



## Say yes to solar power! Because it protects the climate.

### Innovations from a photovoltaic pioneer

As a solar specialist with 50 years' experience in photovoltaics (PV), Sharp makes significant contributions to groundbreaking progress in solar technology.

The NA 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.



### Brief details for the installer

- Tandem structure consisting of an amorphous and a microcrystalline silicon layer
- 180 cells
- 2,400 N/m<sup>2</sup> mechanical load-bearing capacity (245 kg/m<sup>2</sup>)
- 1,000 V DC maximum system voltage
- IEC/EN 61646, IEC/EN 61730, Class II (VDE: 40023069)

### Product features

- Tandem structure with an amorphous and a microcrystalline silicon layer offering a stabilised module efficiency of up to 9.5%.
- Optimised for grid-connected roof mounting PV systems.
- Use of white glass, encapsulation material, weather protection film and a newly designed silver anodised aluminium frame for long-term use. This guarantees simple and safe installation.
- Higher energy yields per watt at high temperatures.
- Output: connection cable with waterproof plug connector.

### Quality from Sharp

Benchmarks are set by the quality standards of Sharp Solar. 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:

- 5-year product guarantee
- 10-year performance guarantee on a power output of 90%
- 25-year performance guarantee on a power output of 80%

The detailed guarantee conditions and additional information can be found at **[www.sharp.eu/solar](http://www.sharp.eu/solar)**.

- End users are required to register the modules with Sharp in order for the product and service warranty to be effective. The registration documents will be handed out by the installation staff or supplied directly by Sharp.

## Mechanical data

Cell	Tandem cell of amorphous ( $\alpha$ -Si) and microcrystalline ( $\mu$ c-Si) silicon
Bypass diodes	1
Dimensions	1,409 × 1,009 × 46 mm (1.42 m <sup>2</sup> )
Weight	18 kg
Connector	SMK (MC4 compatible), Type CCT9901-2452F/CCT9901-2362F
To extend the module connection leads, only use SMK connector from the same series or MultiContactAG MC4 connector (PV-KST04/PV-KBT04)	

## Limit values

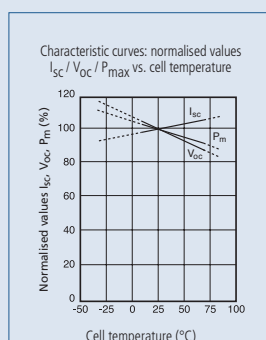
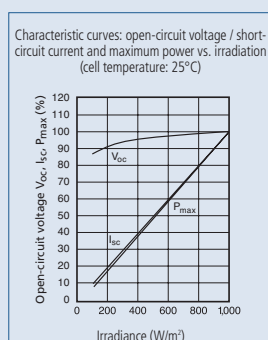
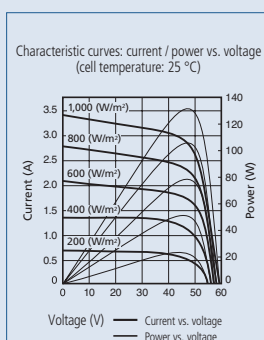
Storage air humidity (relative)	up to 90	%
Operating temperature (cell)	− 40 to + 90	°C
Storage temperature	− 40 to + 90	°C
Maximum system voltage	1,000	V DC
Maximum mechanical load	2,400	N/m <sup>2</sup>
Over-current protection	5	A

## Electrical data

		Initial values			Nominal values		
		NA-F135GK	NA-F128GK	NA-F121GK	NA-F135GK	NA-F128GK	NA-F121GK
Maximum power		158.9 W <sub>p</sub>	150.6 W <sub>p</sub>	142.4 W <sub>p</sub>	135 W <sub>p</sub>	128 W <sub>p</sub>	121 W <sub>p</sub>
Open-circuit voltage	V <sub>OC</sub>	62.5	60.8	60.2	61.3	59.8	59.2
Short-circuit current	I <sub>SC</sub>	3.49	3.54	3.43	3.41	3.45	3.34
Voltage at point of maximum power	V <sub>PM</sub>	49.7	48.6	48.2	47.0	45.4	45.0
Current at point of maximum power	I <sub>PM</sub>	3.20	3.10	2.96	2.88	2.82	2.69
Module efficiency	$\eta_m$				9.5	9.0	8.5
NOCT					44	44	44
Temperature coefficient – open-circuit voltage	$\alpha V_{OC}$	− 0.30	− 0.30	− 0.30	− 0.30	− 0.30	− 0.30
Temperature coefficient – short-circuit current	$\alpha I_{SC}$	+0.07	+0.07	+0.07	+0.07	+0.07	+0.07
Temperature coefficient – power	$\alpha P_m$	− 0.24	− 0.24	− 0.24	− 0.24	− 0.24	− 0.24

The electrical data applies under standard test conditions (STCs): irradiation 1,000 W/m<sup>2</sup> with light spectrum AM 1.5 and a cell temperature of 25 °C. The rated electrical characteristics are subject to a manufacturing tolerance of + 10 % / − 5 % (121, 128 W<sub>p</sub>) and + 5 % / − 5 % (135 W<sub>p</sub>). NOCT conditions: irradiation of 800 W/m<sup>2</sup>, ambient temperature of 20 °C and wind speed of 1 m/s.

## Characteristic curves NA-F135GK

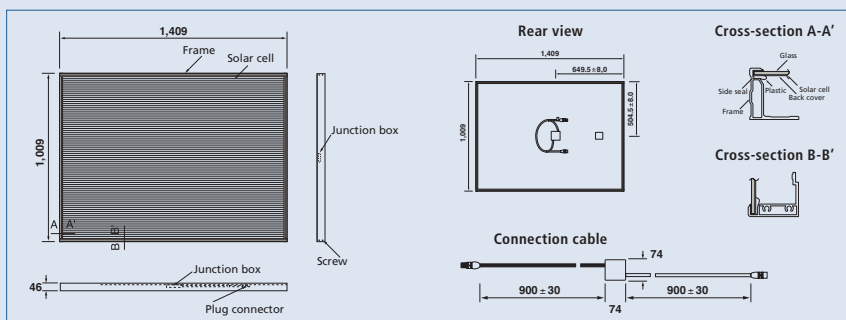


## Applications

- On-grid PV systems
- On-roof PV systems
- Ground-mounted PV systems

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).

## Exterior dimensions



## 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](http://www.sharp.eu).

This module should not be directly connected to a load.

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