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.

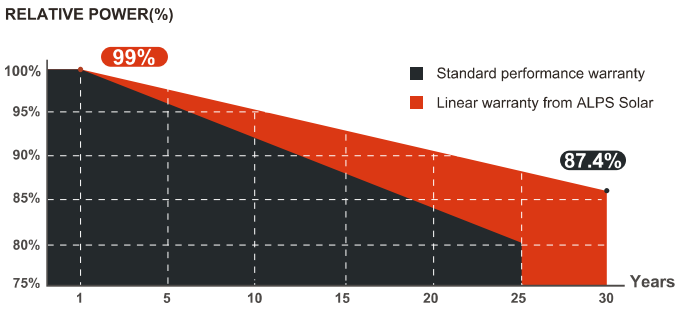
Exceptional Efficiency
Delivers superior energy yield even in low-light or high-temperature conditions.

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

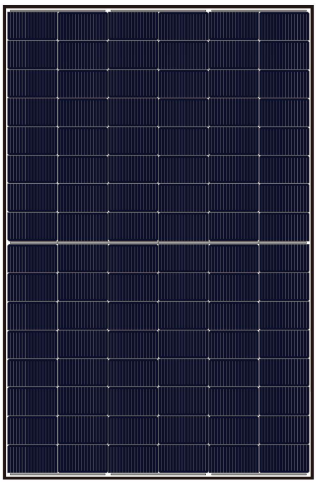
ALPS SOLAR

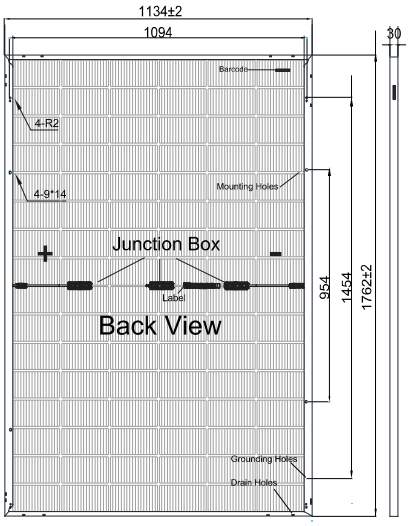
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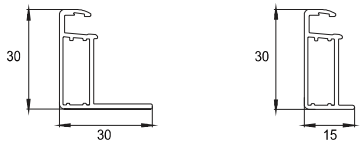
N-type Technology PV Bifacial Module

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	900 kg / 1984 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	182x210mm 210R N-type
Number of Cells	96 pcs (6x16)
Module Dimensions	1762 x 1134 x 30 mm
Weight	24 kg / 52.9 lb
Cable Cross Section Size	4 mm² (IEC), 12 AWG (UL)
Junction box	IP68, 3 diodes
Connectors	Stäubli EVO2
Output Cable	(+) 1200 mm / (-) 1200 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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