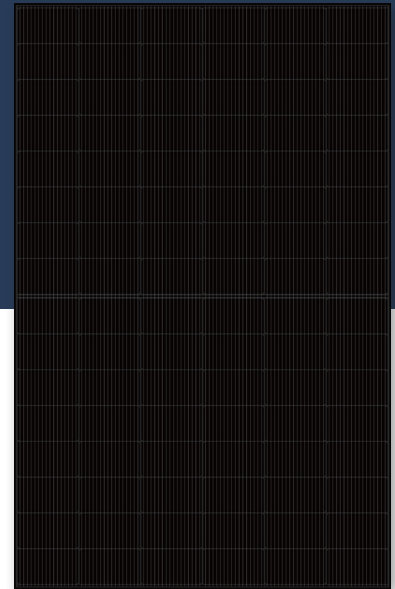


Tangra™ S HD C Black 435-450W

Composite Frame

N-Type High efficiency Monofacial Single Glass Module



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



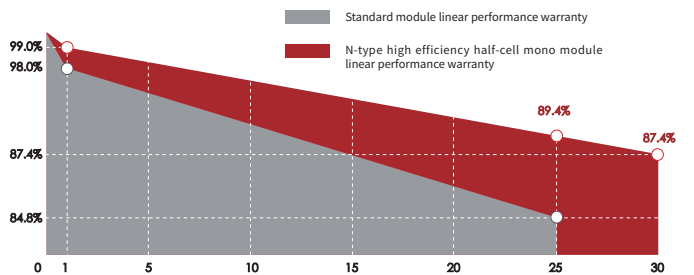
100% triple EL test, which greatly reduces the hidden cracks rate

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-SBT48(435)-G11		TS-SBT48(440)-G11		TS-SBT48(445)-G11		TS-SBT48(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	
Power tolerance (W)	(0,+5)							
Maximum system voltage (V)	1500							
Maximum rated fuse current (A)	25							
Current operating temperature (°C)	-40~+85 °C							

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

STRUCTURAL CHARACTERISTICS

Module dimensions (L*W*H)	1762 x 1134 x 30 mm
Weight	21.0±1kg
Number of cells	96 cells
Cell	N-type monocrystalline
Glass	Tempered, 3.2 mm AR, high transmittance, low iron
Frame	Black GFRP(Glass Fiber Reinforced Polymer)
Junction box	IP68, 3 bypass diodes
Output wire	4.0 mm ² , wire length: 300mm/1200mm/customized
Connector	MC4 Compatible
Mechanical load	Snow load: 5400 Pa * / Wind load: 2400 Pa ☹

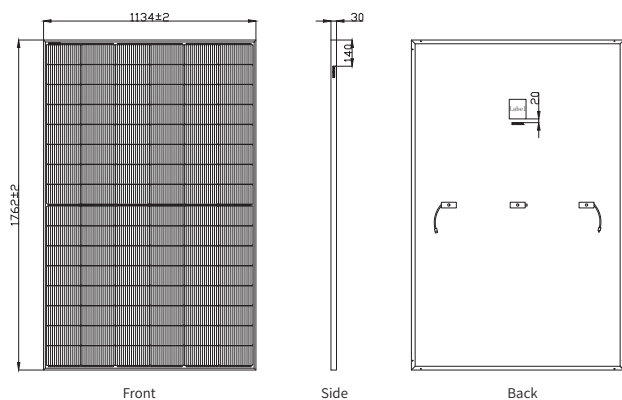
TEMPERATURE PERFORMANCE RATINGS

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

PACKAGING CONFIGURATION

Container	40HQ
Quantity/pallet	36
Pallets/container	26
Quantity/container	936

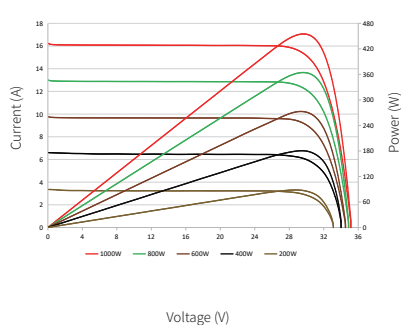
MODULE DIMENSIONS (MM)



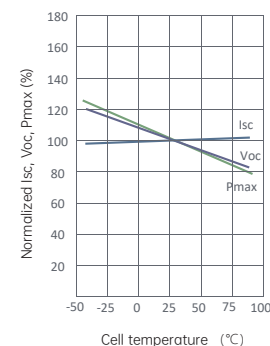
* The unmarked tolerance is ±1 mm
Length shown in mm

* For clamp mounting only

Characteristic curves (445W)



Temperature Dependence of I_{sc} , V_{oc} , P_{max}



Scan the QR code to
get more information

Web: www.thornovasolar.com

E-mail: info@thornovasolar.com

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