

445-460 W

High Efficiency Bifacial Single Glass PERC Module

TS-BB60 All Black



Bifacial technology enables additional energy harvesting from the rear side (up to 25%).



Excellent low irradiance performance.



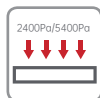
Better light trapping and current collection to improve module power output and reliability.



Industry leading lowest thermal coefficient of power.



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

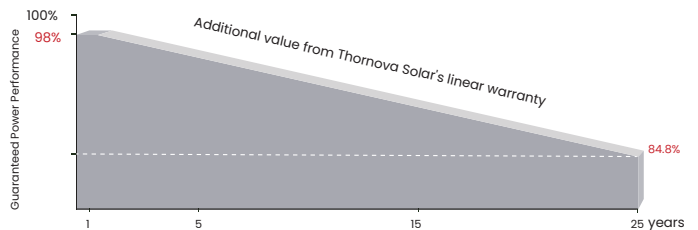


Certified to withstand: wind load (2400 Pa) and snow load (5400 Pa).



100% triple EL test enables remarkable reduction of module hidden crack rate.

LINEAR PERFORMANCE WARRANTY



15 years

Product quality & process guarantee

25 years

Linear power guarantee

0.55 %

Annual Degradation Over 25 years

COMPREHENSIVE CERTIFICATES



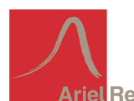
ISO 9001: Quality Management System

ISO 14001: Environmental Management System Standard

ISO 45001: International Occupational Health and Safety Assessment System Standard

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

RE INSURANCE



ELECTRIC CHARACTERISTICS

| Model of modules | TS-BB60(445) | | TS-BB60(450) | | TS-BB60(455) | | TS-BB60(460) | |
|--------------------------------------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|
| | STC | NOCT | STC | NOCT | STC | NOCT | STC | NOCT |
| Maximum power - P_{mp} (W) | 445 | 332 | 450 | 335 | 455 | 339 | 460 | 343 |
| Open-circuit voltage - V_{oc} (V) | 41.27 | 38.79 | 41.46 | 38.97 | 41.65 | 39.15 | 41.78 | 39.29 |
| Short-circuit current - I_{sc} (A) | 13.42 | 10.88 | 13.47 | 10.91 | 13.54 | 10.97 | 13.63 | 11.04 |
| Maximum power voltage - V_{mp} (V) | 34.46 | 32.05 | 34.62 | 32.19 | 34.78 | 32.35 | 34.89 | 32.46 |
| Maximum power current - I_{mp} (A) | 12.92 | 10.36 | 13.01 | 10.41 | 13.09 | 10.48 | 13.19 | 10.57 |
| Module efficiency - η_m (%) | 20.6 % | | 20.9 % | | 21.1 % | | 21.3 % | |

STC (Standard Testing Conditions): Irradiance 1000W/m², Cell Temperature 25 °C, Spectra at AM1.5

NOCT (Nominal Operating Cell 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)

| | | | | |
|--------------------------------------|--------|-------|-------|-------|
| Maximum power - P_{mp} (W) | 487 | 493 | 498 | 504 |
| Open-circuit voltage - V_{oc} (V) | 41.27 | 41.46 | 41.65 | 41.78 |
| Short-circuit current - I_{sc} (A) | 14.69 | 14.74 | 14.82 | 14.92 |
| Maximum power voltage - V_{mp} (V) | 34.46 | 34.62 | 34.78 | 34.89 |
| Maximum power current - I_{mp} (A) | 14.14 | 14.24 | 14.33 | 14.44 |
| Irradiance ratio (rear/front) | 13.5 % | | | |

STRUCTURAL CHARACTERISTICS

| | |
|--------------------------|---|
| Module dimension (L*W*H) | 1903 x 1134 x 30 mm (74.92 x 44.65 x 1.18 inch) |
| Weight | 24 kg (52.91 lbs) |
| Number of cells | 120 cells |
| Cell | PERC Monocrystalline 182x91 mm (7.17 x 3.58 inch) |
| Glass | (F) Tempered, 3.2 mm AR, High transmittance, Low iron (B) Black mesh backsheet |
| Frame | Anodized aluminum alloy |
| Junction box | IP68 |
| Output wire | 4.0 mm ² |
| Wire length | 300 mm/customized |
| Connector | MC4 Compatible |
| Packing Specification | 36 pcs/Pallet; 720 pcs/40'HQ |

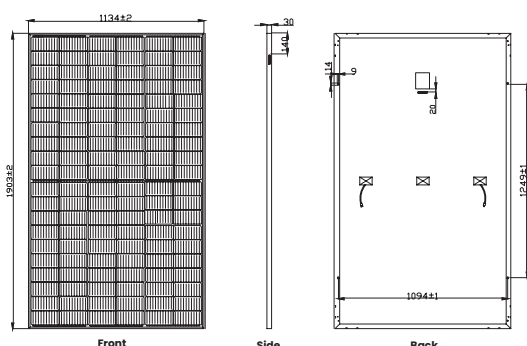
OPERATING PARAMETERS

| | |
|------------------------------------|-------------------|
| 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 RATINGS

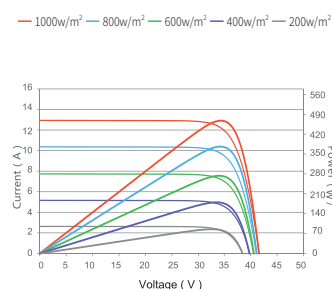
| | |
|---------------------------------------|-------------|
| Temperature coefficient (P_{max}) | -0.35 %/°C |
| Temperature coefficient (V_{oc}) | -0.28 %/°C |
| Temperature coefficient (I_{sc}) | +0.045 %/°C |
| Nominal operating cell temperature | 45±2 °C |

MODULE DIMENSIONS (MM)

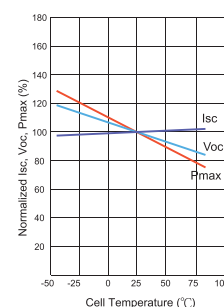


* The unmarked tolerance is ±1 mm
Length shown in mm

Current-Voltage & Power-Voltage Curves (460 W)



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



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