

Photovoltaic modules

TE220/240-60P+

- ▶ High efficiency, reduced area, positive power classification

Tenesol manufactures its own photovoltaic modules in two facilities.

Tenesol's modules use the **high-output technology of the multicrystalline cell**. Each cell is individually measured and sorted before the encapsulation stage.

The combined use of **tempered glass, EVA and back sheet** keeps its weight to a minimum. The laminate **guarantees total watertightness** and long-term protection of the cells.

The **reinforced 50 mm aluminium** frame makes handling easy and allows for quick, easy and **highly resistant assembly**.

This Tenesol's module can withstand a heavy snowload **up to 5400 Pa**.

Each module is subject to an **individual quality control process**.

- Power tolerance : 0 / +5 Wp
- Module efficiency : Up to 14.6%
- Product warranty : 10 years
- Power warranty : 25 years*

The quality of TENESOL modules are CE certified.

Our production facilities are also certified according to ISO 9001 and ISO 14001 standards.

About Tenesol

A rapidly expanding global player in the field of solar energy (with an estimated turnover of €200 million in 2011) Tenesol works on behalf of businesses, local authorities and private individuals. For more than 28 years, the company has been engineering, designing, manufacturing, installing and operating solar energy systems. Its services cover systems that produce or consume the energy they generate (off-grid sites, electricity grid connected, solar water heating) for customers around the globe. A benchmark player in its sector, Tenesol currently has a staff of more than 700 employees across 18 subsidiaries including two production facilities, one in Toulouse, France, and the other in Cape Town, South Africa. In January 2012, Tenesol was acquired by SunPower (NASDAQ: SPWR), a manufacturer of highest efficiency solar cell, solar panels and solar systems. SunPower is headquartered in San Jose, Calif., with offices in North America, Europe, Australia and Asia.

For more information, please visit: www.tenesol-group.com .



Sun access provider.

TENESOL

A SUNPOWER COMPANY

TE220/240-60P+

Electrical characteristics

TE220/240-60P+

Nominal Power (STC)	Wp	220 ¹	225	230	235	240 ¹
Minimum power		220	225	230	235	240
Maximum power		225	230	235	240	245
Sorting limits	Wp	-0/+5				
Sorting limits	%	+2.3	+2.2	+2.2	+2.1	+2.1
Voltage at max. power	(V)	28.5	28.8	29.05	29.3	29.55
Current at max. power	(A)	7.8	7.9	8.0	8.1	8.2
Open circuit voltage	(V)	36.4	36.6	36.8	37.0	37.2
Short circuit current	(A)	8.2	8.3	8.4	8.5	8.6

According to specifications at STC: Irradiation 1000 W/m²; AM 1.5; Cell at ambient Temperature T: 25°C.

(1) : Modules available upon request.

Nominal Pow. 45°C/800W/m ²	Wp	163.6	167.6	171.3	175.0	178.8
Voltage at max. power	(V)	25.9	26.2	26.4	26.7	26.9
Current at max. power	(A)	6.3	6.4	6.5	6.6	6.6
Open circuit voltage	(V)	33.8	34.0	34.2	34.4	34.6
Short circuit current	(A)	6.6	6.7	6.8	6.9	7.0

NOCT tests realized with a maximum power (in Wp), junction temperature 45 °C; irradiation 800 W/m²; Am 1,5 ; Ambient temperature 20 °C; Windspeed 1 m/sec.

Temperature coefficients

Temperature Coefficient of Voltage	-129,0 mV/°C
Temperature Coefficient of Current	+4,8 mA/°C
Temperature Coefficient of Power	-0,43 %/°C
NOCT	45 °C

Cells

Size	156 x 156 mm
Layout	60 cells / 6 x 10
Type	Polycrystalline

General information

Maximum system voltage	1000 V
Maximum reverse current	17 A
Diodes	3 by-pass
Type of connection	Amphenol
Junction Box	IP55
Weight	19 kg
Operating ambient temperature	-40 / +85°C

Certifications

	IEC61215 + IEC61730
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Warranty

Product warranty	10 years
Power warranty (*)	25 years - 80 % of minimal power 10 years - 90 % of minimal power

Irradiant dependency

Irradiation (W/m ²)	Pm	Vpm	Ipm
1000	1	1	1
800	0,799	0,999	0,8
500	0,497	0,994	0,5
400	0,394	0,986	0,4
300	0,291	0,970	0,3
200	0,187	0,936	0,2
100	0,086	0,862	0,1

