

## State-of-the-Art Manufacturing technology

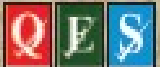
144-Cell  
MONO Perc  
MODULE

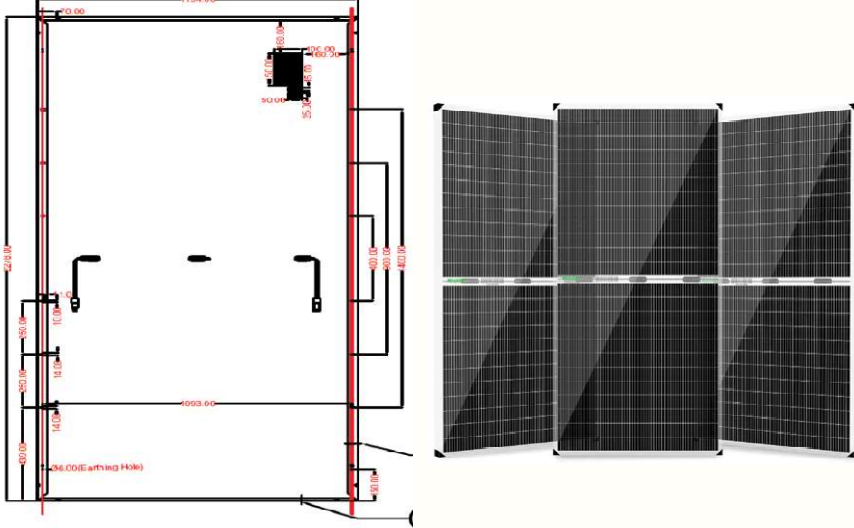
570 Wp  
MAXIMUM POWER  
OUTPUT

21 to 22%  
MAXIMUM  
EFFICIENCY

+Wp  
TOLERANCE

### CERTIFICATIONS





BACK VIEW

# Bifacial Module Function

- PV module generates energy when light falls on its surface.
- For a bifacial module, solar power generate through front as well as back glass where it absorbed sun radiations. Some of the radiations which does not observed by front surface is being reflected (albedo) and adsorbed from the back surface of module which gain the additional power, with respectively different surface.
- Once both light falls on the module, its efficiency and bifacial come in to play.
- The rear side of module does not always generate the same power exactly equals front side so, the ratio between rear side and front side power generation is known as module bi-faciality.
- Bi-faciality further varies with the kind of cell utilized in a solar module.

## ELECTRICAL DATA (STC): Sun Series

Pmp/W*	530	535	540	545*	550
Vmpp/V	40.56	40.63	40.70	40.80	40.90
Imp/A	13.07	13.17	13.27	13.36	13.45
Voc/V	49.26	49.34	49.42	49.52	49.62
Isc/A	13.71	13.79	13.85	13.94	14.03
Eff. %	20.55	20.75	20.94	21.13	21.33

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5

\*Measurement tolerance: ±3%

## Electrical data with bifacial gain of 545\* wp

Pmax(Wp)	572	600	627	654	681
Vmpp/V	41.98	41.98	41.98	41.99	41.99
Imp/A	13.63	14.28	14.93	15.58	16.22
Voc/V	49.97	49.97	49.97	49.97	49.97
Isc/A	14.38	15.03	15.71	16.33	17.03
Pmax gain	5%	10%	15%	20%	25%

Electrical characteristics with different rear side power gains (referenced specific to 545 Wp front)\*\* Bifaciality Factor: 70±5%. \*\* Back-side power gain varies depending upon the specific project Albedo

## MECHANICAL DATA

Solar Cells	Monofacial-PERC Crystalline
Cell Orientation	144 cells (6 x 24)
Module Dimensions	2277 × 1134 × 35 mm (89.67×44.65 × 1.38 inches)
Weight	33.8 kg (Glass to Glass)/ 28.5 kg (Glass to Backsheet)
Front Glass	2.0 mm (Glass to Glass)/ 3.2mm (Glass to Backsheet) ARC low iron, High transmission
Encapsulant Material	POE/EVA
Back Glass/ Back Sheet	2.0 mm (Glass to Glass) / transparent PET Backsheet (Glass to Backsheet)
Frame	35 mm ( 1.38 inches) Anodized Aluminium Alloy
J-Box	Split / Standard Photovoltaic Technology IP68
Cables	300mm (12 inches)

## TEMPERATURE RATING

NOCT (Nominal Cell Operating Temperature)	45 °C (± 3 °C)
Temperature Co-efficient of Pmax	-0.35%/ °C
Temperature Co-efficient of Voc	-0.27%/ °C
Temperature Co-efficient of Isc	0.050%/ °C

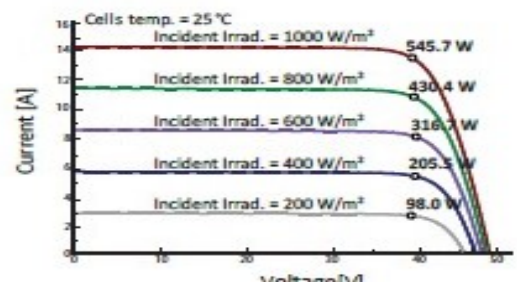
## MAXIMUM RATING

Operational Temperature	- 40~+85 °C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	25A
Snow Load	5400 Pa
Wind load	2400 pa

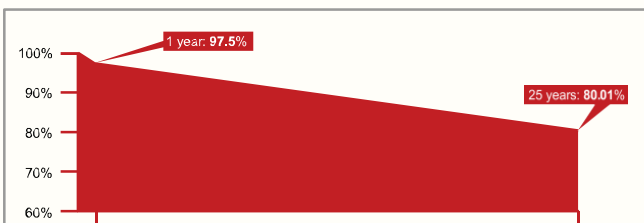
**Bifaciality =** Amount of power generated by the rear side  
Amount of power generated by the front side

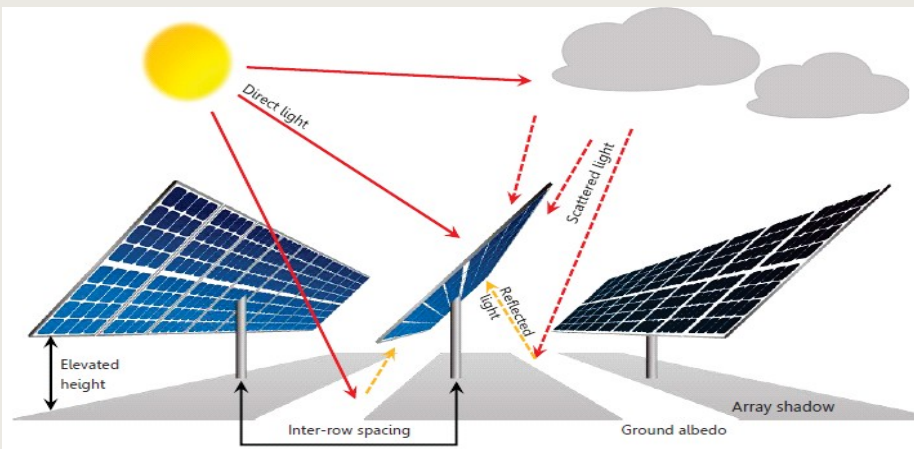
## IV CURVES OF PV MODULE (545Wp)

Incident irradiance sensitivity chart



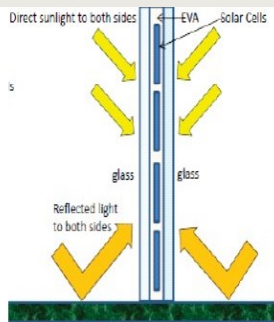
## PERFORMANCE WARRANTY





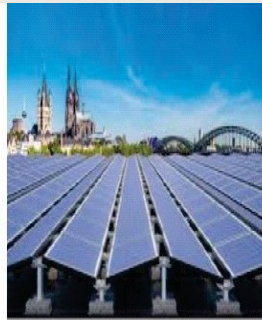
Energy yield gain increases almost linearly from GCR 0.5 to 0.25, while becomes slowly from 0.25 to 0.1. Based on the simulation, both increasing ground albedo and height can have more power gain.

- Increasing module mounting height improves backside energy yield, as well as backside irradiance uniformity.
- Module height (clearance from ground) of 1m and above is recommended to 1.5 to 2 m.



### VERTICAL INSTALLATION

- ~10-20% yield compared to south-facing
- Noon peak shaving
- Better matching with electricity need
- "Rectangle" solar power generation



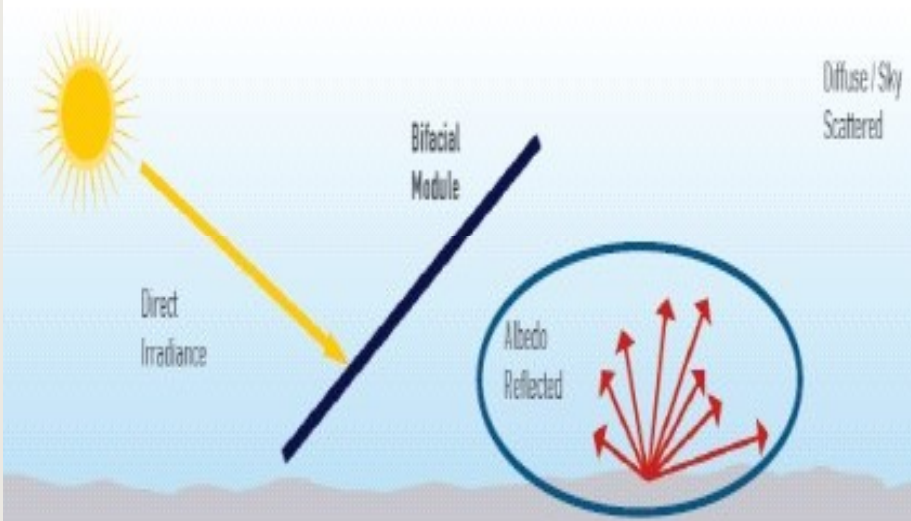
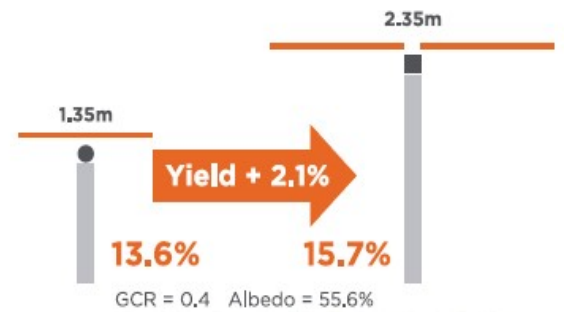
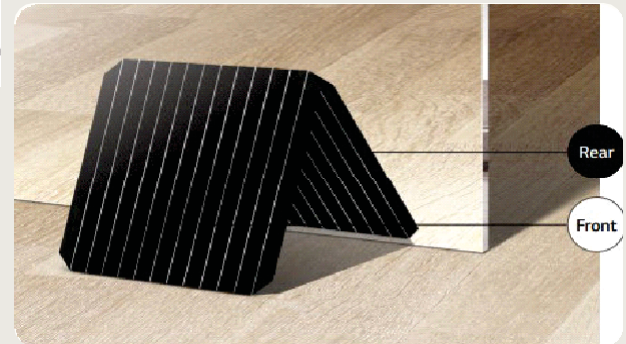
### DOUBLE PEAK PROFILE

- Double Peak Profile
- 50% panels face eastwards to create a generation peak in the morning
- 50% is tilted westwards to also allow for a generation peak in the afternoon



### FLOATING ON BIFACIAL

- Contribute to natural ecosystem
- Bifacial energy gain up to 30%



- ↑ **ALBEDO:**
  - ↑ Main influence
  - ↕ Seasonal variations
- ↓ **GCR**
  - ↑ Tracking time
  - ↑ Bifacial Ratio
- ↑ **Height**
  - ↑ Rear irradiance
  - ↓ Mismatch
  - ↓ Temperature



Type of soil	Albedo
Urban environment	0.14-0.22
Grass	0.15-0.25
Fresh grass	0.26
Fresh snow	0.82
Wet snow	0.55-0.75
Dry asphalt	0.09-0.15

Type of soil	Albedo
Wet Asphalt	0.18
Concrete	0.25-0.35
Red tiles	0.33
Aluminum	0.85
Copper	0.74
New galvanized steel	0.35
Very dirty galvanized	0.08



### **Yield**

As per Albedo, increased energy gain between approx 6%–25% versus mono-facial PV modules



### **PID Free**

Glass backing has a lower permeability to moisture than mono-facial backing materials, which reduces risk from Potential-Induced Degradation (PID)



### **More flexibility in solar PV system design**

With the use of bifacial solar modules, the direction that the modules are facing is of less importance



### **Warranties**

Favourable warranties compared to mono-facial: 25 year lifetime warranty and 0.82% annual degradation are common



### **Extended Durability**

By embedding of solar photovoltaic cells in a glass composite, they are highly protected against environmental and mechanical influences and therefore last longer



### **Vertical Installation**

By installing PV solar panels vertically, heavy snow loads or sand will not inhabit the modules from generating electricity



### **Commercial Benefits**

With the world moving from INR/Wp to INR/kWh, bifacial module would be the next obvious choice for end customers/EPCs



Up to 570W front power and 21% + Ve module efficiency with half-cut technology enabling higher BOS saving. Lower resistance of half-cut cells ensures higher power.



### **Low temperature co-efficient**

(-0.35%) and NOOT increases energy production. Better anti-shading performance and lower operating temperature. Higher power from same installation footprint as standard modules



### **Better low-light performance**

(Excellent performance in low-light environments (e.g. early morning, dusk, and cloud, etc.)



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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. All electrical data without guarantee. Please confirm