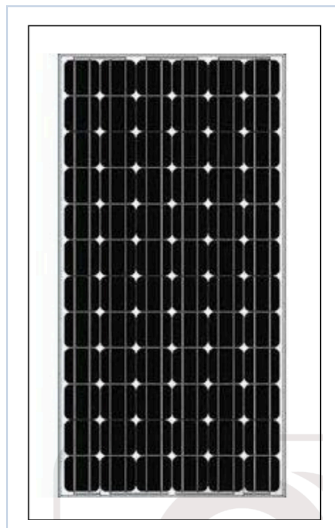


Solar Modules **Mono- and poly-crystalline PV panels, 125 W – 600 W**

Grid-tie, hybrid and off-grid modules built with tier-one cells and tested to IEC 61215 and IEC 61730. All models carry a 25-year linear power output warranty.



SP-280 / SP-340 mono-crystalline module

Key features

- High-efficiency mono/poly PERC cells: > 15 % conversion even at low light, > 21 % module efficiency on the half-cut SP-450 and SP-600
- 3.2 mm tempered, anti-reflective front glass (2.0 mm dual-glass on SP-600) for strength and gain
- Anodised aluminium alloy frame; IP67 / IP68 junction box with bypass diodes; 4.0 mm² cables with MC4-compatible connectors
- Positive power tolerance 0 / +5 W — every module delivers at least its nameplate power
- Certified by TÜV Rheinland to IEC 61215 and IEC 61730; ISO 9001 factory; CE marked
- 25-year linear power output warranty, 12-year product warranty

Electrical data at STC (1000 W/m², cell 25 °C, AM 1.5)

Model	P _{max} (W)	V _{mp} (V)	I _{mp} (A)	V _{oc} (V)	I _{sc} (A)	Module efficiency	Max. system voltage	Max. series fuse
SP-125 LV (12 V)	125	20.13	6.21	24.48	6.46	18.6 %	1000 V DC	15 A
SP-125 HV	125	28.22	4.43	33.29	4.75 *	20.3 %	1000 V DC	15 A
SP-280	280	31.86	8.79	37.86	9.35 *	20.7 %	1500 V DC	15 A
SP-340	340	38.55	8.82	45.64	9.40 *	20.8 %	1500 V DC	15 A
SP-450 LV	450	34.62	13.01	41.46	13.47	20.9 %	1500 V DC	25 A
SP-450 HV	450	68.92	6.53	82.85	7.08	20.9 %	1000 V DC	15 A
SP-600	600	44.31	13.54	52.52	14.12	23.2 %	1500 V DC (IEC)	30 A

Power tolerance 0 / +5 W on all models. * I_{sc} read from the I-V characteristic curves; confirm against the flash-test label on each module. Efficiency calculated from P_{max} and gross module area.

Temperature characteristics

NOCT	46 ± 2 °C (800 W/m ² , 20 °C ambient, 1 m/s wind)
Temperature coefficient of P_{max}	−0.45 %/°C
Temperature coefficient of V_{oc}	−0.37 %/°C
Temperature coefficient of I_{sc}	+0.06 %/°C
Operating temperature	−40 °C to +85 °C

Ratings

Mechanical load (IEC 61215)	5400 Pa front, 2400 Pa rear
Hail impact	25 mm ice ball at 23 m/s
Application / fire class	Class A (IEC 61730) / Class C
Product warranty	12 years materials and workmanship
Power warranty	25 years linear: ≥ 97 % year 1, ≥ 84.8 % year 25

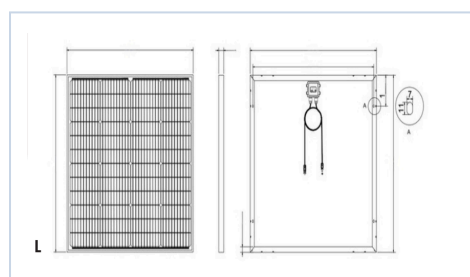
Solar Modules

Mechanical data

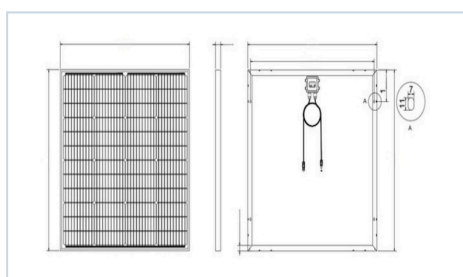
Model	Cells	Dimensions L × W × H (mm)	Weight	Front glass	Junction box	Cable / connector
SP-125 LV	36 mono	880 × 765 × 25	7.2 kg	3.2 mm tempered	IP67, 2 diodes	4.0 mm ² , MC4
SP-125 HV	36 mono	800 × 770 × 25	6.5 kg	3.2 mm tempered	IP67, 2 diodes	4.0 mm ² , MC4
SP-280	60 mono / poly	1535 × 880 × 30	13.5 kg	3.2 mm tempered	IP67, 3 diodes	4.0 mm ² , MC4
SP-340	72 mono / poly	1856 × 880 × 30	17.6 kg	3.2 mm tempered	IP67, 3 diodes	4.0 mm ² , MC4
SP-450 LV / HV	P-mono 210 × 105 mm, 3 × 11 (66 half-cut)	1903 × 1134 × 30	23.6 kg	3.2 mm tempered	IP67, 2 diodes	4.0 mm ² , MC4
SP-600	P-mono 182.2 × 91.9 mm, 6 × 12 × 2 (144 half-cut)	2278 × 1134 × 30	30.6 kg	2.0 mm tempered, dual-glass	IP68, 3 diodes	4.0 mm ² , MC4

Dimension tolerance ± 2 mm; weight tolerance ± 3 %. Backsheet: fluoride-coated on both sides (glass-glass on SP-600). Frame: anodised aluminium alloy with drainage and grounding holes.

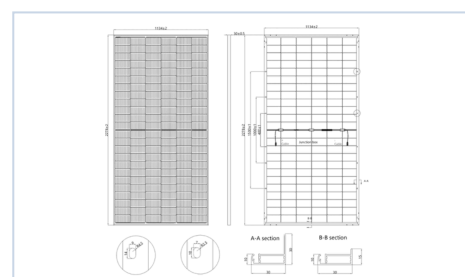
Outline drawings



SP-280 / SP-340 — 60 / 72 full cells, 1535 / 1856 × 880 mm



SP-450 — 66 half-cut cells, 1903 × 1134 mm



SP-600 — 144 half-cut cells, 2278 × 1134 mm, with A-A / B-B frame sections

Mounting

- Clamp on the long frame edges within the marked clamping zones, four clamps per module, torque 14–18 N·m
- Ground every module frame via the grounding hole and lugs to IEC 62548 / IEC 60364-7-712
- Tilt 10°–15° in equatorial latitudes for self-cleaning; allow ≥ 100 mm airflow beneath modules
- Avoid partial shading of any cell string; shaded modules reduce the whole string current

String design

- Calculate string Voc at the site minimum ambient temperature: Voc rises 0.37 % per °C below 25 °C. Keep below the module maximum system voltage and the inverter or charge-controller input limit
- Use the maximum series fuse rating for string protection with DC-rated gPV fuses and a DC isolator
- Pair SP-125 LV with 12 V PWM/MPPT controllers, SP-125 HV / SP-280 with 12–24 V MPPT controllers, SP-340 to SP-600 with 48 V MPPT or grid-tie inverters

Typical applications

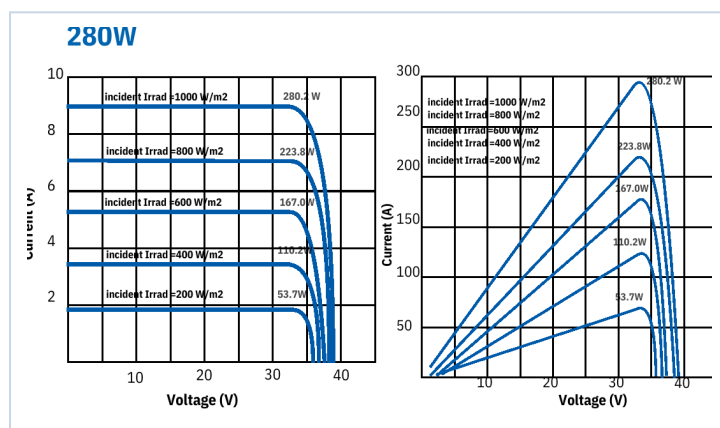
- Residential rooftop grid-tie and hybrid battery systems (SP-340 to SP-600)
- Commercial and institutional rooftop and ground-mount arrays (SP-450, SP-600)
- Off-grid 12 V / 24 V systems, water pumping, telecom, street lighting and mini-grids (SP-125, SP-280)

Solar Modules Performance curves & compliance

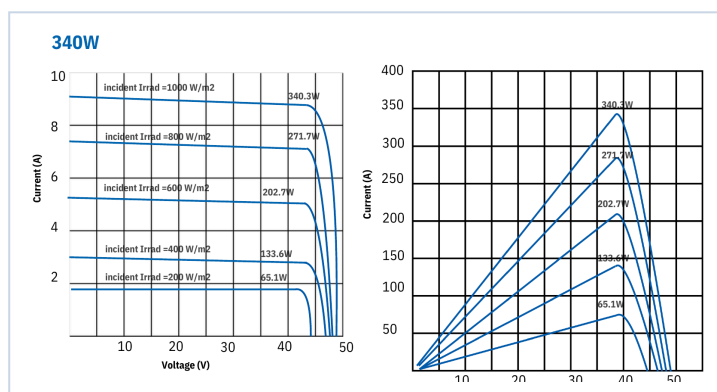
Power at reduced irradiance (from I-V characteristics, cell 25 °C)

Model	1000 W/m ²	800 W/m ²	600 W/m ²	400 W/m ²	200 W/m ²
SP-125 (12 V)	131.0 W	105.7 W	79.7 W	53.0 W	26.1 W
SP-280	280.2 W	223.8 W	167.0 W	110.2 W	53.7 W
SP-340	340.3 W	271.7 W	202.7 W	133.6 W	65.1 W
SP-450	461.2 W	361.2 W	270.2 W	178.8 W	87.6 W
SP-600	600.2 W	463.8 W	346.8 W	229.0 W	112.0 W

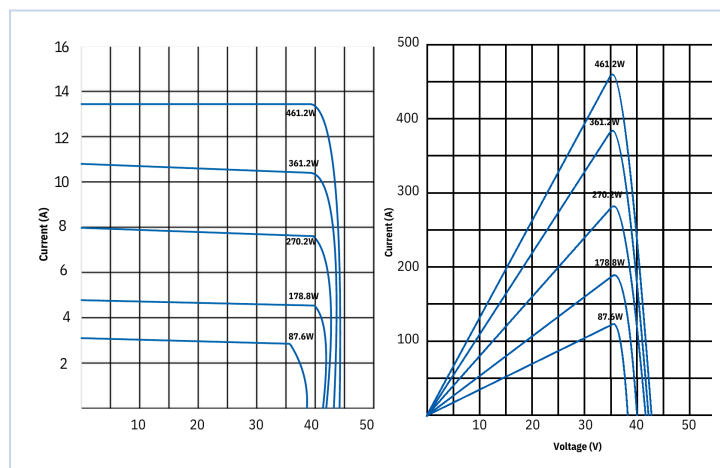
Current-voltage and power-voltage characteristics



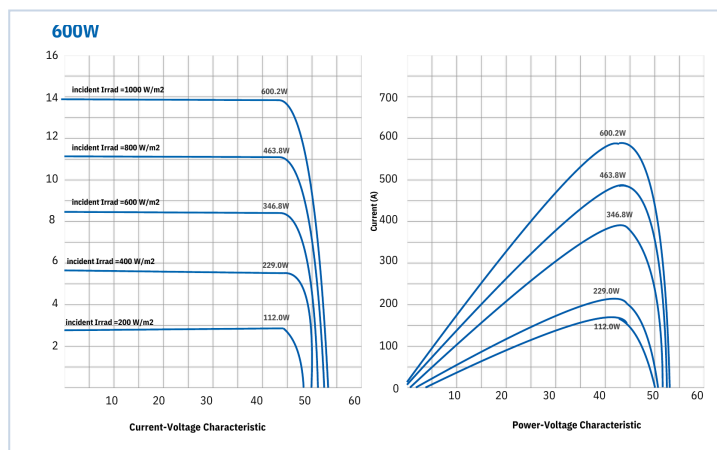
SP-280



SP-340



SP-450



SP-600

Standards & compliance

- **IEC 61215-1/-2:2021** — design qualification and type approval, crystalline silicon modules
- **IEC 61730-1/-2** — PV module safety qualification (construction and testing)
- **IEC 61701** — salt mist corrosion; **IEC 62716** — ammonia corrosion (on request)
- **IEC 62804** — potential-induced degradation (PID) test (on request)
- **IEC 62548 / IEC 60364-7-712** — PV array design and installation
- **ISO 9001:2015, ISO 14001:2015** — factory quality and environmental management
- **TÜV Rheinland** certificates; **CE** marked
- **UNBS US 1064 / IEC 61215** — Uganda acceptance for PV modules; end-of-life return under IEC 62935 / WEEE-aligned recycling