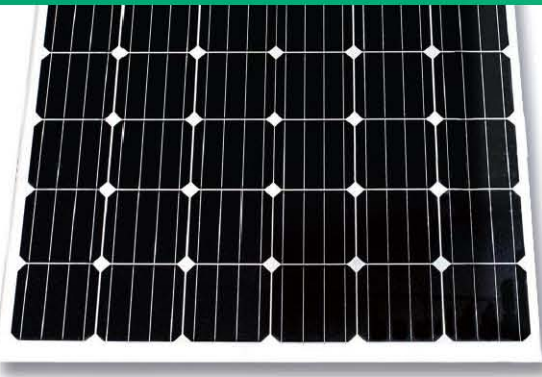




# 3S DUAL 72N



## ABOUT 3SUN

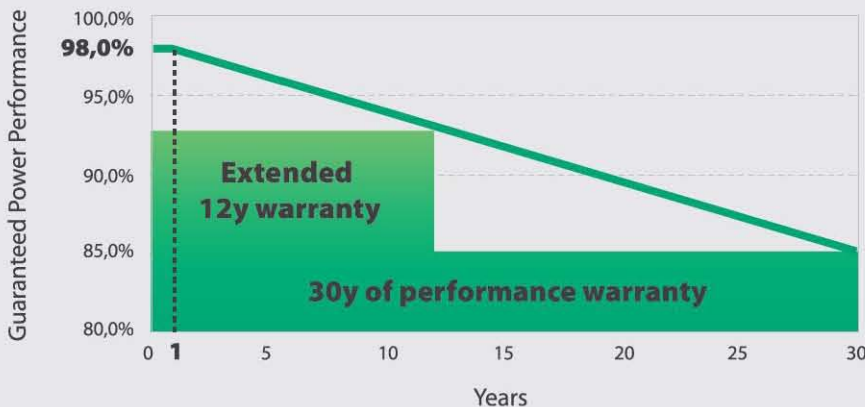
Founded in 2010 and owned by Enel Green Power, this Italian PV factory is the largest in Europe. It's fully committed to the production of photovoltaic modules and its mission is to support the Group with these resources to get clean, renewable energy to finally build a greener world.

## KEY FEATURES

- High efficiency: up to 18.2% of module efficiency.
- Double glass frameless bifacial structure: up to +25% of energy production gain.
- Designed for high voltage systems up to 1500 VDC.
- High durability against harsh environment conditions.
- Higher lifetime power yield:
  - Superior Warranty: 30 years performance
  - 0.45% linear power degradation.
- Designed to be PID free.
- Module made with LID free n-type cells.
- Static load: tested up to 5400Pa front and 2400Pa rear.
- Max Installation Altitude: up to 3000m.

## Warranty:

- 98% warranty for the first year
- Product Warranty 12 years
- Linear Performance Warranty 30 years



<b>N</b>	<b>PV TECNOLOGY</b>	<b>PV PANEL MODEL</b>	<b>CLASS [W]</b>	<b>SERIAL NUMBER</b>	<b>POWER [W]</b>	<b>PANELS [#]</b>	<b>PALLETS [#]</b>
1	THIN FILM	3SUN 3S-A115A	115	2000000664	9.200	80	2
2	THIN FILM	3SUN 3S-A130A	130	2000000667	3.842.800	29560	739
3	THIN FILM	3SUN 3S-A135A	135	2000000668	17.679.195	130957	3274
4	THIN FILM	3SUN 3S-A140A	140	2000000669	4.340	31	1
5	THIN FILM	3SUN NA-E115L5	115	2000000670	4.600	40	1
6	THIN FILM	3SUN NA-E115L5-B	115	2000000671	32.200	280	7
7	THIN FILM	3SUN NA-E130L5	130	2000017524	2.643.290	20333	508
<b>Totale Thin Film</b>					<b>24.215.625</b>	<b>181.281</b>	<b>4.532</b>
8	PERT	EGP 3SBA335A	335	2000072566	836.160	2496	96
9	PERT	EGP 3SBA340A	340	2000072567	10.351.640	30446	1171
10	PERT	EGP 3SBA345A	345	2000072568	10.853.700	31460	1210
11	PERT	EGP 3SBA350A	350	2000072569	200.200	572	22
<b>Totale PERT</b>					<b>22.241.700</b>	<b>64.974</b>	<b>2.499</b>
12	HJT-EVA	EGP 3SHB350A	350	2000853787	391.300	1118	43
13	HJT-EVA	EGP 3SHB355A	355	2000952736	18.460	52	2
14	HJT-EVA	EGP 3SHB360A	360	2000699031	1.048.320	2912	112
<b>Totale HJT-EVA</b>					<b>1.458.080</b>	<b>4.082</b>	<b>157</b>

# 3S DUAL 72N

## GENERAL CHARACTERISTICS

Number, type and arrangement of Cells	Mono-crystalline, n-type PERT, 72pcs in series (6x12)
Cell Size	156.75 mm x 156.75 mm
Pm Temperature Coefficient	-0.416 %/°C
Isc Temperature Coefficient	0.039 %/°C
Voc Temperature Coefficient	-0.321 %/°C
NMOT (Nominal Module Operating Temperature)	39 ± 2 °C
Test Condition	STC: AM=1.5, 1000W/m <sup>2</sup> , Cells Temperature 25°C
Operating Temperature	-40~+85 °C
Storage Temperature	-20~+50 °C

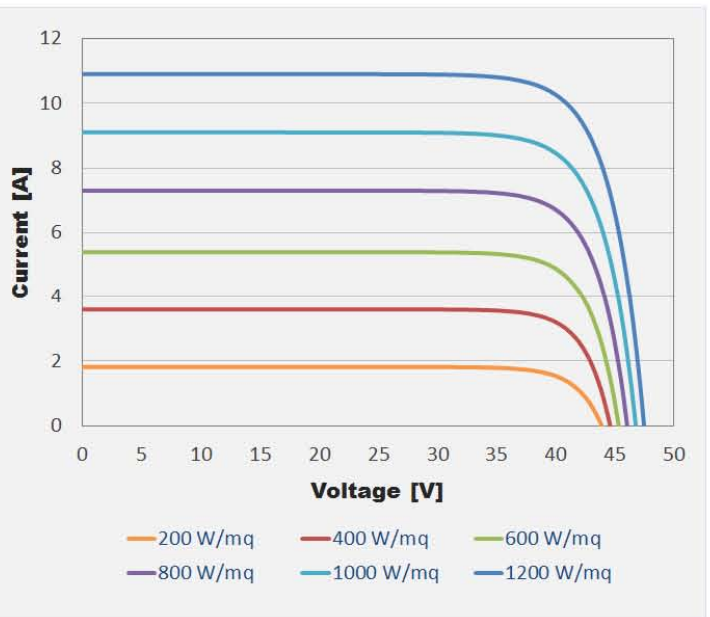
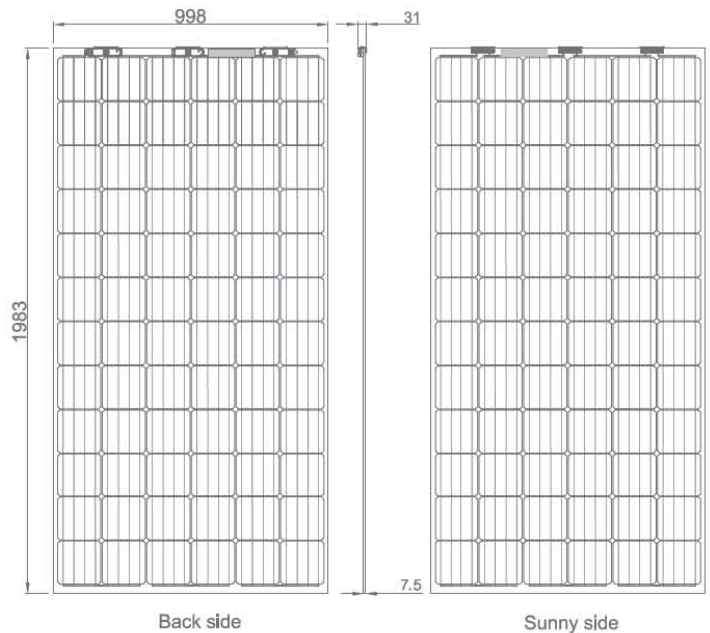
## BIFACIAL PERFORMANCES

Power @STC (W)	<b>335</b>	<b>340</b>	<b>345</b>	<b>350</b>	<b>355</b>	<b>360</b>
Power @BSTC (W)*	<b>396</b>	<b>402</b>	<b>408</b>	<b>414</b>	<b>420</b>	<b>426</b>

\*: BSTC = Bifacial Standard Test Condition according with 2Pfg 2645, certified by TÜV Rheinland Energy GmbH, report no. 21243796.001

## MECHANICAL CHARACTERISTICS

Output Cable Diameter	4 mm <sup>2</sup> (not supplied with module)
Type of Connector	MC4 alternative
Junction Boxes (bifacial version)	IP67, three diodes
Max. Series Fuse (3)	15 A
Dimensions A x B x C	1983 x 998 x 7.5 mm (31 with J-BOX)
Weight	33 kg
Front Glass, Type and Thickness	AR coated, High Transmission, Low Iron, Tempered, 3mm
Back Glass, Type and Thickness	High Transmission, Low Iron, Tempered, 3mm
Packing Configuration	26 pcs/carton
Quantity/Pallet	2 cartons/pallet
Modules/Container	572 pcs/40ft(H), 260 pcs/20ft



## TYPICAL PERFORMANCES AT STC

Module Type		3SBA335A		3SBA340A		3SBA345A		3SBA350A		3SBA355A**		3SBA360A**	
		STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Max-Power	Pm (W)	335	249	340	253	345	257	350	261	355	264	360	268
Power Tolerance	%	0 / +3%											
Max-Power Voltage	Vm(V)	38.9	36.6	39.1	36.8	39.3	37.0	39.5	37.1	39.7	37.3	39.9	37.5
Max-Power Current	Im(A)	8.61	6.95	8.70	7.02	8.78	7.08	8.87	7.15	8.95	7.22	9.03	7.28
Open-Circuit Voltage**	Voc(V)	47.3	44.5	47.6	44.8	47.9	45.0	48.2	45.3	48.5	45.6	48.8	45.9
Short-Circuit Current**	Isc(A)	9.00	7.26	9.10	7.34	9.18	7.40	9.26	7.47	9.35	7.54	9.43	7.61
Max-System Voltage	VDC(V)	1500 (IEC)											
Module Efficiency	%	16.9	/	17.2	/	17.4	/	17.7	/	17.9	/	18.2	/
Bifaciality factor	%	≥88											

\*\* : Tolerance ± 10%

\*\* : classes under development

Manufactured by Enel Green Power S. p. A.  
3SUN Factory, Contrada Blocco Torrazze, Zona Industriale, 95121, Catania (Italy)

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# 3S HYPER 72HB

## ABOUT 3SUN

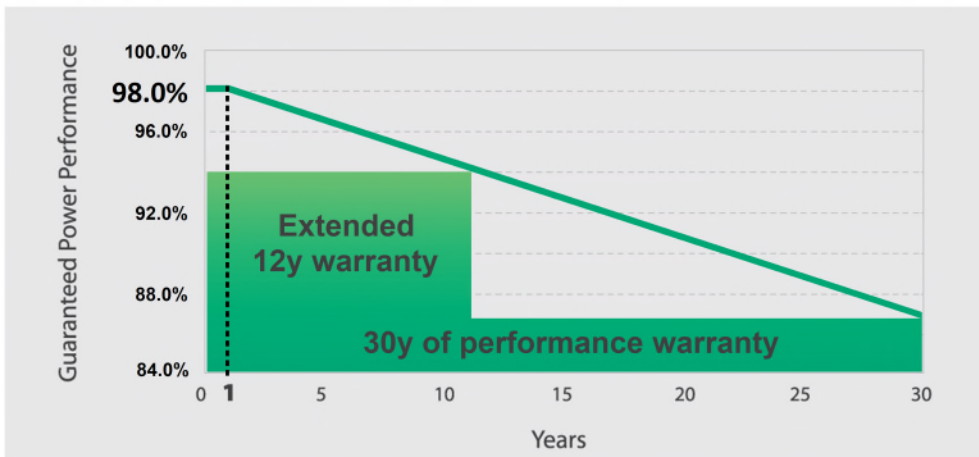
Founded in 2010 and owned by Enel green Power, the Italian PV factory is one of the largest in Europe. It's fully committed to the production of photovoltaic modules and its mission is to support the group to foster clean and renewable energy for a greener world.

## KEY FEATURES

- High module efficiency: up to 20.5%
- Double glass frameless bifacial structure: up to +33% of energy production gain
- Certified for 1500V<sub>DC</sub> system voltage; designed to withstand up to 2000V<sub>DC</sub>
- Higher durability under harsh environment conditions
- Higher lifetime power yield:
  - Superior Warranty: 30 years performance
  - 0.40% linear power degradation
- Designed to be PID free
- Module made with LID & LeTiD free HJT solar cells
- Static load: tested up to 3600Pa front and 2400Pa rear

## Warranty:

- 98.0% warranty for the first year
- Product warranty 12 years
- Linear Performance Warranty 30 years



Certified by KACST CERT:  
IEC 61215-1:2016; IEC 61215-1-1:2016; IEC61215-2:2016  
IEC 61730-1:2016; IEC61730-2:2016



# 3S HYPER 72HB

## GENERAL CHARACTERISTICS

Number, type and arrangement of Cells	Mono-crystalline, n-type Si HJT, 72 cells in series (6x12)
Cell Size	156.75 mm x 156.75 mm
Pm Temperature Coefficient	-0.327 %/°C
Isc Temperature Coefficient	0.0136 %/°C
Voc Temperature Coefficient	-0.285 %/°C
NMOT (Nominal Module Operating Temperature)	39 ± 2 °C
Test Condition	STC: AM1.5, 1000W/m <sup>2</sup> , Cells Temperature 25°C
Operating Temperature	-40~+85 °C
Storage Temperature	-20~+50 °C

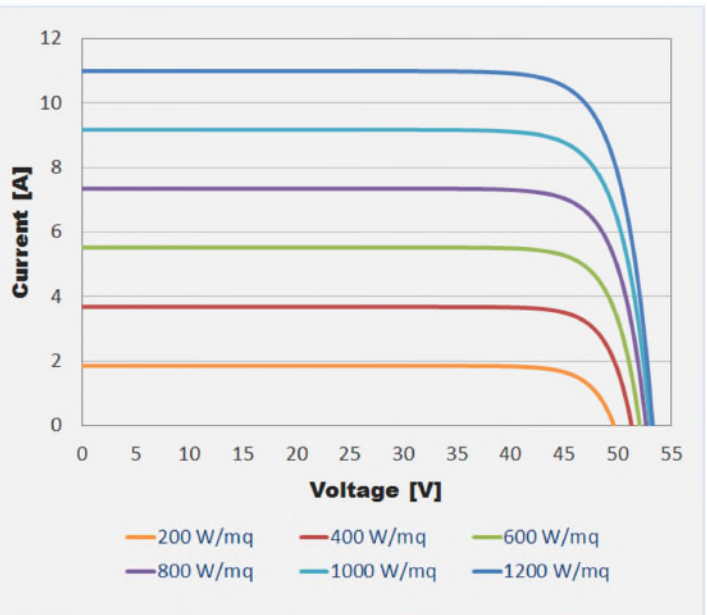
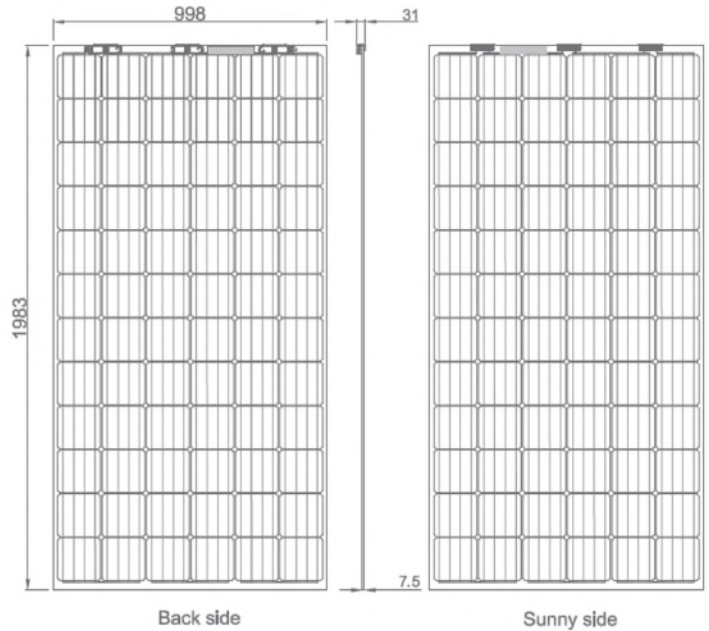
## BIFACIAL AND LOW IRRADIANCE PERFORMANCES

Power @STC (W)	350	355	360	365	370	375	380	385
Power @BSTC (W)*	429	435	441	447	453	459	466	472
Power @200W/m <sup>2</sup> (W)	62	63	64	65	66	67	68	69

\*: BSTC = Bifacial Standard Test Condition according to IEC 60904-1-2:2019.

## MECHANICAL CHARACTERISTICS

Output Cable Diameter	4 mm <sup>2</sup> (not supplied with module)
Type of Connector	PV4-S (MC4 alternative)
Junction Boxes (bifacial version)	IP67, three diodes
Max. Series Fuse (3)	15 A
Dimensions A x B x C	1983 x 998 x 7.5 mm (31 with J-BOX)
Weight	33 kg
Front Glass, Type and Thickness	AR coated, High Transmission, Low Iron, Tempered, 3mm
Back Glass, Type and Thickness	High Transmission, Low Iron, Tempered, 3mm
Packing Configuration	26 pcs/carton
Quantity/Pallet	2 cartons/pallet
Modules/Container	572 pcs/40ft(H), 260 pcs/20ft



## TYPICAL PERFORMANCES AT STC

Module Type		3SHB350A		3SHB355A		3SHB360A		3SHB365A		3SHB370A		3SHB375A		3SHB380A		3SHB385A	
		STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Max-Power	Pm (W)	350	256	355	260	360	264	365	267	370	271	375	275	380	278	385	282
Power Tolerance	%	0 / +3%															
Max-Power Voltage	Vm(V)	42.78	39.04	42.97	39.22	43.16	39.39	43.35	39.56	43.54	39.74	43.73	39.91	43.92	40.08	44.11	40.26
Max-Power Current	Im(A)	8.19	6.57	8.27	6.64	8.35	6.70	8.43	6.76	8.51	6.83	8.58	6.89	8.65	6.95	8.73	7.01
Open-Circuit Voltage**	Voc(V)	52.11	47.80	52.32	47.99	52.53	48.18	52.74	48.38	52.95	48.57	53.16	48.76	53.37	48.96	53.58	49.15
Short-Circuit Current**	Isc(A)	8.66	6.95	8.74	7.02	8.82	7.08	8.90	7.15	8.99	7.22	9.07	7.28	9.15	7.35	9.24	7.42
Max-System Voltage	V <sub>DC</sub> (V)	1500 (IEC)															
Module Efficiency	%	17.69	/	17.94	/	18.19	/	18.44	/	18.70	/	18.95	/	19.20	/	19.45	/
Bifaciality factor	%	>90%															

\*\* : Tolerance ± 5%

Manufactured by Enel Green Power S. p. A.  
3SUN Factory, Contrada Blocco Torrazze, Zona Industriale, 95121, Catania (Italy).

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Sharp is a pioneer in photovoltaics /This is Why Sharp solar modules have set standards for over 50 years.



### Innovations from a photovoltaic pioneer

As a solar specialist with more than 50 years' experience in photovoltaics (PV), Sharp makes significant contributions to groundbreaking progress in solar technology. The NAE series of thin-film photovoltaic modules consists of an amorphous and a microcrystalline silicon layer. This microamorphous tandem structure not only absorbs visible light but also the invisible portion of the solar spectrum. This makes especially efficient use of solar energy. All module types of the Sharp NA Series offer optimum system integration, in terms of both technology and economy, and are suitable for installations in grid-connected PV systems.

### Product features

- Tandem structure with an amorphous and a microcrystalline silicon layer offering a stabilised module efficiency of up to 9.6%
- Two glass layers laminated with a high performing vapor barrier encapsulant
- Aesthetic design for many applications
- Low temperature coefficients enabling higher energy yields per watt at high temperatures
- Less dirt accumulation due to frameless design
- Installation in landscape or portrait mode
- One bypass diode integrated in the junction box
- No Cadmium – RoHS compliant
- Made in Italy

### Quality from Sharp

Continual checks guarantee a consistently high level of quality. Every module undergoes visual, mechanical and electrical inspection. This is recognisable by means of the original Sharp label, the serial number, and the Sharp guarantee:

- 10-year product guarantee
- 10-year guarantee on 90% of the minimum power output
- 25-year guarantee on 80% of the minimum power output

End users are required to register the modules with Sharp in order for the product and power output guarantee to be effective. The registration documents will be handed out by the installer or supplied directly by Sharp.



AWARDS FOR BRAND AWARENESS,  
BRAND EVALUATION, INSTALLERS'  
CHOICE AND DISTRIBUTION.

### Certificates and approvals

- All modules are tested and certified according to
- IEC/EN 61646 and IEC/EN 61730, Application class A
  - Safety class II
  - CE
- Sharp is certified based on
- ISO 9001:2008 and ISO 14001:2004

## ELECTRICAL DATA (AT STC)

		Nominal values					Initial values					
		NA-E135G5	NA-E130G5	NA-E125G5	NA-E120G5	NA-E115G5	NA-E135G5	NA-E130G5	NA-E125G5	NA-E120G5	NA-E115G5	
Maximum power	$P_{max}$	135	130	125	120	115	155.2	149.5	143.7	138.0	132.2	$W_p$
Open-circuit voltage	$V_{OC}$	61.3	60.4	59.7	59.1	58.6	61.8	61.1	60.4	59.7	59.0	V
Short-circuit current	$I_{SC}$	3.41	3.41	3.37	3.33	3.26	3.51	3.47	3.43	3.39	3.35	A
Voltage at point of maximum power	$V_{mpp}$	47.0	46.1	45.5	44.9	44.5	49.3	48.7	48.3	47.8	47.3	V
Current at point of maximum power	$I_{mpp}$	2.88	2.82	2.75	2.68	2.59	3.15	3.07	2.98	2.89	2.80	A
Module efficiency	$\eta_m$	9.6	9.3	8.9	8.6	8.2						%

STC = Standard Test Conditions: irradiance 1,000 W/m<sup>2</sup>, AM 1.5, cell temperature 25 °C. Rated electrical characteristics of  $I_{SC}$  and  $V_{OC}$  are within  $\pm 10\%$  of the indicated values and  $+7/-2\%$  of  $P_{max}$ . The initial values are approx. 15% higher than the nominal (stabilised) values and will decline within the first weeks of operation. Afterwards the power output will stabilize around the nominal value according to the seasonal changes.

## ELECTRICAL DATA (AT NOCT)

		NA-E135G5	NA-E130G5	NA-E125G5	NA-E120G5	NA-E115G5	
Maximum power	$P_{max}$	102.4	98.6	94.8	90.6	86.8	$W_p$
Open-circuit voltage	$V_{OC}$	56.8	55.9	55.3	54.7	54.2	V
Short-circuit current	$I_{SC}$	2.76	2.76	2.73	2.70	2.65	A
Voltage at point of maximum power	$V_{mpp}$	44.0	43.2	42.6	41.8	41.5	V
Current at point of maximum power	$I_{mpp}$	2.33	2.29	2.23	2.17	2.10	A
Nominal operating cell temperature	NOCT	46	46	46	46	46	°C

NOCT: Module operating temperature at 800 W/m<sup>2</sup> irradiance, air temperature of 20 °C, wind speed of 1 m/s.

## LIMIT VALUES

Maximum system voltage	1,000 V DC
Over-current protection	5 A
Temperature range	-40 to +90 °C
Maximum mechanical load	2,400 N/m <sup>2</sup>

## MECHANICAL DATA

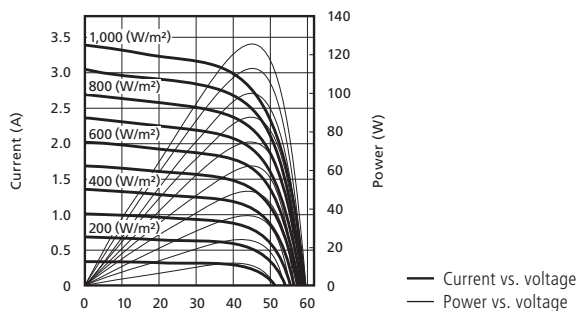
Length	1,402 mm
Width	1,001 mm
Depth (including junction box = 24 mm)	7.4 mm
Weight	26 kg

## TEMPERATURE COEFFICIENT

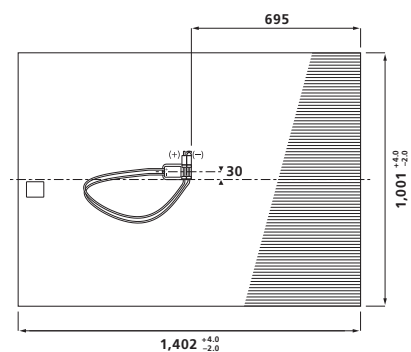
$P_{max}$	-0.24 % / °C
$V_{OC}$	-0.30 % / °C
$I_{SC}$	+0.07 % / °C

## CHARACTERISTIC CURVES NA-E125G5

Characteristic curves: current/power vs. voltage (cell temperature: 25 °C)



## REAR VIEW



## GENERAL DATA

Cells	Tandem cell of amorphous ( $\alpha$ -Si) and microcrystalline ( $\mu$ c-Si) silicon
Front glass   rear glass	low iron non tempered glass   tempered glass
Connection box	PPE/PPO resin, IP65-rating, 1 bypass diode included
Cable	2.5 mm <sup>2</sup> , length 950 mm
Connector	SMK (Type CCT9901-2352F/2462F), IP67 rating To extend the module connection leads, only use SMK connector under the same series or MultiContactAG MC4 connector (PV-KST04/PV-KBT04)

## NOTE

Please read our detailed installation manual carefully before installing the photovoltaic modules. The instructions in the installation manual must always be observed (e.g. minus pole must be grounded, protection with blocking diodes/fuses).

Sharp Energy Solution Europe · a division of Sharp Electronics (Europe) GmbH · Sonninstrasse 3, 20097 Hamburg, Germany · Tel: +49(0)40/23 76 -0 · Fax: +49(0)40/23 76 -2193

[www.sharp.eu/solar](http://www.sharp.eu/solar)

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The reference image on the front page shows a 340 kWp system in Eastern Germany. Note: Technical data is subject to change without prior notice. Before using Sharp products, please request the latest data sheets from Sharp. Sharp accepts no responsibility for damage to devices which have been equipped with Sharp products on the basis of unverified information. The specifications may deviate slightly and are not guaranteed. Installation and operating instructions are to be found in the corresponding handbooks, or can be downloaded from [www.sharp.eu/solar](http://www.sharp.eu/solar). This module should not be directly connected to a load.