

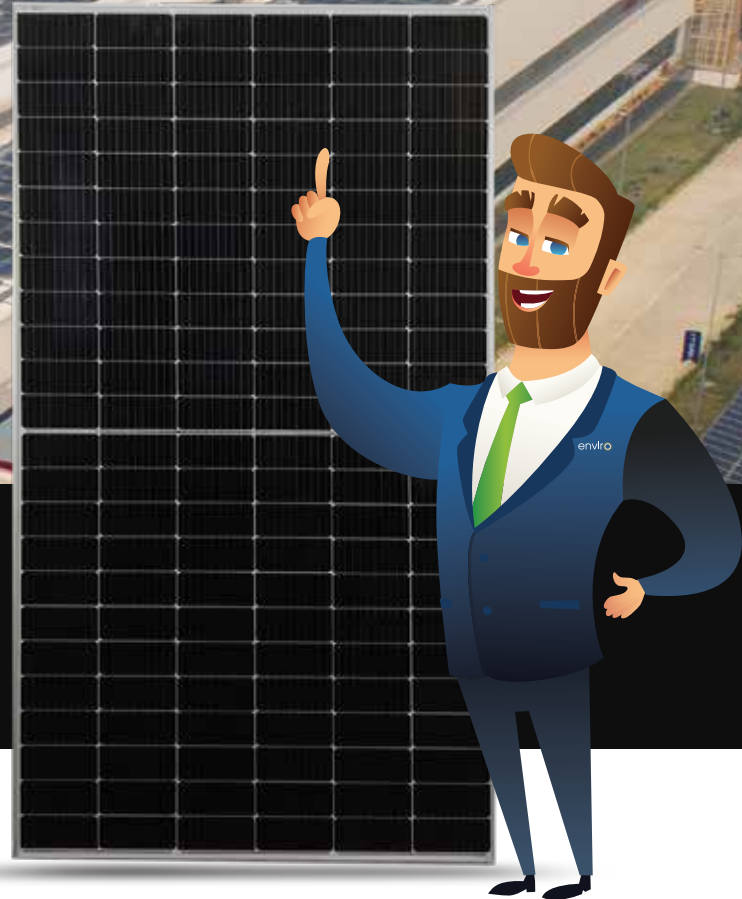


HAVELLS

enviro
HARNESSING LIGHT. HARVESTING ENERGY.

TOPCON SOLAR MODULE

**WORLD-CLASS PRODUCTS
MADE IN INDIA**



- Smart:** High module efficiency with 144X half-cut Mono Crystalline Bi-facial TopCon Solar Cell
- Modern:** Processed on state-of-the-art technology production lines
- Dependable:** Use of highest quality raw materials coupled with rigorous in-house testing
- Versatile:** Suitable for Utility, Rooftop, and other general applications

KEY SALIENT FEATURES



OUTPUT*



EFFICIENCY
UP TO 23.26%



TEMPERATURE
COEFFICIENT 0.29 %/°C

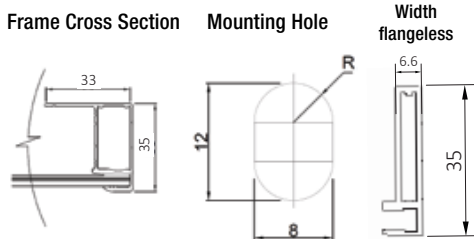


WARRANTY
12-year of product
30-year of power output

144 BI-FACIAL GAIN @DIFFERENT ALBEDO (%)

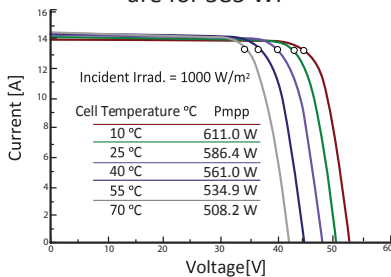
	Pm (WP)	Vmp (V)	Imp (A)	VOC (V)	Isc (A)	Efficiency (%)		Pm (WP)	Vmp (V)	Imp (A)	VOC (V)	Isc (A)	Efficiency (%)
Front @STC	560	42.65	13.14	52.02	13.69	21.71		565	42.87	13.19	52.30	13.75	21.90
5%	588	42.65	13.79	52.02	14.34	22.79		593.25	42.87	13.84	52.30	14.39	23.00
10%	616	42.65	14.44	52.02	14.99	23.88		621.5	42.87	14.50	52.30	15.05	24.09
20%	672	42.65	15.76	52.02	16.31	26.05		678	42.87	15.82	52.30	16.37	26.28
Front @STC	570	43.05	13.24	52.50	13.80	22.09		575	43.28	13.29	52.78	13.85	22.29
5%	598.5	43.05	13.90	52.50	14.45	23.20		603.75	43.28	13.95	52.78	14.50	23.40
10%	627	43.05	14.56	52.50	15.12	24.30		632.5	43.28	14.61	52.78	15.17	24.52
20%	684	43.05	15.89	52.50	16.44	26.51		690	43.28	15.94	52.78	16.50	26.75
Front @STC	580	43.50	13.34	53.03	13.89	22.48		585	43.74	13.38	53.27	13.93	22.68
5%	609	43.50	14.00	53.03	14.55	23.61		614.25	43.74	14.04	53.27	14.59	23.81
10%	638	43.50	14.67	53.03	15.21	24.73		643.5	43.74	14.71	53.27	15.26	24.94
20%	696	43.50	16.00	53.03	16.55	26.98		702	43.74	16.05	53.27	16.59	27.21
Front @STC	590	43.93	13.44	53.51	13.97	22.87		595	44.16	13.48	53.75	14.01	23.06
5%	619.5	43.93	14.10	53.51	14.63	24.01		624.75	44.16	14.15	53.75	14.67	24.22
10%	649	43.93	14.77	53.51	15.30	25.16		654.5	44.16	14.82	53.75	15.35	25.37
20%	708	43.93	16.12	53.51	16.64	27.44		714	44.16	16.17	53.75	16.69	27.68

NOCT (Wp) at 45 ± 2 C @800 W/m	560	565	570	575	580	585	590	595	600
Pmax (W)	416.77	420.49	424.21	427.93	431.65	435.38	439.10	442.82	446.54
Max. power voltage (Vmp), V	39.01	39.21	39.38	39.58	39.78	40.00	40.18	40.39	40.58
Max. power current (Imp), A	10.69	14.74	10.78	10.82	10.86	10.89	10.94	10.97	11.01
Open circuit voltage (Voc), V	48.37	48.63	48.82	49.08	49.30	49.53	49.76	49.98	50.21
Short circuit current (Isc), A	11.18	11.23	11.27	11.31	11.34	11.38	11.41	11.44	11.47

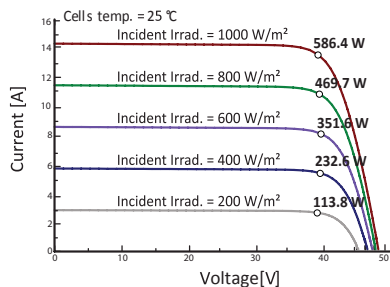


IV Curves

Cell temperature sensitivity chart
are for 585 WP



Incident irradiance sensitivity chart
are for 585 WP



	Pm (WP)	Vmp (V)	Imp (A)	VOC (V)	Isc (A)	Efficiency (%)
Front @STC	600	4437	13.53	54.00	14.05	23.26
5%	630	4437	14.20	54.00	14.71	24.42
10%	660	4437	14.87	54.00	15.39	25.58
20%	720	4437	16.23	54.00	16.74	27.91

Physical Parameters

No. of cells	144
Module dimension (mm)	2277 x 1133 (± 2)
Module Thickness (mm)	35
Approximate weight (kg)	31.5

Operating Conditions

Temperature, °C	-40 to +85
Max. system voltage, Vdc	1500
Hail imoact velocity, m / sec	23
Max. surface load capacity, Pa	5400
Max. wind speed capacity, Pa	2400
Series fuse rating, A	30

Mechanical Characteristics

Cable	No. 12 AWG, 4mm², (300 mm standard)
PV Connectors	MC4 Compatible
Frame	Anodized Aluminum Alloy
junction Box	IP68 Split junction box with 3 bypass diodes
Glass	-Glass (front): 2.0 mm AR Coated Semi Tempered Glass. -Glass (Back): 2.0 mm Semi Tempered Glass.

Cell Temperature Coefficient Bi-Facial

Open circuit voltage	- 0.25 % / °C
Short circuit current	+ 0.05 % / °C
Peak power	- 0.29 % / °C



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CIN - L31900DL1983PLC016304

