

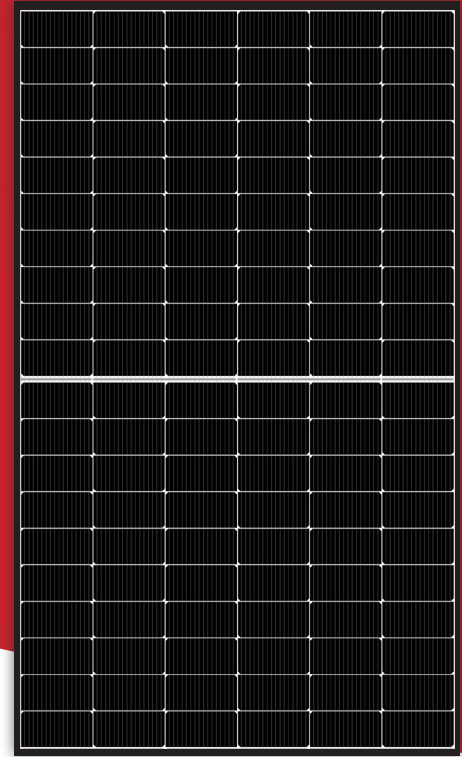


# SUNOVA SOLAR

Pv Tech Expert.

## Tangra™ S 465-485W

N-type High Efficiency Half-Cell Mono Module  
(Black Frame)



30 years lifespan brings 10-30% additional power generation comparing with conventional P-type module



N-type solar cell has no LID naturally which can increase power generation



Excellent low irradiance performance.



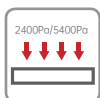
Better light trapping and current collection to improve module power output and reliability.



Industry leading lowest thermal co-efficient of power.



Optimized electrical design and lower operating current for reduced hot spot loss and better temperature coefficient.

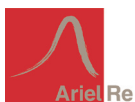


Certified to withstand:  
wind load (2400 Pa) and  
snow load (5400 Pa).



100% triple EL test  
enabling remarkable reduction of  
hidden crack rate of modules

### PERFORMANCE INSURANCE

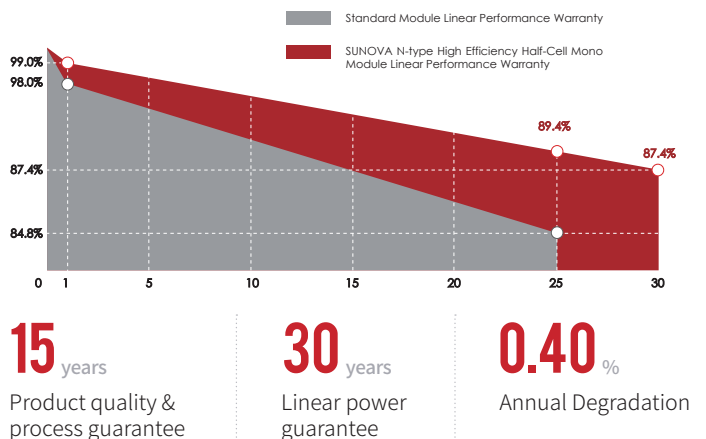


中国平安

PING AN  
P & C INSURANCE CO CN SZN

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

### LINEAR PERFORMANCE WARRANTY



### COMPREHENSIVE CERTIFICATES



ISO 9001: Quality Management System

ISO 14001: Environmental Management System Standard

ISO 45001: International Occupational Health and  
Safety Assessment System Standard

SA 8000: 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.

## ELECTRIC CHARACTERISTICS

Model of modules	SS-465-60MDH(T)		SS-470-60MDH(T)		SS-475-60MDH(T)		SS-480-60MDH(T)		SS-485-60MDH(T)	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum power — P <sub>mp</sub> (W)	465	346	470	350	475	354	480	358	485	361
Open-circuit voltage — V <sub>oc</sub> (V)	42.75	34.30	42.88	34.40	43.01	34.51	43.14	34.61	43.27	34.72
Short-circuit current — I <sub>sc</sub> (A)	13.36	10.10	13.43	10.18	13.51	10.25	13.58	10.33	13.65	20.41
Maximum power voltage — V <sub>mp</sub> (V)	36.64	40.36	36.75	40.48	36.86	40.60	36.97	40.73	37.09	40.85
Maximum power current — I <sub>mp</sub> (A)	12.69	10.79	12.79	10.85	12.89	10.91	12.98	10.97	13.08	11.03
Module efficiency — η <sub>m</sub> (%)	21.6		21.8		22.0		22.2		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/m<sup>2</sup>, Cell Temperature 25 °C, Spectra at AM1.5

**NOCT** (Nominal Operating Cell Temperature): Irradiance 800W/m<sup>2</sup>, Ambient Temperature 20°C, Spectra at AM1.5, Wind at 1m/s

## STRUCTURAL CHARACTERISTICS

Module dimensions (L*W*H)	1903 x 1134 x 30mm
Weight	24.0kg
Number of cells	120 cells
Cell	N-type Monocrystalline 182x91 mm
Glass	Tempered, 3.2 mm AR, High transmittance, Low iron
Frame	Black Anodized aluminum alloy
Junction box	IP68, 3 bypass diodes
Output wire	4.0 mm <sup>2</sup> , wire length: 300mm/1200mm/customized
Connector	MC4 Compatible
Mechanical load	Snow load: 5400 Pa / Wind load: 2400 Pa

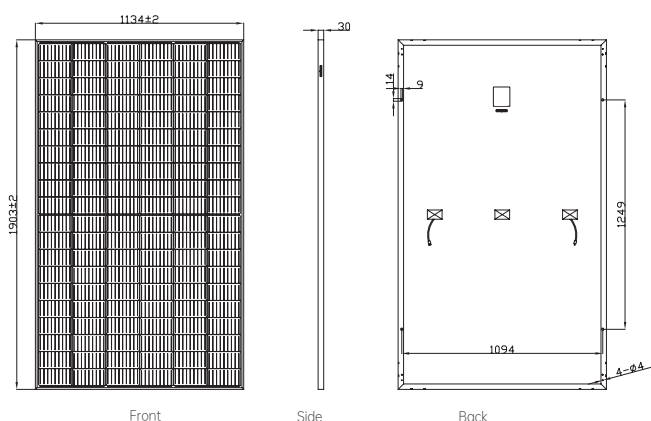
## TEMPERATURE RATINGS

Temperature coefficient ( $P_{max}$ )	-0.30 %/°C
Temperature coefficient ( $V_{oc}$ )	-0.26 %/°C
Temperature coefficient ( $I_{sc}$ )	+0.046 %/°C
Nominal operating cell temperature	43±2 °C

## PACKAGING CONFIGURATION

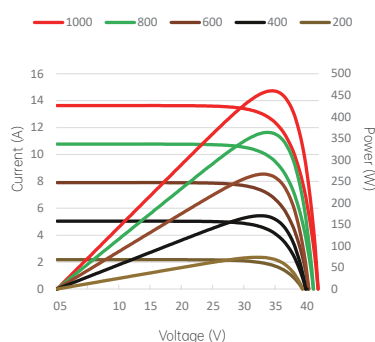
Container	40HQ
Quantity/pallet	36
Pallets/container	24
Quantity/container	864

## MODULE DIMENSIONS (MM)



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

Characteristic Curves (470W)

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