

BLACK HOLE PLUS SERIES

N-Type Bifacial glass to glass panels: 108 Half cut cells

- LIGHT WEIGHT AND COMPACT • RESIDENTIAL APPLICATION

KOSOL
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THE ENERGIE ENGINEERS

Electrical Data (STC)

Maximum Power (Pmax) (+0 ~ 4.99 Wp)	435	440	445	450	455	460	465	470	475
Maximum Power Voltage, (Vmp)	33.32	33.48	33.64	33.7	33.88	34.13	34.31	34.49	34.67
Maximum Power Current (Imp)	13.15	13.19	13.23	13.41	13.44	13.5	13.59	13.68	13.77
Open-Circuit Voltage (Voc) ± 5%	38.34	38.50	38.61	38.66	38.75	39.01	39.27	39.53	39.79
Short-Circuit Current (Isc) ± 5%	13.64	13.66	13.69	13.88	13.92	13.95	13.98	14.01	14.04
Module Efficiency STC (%)	22.26	22.52	22.77	23.03	23.29	23.54	23.80	24.05	24.31

*Values without tolerance are typical numbers. Standard Test Condition (STC): Cell Temperature 25°C, Irradiance: 1000 W/m², AM : 1.5

Electrical Characteristics with different rear side power gain (REF. - 455Wp front)

Bifaciality Gain	3%	5%	10%	15%	20%
Maximum Power (Pmax)	471	478	497	515	534
Maximum, Power Voltage, Vmpp (V)	35.20	35.20	36.48	37.66	38.89
Maximum Current, Imp(A)	13.38	13.59	13.62	13.68	13.72
Open Circuit Voltage, Voc(V)	38.40	38.42	39.72	40.92	42.17
Short Circuit Current, Isc(A)	13.74	13.83	14.07	14.30	14.53

**Bifaciality Factor: 80 ± 20%, Back-side power gain varies depending upon the specific albedo

Mechanical Data

Panel Type	N-Type Bi-Facial Glass to Glass Panels
Dimensions (mm) (± 2mm)	1723mm (L) X 1134mm (W) X 30mm (T)
Dimensions (inch) (± 0.079)	57.83 in (L) X 44.64 in (W) X 1.18 in (T)
Weight (kg)	27 kg ~
Weight (lbs)	59.52 lbs ~
Solar Cell	108 (9 X 12) nos. Half cut M10R cells
Frame	Anodized Aluminium Black/Silver
Front Glass	2.0 mm thickness, AR Coating - Tempered Glass
Back Glass	2.0 mm thickness, Semi-tempered/Grid Glass
Junction Box	Split JB with 03 diodes & IP68 UL Approved
Cable	300mm or customised length, 4 mm ² , 6.3mm dia. (UL approved)
Connector	MC4 Connector / Stabuli Connector (optional) (UL approved)

Operating Conditions

Mechanical Load (Wind/Snow)	2400 Pa Rear / 5400 Pa Front
Hail Impact Resistance	35 mm dia. with 1 Inch at 51.6 mph
Maximum System Voltage	1500 V
Series Fuse Rating	30 A
Operating Temperature	-40 °C to +85 °C

Temperature Characteristics

Nominal Module Operating Temperature	45 °C ± 2 °C
Temperature Co-efficient of Isc	0.046 % / °C
Temperature Co-efficient of Voc	-0.259 % / °C
Temperature Co-efficient of Pmax	-0.30 % / °C

Shipping Specs

Modules / Pallet	31
Pallets / 40 ft HQ container	26

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CAUTION: READ SAFETY AND INSTALLATION MANUAL BEFORE USING THE PRODUCT. Specifications included in this datasheet are subject to change without notice. Please confirm your exact requirements with the company representative before placing the order and finalizing the confirmation.

Certifications

UL - 61730 - 1 & 2 (CAN/CSA), | CEC
UL Fire Class - 1 | Application Class - A
Electrical safety Class - II
IEC 61215 : 2021 | IEC 61730-1 & 2 : 2023
IEC 62716 : 2013 | IEC 61701 : 2020
IEC TS 62804 - 1 - 1 : 2020
IEC TS 63342 : 2022
IEC 61853 -1
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