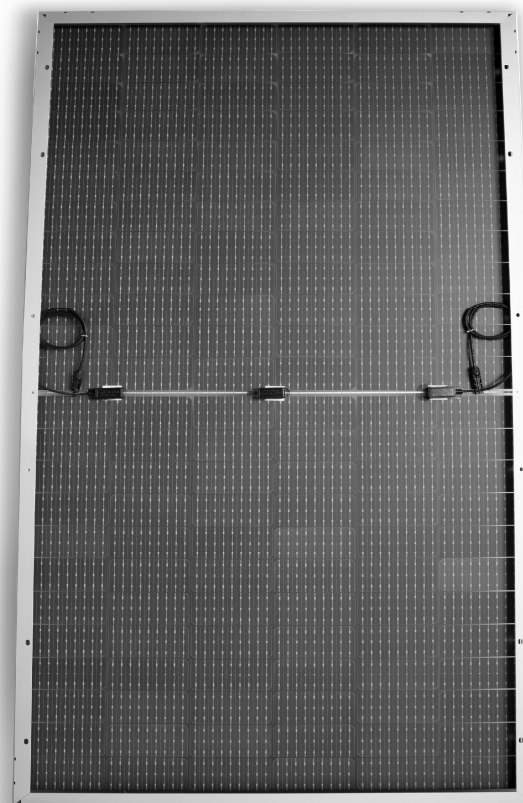
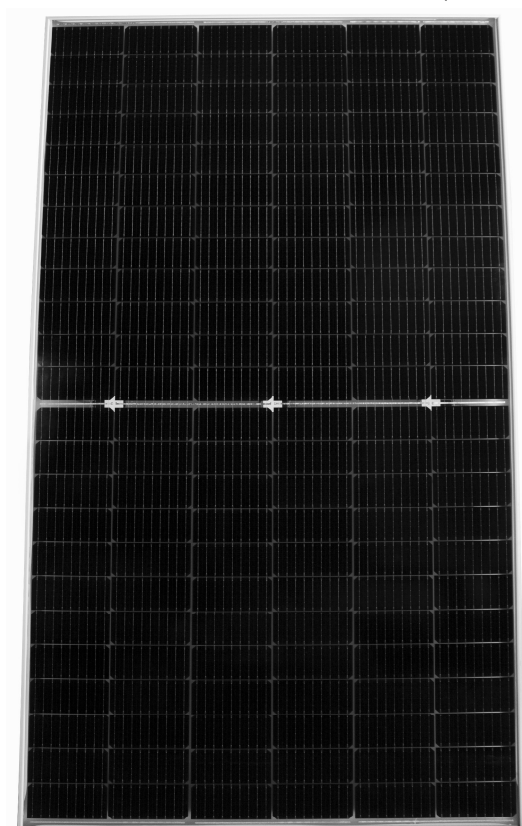


KB SOLAR 450-WATT SOLAR PANEL
MONOCRYSTALLINE BIFACIAL PERC 9BB HIGH EFFICIENCY
(MODULE-KBS-450-MONO-BF)



MODULE EFFICIENCY:
HIGH POWER OUTPUT:
LINEAR POWER OUTPUT WARRANTY:
MATERIAL WORKMANSHIP WARRANTY:

20.4%
450W
30 YEARS
12 YEARS

- High mono efficiency
- Up to 30% more energy yield due to the back-side power generation
- Minimize microcracks and free trails
- Improved shading tolerance
- Wind to 2400 Pa
- Snow to 5400 Pa
- Fire resistance up to Class C
- High-Efficiency PERC bifacial cell technology
- Outstanding temperature coefficient
- Certified for salt/ammonia corrosion resistance
- Lower LCOE
- Suitable for harsh environments such as coasts, lakes
- Assembled in the U.S

MODULE CERTIFICATION

- Conforms to UL STD(s) 61730-1 & 61730-2
- Certified to CSA STD(s) C22.2 #61730-1 & C22.2 #61730-2



Electrical Characteristics at Standard Test Conditions (STC)			MODULE-KBS-450-MONO-BF		
Module Type	KBS-445	KBS-450	KBS-455	KBS-460	KBS-465
Maximum Power - Pmax (W)	445	450	455	460	465
Open Circuit Voltage - Voc (V)	49.53	50.03	50.68	51.31	51.95
Maximum Power Voltage - Vmmp (V)	41.74	42.16	42.71	43.24	43.78
Short Circuit Current - Isc (A)	11.18	11.29	11.44	11.58	11.73
Maximum Power Current - Immp (A)	10.57	10.68	10.82	10.95	11.09
Module Efficiency	20.2%	20.4%	20.6%	20.8%	20.9%
Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1.5; module temperature 25°C. Tolerance of Pmmp: 0~+3%.					
Measuring uncertainty of power: ±3%.					
Electrical Characteristics at Nominal Module Operating Temperature (NMOT)					
Module Type	KBS-445	KBS-450	KBS-455	KBS-460	KBS-465
Maximum Power - Pmax (W)	331	336	339	343	347
Open Circuit Voltage - Voc (V)	46.25	46.71	47.32	47.91	48.51
Maximum Power Voltage - Vmmp (V)	38.30	38.68	39.19	39.68	40.17
Short Circuit Current - Isc (A)	8.97	9.06	9.18	9.29	9.41
Maximum Power Current - Immp (A)	8.60	8.68	8.79	8.90	9.02
(NMOT): irradiance 800 W/m²; ambient temperature 20°C. Wind speed 1 m/s; Tolerance of Pmpp: 0~+3%. Measuring uncertainty of power: ±3%					
Temperature Characteristics					
Nominal Operating Cell Temperature (NOCT)		45°C (±2°C)			
Voltage Temperature Coefficient		-0.26%/°C			
Current Temperature Coefficient		0.037%/°C			
Power Temperature Coefficient		-0.33%/°C			
Maximum Ratings					
Maximum System Voltage [V]		1500			
Operational Temperature		-40°C to +85°C			
Bifacial Factor		70%±5%			

Material Characteristics	
Dimensions	82.99 x 41.25 x 1.6 inch (2108 x 1048 x 35 mm)
Weight	51.4 lbs (23.31 kg)
Frame	Double Webbed 15-Micron Anodized Aluminum Alloy
Front Glass	High transparency, Antireflection coated, Semi-toughened safety glass, 3.2mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate) / POE
Backsheet	Composite film
Cells	144 Half-Cut, M6, 166mm, PERC Cells, 9BB (166mm×166mm)
Junction Box	IP-68 rated with 3 bypass diodes
Cable & Connector	0.3m Symmetrical Cables, compatible with MC4
System Design	
Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with Impact speed of 23 m·s-1
Maximum Surface Load	5,400 Pa
Application class	Class A
Packaging	
Dimensions(L×W×H)	2140x1160x1150mm
Modules per pallet/box:	27 pcs.
Modules per 53' trailer:	702 pcs.

