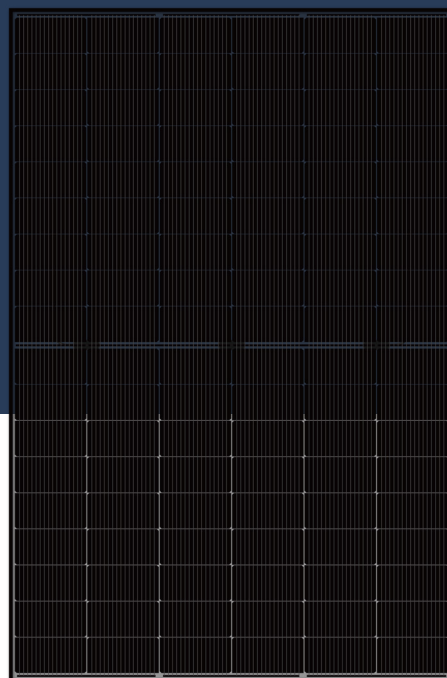


Tangra™ S Pro Black 430-450W

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



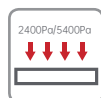
Better light trapping and current collection to improve module power output and reliability



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



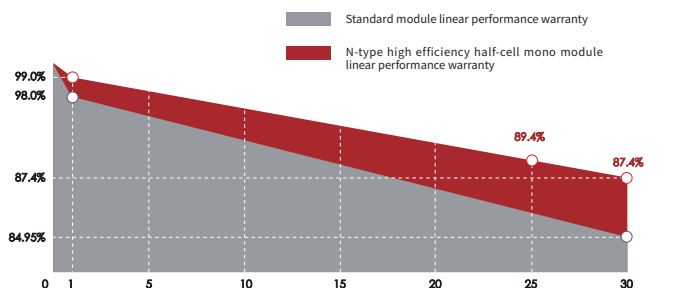
100% triple EL test, which greatly reduces the hidden cracks rate

WARRANTY INSURANCE



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

LINEAR PERFORMANCE WARRANTY



15 years Product quality & process guarantee

30 years Linear power guarantee

0.40 % Annual degradation

COMPREHENSIVE CERTIFICATES



- 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

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 °C, Spectra at AM1.5

NMOT (Nominal Module Operating Temperature): Irradiance 800W/m², Ambient Temperature 20°C, 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 mm ²
Wire length	300mm/1200mm/customized length
Connector	MC4 Compatible
Packaging specification	36pcs/pallet; 936 pcs/40'HQ

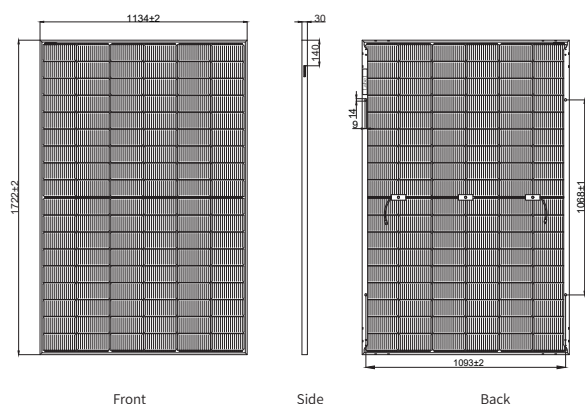
OPERATING PARAMETERS

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



Scan the QR code to
get more information

Web: www.thornovasolar.com

E-mail: info@thornovasolar.com

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