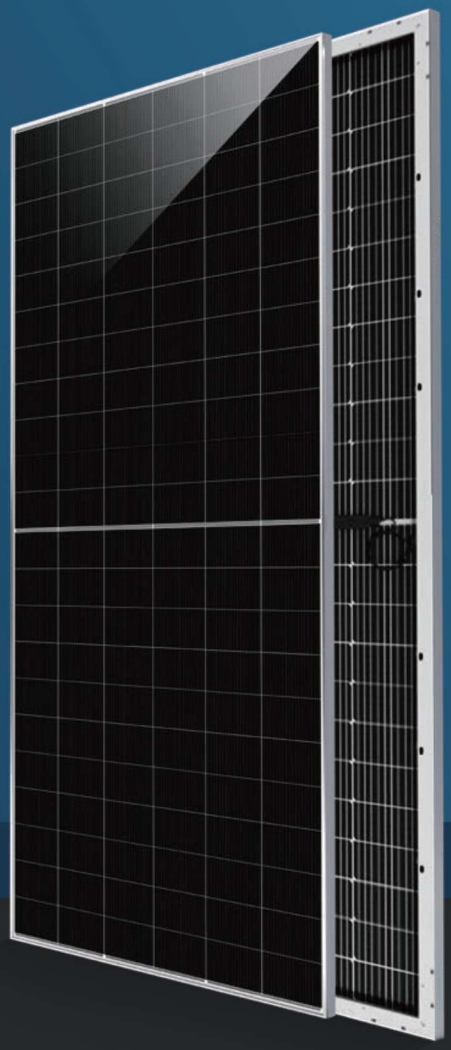
ALPS SOLAR

# ALPS48D60-TP

# 440-465W

**High Performance**
**N-type Dual Glass Bifacial Solar Module**



**30 YEAR** LINEARITY POWER AND OUTPUT WARRANTY

**25 YEAR** EXCELLENT PRODUCTS MATERIAL AND PROCESS WARRANTY

## KEY FEATURES

### Reliable Quality
Manufactured with consistent quality and advanced technology across our global production facilities.

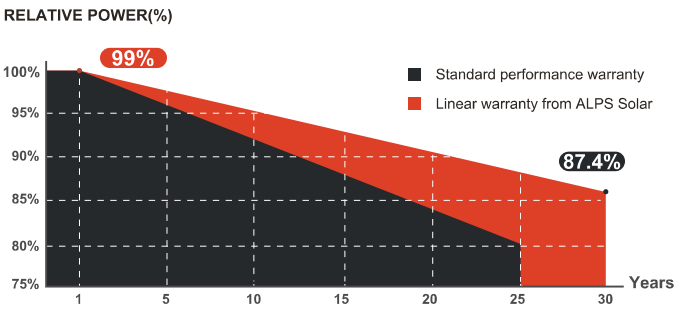
### Exceptional Efficiency
Delivers superior energy yield even in low-light or high-temperature conditions.

### Tested for Extreme Conditions
Certified under IEC 61215 and withstand 45 mm hail impact demonstrating reliability and strength .

### N-Type with Low LID
Advanced N-type cells minimize Light-Induced Degradation (LID) for performance stability.

### Industry-Leading Warranty
30-year performance and 25-year product coverage surpass industry norms.

## ALPS N-TYPE MODULE PERFORMANCE WARRANTY




## COMPREHENSIVE CERTIFICATES

| |
|---|
| IEC 61215, IEC 61730, UL 61730, UL 61215 |
| IEC 62716 (Ammonia Corrosion) |
| IEC 61701 (Salt Mist Corrosion) |
| IEC 60068 (Sand and Dust) |
| IEC 62804 (PID Resistance) |
| IEC 62759 (Transportation Testing) |
| IEC 62941 (Quality System for PV Module Manufacturing) |
| LID, LeTID, DH 2000, TC 400, HF 30, UV 60 |
| Wind Test |
| Hail Impact Test (45mm / 55mm) |

Registro ENEA

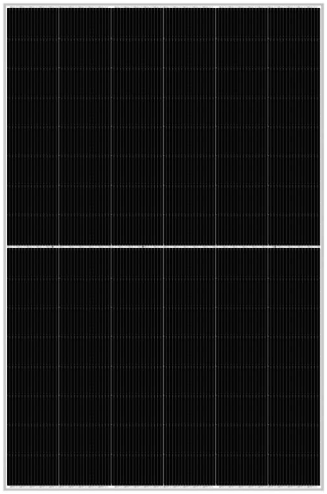
# ALPS SOLAR

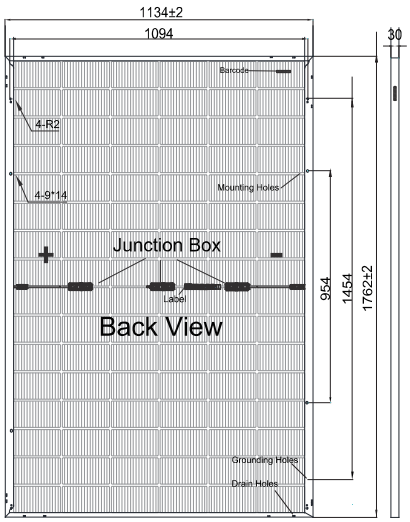
# ALPS48D60-TP 440-465W

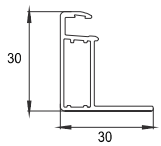
## N-type Technology PV Bifacial Module

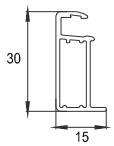
## MADE IN ROMANIA AND PHILIPPINES

## ENGINEERING DRAWINGS






## PACKING CONFIGURATION

| | |
|---|---|
| Pieces per pallet | 36 pcs |
| Pallet Dimension | 1780 x 1120 x 1255 mm |
| Weight of packing | 830 kg / 1830 lb |
| Pieces per container | 936 pcs |
| Size of container | 40'HQ |

## ELECTRICAL CHARACTERISTICS (STC)

| | | | | | | |
|---|---|---|---|---|---|---|
| Power Level | 440 | 445 | 450 | 455 | 460 | 465 |
| Pmax (W) | 440 | 445 | 450 | 455 | 460 | 465 |
| Vmp (v) | 29.75 | 29.95 | 30.15 | 30.35 | 30.55 | 30.75 |
| Imp (A) | 14.79 | 14.86 | 14.93 | 14.99 | 15.06 | 15.12 |
| Voc (V) | 35.10 | 35.30 | 35.50 | 35.70 | 35.90 | 36.10 |
| Isc (A) | 15.50 | 15.56 | 15.62 | 15. 68 | 15.74 | 15.80 |
| Module Efficiency (%) | 22.02 | 22.27 | 22.52 | 22.77 | 23.02 | 23.27 |
| Power Tolerance (W) | 0~+3% | | | | | |
| Temperature Coefficient Pmax (%/°c) | -0.29 | | | | | |
| Temperature Coefficient Isc (%/°C) | 0.044 | | | | | |
| Temperature Coefficient Voc (%/°C) | -0.25 | | | | | |

STC:Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5

## BIFACIAL OUTPUT-BACKSIDE POWER GAIN

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5% | Power Output (W) | 462 | 467 | 473 | 478 | 483 | 488 |
| | Module Efficiency (%) | 23.12 | 23.38 | 23.65 | 23.91 | 24.17 | 24.44 |
| 10% | Power Output (W) | 484 | 490 | 495 | 501 | 506 | 512 |
| | Module Efficiency (%) | 24.22 | 24.50 | 24.77 | 25.05 | 25.32 | 25.60 |
| 20% | Power Output (W) | 528 | 534 | 540 | 546 | 552 | 558 |
| | Module Efficiency (%) | 26.42 | 26.73 | 27.03 | 27.33 | 27.63 | 27.93 |

## WORKING CHARACTERISTICS (BNPI)

| | | | | | | |
|---|---|---|---|---|---|---|
| Pmax (W) | 488 | 493 | 499 | 504 | 510 | 515 |
| Vmp (V) | 29.85 | 30.05 | 30.25 | 30.45 | 30.65 | 30.85 |
| Imp (A) | 16.33 | 16.41 | 16.48 | 16.56 | 16.63 | 16.70 |
| Voc (V) | 35.2 | 35.4 | 35.6 | 35.8 | 36.0 | 36.2 |
| Isc (A) | 17.00 | 17.06 | 17.12 | 17.18 | 17.24 | 17.30 |

BNPI: Front Irradiance 1000 W/m², Rear 135 W/m², Cell Temperature 25°C, AM=1.5

## WORKING PARAMETERS

| | |
|---|---|
| Maximum System Voltage | 1500V DC (IEC) |
| Operational Temperature | -40~+85 °C |
| Maximum Series Fuse Rating | 30 A |
| Maximum Static Load, Front | 5400 Pa |
| Maximum Static Load, Back | 3750 Pa |
| NOCT | 45±2 °C |
| Safety Class | Class A |

## MECHANICAL CHARACTERISTICS

| | |
|---|---|
| Solar Cells | 210R N-type |
| Number of Cells | 96 pcs (6x16) |
| Module Dimensions | 1762 x 1134 x 30 mm |
| Weight | 22 kg / 48.5 lb |
| Cable Cross Section Size | 4 mm² (IEC), 12 AWG (UL) |
| Junction box | IP68, 3 diodes |
| Connectors | Stäubli EVO2 |
| Output Cable | (+) 300 mm / (-) 200 mm |
| Front Glass / Back Glass | 2.0 mm / 2.0 mm |

## MAXIMUM RATINGS

| | |
|---|---|
| Operating Temperature | -40~85 °C |
| Operating Humidity | 5~85 %RH |
| Hail Impact Resistance | Withstands 45 mm hail at 31 m/s |

**Revised in July 2026 1st Edition***

CAUTION:All rights and explain reserved by Alps Solar Energy Inc.
Specifications included in this datasheet are subject to change without notice.
The specific content of the product warranty refers to Alps's latest warranty.

ALPS SOLAR

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