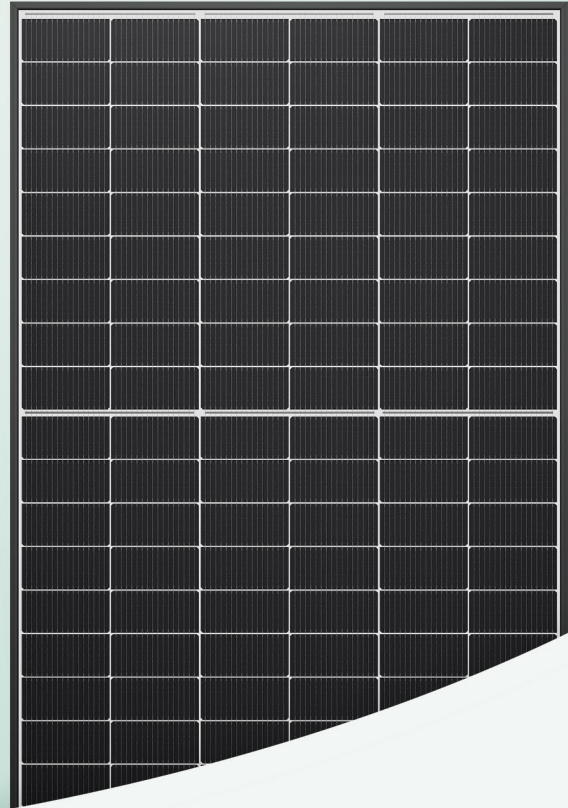


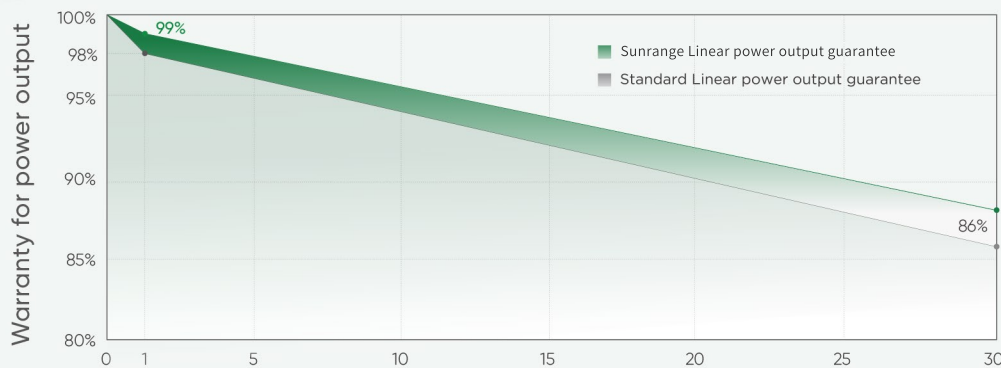
415~445W

N-type TOPCon Black Frame Solar Module



Quality Guarantee

25-year Materials Warranty
30-year Power Warranty



87.4%

22.79%
Max Module Eff.

0~+5W
Positive Tolerance

Complete System and Product Certifications

IEC61215/IEC61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO 45001: Occupational Health and Safety Management System



* Specifications subject to technical changes and tests. Sunrange Solar reserves the right of interpretation.

Positive power tolerance (0~+5W) guaranteed

High module conversion efficiency (up to 22.79%)

Slower power degradation enabled by Low LID Mono TOPCON technology: first year <1%, 0.40% year 2-30

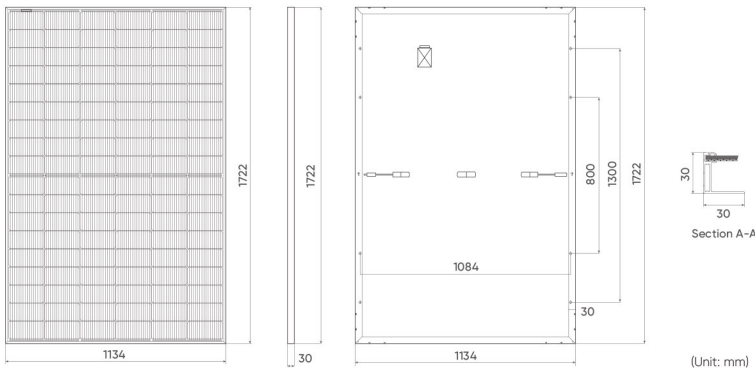
Solid PID resistance ensured by solar cell process optimization and careful module BOM selection

Reduced resistive loss with lower operating current

Higher energy yield with lower operating temperature

Reduced hot spot risk with optimized electrical design and lower operating current

Design (mm)



| | |
|----------------------|--|
| Solar Cells | N-type Mono |
| No. of Cells | 108(6×18) |
| Dimensions | 1722 × 1134 × 30mm |
| Weight | 21.0kg |
| Front Glass | 3.2mm coated tempered glass |
| Frame | Anodized aluminium alloy |
| Junction Box | Ip68 rated (3 bypass diodes) |
| Output Cables | 4mm ² , 300mm (+) / 300mm (-), Length can be customized |
| Connectors | Mc4 compatible |
| Mechanical load test | 5400Pa |
| Packaging | 36pcs/box, 216pcs/20'GP, 936pcs/40'HQ |

| | |
|------------------------------|----------------|
| Operating Module Temperature | -40°C to +85°C |
| Maximum System Voltage | 1500 DC (IEC) |
| Maximum Series Fuse Rating | 25A |
| Power Tolerance | 0/+5W |

| | |
|--------------------------------------|------------|
| Nominal Operating Temperature (NMOT) | 45±2°C |
| Temperature Coefficient of Pmax | -0.30%/°C |
| Temperature Coefficient of Voc | -0.25%/°C |
| Temperature Coefficient of Isc | +0.046%/°C |

Electrical Parameters (STC*)

| Module Type: SP-445N | 415 | 420 | 425 | 430 | 435 | 440 | 445 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Maximum power (Pmax/W) | 415 | 420 | 425 | 430 | 435 | 440 | 445 |
| Open Circuit Voltage (Voc/V) | 38.34 | 38.57 | 38.81 | 39.04 | 39.27 | 39.50 | 39.73 |
| Short Circuit Current (Isc/A) | 13.89 | 13.96 | 14.03 | 14.10 | 14.17 | 14.24 | 14.31 |
| Voltage at Maximum power (Vmpp/V) | 32.02 | 32.23 | 32.44 | 32.65 | 32.85 | 33.06 | 33.26 |
| Current at Maximum Power (Imp/A) | 12.96 | 13.03 | 13.10 | 13.17 | 13.24 | 13.31 | 13.38 |
| Module Efficiency(%) | 21.25 | 21.51 | 21.76 | 22.02 | 22.28 | 22.54 | 22.79 |

Electrical Parameters (NMOT*)

| | 311 | 315 | 319 | 323 | 327 | 331 | 335 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Maximum power (Pmax) | 311 | 315 | 319 | 323 | 327 | 331 | 335 |
| Open Circuit Voltage (Voc/V) | 36.54 | 36.74 | 36.95 | 37.15 | 37.35 | 37.55 | 37.75 |
| Short Circuit Current (Isc/A) | 11.18 | 11.24 | 11.30 | 11.36 | 11.42 | 11.48 | 11.54 |
| Voltage at Maximum power (Vmpp/V) | 29.45 | 29.66 | 29.87 | 30.07 | 30.28 | 30.48 | 30.68 |
| Current Maximum Power (Imp/A) | 10.56 | 10.62 | 10.68 | 10.74 | 10.80 | 10.86 | 10.92 |

- Standard Test Conditions [STC]: irradiance 1000W/m²; AM 1.5; ambient temperature 25°C according to EN 60904-3;
- Nominal Module Operating Temperature (NMOT): Irradiance 800W/m²; wind speed 1m/s, ambient temperature 20°C.
- Tolerance of Pm: 0~+5W, Measuring uncertainty of power: ±3%. Performance deviation of Voc [V], Isc [A], Vm [V] and Im [A]: ±3%.

I-V Curve

