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# APEX SOLAR ENTERPRISE BROCHURE

LET EVERYONE ENJOY  
THE WEALTH OF SUNSHINE



APEX SOLAR WECHAT PUBLIC ACCOUNT

GLOBAL OPERATION CENTER : ROOM 704, BLOCK A, JEWEL INTERNATIONAL CENTER, XISHAN DISTRICT, WUXI CITY  
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CONCENTRATION ZONE, SONGQIAO TOWN, GAOYOU CITY , JIANGSU PROVINCE ,CHINA  
WEBSITE: WWW.APEX-SOLARENERGY.COM

JIANGSU APEX SOLAR ENERGY GROUP CO., LTD.

APEX SOLAR  
**LET EVERYONE ENJOY  
THE WEALTH OF SUNSHINE**

Apex Solar Inc. operates with a 100% green production chain to help SMEs realize their carbon-reducing goals by providing:

Highest quality solar panels

A full range of clean energy solutions

Custom designs to meet your specific needs

Excellent and responsive customer service.

We are committed to providing satisfied customers with the highest quality cutting-edge solar

Let us connect your solar plan to our 100% renewable supply chain and dedicated professional team so that we can work together to help you save on energy while protecting our natural environment.

## 108cells Monocrystalline Bifacial Dual Glass Module



### HRAP-108HBD 395-420M10

**21.51%**

Maximum Module Efficiency

**420W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**1722x1134x30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

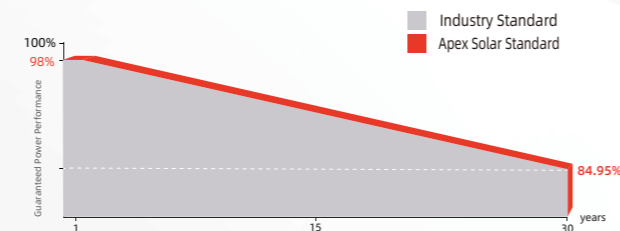
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## High Efficiency Half-cells Solar Panel HRAP-108HBD 395-420M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	395	400	405	410	415	420
Maximum Power Voltage(Vmp) [V]	30.84	31.02	31.23	31.45	31.64	31.82
Maximum Power Current(Impp) [A]	12.81	12.90	12.97	13.04	13.12	13.20
Open Circuit Voltage(Voc) [V]	36.98	37.07	37.19	37.32	37.45	37.58
Short Circuit Current(Isc) [A]	13.70	13.79	13.87	13.95	14.02	14.10
Module Efficiency [%]	20.23	20.48	20.74	21.00	21.25	21.51

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	298	302	306	310	314	318
Maximum Power Voltage(Vmp) [V]	34.75	34.88	35.12	35.23	35.37	35.50
Maximum Power Current(Impp) [A]	29.08	29.26	29.47	29.72	29.89	30.09
Open Circuit Voltage(Voc) [V]	10.96	11.03	11.10	11.16	11.22	11.29
Short Circuit Current(Isc) [A]	10.25	10.32	10.38	10.43	10.50	10.57

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	415	420	425	431	436	441
	Module Efficiency STC[%]	21.24	21.51	21.78	22.05	22.31	22.58
10%	Maximum Power (Pmax) [W]	435	440	446	451	457	462
	Module Efficiency STC[%]	22.25	22.53	22.81	23.10	23.38	23.66
20%	Maximum Power (Pmax) [W]	474	480	486	492	498	504
	Module Efficiency STC[%]	24.27	24.58	24.89	25.20	25.50	25.81

### MECHANICAL SPECIFICATION

Cell Type	Monocrystalline
Cell Dimensions	182x182mm
Cell Arrangement	108(6x18)
Weight	21.5kg(±3%)
Module Dimensions	1722x1134x30mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

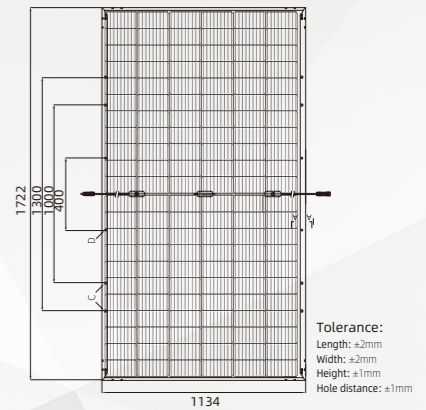
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C-+85°C
Maximum Series Fuse	25A

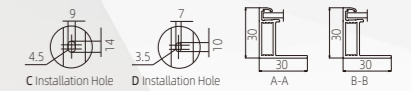
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	962pcs/40HQ

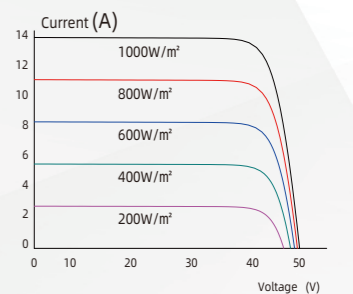
### Module Dimension(mm)



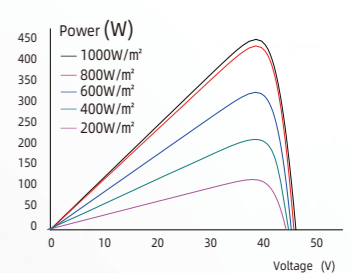
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (420W)



### Power-Voltage Curve (420W)



#### 0-3W

0-3W%

Guaranteed 0-3W positive tolerance ensures the power output reliability



#### High customer value

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations



#### Highly reliable due to stringent quality control

Three times strict EL testing beyond certification requirements



#### Fusion of MBB and half-cut cells technology

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability



#### Excellent Anti-PID performance

Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process



#### Outstanding low light performance

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment



## 144cells Monocrystalline Bifacial Dual Glass Module



### HRAP-144HBD 435-455M6

**20.93%**

Maximum Module Efficiency

**455W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2094×1038×30mm**

Module Dimensions

**0-3W%**

Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**

Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

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Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

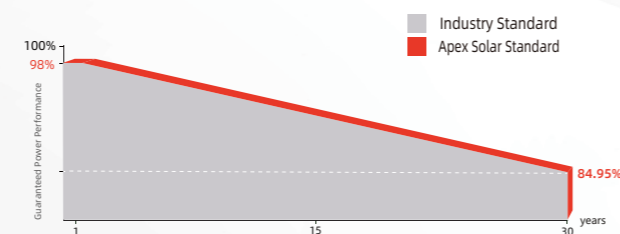
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



**Industry Leading Linear Power Warranty**

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## High Efficiency Half-cells Solar Panel HRAP-144HBD 435-455M6

**ELECTRICAL PARAMETERS AT STC**

Rated Maximum Power(Pmax) [W]	435	440	445	450	455
Maximum Power Voltage(Vmp) [V]	40.97	41.2	41.44	41.67	41.9
Maximum Power Current(Impp) [A]	10.62	10.68	10.74	10.8	10.86
Open Circuit Voltage(Voc) [V]	49.05	49.3	49.55	49.8	50.05
Short Circuit Current(Isc) [A]	11.24	11.3	11.36	11.42	11.48
Module Efficiency [%]	20.01	20.24	20.47	20.7	20.93

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

**ELECTRICAL PARAMETERS AT NMOT**

Rated Maximum Power(Pmax)[W]	331.03	334.76	338.61	342.39	346.19
Maximum Power Voltage(Vmp) [V]	39.07	39.29	39.52	39.74	39.96
Maximum Power Current(Impp) [A]	8.47	8.52	8.57	8.62	8.66
Open Circuit Voltage(Voc) [V]	46.52	46.76	46.99	47.23	47.47
Short Circuit Current(Isc) [A]	9.04	9.09	9.14	9.19	9.24

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

**BIFACIAL OUTPUT-REAR SIDE POWER GAIN**

5%	Maximum Power (Pmax) [W]	457	462	467	473	478
	Module Efficiency STC[%]	21.01	21.26	21.50	21.74	21.98
10%	Maximum Power (Pmax) [W]	479	484	490	495	501
	Module Efficiency STC[%]	22.01	22.27	22.52	22.77	23.03
20%	Maximum Power (Pmax) [W]	522	528	534	540	546
	Module Efficiency STC[%]	24.02	24.29	24.57	24.84	25.12

**MECHANICAL SPECIFICATION**

Cell Type	Monocrystalline
Cell Dimensions	166×166mm
Cell Arrangement	144(6×24)
Weight	27kg(±3%)
Module Dimensions	2094×1038×30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

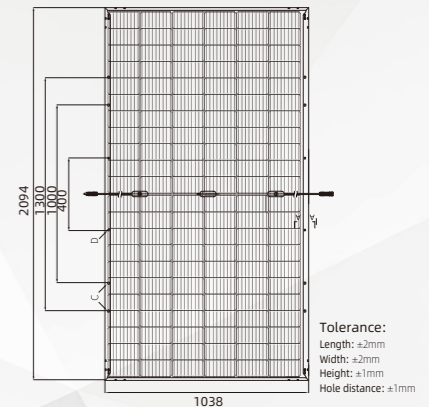
**OPERATING CONDITIONS**

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	20A

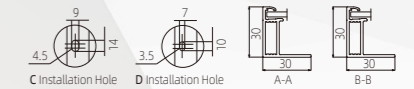
**PPACKING CONFIGURATION**

Quantity/Pallet	36pcs/pallet
Quantity/Container	825pcs/40HQ

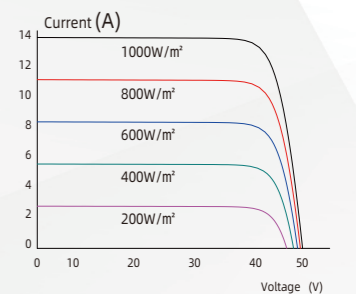
**Module Dimension(mm)**



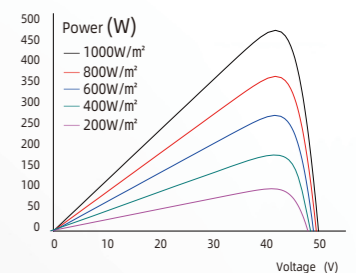
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



**Current-Voltage Curve (455W)**



**Power-Voltage Curve (455W)**





# 120cells Monocrystalline Bifacial Dual Glass Module



## HRAP-120HBD 440-455M10

**21.08%**

Maximum Module Efficiency

**455W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**1909×1134×30mm**

Module Dimensions

**0-3W** **0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

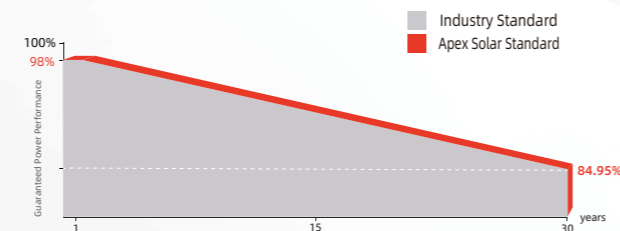
**Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

IEC 61215 / IEC 61730  
Fire safty class:Class C according to UL790  
ISO 9001 :Quality Management System  
ISO 14001 :Environment Management



**Industry Leading Linear Power Warranty**  
12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty **30** Power Warranty

# High Efficiency Half-cells Solar Panel HRAP-120HBD 440-455M10

## ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	440	445	450	455
Maximum Power Voltage(Vmp) [V]	34.10	34.30	34.50	34.70
Maximum Power Current(Impp) [A]	12.91	12.98	13.05	13.12
Open Circuit Voltage(Voc) [V]	41.00	41.20	41.40	41.60
Short Circuit Current(Isc) [A]	13.64	13.71	13.78	13.85
Module Efficiency [%]	20.39	20.62	20.85	21.08

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

## ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	328.90	332.60	336.40	340.10
Maximum Power Voltage(Vmp) [V]	31.70	31.90	32.10	32.30
Maximum Power Current(Impp) [A]	10.37	10.43	10.48	10.54
Open Circuit Voltage(Voc) [V]	38.30	38.50	38.70	38.90
Short Circuit Current(Isc) [A]	11.02	11.07	11.13	11.18

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

## BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	462	467	473	478
	Module Efficiency STC[%]	21.34	21.58	21.83	22.07
10%	Maximum Power (Pmax) [W]	484	490	495	501
	Module Efficiency STC[%]	22.36	22.61	22.87	23.12
20%	Maximum Power (Pmax) [W]	528	534	540	546
	Module Efficiency STC[%]	24.39	24.67	24.94	25.22

## MECHANICAL SPECIFICATION

Cell Type	Monocrystalline
Cell Dimensions	182×182mm
Cell Arrangement	120(6×20)
Weight	26kg(±3%)
Module Dimensions	1909×1134×30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

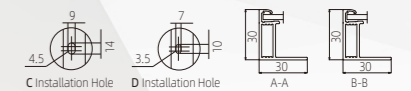
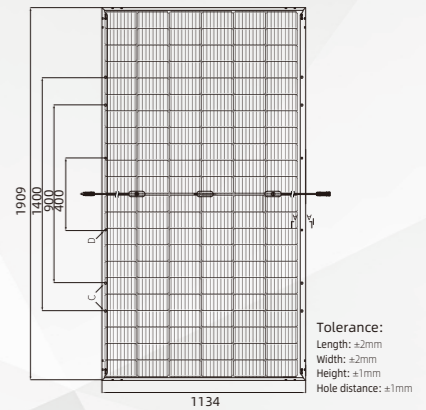
## OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	25A

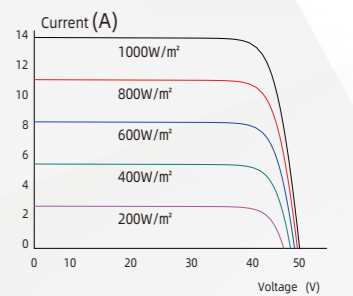
## PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	864pcs/40HQ

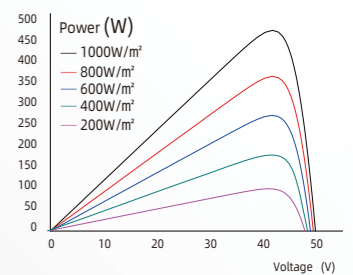
## Module Dimension(mm)



## Current-Voltage Curve (455W)



## Power-Voltage Curve (455W)



## 144cells Monocrystalline Bifacial Dual Glass Module



### HRAP-144HBD 530-550M10

**21.3%**

Maximum Module Efficiency

**550W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2279×1134×30mm**

Module Dimensions

**0-3W%**

Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**

Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

**Excellent Anti-PID performance**

Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

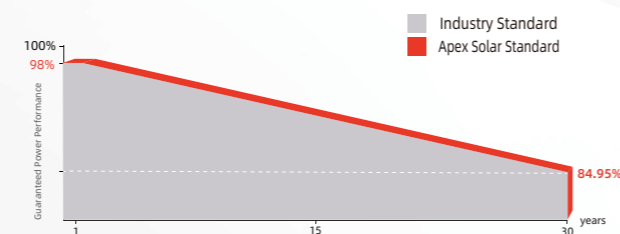
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## High Efficiency Half-cells Solar Panel HRAP-144HBD 530-550M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	530	535	540	545	550
Maximum Power Voltage(Vmp) [V]	41.31	41.47	41.64	41.80	41.96
Maximum Power Current(Impp) [A]	12.83	12.90	12.97	13.04	13.11
Open Circuit Voltage(Voc) [V]	49.30	49.45	49.60	49.75	49.90
Short Circuit Current(Isc) [A]	13.72	13.79	13.86	13.93	14.00
Module Efficiency [%]	20.5	20.7	20.9	21.1	21.3

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	401	405	408	412	416
Maximum Power Voltage(Vmp) [V]	38.57	38.78	38.99	39.20	39.43
Maximum Power Current(Impp) [A]	10.39	10.43	10.47	10.51	10.55
Open Circuit Voltage(Voc) [V]	46.18	46.31	46.43	46.55	46.68
Short Circuit Current(Isc) [A]	11.01	11.05	11.09	11.13	11.17

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	557	562	567	572	578
	Module Efficiency STC[%]	21.53	21.74	21.94	22.14	22.35
10%	Maximum Power (Pmax) [W]	583	589	594	600	605
	Module Efficiency STC[%]	22.56	22.77	22.98	23.20	23.41
20%	Maximum Power (Pmax) [W]	636	642	648	654	660
	Module Efficiency STC[%]	24.61	24.84	25.07	25.31	25.54

### MECHANICAL SPECIFICATION

Cell Type	Monocrystalline
Cell Dimensions	182×182mm
Cell Arrangement	144(6×24)
Weight	32kg(±3%)
Module Dimensions	2279×1134×30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

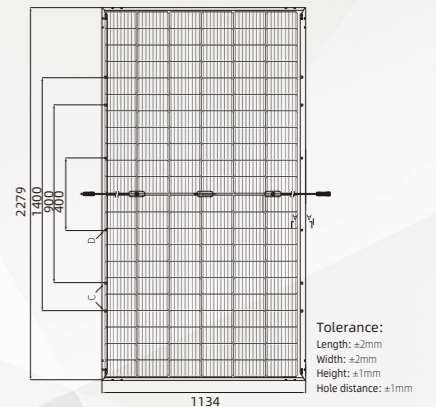
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C-+85°C
Maximum Series Fuse	20A

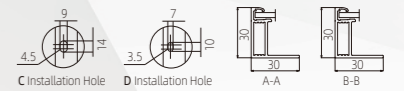
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	720pcs/40HQ

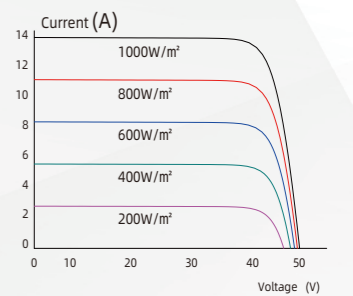
### Module Dimension(mm)



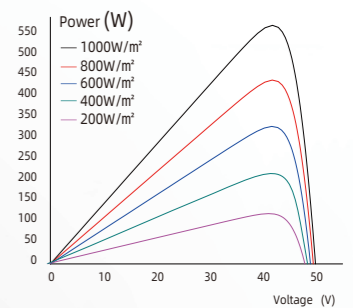
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (550W)



### Power-Voltage Curve (550W)





## 120cells Monocrystalline Bifacial Dual Glass Module



### HRAP-120HBD 590-605M12

**21.4%**

Maximum Module Efficiency

**605W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2172×1303×35mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

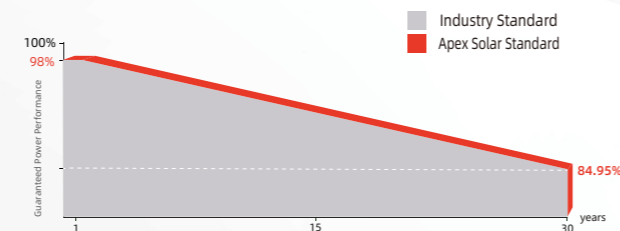
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## High Efficiency Half-cells Solar Panel HRAP-120HBD 590-605M12

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	590	595	600	605
Maximum Power Voltage(Vmp) [V]	34	34.2	34.4	34.6
Maximum Power Current(Impp) [A]	17.35	17.4	17.44	17.49
Open Circuit Voltage(Voc) [V]	41.1	41.3	41.5	41.7
Short Circuit Current(Isc) [A]	18.42	18.47	18.52	18.57
Module Efficiency [%]	20.8	21	21.2	21.4

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	447	451	454	458
Maximum Power Voltage(Vmp) [V]	31.7	31.9	32	32.2
Maximum Power Current(Impp) [A]	14.09	14.13	14.18	14.22
Open Circuit Voltage(Voc) [V]	38.7	38.9	39.1	39.3
Short Circuit Current(Isc) [A]	14.85	14.88	14.92	14.96

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	620	625	630	635
	Module Efficiency STC[%]	21.89	22.08	22.26	22.45
10%	Maximum Power (Pmax) [W]	649	655	660	666
	Module Efficiency STC[%]	22.93	23.13	23.32	23.51
20%	Maximum Power (Pmax) [W]	708	714	720	726
	Module Efficiency STC[%]	25.02	25.23	25.44	25.65

### MECHANICAL SPECIFICATION

Cell Type	Monocrystalline
Cell Dimensions	210×210mm
Cell Arrangement	120(6×20)
Weight	30.9kg(±3%)
Module Dimensions	2172×1303×35mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

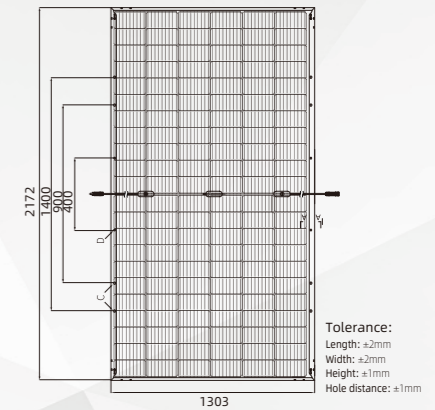
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C-+85°C
Maximum Series Fuse	30A

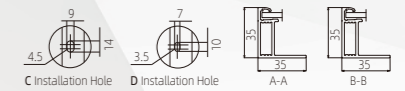
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	648pcs/40HQ

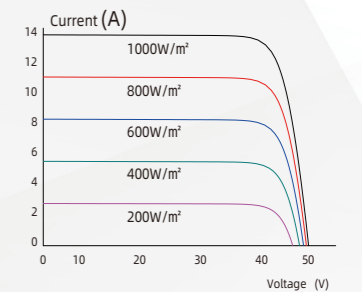
### Module Dimension(mm)



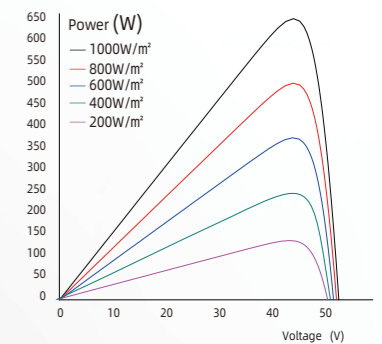
Tolerance:  
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Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (605W)



### Power-Voltage Curve (605W)



#### 0-3W

0-3W%

Guaranteed 0-3W positive tolerance ensures the power output reliability



#### High customer value

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations



#### Highly reliable due to stringent quality control

Three times strict EL testing beyond certification requirements



#### Fusion of MBB and half-cut cells technology

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability



#### Excellent Anti-PID performance

Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process



#### Outstanding low light performance

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment



## 132cells Monocrystalline Bifacial Dual Glass Module



# HRAP-132HBD 655-670M12

## 21.57%

Maximum Module Efficiency

## 670W

Maximum Power Output

Power Shorting Tolerance:0-3W

## 2384×1303×35mm

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

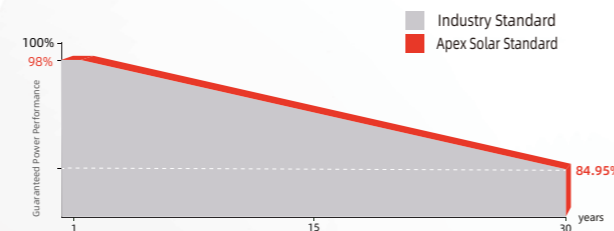
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## High Efficiency Half-cells Solar Panel HRAP-132HBD 655-670M12

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	655	660	665	670
Maximum Power Voltage(Vmp) [V]	37.59	37.79	37.99	38.19
Maximum Power Current(Imp) [A]	17.43	17.47	17.51	17.55
Open Circuit Voltage(Voc) [V]	45.49	45.69	45.89	46.09
Short Circuit Current(Isc) [A]	18.49	18.52	18.55	18.61
Module Efficiency [%]	21.09	21.25	21.41	21.57

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	496	500	504	508
Maximum Power Voltage(Vmp) [V]	35.09	35.29	35.49	35.69
Maximum Power Current(Imp) [A]	14.14	14.17	14.20	14.23
Open Circuit Voltage(Voc) [V]	42.79	42.99	43.19	43.39
Short Circuit Current(Isc) [A]	14.88	14.93	14.98	15.03

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	688	693	698	704
	Module Efficiency STC[%]	22.14	22.31	22.48	22.65
10%	Maximum Power (Pmax) [W]	721	726	732	737
	Module Efficiency STC[%]	23.19	23.37	23.55	23.73
20%	Maximum Power (Pmax) [W]	786	792	798	804
	Module Efficiency STC[%]	25.30	25.50	25.69	25.88

### MECHANICAL SPECIFICATION

Cell Type	Monocrystalline
Cell Dimensions	210×210mm
Cell Arrangement	132(6×22)
Weight	38.1kg(±3%)
Module Dimensions	2384×1303×35mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

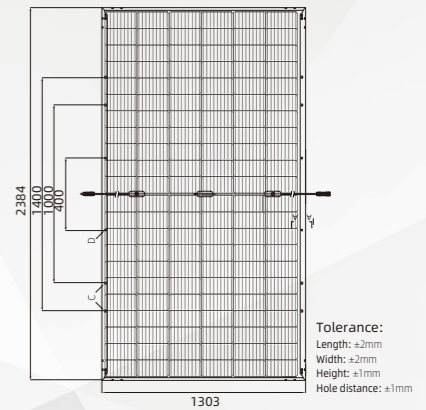
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	35A

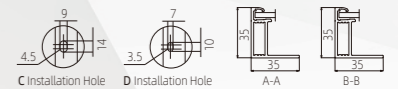
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	648pcs/40HQ

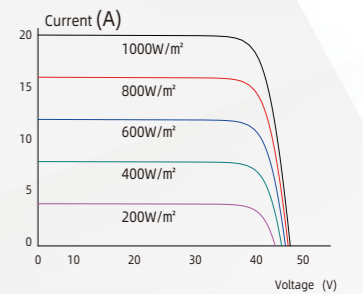
### Module Dimension(mm)



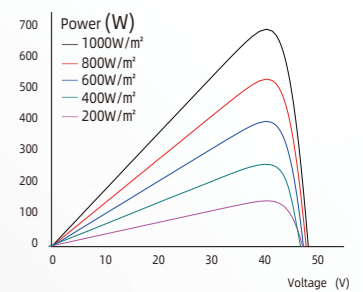
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (605W)



### Power-Voltage Curve (605W)



#### 0-3W

0-3W%

Guaranteed 0-3W positive tolerance ensures the power output reliability



#### High customer value

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations



#### Highly reliable due to stringent quality control

Three times strict EL testing beyond certification requirements



#### Fusion of MBB and half-cut cells technology

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability



#### Excellent Anti-PID performance

Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process



#### Outstanding low light performance

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

# 108cells Monocrystalline Bifacial Dual Glass Module

## HRAP-108HBD-N410-N425M10

### N-TOPCon Technology

**21.76%**

Maximum Module Efficiency

**425W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**1724x1134x30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

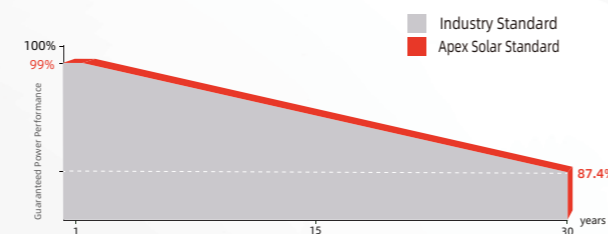
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-108HBD-N410-N425M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	410	415	420	425
Maximum Power Voltage(Vmp) [V]	31.13	31.32	31.51	31.70
Maximum Power Current(Impp) [A]	13.17	13.25	13.33	13.41
Open Circuit Voltage(Voc) [V]	37.73	37.92	38.11	38.30
Short Circuit Current(Isc) [A]	13.91	13.99	14.07	14.15
Module Efficiency [%]	21.00	21.25	21.51	21.76

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	308	312	316	320
Maximum Power Voltage(Vmp) [V]	29.06	29.21	29.34	29.50
Maximum Power Current(Impp) [A]	10.61	10.68	10.76	10.83
Open Circuit Voltage(Voc) [V]	35.84	36.02	36.20	36.38
Short Circuit Current(Isc) [A]	11.23	11.29	11.36	11.42

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	431	436	441	446
	Module Efficiency STC[%]	22.02	22.29	22.56	22.83
10%	Maximum Power (Pmax) [W]	451	457	462	468
	Module Efficiency STC[%]	23.07	23.35	23.63	23.91
20%	Maximum Power (Pmax) [W]	492	498	504	510
	Module Efficiency STC[%]	25.17	25.47	25.78	26.09

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	182x182mm
Cell Arrangement	108(6x18)
Weight	23kg(±3%)
Module Dimensions	1724x1134x30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

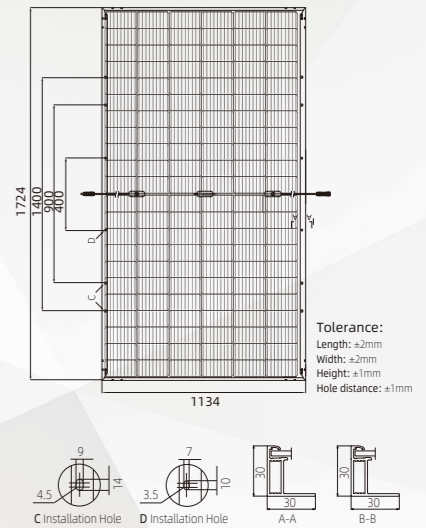
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C-+85°C
Maximum Series Fuse	25A

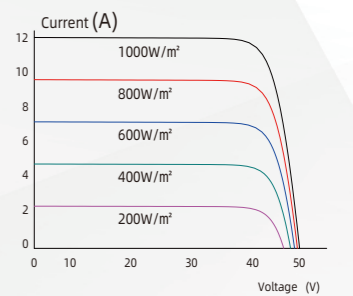
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	962pcs/40HQ

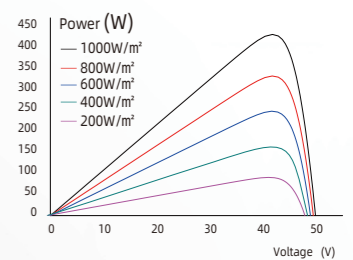
### Module Dimension(mm)



### Current-Voltage Curve (425W)



### Power-Voltage Curve (425W)



- 0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability
- High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations
- Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements
- Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability
- Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process
- Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment



# 120cells Monocrystalline Bifacial Dual Glass Module



## HRAP-120HBD-N460-N490M10

### N-TOPCon Technology

**22.63%**

Maximum Module Efficiency

**490W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**1909x1134x30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

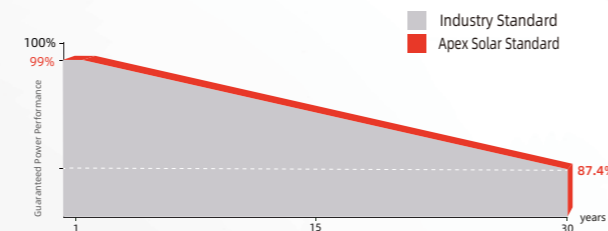
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

**0-3W**

**0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**

Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**

Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**

The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

**Excellent Anti-PID performance**

Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**

The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

## HRAP-120HBD-N460-N490M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	460	465	470	475	480	485	490
Maximum Power Voltage(Vmp) [V]	34.72	34.89	35.05	35.21	35.38	35.54	35.64
Maximum Power Current(Impp) [A]	13.25	13.33	13.41	13.49	13.57	13.65	13.75
Open Circuit Voltage(Voc) [V]	42.05	42.22	42.38	42.54	42.71	42.88	43.12
Short Circuit Current(Isc) [A]	13.99	14.07	14.15	14.23	14.31	14.39	14.51
Module Efficiency [%]	21.32	21.55	21.78	22.01	22.20	22.40	22.63

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	346	350	353	357	361	365	369
Maximum Power Voltage(Vmp) [V]	32.60	32.77	32.94	33.10	33.27	33.84	34.00
Maximum Power Current(Impp) [A]	10.61	10.67	10.73	10.79	10.85	10.80	10.86
Open Circuit Voltage(Voc) [V]	39.94	40.10	40.25	40.41	40.57	41.57	41.71
Short Circuit Current(Isc) [A]	11.29	11.36	11.42	11.49	11.55	11.24	11.31

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	483	488	494	499	504	509	515
	Module Efficiency STC[%]	22.31	22.55	22.80	23.04	23.28	23.52	23.77
10%	Maximum Power (Pmax) [W]	506	512	517	523	528	534	539
	Module Efficiency STC[%]	23.37	23.63	23.88	24.14	24.39	24.64	24.89
20%	Maximum Power (Pmax) [W]	552	558	564	570	576	582	588
	Module Efficiency STC[%]	25.50	25.78	26.05	26.33	26.61	26.88	27.16

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	182x182mm
Cell Arrangement	120(6x20)
Weight	26.2kg(±3%)
Module Dimensions	1909x1134x30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

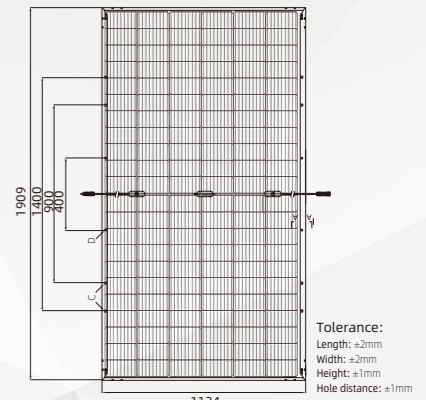
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	25A

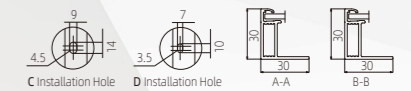
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	864pcs/40HQ

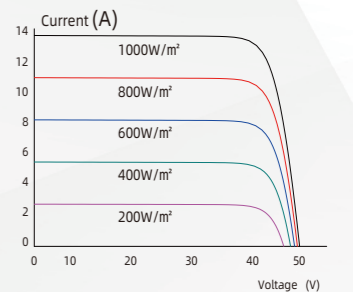
### Module Dimension(mm)



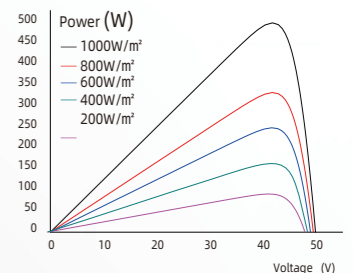
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (490W)



### Power-Voltage Curve (490W)





# 144cells Monocrystalline Bifacial Dual Glass Module



## HRAP-144HBD-N570-N590M10

### N-TOPCon Technology

**22.82%**

Maximum Module Efficiency

**590W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2279x1134x30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

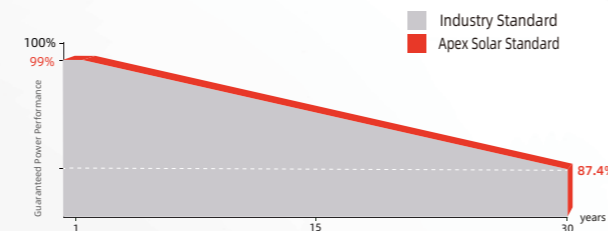
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-144HBD-N570-N590M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	570	575	580	585	590
Maximum Power Voltage(Vmp) [V]	42.07	42.22	42.37	42.52	42.67
Maximum Power Current(Impp) [A]	13.55	13.62	13.69	13.76	13.83
Open Circuit Voltage(Voc) [V]	50.74	51.88	51.02	52.16	52.37
Short Circuit Current(Isc) [A]	14.31	14.39	14.47	14.89	14.94
Module Efficiency [%]	22.05	22.24	22.45	22.63	22.82

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	429	432	436	441	445
Maximum Power Voltage(Vmp) [V]	39.65	39.78	39.87	41.05	41.21
Maximum Power Current(Impp) [A]	10.81	10.87	10.94	10.74	10.79
Open Circuit Voltage(Voc) [V]	48.51	48.70	48.89	50.06	50.25
Short Circuit Current(Isc) [A]	11.50	11.55	11.60	11.30	11.36

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	599	604	609	614	620
	Module Efficiency STC[%]	23.16	23.36	23.56	23.77	23.97
10%	Maximum Power (Pmax) [W]	627	633	638	644	649
	Module Efficiency STC[%]	24.26	24.47	24.69	24.90	25.11
20%	Maximum Power (Pmax) [W]	684	690	696	702	708
	Module Efficiency STC[%]	26.47	26.70	26.93	27.16	27.40

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	182x182mm
Cell Arrangement	144(6x24)
Weight	32kg(±3%)
Module Dimensions	2279x1134x30mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

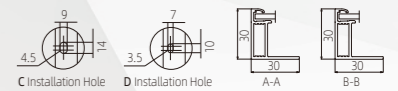
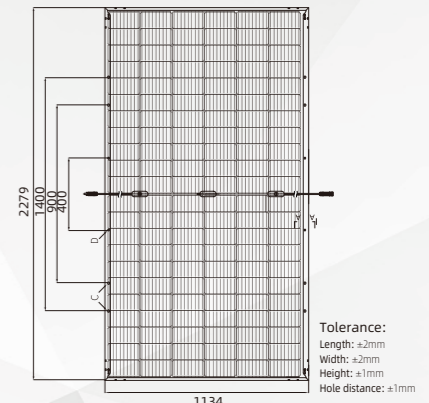
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	30A

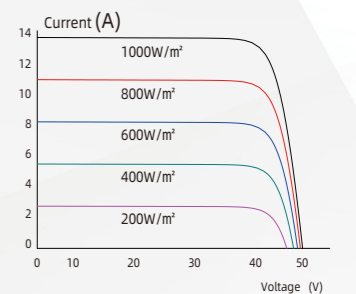
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	720pcs/40HQ

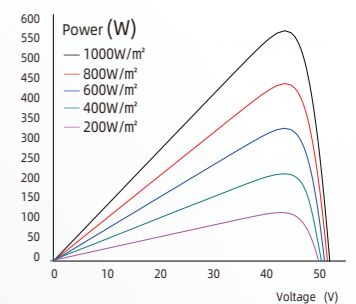
### Module Dimension(mm)



### Current-Voltage Curve (590W)



### Power-Voltage Curve (590W)



**0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

**Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

# 156cells Monocrystalline Bifacial Dual Glass Module



## HRAP-156HBD-N610-N640M10

### N-TOPCon Technology

**22.89%**

Maximum Module Efficiency

**640W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2465×1134×30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

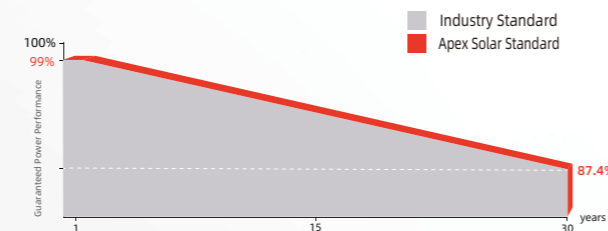
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-156HBD-N610-N640M10

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	610	615	620	625	630	635	640
Maximum Power Voltage(Vmp) [V]	45.59	45.69	45.79	45.92	46.26	46.42	46.52
Maximum Power Current(Impp) [A]	13.38	13.46	13.54	13.61	13.62	13.68	13.76
Open Circuit Voltage(Voc) [V]	55.25	55.40	55.55	55.70	55.86	56.01	56.15
Short Circuit Current(Isc) [A]	14.11	14.18	14.25	14.32	14.35	14.48	14.54
Module Efficiency [%]	21.82	22.00	22.18	22.36	22.53	22.71	22.89

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	459	462	466	470	472	476	480
Maximum Power Voltage(Vmp) [V]	42.28	42.39	42.50	42.61	42.72	42.82	42.92
Maximum Power Current(Impp) [A]	10.85	10.91	10.97	11.03	11.09	11.11	11.18
Open Circuit Voltage(Voc) [V]	52.48	52.62	52.77	52.91	53.05	53.66	53.96
Short Circuit Current(Isc) [A]	11.39	11.45	11.50	11.56	11.62	11.68	11.72

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	641	646	651	656	662	667	672
	Module Efficiency STC[%]	22.91	23.10	23.29	23.48	23.66	23.86	24.04
10%	Maximum Power (Pmax) [W]	671	677	682	688	693	698	704
	Module Efficiency STC[%]	24.00	24.20	24.40	24.59	24.79	24.97	25.18
20%	Maximum Power (Pmax) [W]	732	738	744	750	756	762	768
	Module Efficiency STC[%]	26.19	26.40	26.62	26.83	27.05	27.26	27.47

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	182x182mm
Cell Arrangement	156(6x26)
Weight	34.6kg(±3%)
Module Dimensions	2465x1134x30mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

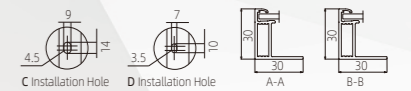
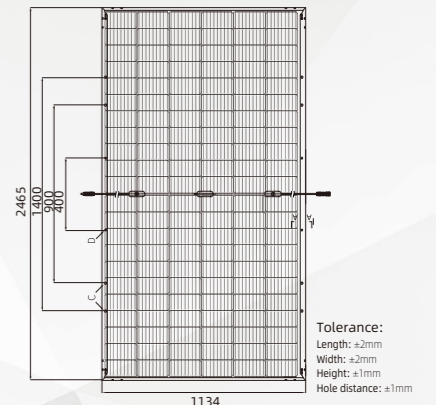
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	30A

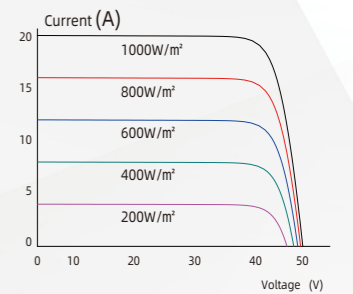
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	720pcs/40HQ

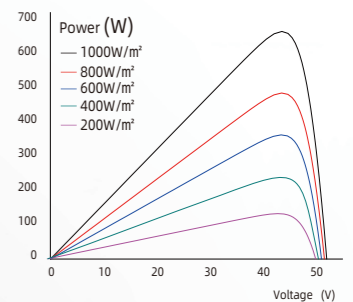
### Module Dimension(mm)



### Current-Voltage Curve (640W)



### Power-Voltage Curve 640W



**0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability

**High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations

**Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements

**Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability

**Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process

**Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment



# 132cells Monocrystalline Bifacial Dual Glass Module

## HRAP-132HBD-N680-N700M12

### N-TOPCon Technology

**22.53%**

Maximum Module Efficiency

**700W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2384×1303×35mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

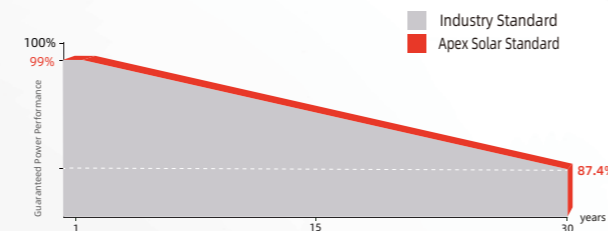
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-132HBD-N680-N700M12

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	680	685	690	695	700
Maximum Power Voltage(Vmp) [V]	38.55	38.74	38.94	39.13	39.33
Maximum Power Current(Impp) [A]	17.64	17.68	17.72	17.76	17.80
Open Circuit Voltage(Voc) [V]	46.50	46.69	46.88	47.07	47.26
Short Circuit Current(Isc) [A]	18.69	18.74	18.79	18.84	18.89
Module Efficiency [%]	21.89	22.05	22.21	22.37	22.53

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	513	517	521	525	529
Maximum Power Voltage(Vmp) [V]	36.15	36.36	36.56	36.74	36.94
Maximum Power Current(Impp) [A]	14.19	14.22	14.25	14.29	14.32
Open Circuit Voltage(Voc) [V]	44.37	44.56	44.75	44.94	45.13
Short Circuit Current(Isc) [A]	15.05	15.09	15.13	15.17	15.21

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	714	719	725	730	735
	Module Efficiency STC[%]	22.99	23.15	23.32	23.49	23.66
10%	Maximum Power (Pmax) [W]	748	754	759	765	770
	Module Efficiency STC[%]	24.08	24.26	24.43	24.61	24.79
20%	Maximum Power (Pmax) [W]	816	822	828	834	840
	Module Efficiency STC[%]	26.27	26.46	26.66	26.85	27.04

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	210×210mm
Cell Arrangement	132(6×22)
Weight	38kg(±3%)
Module Dimensions	2384×1303×35mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

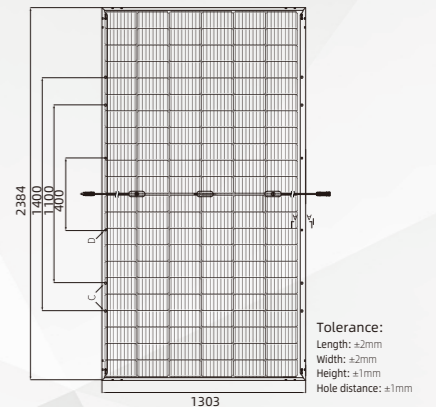
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	30A

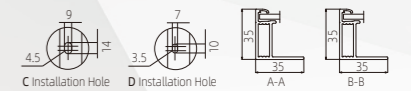
### PPACKING CONFIGURATION

Quantity/Pallet	31pcs/pallet
Quantity/Container	558pcs/40HQ

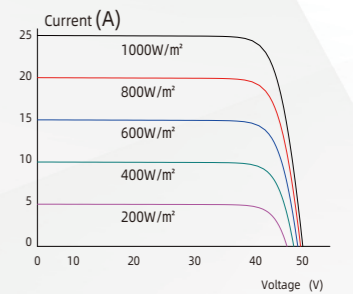
### Module Dimension(mm)



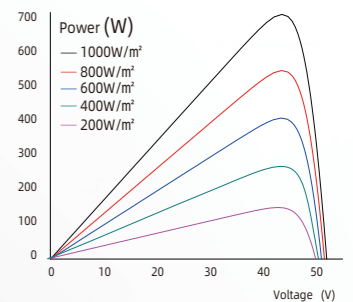
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (700W)



### Power-Voltage Curve (700W)



- 0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability
- High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations
- Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements
- Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability
- Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process
- Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment



# 132cells Monocrystalline Bifacial Dual Glass Module

## HRAP-132HBD-N695-N720M12

### N-TOPCon Technology

**23.20%**

Maximum Module Efficiency

**720W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2384×1303×35mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

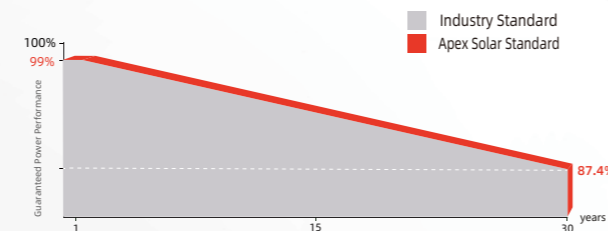
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-132HBD-N695-N720M12

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	695	700	705	710	715	720
Maximum Power Voltage(Vmp) [V]	40.30	40.50	40.70	40.90	41.10	41.30
Maximum Power Current(Impp) [A]	17.25	17.29	17.33	17.36	17.40	17.44
Open Circuit Voltage(Voc) [V]	48.30	48.60	48.80	49.00	49.20	49.40
Short Circuit Current(Isc) [A]	18.28	18.32	18.36	18.40	18.44	18.49
Module Efficiency [%]	22.40	22.50	22.70	22.90	23.00	23.20

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	531	534	540	543	547	551
Maximum Power Voltage(Vmp) [V]	37.90	38.00	38.30	38.50	38.70	38.80
Maximum Power Current(Impp) [A]	14.00	14.04	14.08	14.12	14.14	14.19
Open Circuit Voltage(Voc) [V]	45.90	46.10	46.30	46.50	46.70	46.90
Short Circuit Current(Isc) [A]	14.72	14.76	14.80	14.83	14.86	14.90

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	730	735	740	746	751	756
	Module Efficiency STC[%]	23.49	23.66	23.83	24.00	24.17	24.34
10%	Maximum Power (Pmax) [W]	765	770	776	781	787	792
	Module Efficiency STC[%]	24.61	24.79	24.96	25.14	25.32	25.50
20%	Maximum Power (Pmax) [W]	834	840	846	852	858	864
	Module Efficiency STC[%]	26.85	27.04	27.23	27.43	27.62	27.81

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	210×210mm
Cell Arrangement	132(6×22)
Weight	38.3kg(±3%)
Module Dimensions	2384×1303×35mm
Cable	4.0 mm <sup>2</sup> positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

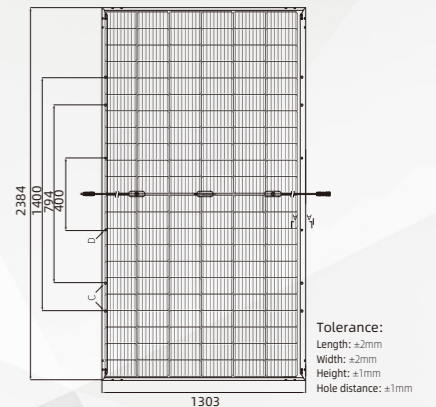
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C~+85°C
Maximum Series Fuse	35A

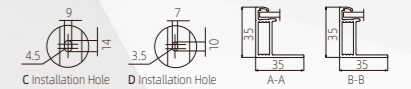
### PPACKING CONFIGURATION

Quantity/Pallet	31pcs/pallet
Quantity/Container	558pcs/40HQ

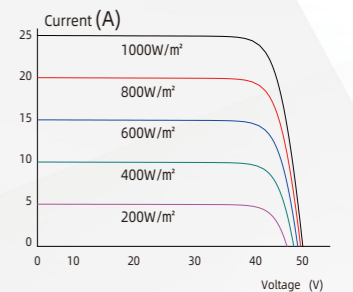
### Module Dimension(mm)



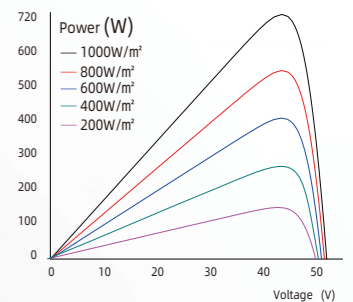
Tolerance:  
Length: ±2mm  
Width: ±2mm  
Height: ±1mm  
Hole distance: ±1mm



### Current-Voltage Curve (720W)



### Power-Voltage Curve (720W)



- 0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability
- High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations
- Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements
- Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability
- Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process
- Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment

# 132cells Monocrystalline Bifacial Dual Glass Module

## HRAP-132HBD-N600-N630R12

### N-TOPCon Technology

**23.32%**

Maximum Module Efficiency

**630W**

Maximum Power Output

Power Shorting Tolerance:0-3W

**2382x1134x30mm**

Module Dimensions

IEC 61215 / IEC 61730

Fire safty class:Class C according to UL790

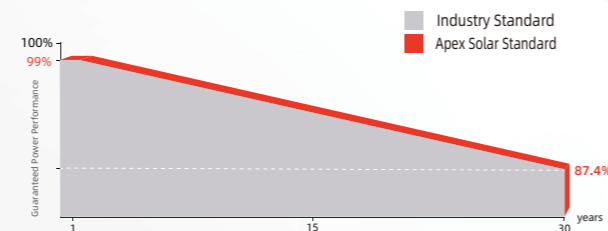
ISO 9001 :Quality Management System

ISO 14001 :Environment Management



#### Industry Leading Linear Power Warranty

12-year Warranty for Materials and Processing .30-year Warranty for Extra Linear Power Output



**12** Process Warranty

**30** Power Warranty

## HRAP-132HBD-N600-N630R12

### ELECTRICAL PARAMETERS AT STC

Rated Maximum Power(Pmax) [W]	600	605	610	615	620	625	630
Maximum Power Voltage(Vmp) [V]	47.80	48.00	48.20	48.40	48.60	48.80	49.00
Maximum Power Current(Impp) [A]	40.50	40.70	40.90	41.10	41.30	41.50	41.70
Open Circuit Voltage(Voc) [V]	15.76	15.82	15.88	15.94	16.00	16.06	16.12
Short Circuit Current(Isc) [A]	14.81	14.86	14.91	14.96	15.01	15.06	15.11
Module Efficiency [%]	22.21	22.40	22.58	22.77	22.95	23.14	23.32

STC: Irradiance 1000 W/m2 module temperature 25°C AM=1.5

### ELECTRICAL PARAMETERS AT NMOT

Rated Maximum Power(Pmax)[W]	452	456	460	463	467	471	475
Maximum Power Voltage(Vmp) [V]	45.40	45.60	45.80	46.00	46.20	46.40	46.60
Maximum Power Current(Impp) [A]	38.50	38.70	38.90	39.00	39.20	39.40	39.60
Open Circuit Voltage(Voc) [V]	12.72	12.77	12.82	12.87	12.92	12.97	13.01
Short Circuit Current(Isc) [A]	11.75	11.79	11.83	11.87	11.91	11.95	11.98

NMOT: Irradiance 800 W/m2 ambient temperature 20°C wind speed: 1m/s

### BIFACIAL OUTPUT-REAR SIDE POWER GAIN

5%	Maximum Power (Pmax) [W]	630	635	641	646	651	656	622
	Module Efficiency STC[%]	23.3	23.5	23.7	23.9	24.1	24.3	24.5
10%	Maximum Power (Pmax) [W]	690.0	695.8	701.5	707.3	713.0	718.8	724.5
	Module Efficiency STC[%]	25.5	25.8	26.0	26.2	26.4	26.6	26.8
20%	Maximum Power (Pmax) [W]	750.0	756.3	762.5	768.8	775.0	781.3	787.5
	Module Efficiency STC[%]	27.8	28.0	28.2	28.5	28.7	28.9	29.2

### MECHANICAL SPECIFICATION

Cell Type	N-Type Monocrystalline
Cell Dimensions	182x105mm
Cell Arrangement	132(6x22)
Weight	32.5kg(±3%)
Module Dimensions	2382x1134x30mm
Cable	4.0 mm² positive/negative:300mm(11.8inches ),length Can be customized
Front Glass	2.0 mm (0.08 inches), High Transmission, ARCoated Heat Strengthened Glass
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)
Frame	Anodized aluminium alloy
Junction Box	Protection class IP68
Connector	Mc4 Compatible
Mechanical Load	Front side 5400Pa/Rear side 2400Pa

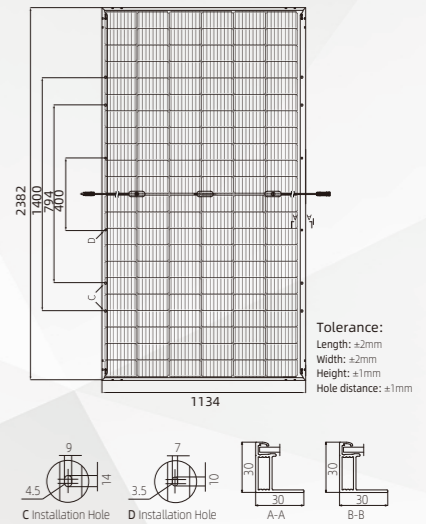
### OPERATING CONDITIONS

Maximum System Voltage (V)	1000/1500VDC (IEC)
Pmax Temperature Coefficient	-0.34%/°C
Voc Temperature Coefficient	-0.28%/°C
ISC Temperature Coefficient	+0.05%/°C
Nominal Operating Cell Temperature	45±2°C
Operating Temperature	-40°C-+85°C
Maximum Series Fuse	30A

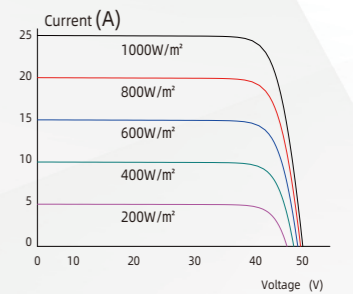
### PPACKING CONFIGURATION

Quantity/Pallet	36pcs/pallet
Quantity/Container	864pcs/40HQ

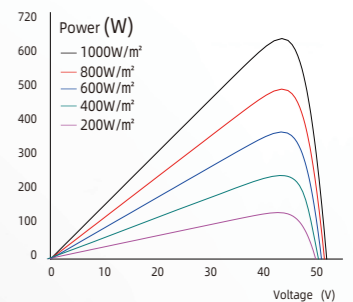
### Module Dimension(mm)



### Current-Voltage Curve (630W)



### Power-Voltage Curve (630W)



- 0-3W%**  
Guaranteed 0-3W positive tolerance ensures the power output reliability
- High customer value**  
Lower cost per kilowatt hour.High quality silicon wafer guarantee, high power module output, excellent cost performance advantage, is an ideal choice for solar power stations
- Highly reliable due to stringent quality control**  
Three times strict EL testing beyond certification requirements
- Fusion of MBB and half-cut cells technology**  
The new circuit design, minimizes the impact of shadow on the power generation of solar module.Excellent light utilization and current collection capacity, effectively improve product power output and reliability
- Excellent Anti-PID performance**  
Ensure that the scale production passes the PID test, and greatly reduce the attenuation caused by PID by optimizing the wafer process
- Outstanding low light performance**  
The coated glass with high transmittance and the surface technology of the wafer are used to achieve excellent performance in low light environment