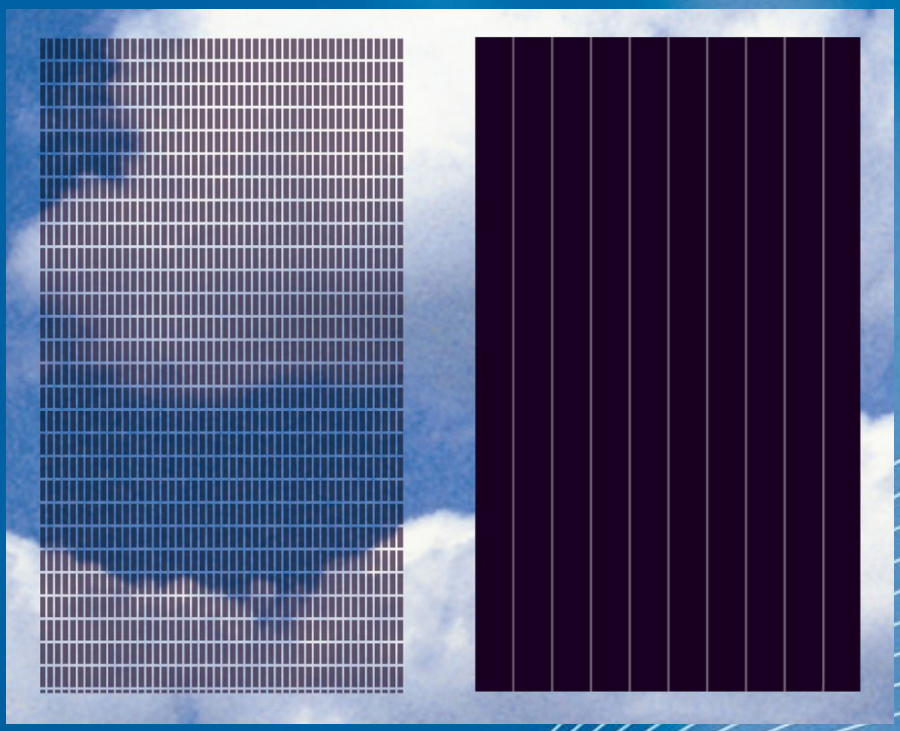
SCHOTT ASI® Glass

Modular Sizes



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SCHOTT ASI® Glass – Modular Sizes

- Solar electricity
- Light management
- Effective shading
- Glare protection
- Thermal management
- Innovative architecture
- Comfort
- Cost savings by combining and integrating several functions

The frameless glass laminates and double glazed elements are designed to be compatible with most conventional glazing systems for facades and skylights.

ASI® Glass elements are designed on the basis of SCHOTT Solar's ASI® thin-film technology as silicon tandem cells on glass substrate. ASI ® Glass elements demonstrably produce maximum energy yields.

Whether a façade or an roof, today's building envelope has to fulfil multiple purposes. Alongside it's conventional roles of providing privacy and protection from rain and noise, additional factors are becoming increasingly important, such as thermal insulation and shading. All of these tasks have to be performed by the shell of a building. Today, building integrated photovoltaic systems are able to provide all of these functions plus solar electricity.

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Laminates

Large area laminates are realized using up to 4 sub-modules forming a uniform area. The laminates given on the following pages are sorted according to the number of sub-modules being used.

SCHOTT ASI® Glass laminate

Applications with semi-transparent laminates

For carports or train stations, glazed roofs without a thermal insulation function are typical applications for semi-transparent laminates. It is possible to combine non-transparent ASI ® OPAK areas with semi-transparent ASI ® THRU areas.
Additionally, clear glass elements can be integrated. This allows engineering the light falling through the glazed area for your specific project.

Application with non-transparent (opaque) laminates

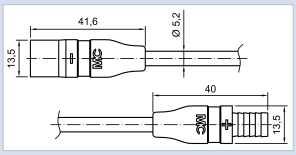
The non-transparent (ASI ® OPAK) laminates can be used for rain screen cladding as well as for facades using transom and mullion systems.

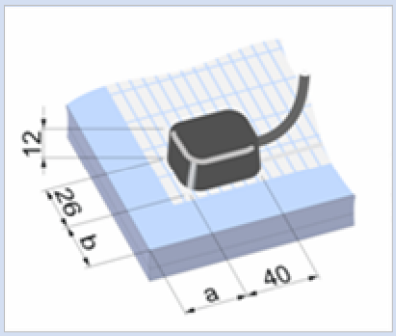
Module-design

All laminates come with two outlets on the rear face. The distance of the cable outlet to the laminate edge is defined by the active area of the module. The drawing at the right hand side shows within this data sheet.

Please note, the framing system needs to allow a sufficient distance between the cable outlet housing and the actual framework. Any mechanical load on the cable outlet housing must be avoided.

All modules are delivered with Multi-Contact connectors. Please note the geometry of the connectors when planning the cable guidance within your framework.





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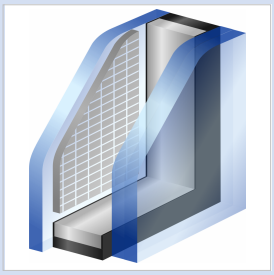
SCHOTT ASI® Glass – Double glazing

Double glazed units based on the ASI® THRU technology are always used when a thermal insulation, shading of course electricity generation is required. The construction of the double glazed units offer the same thermal insulation compared with conventional double glazed units. As standard, the elements are offered with a U-Value of 1.1 W/m²K. For even higher requirements, please contact your local sales representative.

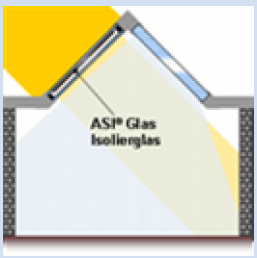


SCHOTT ASI® Glass double glazing

Applications with double glazing

SCHOTT ASI® Glass – double glazing used in overhead application

SCHOTT ASI® Glass – double glazing used in façade applications

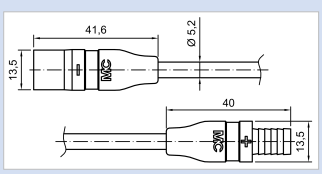


SCHOTT ASI® Glass – double glazing used in roofs

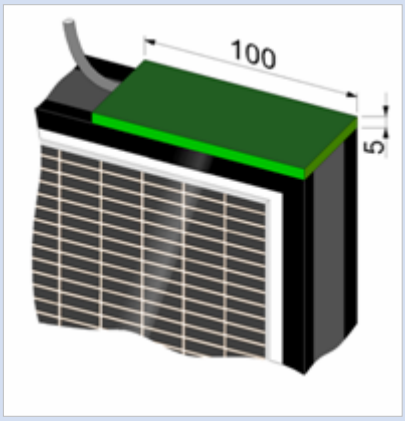
Module design

All SCHOTT ASI® glass double glazing units are built with cable outlets exiting from the edge. These are designed to fit into the majority of transom and million systems available. The details are shown in the drawing on the right hand side. Please note, the cable outlets must not be used as setting blocks when installing the elements.

All modules are delivered with Multi-Contact connectors. Please note the geometry of the connectors when planning the cable guidance within your framework.



Multi-Contact connectors



Cable outlet of a SCHOTT ASI® double glazing unit

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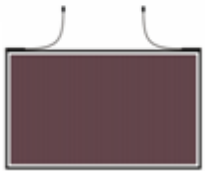
SCHOTT ASI® Glass with 1 sub-module

Version:	Laminate			Double glazing	
					
Typ:	**ASI® OPAK-1-L**	**ASI® THRU-1-L 10 %**	**ASI® THRU-1-L 20%**	**ASI® THRU-1-IO 10%**	**ASI® THRU-1-IO 20%**

Mechanical construction:

Front glass (low iron)	6 mm HSG			6 mm HSG	
Interlayer	1,1 mm PVB			0,8 mm PVB	
ASI® Glass (1x)	ASI® THRU			ASI® THRU	
Interlayer	1,1 mm PVB			/	
Cavity	/			18 mm / 20 mm	
Back glass	6mm HSG			8 mm LSG	
Cable outlet	Rear side			lateral	
Cable type/diameter (+and-)	Double isolated, black / 4,0 mm²				
Outer diameter / cable length	Ø6,0 mm / 1 m				
Connector (male/female)	Multi-Contact PV-KBT3 / PV-KST3				

Dimensions/Weight*:

Glass size	1122 mm x 690 mm			1122 mm x 696 mm	
Active area	1072 mm x 640 mm			1072 mm x 640 mm	
Total glass thickness	16 mm			34 mm	
Total weight	29 kg			33 kg	

Physical data***:

U_g- Value (DIN EN 673)	~5 W/m²K			1,1 W/m²K	
g- Value (active area)	27 %			10 %	
Light transmission (active area)	1	10 %	20 %	10 %	20 %

Electrical Data:

Initial nominal power P_{mpp}	53 W_p	48 W_p	43 W_p	48 W_p	43 W_p
Nominal power P_{mpp} **	43 W_p	39 W_p	35 W_p	39 W_p	35 W_p
Current at nominal power I_{mpp} **	0,52 A	0,47 A	0,42 A	0,47 A	0,42 A
Short-circuit current I_{sc} **	0,62 A	0,55 A	0,50 A	0,55 A	0,50 A
Voltage at nominal power U_{mpp} **	83 V	83 V	83 V	83 V	83 V
Open-circuit voltage U_{oc} **	111 V	111 V	111 V	111 V	111 V
Maximum system voltage	600 V	600 V	600 V	600 V	600 V

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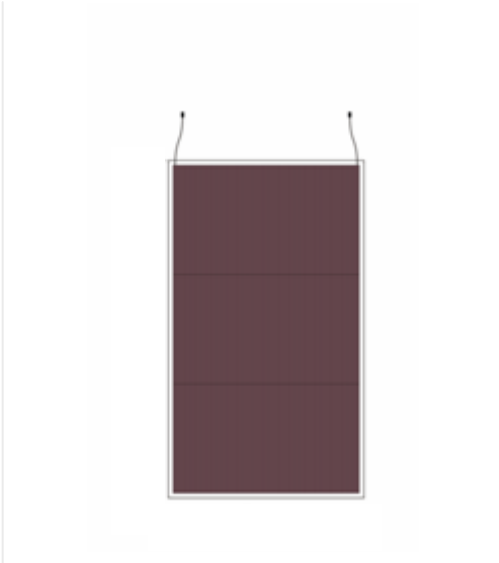
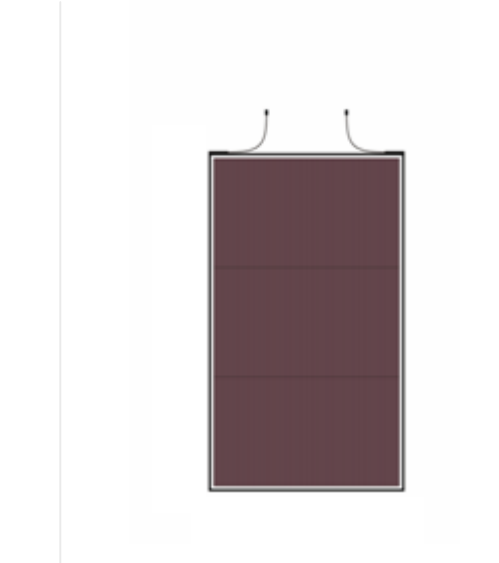
SCHOTT ASI® Glass with 2 sub-modules

Version:	Laminate			Double glazing	
					
Typ:	**ASI® OPAK-2-L**	**ASI® THRU-2-L 10 %**	**ASI® THRU-2-L 20%**	**ASI® THRU-2-IO 10%**	**ASI® THRU-2-IO 20%**
Mechanical construction:					
Front glass (low iron)	6 mm HSG			6 mm HSG	
Interlayer	1,1 mm PVB			0,8 mm PVB	
ASI® Glass (2x)	ASI® THRU			ASI® THRU	
Interlayer	1,1 mm PVB			/	
Cavity	/			18 mm / 20 mm	
Back glass	6 mm HSG			8 mm LSG	
Cable outlet	Rear side			lateral	
Cable type/diameter (+ and -)	Double isolated, black / 4,0 mm²				
Outer diameter / cable length	Ø6,0 mm / 1 m				
Connector (male / female)	Multi-Contact PV-KBT3 / PV-KST3				
Dimensions/Weight*:					
Glass size	1122 mm x 1331 mm			1122 mm x 1337 mm	
Active area	1072 mm x 1280 mm			1072 mm x 1280 mm	
Total glass thickness	16 mm			34 mm	
Total weight	58 kg			65 kg	
Physical Data*:**					
U_g- Value (DIN EN 673)	~5 W/m²K			1,1 W/m²K	
g-Value (active area)	27 %			10 %	
Light transmission (active area)	1	10 %	20 %	10 %	20 %
Electrical Data:					
Initial nominal power P_{mpp}	106 W_p	95 W_p	85 W_p	95 W_p	85 W_p
Nominal power P_{mpp} **	87 W_p	78 W_p	70 W_p	78 W_p	70 W_p
Current at nominal power I_{mpp} **	1,04 A	0,94 A	0,84 A	0,94 A	0,84 A
Short-circuit current I_{sc} **	1,23 A	1,11 A	0,99 A	1,11 A	0,99 A
Voltage at nominal power U_{mpp} **	83 V	83 V	83 V	83 V	83 V
Open-circuit voltage U_{oc} **	111 V	111 V	111 V	111 V	111 V
Maximum system voltage	600 V	600 V	600 V	600 V	600 V

SCHOTT ASI® Glass with 3 sub-modules

Version:	Laminate			Double glazing	
					
Typ:	**ASI® OPAK-3-L**	**ASI® THRU-3-L 10 %**	**ASI® THRU-3-L 20%**	**ASI® THRU-3-IO 10%**	**ASI® THRU-3-IO 20%**

Mechanical construction

Front glass (low iron)	6 mm HSG			6 mm HSG	
Interlayer	1,1 mm PVB			0,8 mm PVB	
ASI® Glass (3x)	ASI® THRU			ASI® THRU	
Interlayer	1,1 mm PVB			/	
Cavity	/			18 mm / 20 mm	
Back glass	6 mm HSG			8 mm LSG	
Cable outlet	Rear side			lateral	
Cable type/diameter (+ and -)	Double isolated, black / 4,0 mm²				
Outer diameter / Cable length	Ø6,0 mm / 1 m				
Connector (male / female)	Multi-Contact PV-KBT3 / PV-KST3				

Dimensions/Weight*:

Glass size	1122 mm x 1972 mm			1122 mm x 1978 mm	
Active area	1072 mm x 1920 mm			1072 mm x 192 0mm	
Total glass thickness	16 mm			34 mm	
Total weight	86 kg			95 kg	

Physical Data***:

U- Value (DIN EN 673)	~5 W/m²K			1,1 W/m²	
g-Value (active area)	27 %			10 %	
Light transmission (active area)	1	10 %	20 %	10 %	20 %

Electrical Data:

Initial nominal power P_{mpp}	158 W_p	143 W_p	128 W_p	143 W_p	128 W_p
Nominal power P_{mpp} **	130 W_p	117 W_p	105 W_p	117 W_p	105 W_p
Current at nominal power I_{mpp} **	1,56 A	1,41 A	1,26 A	1,41 A	1,26 A
Short-circuit current I_{sc} **	1,85 A	1,66 A	1,49 A	1,66 A	1,49 A
Voltage at nominal power U_{mpp} **	83 V	83 V	83 V	83 V	83 V
Open-circuit voltage U_{oc} **	111 V	111 V	111 V	111 V	111 V
Maximum system voltage	600 V	600 V	600 V	600 V	600 V

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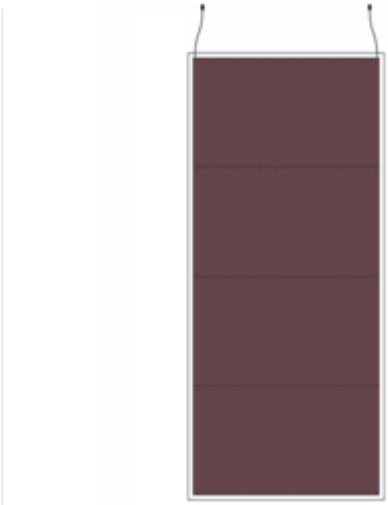
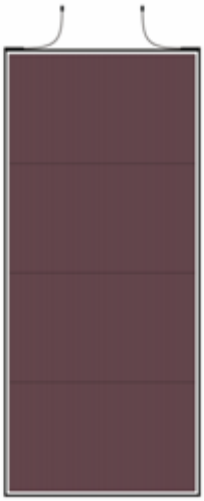
SCHOTT ASI® Glass with 4 sub-modules

Version:	Laminate			Double glazing	
					
Type:	**ASI® OPAK-4-L**	**ASI® THRU-4-L 10 %**	**ASI® THRU-4-L 20%**	**ASI® THRU-4-IO 10%**	**ASI® THRU-4-IO 20%**

Mechanical construction:

Front glass (low iron)	6 mm HSG			6 mm HSG	
Interlayer	1,1 mm PVB			0,8 mm PVB	
ASI® Glass (4x)	ASI® THRU			ASI® THRU	
Interlayer	1,1 mm PVB			/	
Cavity	/			18 mm / 20 mm	
Back glass	6 mm HSG			8 mm LSG	
Cable outlet	Rear side			lateral	
Cable type/diameter (+ and -)	Double isolated, black / 4,0mm²				
Outer diameter / Cable length	Ø6,0 mm / 1 m				
Connector (male / female)	Multi-Contact PV-KBT3 / PV-KST3				

Dimensions/Weight*:

Glass size	1122 mm x 2613 mm			1122 mm x 2619 mm	
Active area	1072 mm x 2560 mm			1072 mm x 2560 mm	
Total glass thickness	16 mm			34 mm	
Total weight	114 kg			126 kg	

Physical Data***:

U_g- Value (DIN EN 673)	~5 W/m²K			1,1 W/m²K	
g-Value (active area)	27 %			10 %	
Light transmission (active area)	1	10 %	20 %	10 %	20 %

Electrical Data:

Initial nominal power P_{mpp}	211 W_p	190 W_p	171 W_p	190 W_p	171 W_p
Nominal power P_{mpp} **	173 W_p	156 W_p	140 W_p	156 W_p	140 W_p
Current at nominal power I_{mpp} **	2,08 A	1,87 A	1,85 A	1,87 A	1,85 A
Short-circuit current I_{sc} **	2,46 A	2,22 A	2,19 A	2,22 A	2,19 A
Voltage at nominal power U_{mpp} **	83 V	83 V	83 V	83 V	83 V
Open-circuit voltage U_{oc} **	111 V	111 V	111 V	111 V	111 V
Maximum system voltage	600 V	600 V	600 V	600 V	600 V

Notes on given technical data

* The tolerances of the outer glass dimensions are ±3 mm.

** These data represent stabilised electrical module performance at standard test conditions (STC -1000 W/m²; AM 1.5; 25°C cell temperature). The nominal power may be initially approx. 18% higher than the quoted stabilised power data. This power bonus has to be considered when designing the system. All given electrical data are subject to a production tolerance of ± 10%.

*** The given g- Values and U- Values are approximate data.

Cell temperature coefficients

Referred to nominal power	$T_k (P_n)$	- 0,2 % / K
Referred to open-circuit voltage	$T_k (U_{oc})$	- 0,31 % / K
Referred to short-circuit current	$T_k (I_{sc})$	+ 0,08 % / K

Hinweise für die Systemauslegung

Negative potentials:	Any negative potential between SCHOTT ASI ® glass modules and earth (ground potential) must be avoided for installations with a system voltage exceeding 100V. This requirement has to be ensured by an adequate system design. Please contact your inverter supplier for details regarding this requirement.
Shading:	Solar modules based on the SCHOTT ASI ® technology are very shading tolerant. However, shades covering fully one or more cells have to be avoided.
Reverse current:	The maximum reverse current must not exceed two times the short circuit current (2 x Isc). It is recommended to provide a fuse for each string (serial interconnection of single PV-elements). The recommended fuse rating for string fuse is two times the short-circuit current (2 x Isc).
General:	Never exceed the given maximum system voltage. Under normal conditions, a photovoltaic module may experience conditions that produce more current and/or voltage than reported at standard test conditions.

Produktnomenklatur

Nomenklatur: **ASI® THRU 10% - 3 - L**

Technology	Number of sub-modules	Version:
THRU 10% T_L		L = Laminate Io= Double glazing

Erscheinungsbild des Halbleiters

Thin-film silicon modules may exhibit slight variations in colour, both across any given module and from module to module. These non-uniformities are caused by optical interference effects within the semiconductor layers, and are thus inherent to the manufacturing process. Most importantly, however, the perceived colour differences have no influence whatsoever on the electrical performance of the modules and their service life, and, therefore, present no reason for rejection.

Quality of glass and lamination

Glass
- HSG: Heat Strengthened Glass (semi toughened glass) according to DIN EN 1863-1
- LSG: Laminated Safety Glass (float glass / PVB foil / float glass) according to DIN EN 12543-1

Lamination foil:
For all given laminates and double glazing elements only PVB (Polyvinylbutyral) interlayer will be used with the following mechanical parameters:

- Tensile Strength > 20 N/mm²
- Breaking Elongation > 250 %

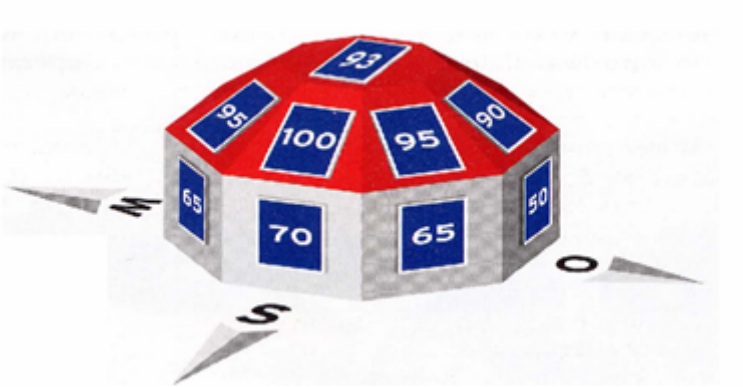
The glass edges are not polished. Due to the production process, isolated and sporadic small bubbles in the laminate in the rim area and main areas of the glass panes may appear and are not considered to be defects.

The choice of glass thickness and quality, such as float glass, heat strengthened glass or fully hardened glass is not the responsibility of SCHOTT. All glazing has to be built according to relevant building codes, national standards and best practice for glazed structures. The actual specifications for glass configuration has to be determined by the architect or buyer based upon local building codes. On request the inner glass of all double glazing units can be offered as safety glass laminate based on heat strengthened glass.

Qualifizierung

Qualification: CE conformity

The right is reserved to make technical modifications.



High energy yields are generated by arranging for the system to face south at a horizontal angle of 30° (100). The yield values will be somewhat lower if the direction deviates from this.

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SCHOTT AG
Architecture + Design
Hattenbergstr. 10
55126 Mainz
Germany
Phone: +49 (0)6131/66-2625
Fax: +49 (0)3641/2847-498
info.bipv@schott.com
www.schott.com/architecture

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