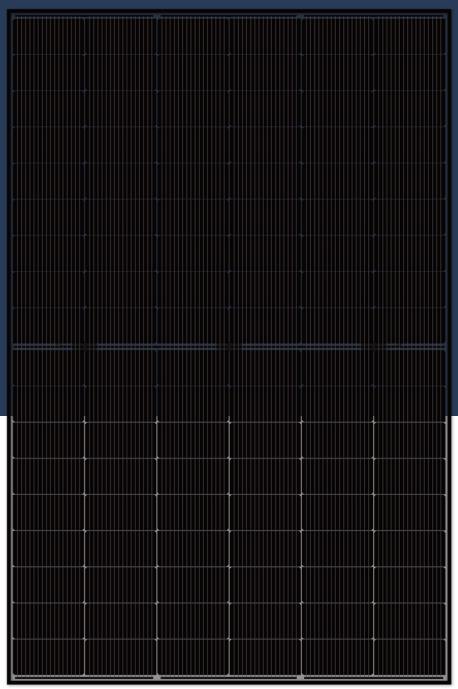
THORNOVA solar

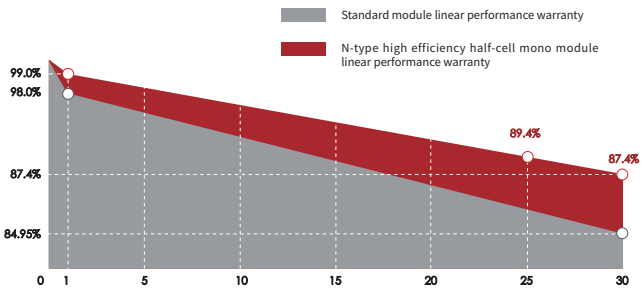
Tangra™ S Pro Black 430-450W

N-Type High efficiency Bifacial Dual Glass Module



- 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

108 cells

Model of modules	TS-BGT54(430)		TS-BGT54(435)		TS-BGT54(440)		TS-BGT54(445)		TS-BGT54(450)	
	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Peak power - P_{mp} (W)	430	329	435	333	440	337	445	340	450	344
Open circuit voltage - V_{oc} (V)	38.78	37.13	38.97	37.31	39.16	37.49	39.35	37.67	39.54	37.85
Short circuit current - I_{sc} (A)	13.72	11.06	13.80	11.12	13.88	11.18	13.96	11.24	14.04	11.30
MPP voltage - V_{mp} (V)	32.85	31.45	33.03	31.62	33.21	31.79	33.39	31.96	33.57	32.13
MPP current - I_{mp} (A)	13.09	10.47	13.17	10.53	13.25	10.59	13.33	10.65	13.41	10.71
Module efficiency - η_m (%)	22.0		22.3		22.5		22.8		23.0	

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)	476	482	488	493	499
Open circuit voltage (V_{oc}) (V)	38.78	38.97	39.16	39.35	39.54
Short circuit current (I_{sc}) (A)	15.20	15.29	15.38	15.47	15.56
MPP voltage — V_{mp} (V)	32.85	33.03	33.21	33.39	33.57
MPP current — I_{mp} (A)	14.50	14.59	14.68	14.77	14.86

STRUCTURAL CHARACTERISTICS

Module dimensions (L*W*H)	1722 x 1134 x 30 mm
Weight	24.2 kg
Cell	108 cells, N-type monocrystalline
Front glass	2.0mm, anti-reflection coating
Back glass	2.0mm, heat strengthened glass
Frame	Black anodized aluminum alloy
Junction box	IP68, 3 bypass diodes
Output wire	4.0 mm²
Wire length	300mm/1200mm/customized length
Connector	MC4 Compatible
Packaging specification	36pcs/pallet; 936 pcs/40'HQ

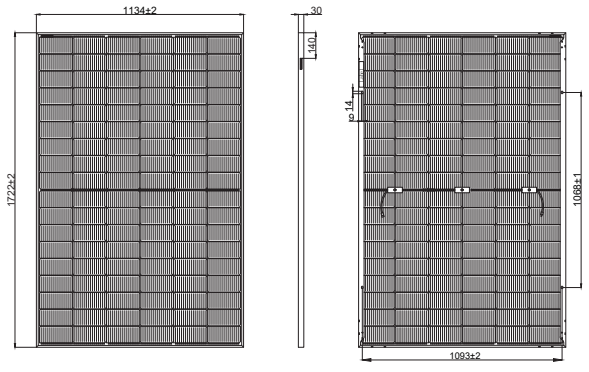
OPERATING PARAMETERS

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 ෴

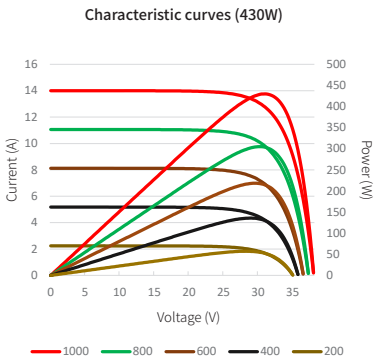
TEMPERATURE PERFORMANCE RATINGS

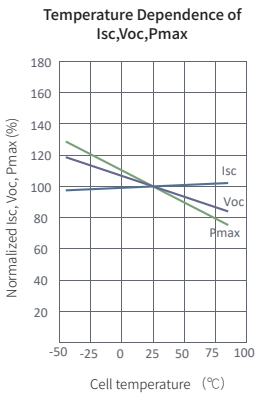
Temperature coefficient (P_{max})	-0.30 %/°C
Temperature coefficient (V_{oc})	-0.28 %/°C
Temperature coefficient (I_{sc})	+0.04 %/°C
Nominal Module Operating Temperature	43±2 °C

MODULE DIMENSIONS (MM)



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





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