

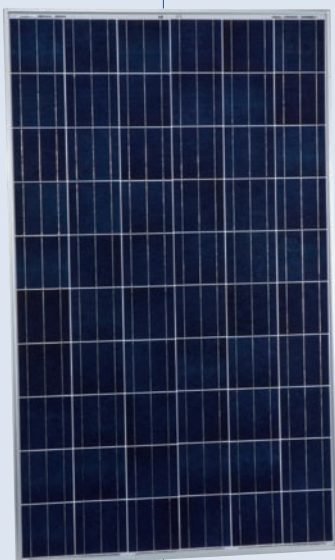
Say yes to solar power! Because it protects the climate.

Innovations from a photovoltaic pioneer

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

Sharp photovoltaic modules in the ND series are designed for applications with high power requirements. These quality polycrystalline modules produce a continuous, reliable yield, even under demanding operational conditions.

All Sharp ND series modules offer system integration which is optimal both technically and economically, and are suitable for installations in on and off-grid PV systems.



Product features

- High-performance photovoltaic modules made of polycrystalline (156.5 mm)² silicon solar cells with module efficiencies of up to 14.6%.
- 3 busbar technology for enhancing the power output.
- Production controlled positive power tolerance from 0 to +5%. Only modules will be delivered that have the specified power or more for high energy yield.
- Delivery of modules in 5-watt intervals.
- Improved temperature coefficient to reduce power losses at higher temperatures.
- High power performance even at lower irradianations.

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.

Certificates and approvals

All modules are tested and certified according to

- IEC/EN 61215 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)

		ND-R240A2	ND-R235A2	ND-R230A2	ND-R225A2	ND-R220A2	ND-R215A2	ND-R210A2	
Maximum power	P_{max}	240	235	230	225	220	215	210	W_p
Open-circuit voltage	V_{OC}	37.2	37.1	37.0	36.9	36.8	36.7	36.6	V
Short-circuit current	I_{SC}	8.52	8.38	8.24	8.10	7.96	7.82	7.68	A
Voltage at point of maximum power	V_{mpp}	30.4	30.4	30.3	30.3	30.2	30.2	30.1	V
Current at point of maximum power	I_{mpp}	7.90	7.74	7.60	7.43	7.29	7.13	6.98	A
Module efficiency	η_m	14.6	14.3	14.0	13.7	13.4	13.1	12.8	%

STC = Standard Test Conditions: irradiance 1,000 W/m², AM 1.5, cell temperature 25 °C.
 Rated electrical characteristics are within ±10% of the indicated values of I_{SC} , V_{OC} and 0 to +5% of P_{max} (power measurement tolerance ±3%).

Electrical data (at NOCT)

		ND-R240A2	ND-R235A2	ND-R230A2	ND-R225A2	ND-R220A2	ND-R215A2	ND-R210A2	
Maximum power	P_{max}	173.0	169.3	165.7	162.1	158.5	154.9	151.3	W_p
Open-circuit voltage	V_{OC}	36.4	36.3	36.2	36.1	36.0	35.9	35.8	V
Short-circuit current	I_{SC}	6.88	6.76	6.65	6.54	6.42	6.31	6.20	A
Voltage at point of maximum power	V_{mpp}	27.2	27.2	27.1	27.1	27.0	27.0	26.9	V
Nominal Operating Cell Temperature	NOCT	47.5	47.5	47.5	47.5	47.5	47.5	47.5	°C

NOCT: Module operating temperature at 800 W/m² irradiance, air temperature of 20 °C, wind speed of 1 m/s.

Limit values

Maximum system voltage	1,000 V DC
Over-current protection	15 A
Temperature range	-40 to +90 °C
Maximum mechanical load	2,400 N/m ²

Mechanical data

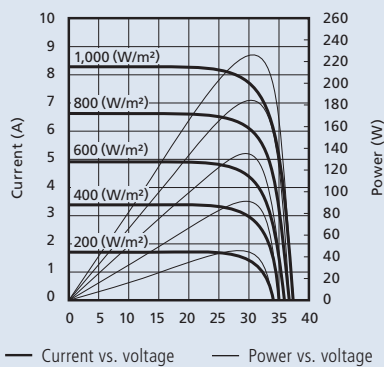
Length	1,652 mm (+/-3.0 mm)
Width	994 mm (+/-2.0 mm)
Depth	46 mm (+/-0.8 mm)
Weight	19 kg

Temperature coefficient

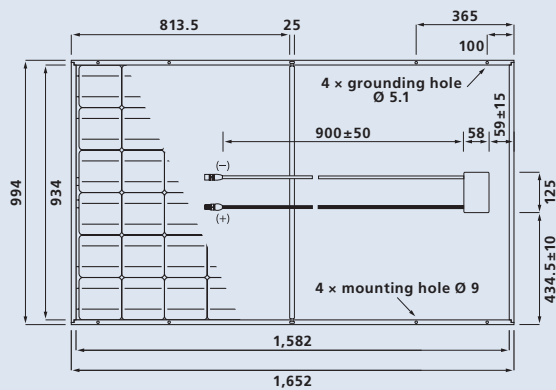
P_{max}	-0.440 % / °C
V_{OC}	-0.329 % / °C
I_{SC}	-0.038 % / °C

Characteristic curves ND-R230A2

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



Rear view



General data

Cells	polycrystalline, 156.5 mm × 156.5 mm, 60 cells in series
Front glass	low iron tempered glass, 3 mm
Frame	anodized aluminium alloy, silver
Connection box	PPE/PPO resin, IP65 rating, 58 × 125 × 15 mm, 3 bypass diodes
Cable	4 mm ² , length 900 mm
Connector	SMK (MC4 compatible), Type CCT9901-2361F/2451F (Catalogue no. P51-7H/R51-7), IP67 rating
To extend the module connection leads, only use SMK connector from the same series or MultiContactAG MC4 connector (PV-KST04/PV-KBT04)	

Registration

Sharp Solar guarantees the safety, quality and value of your product over many years – the only thing we ask you to do is to register your modules with the serial number, so that we can send you the guarantee certificate. Register your modules quickly and easily at www.brandaddedvalue.net.

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SHARP

The reference image on the front page shows a 240.8 kWp system on the roof of the Mainz football stadium, Germany.
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