

450-475W

SUBSTRATE
GLASS ●
MESH GLASS ●

FRAME TYPE
ALUMINIUM ●

FRAME VARIANT
SILVER ●
BLACK ●

MAXIMUM EFFICIENCY %

23.96

CELL TYPE

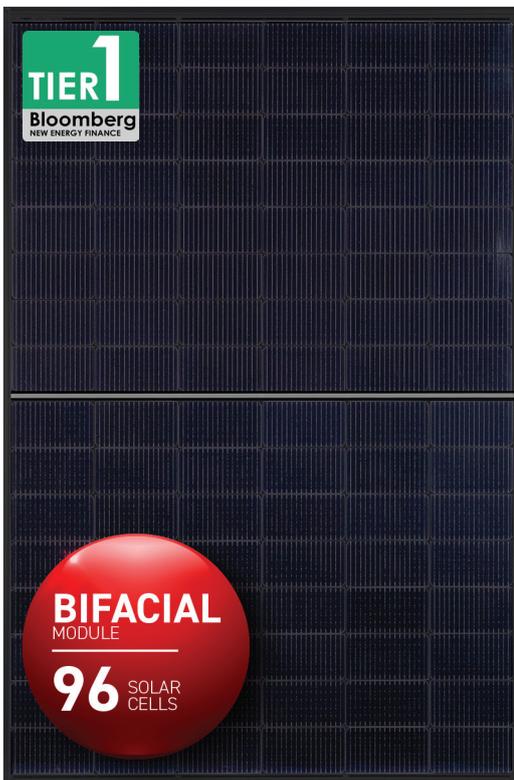
G12R HALF CUT

PRODUCT WARRANTY

12 YEARS

PERFORMANCE WARRANTY

30 YEARS



LOWER LCOE

- Lower balance of systems cost
- Improved value proposition of the product with competitive ROI



0% NEGATIVE POWER TOLERANCE

- Positive power tolerance of upto 0 ~ 4.99Wp
- Module current binning radically reduces string mismatch losses



IMPROVED LONGEVITY

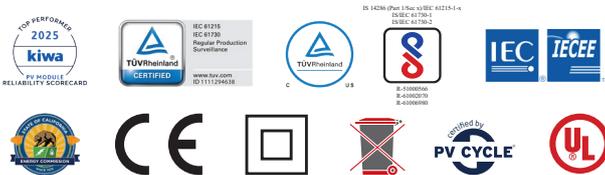
- Excellent anti-PID performance via optimized process and materials control
- Lower susceptibility to LID & LeTID



PREMIUM PERFORMANCE PARAMETERS

- N-TYPE solar cell upto 80% bifaciality, brings higher energy yield from rear side
- Lower temperature coefficient minimizing generation losses at high temperature

PRODUCT CERTIFICATES*



SYSTEM CERTIFICATES*

IEC 61215 : 2021, IEC 61730, UL 61215, UL 61730, IS 14286, IEC 61701, IEC 62716, IEC 60068-2-68, CAN-CSA

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION:

- ISO 9001:2015/ Quality Management System
- ISO 14001:2015/ Environmental Management System
- ISO 45001:2018/ Occupational Health and Safety Management System
- SA 8000 :2014/ Social Accountability International

THIS DATASHEET IS APPLICABLE FOR: HYPERSOL VSMDDH.48.AAA.05 (AAA=450-475)

ELECTRICAL PARAMETERS | STC^{1,2}

Parameter	450	455	460	465	470	475
Peak Power P_{max} (Wp)	450	455	460	465	470	475
Maximum Voltage V_{mpp} (V)	30.20	30.4	30.60	30.80	31.00	31.20
Maximum Current I_{mpp} (A)	14.91	14.98	15.04	15.1	15.17	15.23
Open Circuit Voltage V_{oc} (V)	36.1	36.3	36.5	36.7	36.9	37.1
Short Circuit Current I_{sc} (A)	15.68	15.74	15.82	15.88	15.94	16.01
Module Efficiency (%)	22.70	22.95	23.21	23.46	23.71	23.96

1) STC: 1000 W/M² IRRADIANCE, 25°C CELL TEMPERATURE, AM1.5G SPECTRUM ACCORDING TO EN 60904-3 | 2) TOLERANCE OF RATING AT STC (P_{max} / I_{sc} / V_{oc}) [%] : 0-3/+5/+5 ELECTRICAL MEASUREMENT UNCERTAINTY IS WITHIN ± 2%

ELECTRICAL PARAMETERS | NOCT³

Parameter	340.20	343.90	347.30	351.00	354.80	358.51
Peak Power P_{max} (Wp)	340.20	343.90	347.30	351.00	354.80	358.51
Maximum Voltage V_{mpp} (V)	28.30	28.50	28.70	28.80	29.00	29.20
Maximum Current I_{mpp} (A)	12.02	12.07	12.12	12.17	12.22	12.25
Open Circuit Voltage V_{oc} (V)	34.00	34.20	34.40	34.60	34.80	35.00
Short Circuit Current I_{sc} (A)	12.66	12.71	12.76	12.81	12.86	12.90

3) NOCT IRRADIANCE 800 W/M², AMBIENT TEMPERATURE 20°C, WIND SPEED 1 M/SEC

ELECTRICAL PARAMETERS | BNPI^{4,5}

Parameter	498.6	504.1	509.7	515.2	520.8	526.3
Peak Power P_{max} (Wp)	498.6	504.1	509.7	515.2	520.8	526.3
Maximum Voltage V_{mpp} (V)	30.20	30.40	30.60	30.80	31.00	31.20
Maximum Current I_{mpp} (A)	16.52	16.60	16.66	16.73	16.81	16.88
Open Circuit Voltage V_{oc} (V)	36.1	36.3	36.5	36.7	36.9	37.1
Short Circuit Current I_{sc} (A)	17.37	17.44	17.53	17.60	17.66	17.74

4) BNPI: 1000W/M²+q.135, BIFACILITY COEFF. (q) AT BNPI P_{max} , I_{sc} IS 75±5% & FOR V_{oc} IS 99±10%, AM 1.5, 25°C | 5) TOLERANCE OF RATING AT BNPI (P_{max} / I_{sc} / V_{oc}) [%] : 0-3/+5/+5

TEMPERATURE COEFFICIENTS (Tc) PERMISSIBLE OPERATING CONDITIONS

Tc of Open Circuit Voltage (β)	-0.24%/°C
Tc of Short Circuit Current (α)	0.04%/°C
Tc of Power (γ)	-0.29%/°C
Maximum System Voltage	1500V
NOCT	45°C ± 2°C
Temperature Range	-40°C to + 85°C

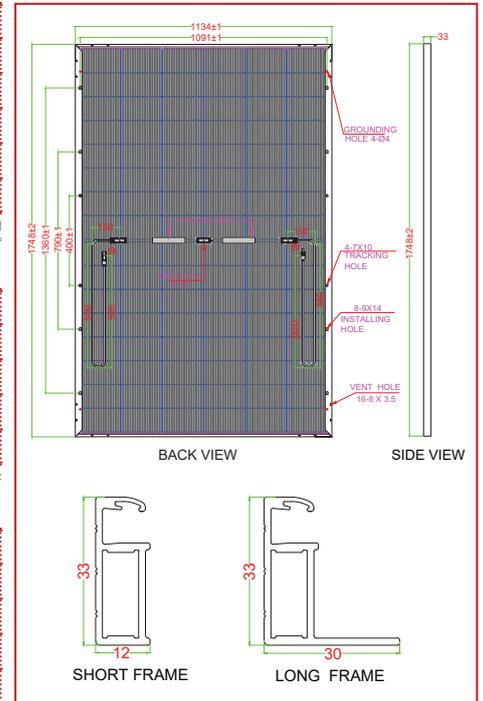
MECHANICAL DATA

Length × Width × Height	1748 X 1134 X 33 mm (68.82 x 44.65x 1.3 inches)
Weight	31.3Kg ±5% (69.0 lbs)
Junction Box	IP 68, Split Junction Box with individual bypass diodes
Cable & Connectors [#]	1200 mm (+ve terminal) and 1200 mm (-ve terminal) length cables, Staubli EVO connectors
Application Class	Class A (Safety class II)
Superstrate ^{##}	3.2 mm (0.126 inches) high transmission ARC Semi-tempered glass (low iron content)
Cells	48 (96 half-cells) N-TYPE bifacial solar cells
Substrate	2.0 mm (0.08 inches) high transmission heat strengthened glass/mesh glass (low iron content)
Frame	Anodized aluminium
Mechanical Load Test	5400 Pa (Snow load), 2400 Pa (Wind load)
Cell Encapsulant	EPE/EVA or EPE/EPE
Maximum Series Fuse Rating	30 A
Hail Test	≥ Ø 50mm

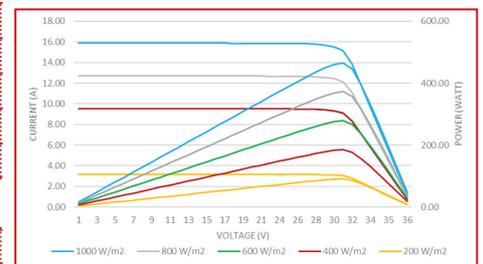
WARRANTY

Product Warranty ^{**}	12 years
Performance Warranty ^{**}	Linear Power Warranty for 30 years with 1% for 1 st year degradation and 0.4% from year 2 to year 30

DIMENSIONS IN MM

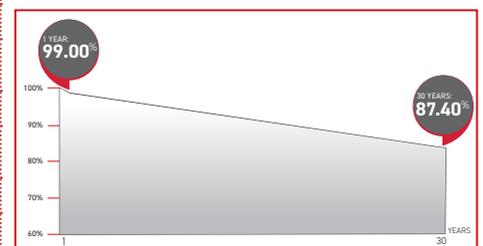


TYPICAL I-V CURVES⁶



6) AVERAGE RELATIVE EFFICIENCY REDUCTION OF 5% AT 200 W/M² ACCORDING TO EN 60904-1

PERFORMANCE WARRANTY



PACKAGING INFORMATION

Quantity /Pallet	33
Pallets/Container (40'HC)	26
Quantity/Container (40'HC)	858

^{*}All (*) certifications under progress. ^{**}Refer to Vikram Solar's warranty document for terms and conditions. | #1400mm (55.12 inches), 1600mm (62.99 inches) cable lengths are also available | ##Anti-glare Glass is also available | *As per applicable product | STC : Standard Testing Condition | BNPI : Bifacial Nameplate Irradiance | NOCT : Nominal Operating Cell Temperature

CAUTION: READ SAFETY AND INSTALLATION MANUAL BEFORE USING THE PRODUCT.

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