SUNdidactics

SolarEnergyDidactics
SolarEducation
SolarEngineering

innovative Solarsysteme für Schule und Ausbildung
innovative solar- systems for school, college, technical education

- Solardidaktik
- Solarzellen
- Solarmodule
- Photovoltaik- Experimentiergeräte
- Photovoltaik- Gerätentwicklung
- Experimentieranleitungen didaktische Konzepte
- Solarberatung
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- solar training for teachers
- solar toys

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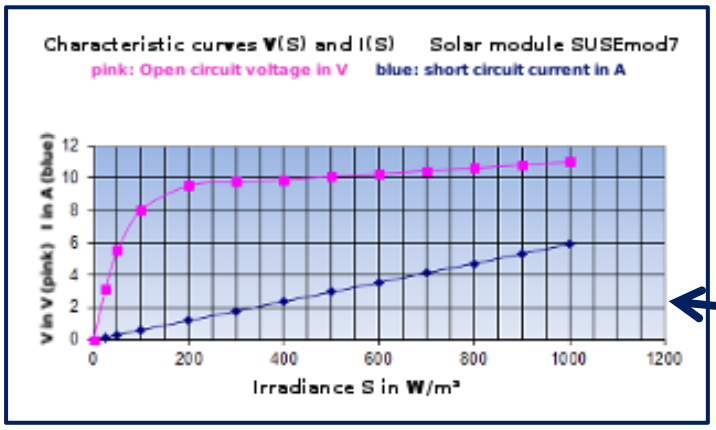
SUSEmod7 - a powerful and robust 11 V / 5 W solar module for PV experiments

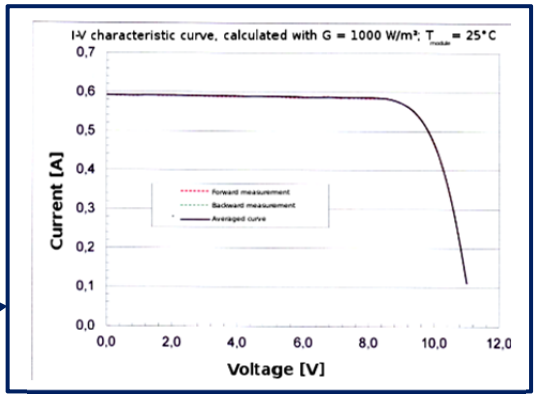
The **solar module SUSEmod7** is a professional, powerful, and robust solar module with 18 solar cells in intern series connection behind solar glass, framed with an aluminum profile. The power P is 5 Watts with an irradiation of 1000 W/m², 25° C and AM 1.5. On the back there is a junction box with screwed or soldering connection for a two wire cable. This solar module is used in the experimentation device SUSE 4.51 or in SUSE 4.17 (solar smartphone- charger).



The V(S) (pink) and I(S) (blue) characteristic curves
The characteristic curves show the dependency of the open circuit voltage V (exp. Function) and the short-circuit current I (linear function) on the irradiance S (light intensity)
0 = absolute darkness, 1000 = bright sunshine in the summer half-year with deep blue sky

Physical value	Symbol	Numerical value	Physical unit	Annotations
Dimensions of the solar cells		52 x 31	mm	Multicrystalline cells
Open circuit voltage	V_{oc}	11.0	V	Typical for silicon
Short-circuit current	I_{sc}	0.59	A	Proportional to light intensity S
El. power	P	5.2	W	With solar spectrum, AM 1.5
Efficiency factor	η	18.0	%	Efficiency factor of the energy conversion
Filling factor	FF	79.6	%	FF is a quality feature
Current density	j	36.6	mA/cm²	j is a quality feature
Thermal behaviour open circuit voltage U_{oc}		- 0.36	% /K	The voltage decreases with warming by 0.36% per 1K
Thermal behaviour short-circuit current I_{sc}		+ 0.06	% /K	The short-circuit current increases by 0.06 % per 1K
Voltage at MPP	V_{MPP}	9.2	V	
Current at MPP	I_{MPP}	0.56	A	
Power at MPP	P_{MPP}	5.2	W	

The open circuit voltage V_{oc} first strongly increases with increasing irradiance S (= light intensity) and then slowly approximates the voltage 11.0 V. The short-circuit current I_{sc} increases in a linear fashion with the irradiance up to a maximum value of 0.59 A.



The I(V) characteristic curve
the solar cell current on the solar cell voltage with a resistive load on the solar cell. The intersection point with the x-axis is the open circuit voltage of the solar cell, the intersection point with the y-axis is the short-circuit current.