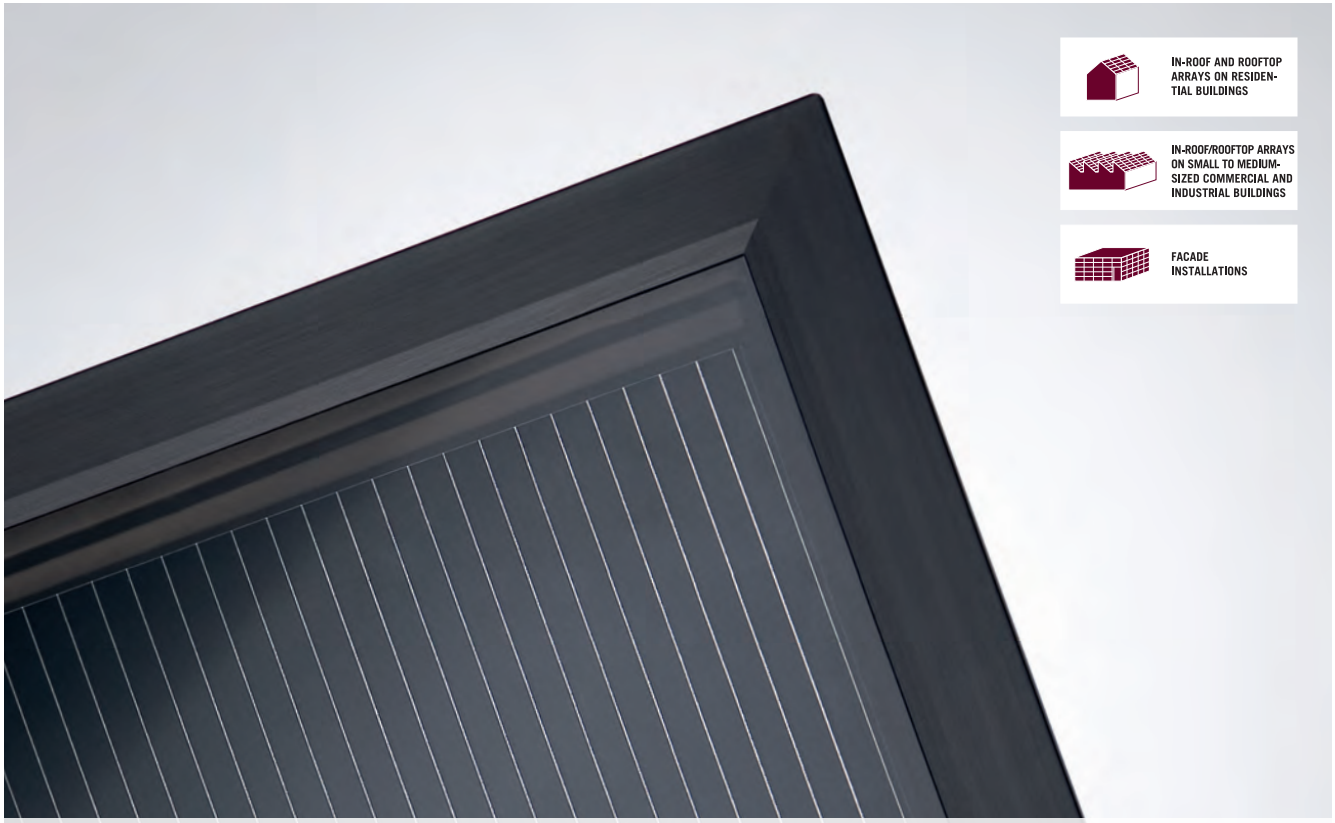


IN-ROOF AND ROOFTOP ARRAYS ON RESIDENTIAL BUILDINGS

IN-ROOF/ROOFTOP ARRAYS ON SMALL TO MEDIUM-SIZED COMMERCIAL AND INDUSTRIAL BUILDINGS

FACADE INSTALLATIONS

CIGS SOLAR MODULE

Q.SMART 70-90

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. Q.SMART solar modules offer the world's highest efficiencies for thin-film modules. The reliable „Made in Germany" quality and the particularly appealing design qualify them for rooftop arrays and building-integrated installations alike.

QUALITY „MADE IN GERMANY" FOR HIGHLY RELIABLE YIELDS:

- World's best efficiencies for thin-film modules in mass production
- High yields due to good temperature behavior and low-light performance
- Particularly efficient, even in cases of partial shading and unfavorable roof orientation and ventilation, thanks to advantageous cell geometry
- Long-term weather resistance due to durable glass encapsulation
- Further optimization of output due to positive sorting +5/-0 Wp

ATTRACTIVE AND AESTHETICAL VISUAL APPEARANCE:

- Outstanding design with homogeneous black surface and black aluminum frame

SIMPLE, COST-EFFECTIVE INSTALLATION:

- Wide clamping range for cost-efficient mounting on roof hooks
- Approved for increased snow and wind loads of up to 5400 Pa
- 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**

* 90% OF INITIAL EFFICIENCY UP TO 10 YEARS FROM COMMISSIONING, 80% UP TO 25 YEARS

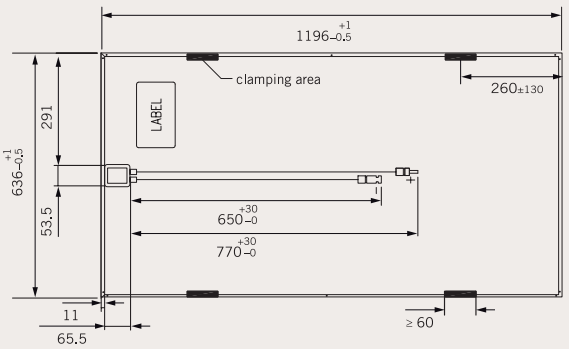
** IN MEMBER COUNTRIES ONLY, SEE WWW.PVCYCLE.COM

Q.CELLS

MECHANICAL SPECIFICATION

Format	1196 mm × 636 mm × 36 mm (including frame)
Weight	14.5 kg
Front Cover	4 mm tempered low iron glass
Back Cover	3 mm float glass
Frame	Black anodized aluminium
Cell Type	CIGS [Cu(In, Ga) Se_2]
Junction box	Protection class IP 65, with bypass diode
Cable length	(+) 770 mm; (–) 650 mm
Cable type	Solar cable 1.5 mm²
Connector	MC4

TECHNICAL DRAWING



ELECTRICAL CHARACTERISTICS

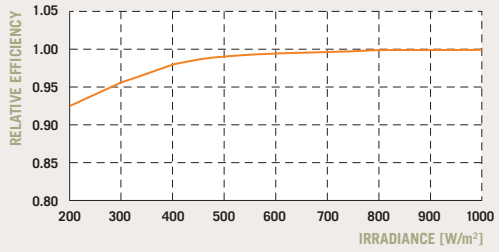
PERFORMANCE AT STANDARD TEST CONDITIONS (STC: 1000 W/m². 25 °C. AM 1.5 SPECTRUM)[1]

POWER CLASS			70	75	80	85	90
Nominal Efficiency	η	[%]	9.2	9.9	10.5	11.2	11.8
Nominal Power (+5/-0 Wp)	P_{MAX}	[W]	70.0	75.0	80.0	85.0	90.0
Short Circuit Current	I_{SC}	[A]	1.66	1.66	1.67	1.68	1.69
Open Circuit Voltage	V_{OC}	[V]	69.1	70.5	71.8	73.1	75.1
Current at Maximum Power	I_{MPP}	[A]	1.40	1.42	1.46	1.49	1.52
Voltage at Maximum Power	V_{MPP}	[V]	50.2	52.7	54.8	57.2	59.2

PERFORMANCE AT NORMAL OPERATING CELL TEMPERATURE (NOCT: 800 W/m². 51± 2 °C. AM 1.5 SPECTRUM)

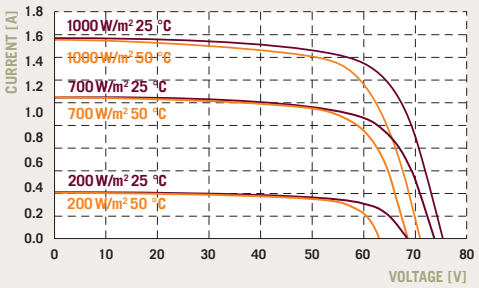
POWER CLASS			70	75	80	85	90
Nominal Power	P_{MAX}	[W]	50.7	54.3	57.9	61.5	65.1
Short Circuit Current	I_{SC}	[A]	1.32	1.33	1.33	1.34	1.35
Open Circuit Voltage	V_{OC}	[V]	62.8	64.1	65.2	66.5	68.3
Current at Maximum Power	I_{MPP}	[A]	1.11	1.13	1.16	1.18	1.21
Voltage at Maximum Power	V_{MPP}	[V]	45.5	47.8	49.7	51.8	53.7

PERFORMANCE AT LOW IRRADIANCE



The typical relative change in module efficiency at an irradiance of 200 W/m² in relation to 1000 W/m² (both at 25 °C and AM 1.5 spectrum) is -7%.

CHARACTERISTICS AT DIFFERENT TEMPERATURES AND IRRADIANCES



TEMPERATURE COEFFICIENTS (AT 1000 W / M2, AM 1.5 SPECTRUM)

Temperature Coefficient of I_{SC}	α	[%/K]	– 0.01 ± 0.04	**Temperature Coefficient of V_{OC}**	β	[%/K]	–0.30 ± 0.04
Temperature Coefficient of P_{MAX}	γ	[%/K]	–0.38 ± 0.04				

[1] The power classes are defined by positive sorting (+5 W/-0 W) according to measured P_{max} under STC. The accuracy of this measurement is ±3 %. I_{sc}, V_{oc}, I_{mp}, V_{mp} are within ±10 % of the indicated values under STC. Valid indoor measurement of STC performance is obtained by pretreating the modules before measurement with 1 hour light soak (at approx. 1000 W/m² in open circuit) followed by cool down to 25 °C.

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1000 (IEC) / 600 (UL 1703)	**Safety Class**	II
Maximum Reverse Current I_R	[A]	6.5	**Fire Rating**	C
Wind / Snow Load	[Pa]	5400		

QUALIFICATIONS AND CERTIFICATES

IEC 61646 (Ed. 2); IEC 61730 (Ed.1) Application Class A; ISO 9001:2008

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.

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