



LARGE ROOFTOP ARRAYS ON  
COMMERCIAL / INDUSTRIAL  
BUILDINGS



ROOF-PARALLEL FLAT  
ROOF INSTALLATIONS

## CIGS SOLAR MODULE

# Q.SMART UF L 90-1 10

Sophisticated design for a broad range of applications

Q-Cells is now applying the skills perfected over years of solar cell manufacture to solar module production. Thanks to their large format, the frameless **Q.SMART UF L** solar modules offer output of up to 110 Wp. The reliable „Made in Germany“ quality and the particularly appealing design qualify them for ambitious rooftop arrays and building-integrated installations alike.

### QUALITY „MADE IN GERMANY“ FOR HIGHLY RELIABLE YIELDS

- With an efficiency of up to 11.7 % one of the most powerful thin-film modules
- Surface area of 0.94 m<sup>2</sup> for high output of up to 110 Wp
- High yields due to good temperature behavior and low-light performance
- Particularly efficient, even in cases of partial shading and unfavorable roof orientation, thanks to advantageous cell geometry
- Long-term weather resistance due to durable glass encapsulation
- Efficient self-cleaning due to lack of raised edges
- Further optimization of output due to positive sorting +5/-0 Wp

### ATTRACTIVE AND AESTHETICAL VISUAL APPEARANCE

- Outstanding design with homogeneous black surface

### SIMPLE, COST-EFFECTIVE INSTALLATION

- Mounting options for every inclination
- Minimal wiring effort required, as the module itself has high reverse current resistance

### STEADY, GUARANTEED PERFORMANCE

- 10-year product warranty\*
- 25-year performance warranty\*
- Free module recycling through membership in the PV Cycle Association\*\*



\* ACCORDING TO THE RESPECTIVE EFFECTIVE REGIONAL WARRANTY TERMS. PERFORMANCE EFFICIENCY: 90% OF THE INITIAL EFFICIENCY UP TO 10 YEARS, 80% UP TO 25 YEARS  
\*\* IN PV CYCLE MEMBER COUNTRIES ONLY. SEE WWW.PVCYCLE.COM

MECHANICAL SPECIFICATION		TECHNICAL DRAWING
<b>Length</b>	1190 (+3/-1) mm	
<b>Width</b>	789.5 (+3/-1) mm	
<b>Height</b>	7.3 mm (+ Junction box, 15 mm)	
<b>Weight</b>	16.5 kg	
<b>Front Cover</b>	4 mm tempered low iron glass	
<b>Back Cover</b>	3 mm float glass	
<b>Frame</b>	None	
<b>Cell Type</b>	CIGS [Cu(In, Ga) Se <sub>2</sub> ]	
<b>Junction box</b>	Protection class IP 65, with 1 bypass diode (3 A) 66 x 54 x 15 mm <sup>3</sup>	
<b>Cable type</b>	Solar cable 2.5 mm <sup>2</sup> ; (+) 855 (+30/-0) mm; (-) 735 (+30/-0) mm	
<b>Connector</b>	MC4	

### ELECTRICAL CHARACTERISTICS

PERFORMANCE AT STANDARD TEST CONDITIONS (STC: 1000 W/m<sup>2</sup>, 25 °C, AM 1.5 SPECTRUM)<sup>1)</sup>

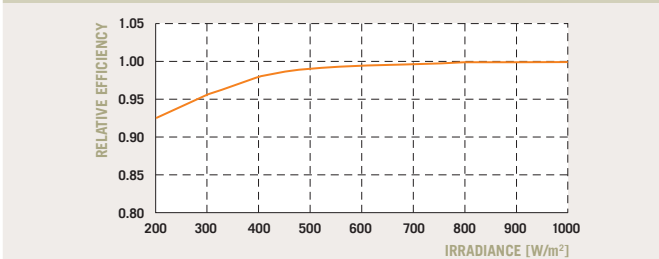
POWER CLASS		90	95	100	105	110
<b>Nominal Efficiency</b>	$\eta$ [%]	9.6	10.1	10.6	11.2	11.7
<b>Nominal Power (+5/-0 Wp)</b>	$P_{MAX}$ [W]	90.0	95.0	100.0	105.0	110.0
<b>Short Circuit Current</b>	$I_{SC}$ [A]	1.63	1.63	1.63	1.63	1.65
<b>Open Circuit Voltage</b>	$V_{OC}$ [V]	90.1	90.7	91.8	93.1	94.7
<b>Current at Maximum Power</b>	$I_{MPP}$ [A]	1.38	1.42	1.44	1.47	1.49
<b>Voltage at Maximum Power</b>	$V_{MPP}$ [V]	65.2	66.9	69.4	71.5	73.8

PERFORMANCE AT NORMAL OPERATING CELL TEMPERATURE (NOCT: 800 W/m<sup>2</sup>, 51 ± 2 °C, AM 1.5 SPECTRUM)

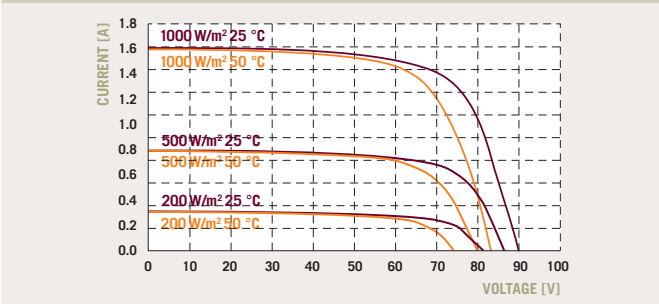
POWER CLASS		90	95	100	105	110
<b>Nominal Power</b>	$P_{MAX}$ [W]	65.1	68.8	72.4	76.0	79.6
<b>Short Circuit Current</b>	$I_{SC}$ [A]	1.30	1.30	1.30	1.30	1.32
<b>Open Circuit Voltage</b>	$V_{OC}$ [V]	81.9	82.4	83.4	84.6	86.1
<b>Current at Maximum Power</b>	$I_{MPP}$ [A]	1.10	1.13	1.15	1.17	1.19
<b>Voltage at Maximum Power</b>	$V_{MPP}$ [V]	59.1	60.7	62.9	64.8	66.9

<sup>1)</sup> The power classes are defined by positive sorting (+5W/-0W) according to measured. The accuracy of  $P_{MAX}$  (STC) is ± 3 %.  $I_{SC}$ ,  $V_{OC}$ ,  $I_{MPP}$ ,  $V_{MPP}$  are within ± 10 % of the indicated values under STC. STC performance data obtained by pretreating the modules before measurement with 1 hour light soak (1000 W/m<sup>2</sup> in open circuit) followed by cool down to 25 °C.

### PERFORMANCE AT LOW IRRADIANCE CHARACTERISTICS AT DIFFERENT TEMPERATURES AND IRRADIANCES



The typical relative change in module efficiency at an irradiance of 200 W/m<sup>2</sup> in relation to 1000 W/m<sup>2</sup> (both at 25 °C and AM 1.5 spectrum) is -7%.



### TEMPERATURE COEFFICIENTS (AT 1000 W/m<sup>2</sup>, AM 1.5 SPECTRUM)

<b>Temperature Coefficient of <math>I_{SC}</math></b>	$\alpha$ [%/K]	- 0.01 ± 0.04	<b>Temperature Coefficient of <math>V_{OC}</math></b>	$\beta$ [%/K]	- 0.30 ± 0.04
<b>Temperature Coefficient of <math>P_{MAX}</math></b>	$\gamma$ [%/K]	- 0.38 ± 0.04			

### PROPERTIES FOR SYSTEM DESIGN

<b>Maximum System Voltage <math>V_{SYS}</math></b>	[V]	1000 (IEC) / 600 (UL 1703)	<b>Safety Class</b>	II
<b>Maximum Reverse Current <math>I_R</math></b>	[A]	5.0	<b>Fire Rating</b>	C
<b>Wind/Snow Load</b>	[Pa]	2400	<b>Permitted module temperature on continuous duty</b>	-40 °C up to +85 °C

### QUALIFICATIONS AND CERTIFICATES PARTNER

IEC 61646 (Ed. 2), IEC 61730 (Ed. 1) Application Class A, UL 1703  
The production site is certified according to ISO 9001 for Quality Management.



Content of this data sheet according to DIN EN 50380.

PARTNER

**NOTE:** Installation instructions must be followed. See the installation and operating manual or contact the technical service for further information on approved installation and use of this product.