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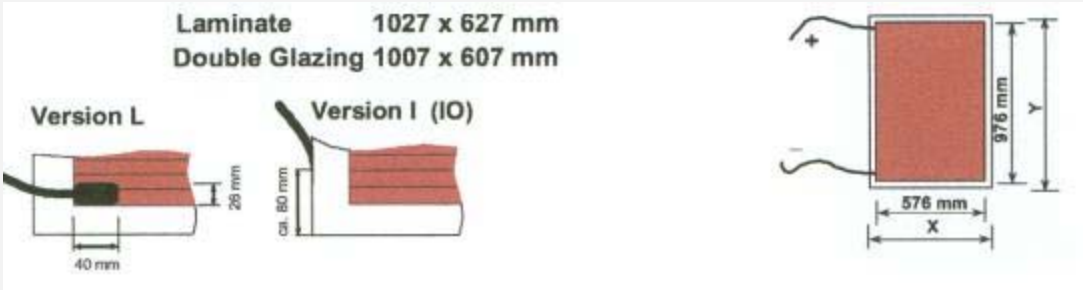
BIPV THIN FILM MODULES



TYPE	OPAK-1-L	THRU-1-L	THRU-1-I Double Glazing	THRU-1-IO Double Glazing
Mechanical Construction				
Front Glass(white Glass)	6mm HSG	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	1.1mm PVB	1.1mm PVB
Thin Film Solar Plate	Opaque	Transparent	Transparent	Transparent
Interlayer	1.1mm PVB	1.1mm PVB	/	/
Spacer	/	/	16mm	16mm
Back Glass	6mm HSG	6mm HSG	6mm HSG	8mm SGL
Cable Outlet	rear side	rear side	lateral	lateral
Cable Type/Diametr(+and-) Outer Diameter/Cable Length	Double isolated, black/2.5mm^2 5.2mm / 1m		Double isolated, black/2.5mm^2 5.2mm / 1m	
Connector(Male/Female)	Multi-Contact PV-KBT3/PV-KST3		Without Connector	
Dimension, Weight:**				
Dimension(X/Y)	1027 x 627 mm		1007 x 607 mm	
Total Glass Thickness	17mm	17mm	32mm	34mm
Total Weight	27kg	27kg	24kg	29kg
Physical Data:				
Heat Transmittance Ug-Value (DIN EN 673) (American)	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F
Solar Heat Gain Coefficient(SHGC)	23%	27%	10%	10%
Light Transmission	1%	10%	10%	10%
Electrical Data:				
Initial Nominal Power P_{mpp}	35Wp	31Wp	31Wp	31Wp
Nominal Power P_{mpp}***	29Wp	25Wp	25Wp	25Wp
Current at Nominal Power I_{mpp}***	0.43A	0.37A	0.37A	0.37A
Short Circuit Current I_{sc}***	0.55A	0.49A	0.49A	0.49A
Voltage at Nominal Power U_{mpp}***	68V	68V	68V	68V
Open Circuit Voltage U_{oc}***	93V	93V	93V	93V
Maximum System Voltage	1000V	1000V	120V	120V

*The specification for glass configuration should be determined by the architect or buyer upon local building codes.
**The tolerances of the outer glass dimensions are ±3mm. ***These data represent stabilized electrical module performance at standard test conditions(STC:1000W/m^2, AM1.5, 25^{0}C cell temperature). The nominal power may be initially approximately 18% higher than the quoted stabilized 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%.

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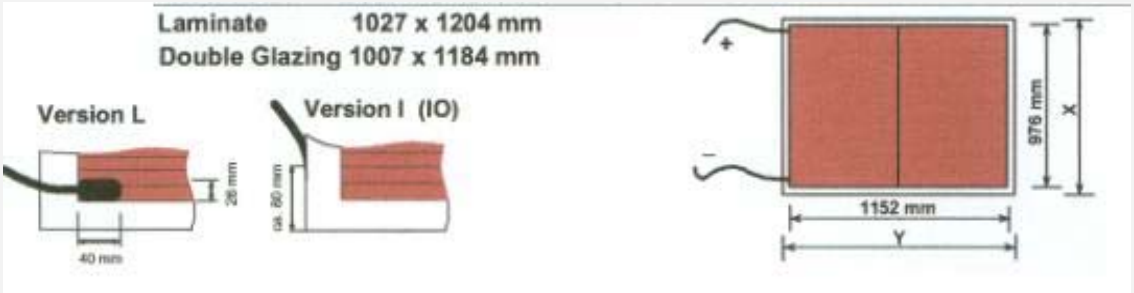

			Double Glazing	Double Glazing
Front Glass(white Glass)	6mm HSG	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	1.1mm PVB	1.1mm PVB
Thin Film Solar Plate	Opaque	Transparent	Transparent	Transparent
Interlayer	1.1mm PVB	1.1mm PVB	/	/
Spacer	/	/	16mm	16mm
Back Glass	6mm HSG	6mm HSG	6mm HSG	8mm SGL
Cable Outlet	rear side	rear side	lateral	lateral
Cable Type/Diametr(+and-) Outer Diameter/Cable Length	Double isolated, black/2.5mm^2 5.2mm / 1m		Double isolated, black/2.5mm^2 5.2mm / 1m	
Connector(Male/Female)	Multi-Contact PV-KBT3/PV-KST3		Without Connector	
Dimension, Weight:**				
Dimension(X/Y)	1027 x 1204 mm		1007 x 1184 mm	
Total Glass Thickness	17mm	17mm	32mm	34mm
Total Weight	54kg	54kg	48kg	57kg
Physical Data:				
Heat Transmittance Ug-Value (DIN EN 673) (American)	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F
Solar Heat Gain Coefficient(SHGC)	23%	27%	10%	10%
Light Transmission	1%	10%	10%	10%
Electrical Data:				
Initial Nominal Power P_{mpp}	71Wp	61Wp	61Wp	61Wp
Nominal Power P_{mpp}***	58Wp	50Wp	50Wp	50Wp
Current at Nominal Power I_{mpp}***	0.85A	0.74A	0.74A	0.74A
Short Circuit Current I_{sc}***	1.10A	0.98A	0.98A	0.98A
Voltage at Nominal Power U_{mpp}***	68V	68V	68V	68V
Open Circuit Voltage U_{oc}***	93V	93V	93V	93V
Maximum System Voltage	1000V	1000V	120V	120V

*The specification for glass configuration should be determined by the architect or buyer upon local building codes.
**The tolerances of the outer glass dimensions are ±3mm. ***These data represent stabilized electrical module performance at standard test conditions(STC:1000W/m^2, AM1.5, 25^{0}C cell temperature). The nominal power may be initially approximately 18% higher than the quoted stabilized 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%.

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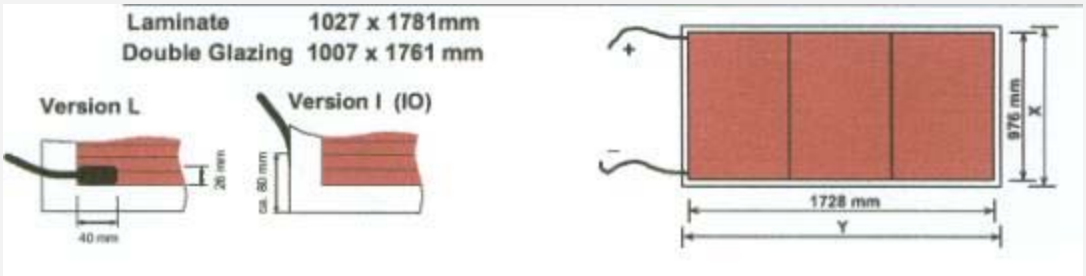

TYPE	OPAK-3-L	THRU-3-L	THRU-3-I Double Glazing	THRU-3-IO Double Glazing
Mechanical Construction				
Front Glass(white Glass)	6mm HSG	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	1.1mm PVB	1.1mm PVB
Thin Film Solar Plate	Opaque	Transparent	Transparent	Transparent
Interlayer	1.1mm PVB	1.1mm PVB	/	/
Spacer	/	/	16mm	16mm
Back Glass	6mm HSG	6mm HSG	6mm HSG	8mm SGL
Cable Outlet	rear side	rear side	lateral	lateral
Cable Type/Diametr(+and-) Outer Diameter/Cable Length	Double isolated, black/2.5mm^2 5.2mm / 1m		Double isolated, black/2.5mm^2 5.2mm / 1m	
Connector(Male/Female)	Multi-Contact PV-KBT3/PV-KST3		Without Connector	
Dimension, Weight:**				
Dimension(X/Y)	1027 x 1781 mm		1007 x 1761 mm	
Total Glass Thickness	17mm	17mm	32mm	34mm
Total Weight	80kg	80kg	71kg	84kg
Physical Data:				
Heat Transmittance Ug-Value (DIN EN 673) (American)	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F
Solar Heat Gain Coefficient(SHGC)	23%	27%	10%	10%
Light Transmission	1%	10%	10%	10%
Electrical Data:				
Initial Nominal Power P_{mpp}	106Wp	92Wp	92Wp	92Wp
Nominal Power P_{mpp}***	87Wp	75Wp	75Wp	75Wp
Current at Nominal Power I_{mpp}***	1.28A	1.11A	1.11A	1.11A
Short Circuit Current I_{sc}***	1.65A	1.48A	1.48A	1.48A
Voltage at Nominal Power U_{mpp}***	68V	68V	68V	68V
Open Circuit Voltage U_{oc}***	93V	93V	93V	93V
Maximum System Voltage	1000V	1000V	120V	120V

*The specification for glass configuration should be determined by the architect or buyer upon local building codes.
**The tolerances of the outer glass dimensions are ±3mm. ***These data represent stabilized electrical module performance at standard test conditions(STC:1000W/m^2, AM1.5, 25^{0}C cell temperature). The nominal power may be initially approximately 18% higher than the quoted stabilized 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%.

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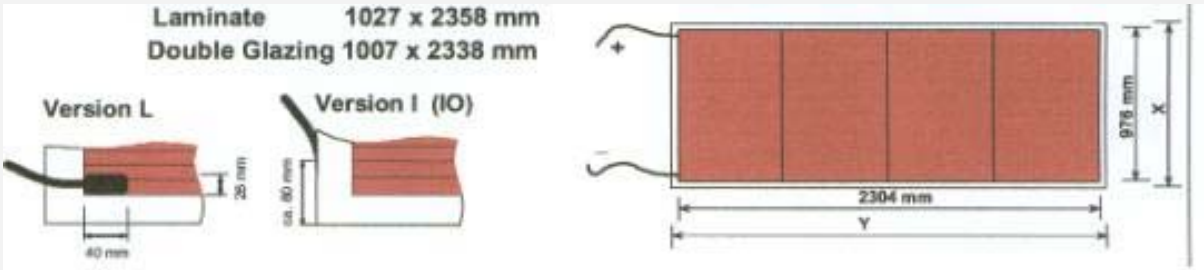

TYPE	OPAK-4-L	THRU-4-L	THRU-4-I Double Glazing	THRU-4-IO Double Glazing
Mechanical Construction				
Front Glass(white Glass)	6mm HSG	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	1.1mm PVB	1.1mm PVB
Thin Film Solar Plate	Opaque	Transparent	Transparent	Transparent
Interlayer	1.1mm PVB	1.1mm PVB	/	/
Spacer	/	/	16mm	16mm
Back Glass	6mm HSG	6mm HSG	6mm HSG	8mm SGL
Cable Outlet	rear side	rear side	lateral	lateral
Cable Type/Diametr(+and-) Outer Diameter/Cable Length	Double isolated, black/2.5mm^2 5.2mm / 1m		Double isolated, black/2.5mm^2 5.2mm / 1m	
Connector(Male/Female)	Multi-Contact PV-KBT3/PV-KST3		Without Connector	
Dimension, Weight:**				
Dimension(X/Y)	1027 x 2358 mm		1007 x 2338 mm	
Total Glass Thickness	17mm	17mm	32mm	34mm
Total Weight	106kg	106kg	94kg	112kg
Physical Data:				
Heat Transmittance Ug-Value (DIN EN 673) (American)	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F
Solar Heat Gain Coefficient(SHGC)	23%	27%	10%	10%
Light Transmission	1%	10%	10%	10%
Electrical Data:				
Initial Nominal Power P_{mpp}	141Wp	122Wp	122Wp	122Wp
Nominal Power P_{mpp}***	116Wp	100Wp	100Wp	100Wp
Current at Nominal Power I_{mpp}***	1.71A	1.48A	1.48A	1.48A
Short Circuit Current I_{sc}***	2.20A	1.97A	1.97A	1.97A
Voltage at Nominal Power U_{mpp}***	68V	68V	68V	68V
Open Circuit Voltage U_{oc}***	93V	93V	93V	93V
Maximum System Voltage	1000V	1000V	120V	120V

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**The tolerances of the outer glass dimensions are ±3mm. ***These data represent stabilized electrical module performance at standard test conditions(STC:1000W/m^2, AM1.5, 25^{0}C cell temperature). The nominal power may be initially approximately 18% higher than the quoted stabilized 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%.

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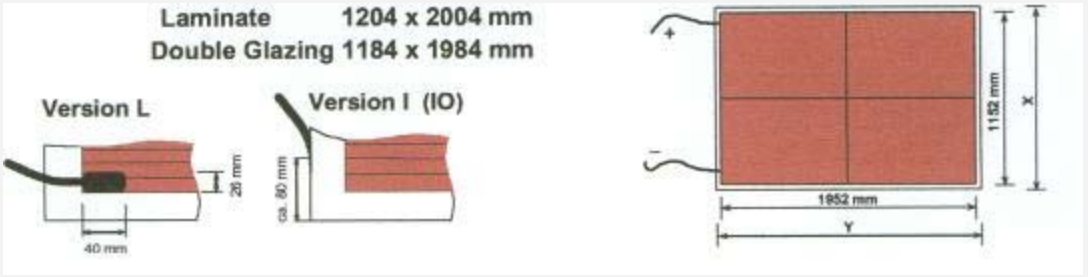

TYPE	OPAK-4x-L	THRU-4x-L	THRU-4x-I Double Glazing	THRU-4x-IO Double Gla-zing
Mechanical Construction				
Front Glass(white Glass)	6mm HSG	6mm HSG	6mm HSG	6mm HSG
Interlayer	1.1mm PVB	1.1mm PVB	1.1mm PVB	1.1mm PVB
Thin Film Solar Plate	Opaque	Transparent	Transparent	Transparent
Interlayer	1.1mm PVB	1.1mm PVB	/	/
Spacer	/	/	16mm	16mm
Back Glass	6mm HSG	6mm HSG	6mm HSG	8mm SGL
Cable Outlet	rear side	rear side	lateral	lateral
Cable Type/Diametr(+and-) Outer Diameter/Cable Length	Double isolated, black/2.5mm^2 5.2mm / 1m		Double isolated, black/2.5mm^2 5.2mm / 1m	
Connector(Male/Female)	Multi-Contact PV-KBT3/PV-KST3		Without Connector	
Dimension, Weight:**				
Dimension(X/Y)	1204 x 2004 mm		1184 x 1984 mm	
Total Glass Thickness	17mm	17mm	32mm	34mm
Total Weight	105kg	105kg	94kg	112kg
Physical Data:				
Heat Transmittance Ug-Value (DIN EN 673) (American)	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~5W/m^{2}K ~0.88 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F	~1.2W/m^{2}K ~0.21 Btu/hr ft^{2}F
Solar Heat Gain Coefficient(SHGC)	23%	27%	10%	10%
Light Transmission	1%	10%	10%	10%
Electrical Data:				
Initial Nominal Power P_{mpp}	140Wp	117Wp	117Wp	117Wp
Nominal Power P_{mpp}***	114Wp	96Wp	96Wp	96Wp
Current at Nominal Power I_{mpp}***	1.59A	1.33A	1.33A	1.33A
Short Circuit Current I_{sc}***	2.09A	1.80A	1.80A	1.80A
Voltage at Nominal Power U_{mpp}***	72V	72V	72V	72V
Open Circuit Voltage U_{oc}***	98V	98V	98V	98V
Maximum System Voltage	1000V	1000V	120V	120V

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