

MANUFACTURER



SOLAR INNOVA GREEN TECHNOLOGY, S.L.

N.I.F.: ESB-54.627.278

Paseo de los Molinos, 12

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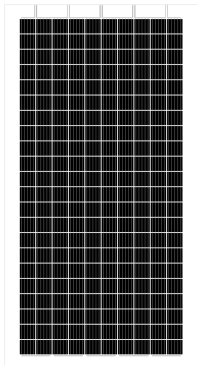
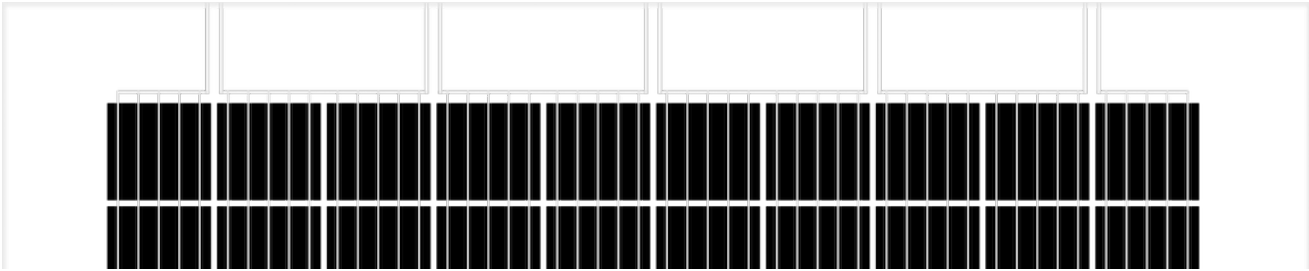
W: www.solarinnova.net



PHOTOVOLTAIC MODULES

Series	BIPV-NOISE BARRIERS	Reference	SI-ESF-M-BIPV-NB-M158-220	Type	MONOCRYSTALLINE
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INTRODUCTION



**MATERIALS**

Solar Innova uses the latest materials to manufacture photovoltaic modules.

**USE**

Our modules are ideal for any application that uses the photoelectric effect as a clean energy source because of its minimal chemical pollution and no noise pollution.

**FRONT**

The front of the module contains a tempered solar glass with:

- High transmissivity.
- Low reflectivity.
- Low iron content.

**PV CELLS**

These PV modules use high-efficiency monocrystalline silicon cells (the cells are made of a single crystal of high purity silicon) to transform the energy of sunlight into electric energy.

Each cell is electrically rated to optimize the behavior of the module.

Its performance is excellent over the entire range of light spectrum, with particularly high yields in low light situations or cloudiness to direct sunlight (diffuse radiation).

**ENCAPSULANT**

The cell circuit is laminated using as encapsulant:

- PVB (Polivinil Butiral).

**BACK**

The rear of the module contains a tempered glass which provides complete protection and seals against environmental agents and electrical insulation.

**JUNCTION BOX**

The junction boxes with IP67, are made from high temperature resistant plastics and containing terminals, connection terminals and protection diodes (by-pass).

These modules are supplied with symmetric lengths of cable, with a diameter of copper section of 4 mm and an extremely low contact resistance, all designed to achieve the minimum voltage drop losses.

**PERFORMANCE**

Our modules comply with all safety requirements not only flexibility but also double insulation and high resistance to UV rays, all are suitable for use in outdoor applications. The design of these modules makes their integration in both industrial and residential buildings (one of the most emerging sectors in the photovoltaic market), and other infrastructure, simple and aesthetic.

**QUALITY CONTROL**

We have quality control divided into three elements:

- Regular inspections allow us to guarantee the quality of the raw material.
- Quality control in the process of our manufacturing procedures.
- Quality control of finished products, we conduct through inspections and tests of reliability and performance.

**WARRANTIES**

Our manufacturing plants have been prepared in accordance with:

- ISO 9001, in terms of Quality Systems and Business.
- ISO 14001, in terms of Environmental Management Systems.
- ISO 45001, in terms of Management Systems Health and Safety.

**CERTIFICATES**

Our PV modules are certified by internationally recognized laboratories and are proof of our strict adherence to international safety standards, long term performance and overall quality of products.



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PV CELLS					
Type	Monofacial		sc-Si		
MECHANICAL CHARACTERISTICS			TEMPERATURE COEFFICIENTS		
Size	mm	158,75 x 158,75 ±0,25	Tk Voltage	%/K	-0,36
Thickness	µm	180 ±20	Tk Current	%/K	0,06
Front	-	Si3N4 anti-reflection coating	Tk Power	%/K	-0,36
Back	+	Aluminum back surface field (Al-BSF)			

PV MODULES

ELECTRICAL CHARACTERISTICS					
STC CONDITIONS					
Maximum power	[Pmpp]	Wp	1210		±3% (*)
Power selection	[Pmpp]	%	±3		
Voltage at maximum power	[Vmpp]	V	127,64		IEC 60904-1
Current at maximum power	[Impp]	A	9,48		IEC 60904-3
Open circuit voltage	[Voc]	V	150,33		±3% (*)
Short circuit current	[Isc]	A	10,04		±4% (*)
Maximum system voltage	[Vsyst]	V	1500 / 1000		IEC / UL
Maximum series fuse rating	[Icf]	A	15		
Efficiency	[ηm]	%	15,12		
Form Factor	[FF]	%	80,17		
STC (Standard Test Conditions): Irradiance: 1000 W/m2 + Cell Temperature: 25° C + Air Mass: 1.5					
* (Considering LID, the power range of the certification authority)					

NMOT CONDITIONS					
Maximum power	[Pmpp]	Wp	892		IEC 61215
Voltage at maximum power	[Vmpp]	V	116,22		
Current at maximum power	[Impp]	A	7,70		
Open circuit voltage	[Voc]	V	137,40		
Short circuit current	[Isc]	A	8,14		
NMOT (Nominal Module Operating Temperature): Irradiance: 800 W/m2 + Ambient Temperature: 20° C + Air Mass: 1.5 + Wind Speed: 1 m/s					

MECHANICAL CHARACTERISTICS						
PANEL	WIDTH (X)		HIGH (Y)	DIAGONAL	AREA	POWER/AREA
Size - Glass-1	2000	x	4000	mm	8,00 m2	151 Wp/m2
Size - Glass-2	2000	x	4000	mm	8,00 m2	
CELLS						
Size	158,75	x	158,75	mm	223 mm	0,03 m2
Distance - Top			149	mm		
Distance - between Cells	10	x	10	mm		
Distance - Left	161	mm				
Distance - Right	161	mm				
Distance - Bottom			149	mm		
Quantity	10	x	22	=	220 units	5,54 m2

COMPONENTS							
MATERIAL	QUANTITY	THICKNESS (Z)	DESCRIPTION	DENSITY	TOTAL WEIGHT	THERMAL RESISTANCE	
Glass-1	1 units	12 mm	FTG-UClear	30,37 kg/m2	242,98 kg	0,1814 m2K/W	
Encapsulant	2 units	0,76 mm	PVB (UV+/IR+)	1,62 kg/m2	12,94 kg	0,0064 m2K/W	
Busbars	5 units	1 mm	SnAgCu	0,10 kg/m2	0,55 kg		
PV Cells	220 units	0,21 mm	sc-Si	0,20 kg/m2	1,11 kg		
Encapsulant	2 units	0,76 mm	PVB (UV+/IR+)	1,62 kg/m2	12,94 kg	0,0064 m2K/W	
Glass-2	1 units	12 mm	FTG	30,37 kg/m2	242,98 kg	0,1814 m2K/W	
Junction Box	1 units	10 mm	PVC-IP68	0,10 kg/m2	0,10 kg		
Diodes (By-pass)	11 units			0,01 kg/m2	0,02 kg		
Cables (+/-)	2 units	4 mm2	900 mm	0,10 kg/m2	0,20 kg		
Connectors	2 units	MC3/MC4 type	PVC-IP67	0,05 kg/m2	0,10 kg		
<b>TOTAL</b>		<b>27,46 mm</b>		<b>64,54 kg/m2</b>	<b>513,91 kg</b>	<b>0,38 m2K/W</b>	

THERMAL CHARACTERISTICS							
TEMPERATURE COEFFICIENTS				MONOCRYSTALLINE			
Temperature coefficient of short circuit current	α	[Isc]		0,0700	% / ° C		
Temperature coefficient of open circuit voltage	β	[Voc]		-0,3600	% / ° C		
Temperature coefficient of maximum power	γ	[Pmpp]		-0,3800	% / ° C		
Temperature coefficient of current at maximum power		[Impp]		0,1000	% / ° C		
Temperature coefficient of voltage at maximum power		[Vmpp]		-0,3800	% / ° C		
Nominal Module Operating Temperature		[NMOT]		+ 47 ± 2	° C		

THERMAL TRANSMITTANCE (U)			SOLAR HEAT GAIN COEFFICIENT (G)		
Ug-Value	2,66 W/m2 K	EN 673	G-Value	0,38 %	EN 410

UV TRANSMITTANCE			ACOUSTIC INSULATION (R)		
UV-Value	30,70 %	300-380 nm EN 410	R-Value	32(-1;-3)	EN 12758

VISIBLE LIGHT TRANSMISSION (LT)					
LT-Value	30,70 %	380-780 nm EN 410	Opacity	69,30 %	CIE D65 ISO 9050

EXTERIOR REFLECTION (LRe)			INTERIOR REFLECTION (LRI)		
LRe-Value	8,00 %	EN 410	LRI-Value	15,00 %	EN 410

TOLERANCES					
Working temperature	- 40 / + 85 °C		Glass dimension	< ± 2,5 mm	EN 12543-5
Dielectric isolation voltage	3000 V		Glass symmetry tolerance	< ± 3 mm	EN 12543-5
Relative humidity	0 / 100 %		Cell single string distolerance	< ± 1 mm	EN 12543-6
Wind resistance	41190 Pa	4200 kg/m2			IEC 61215
Snow resistance	41190 Pa	4200 kg/m2	Maximum hail resistance	Ø 25 23 m/s	IEC 61215
Conductivity at ground	≤ 0.1 Ω		Resistance	≥ 100 Ω	

CLASSIFICATIONS					
Application class	A Class	IEC 61730	Pollution	1 Degree	IEC 61730
Electrical protection class	II Class	IEC 61140 IEC 61730	Material	I Group	IEC 61730
Fire safety class	A Class	ANSI/UL 790 IEC 61730	Safety	1.5 Factors	IEC 61730

LAMINATED GLASS (EN 14449)					
Impact resistance	1B1 Class	EN 12600	High temperature	OK	EN 12543-4
Manual attack	P2A Class	EN 356	Humidity	OK	EN 12543-4

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PHOTOVOLTAIC MODULES

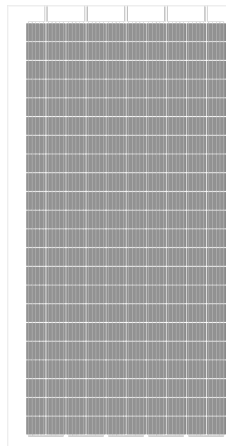
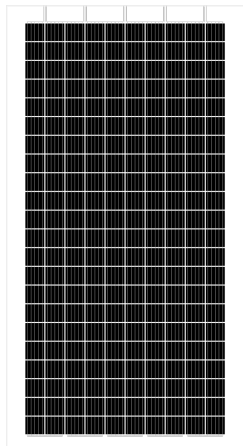
Series BIPV-NOISE BARRIERS Reference SI-ESF-M-BIPV-NB-M158-220 Type MONOCRYSTALLINE

DRAWING

JUNCTION BOX

Position Front - Rear - Edge - Axis (X) - Axis (Y) -

PANEL FRONT REAR SECTION



HIGH (Y) 4000 mm

WIDTH (X) 2000 mm THICKNESS (Z) 27,46 mm

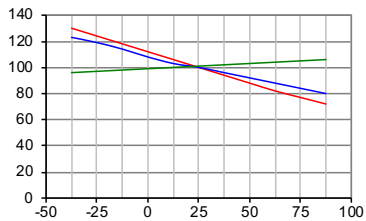
PERFORMANCE

CELLS

TEMPERATURE

Temperature depending on Isc, Voc and Pmax

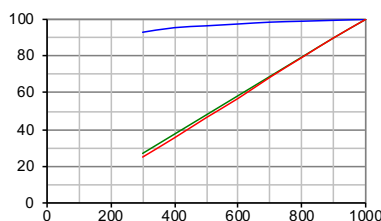
Isc, Voc, Pmax normalized (%)



Cell temperature (°C)  
--- Pmax --- Voc --- Isc

IRRADIANCE

Irradiance depending on Isc, Voc and Pmax (cell temperature: 25°C)

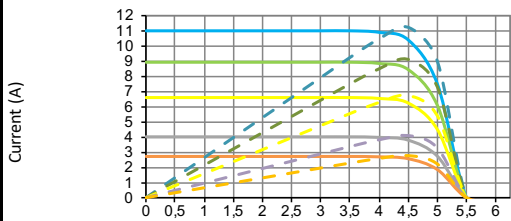


Irradiance (W/m2)  
--- Voc --- Isc --- Pmax

PANELS

TEMPERATURE

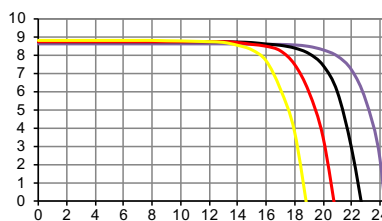
Electrical performance (cell temperature: 25°C)



Voltage (V)

--- I-V 1000 W/m2	--- P-I 1000 W/m2
--- I-V 800 W/m2	--- P-I 800 W/m2
--- I-V 600 W/m2	--- P-I 600 W/m2
--- I-V 400 W/m2	--- P-I 400 W/m2
--- I-V 200 W/m2	--- P-I 200 W/m2

IV-IRRADIANCE



Voltage (V)

I-V (-25°C) I-V (0°C) I-V (+25°C) I-V (+50°C) I-V (+75°C)

Power (W)

SOLAR SIMULATOR

Class AAA IEC 60904-9 Power measurement uncertainty is ± 3 %

ELECTRICAL MEASURES

STC CONDITIONS		ELECTRICAL MEASURES		NMOT CONDITIONS	
Irradiance	1000 W/m2	IEC 60904-1	Irradiance	800 W/m2	IEC 61215
Cell temperature	25 °C	IEC 60904-3	Ambient temperature	20 °C	
Air Mass	1,5	ASTM G173	Air Mass	1,5	ASTM G173-03
		ASTM 1036	Wind speed	1 m/s	

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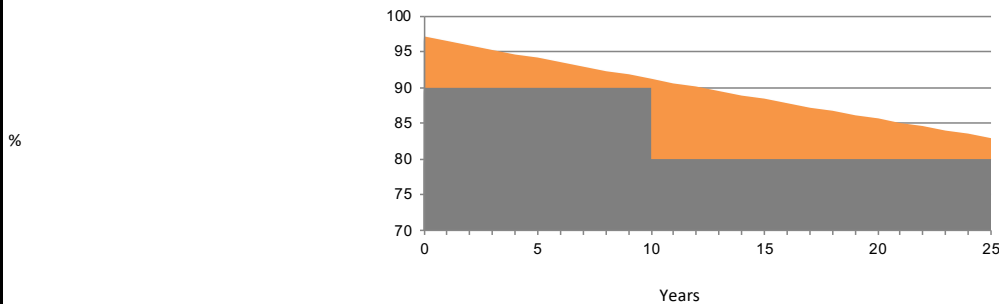


**PHOTOVOLTAIC MODULES**

**Series** BIPV-NOISE BARRIERS **Reference** SI-ESF-M-BIPV-NB-M158-220 **Type** MONOCRYSTALLINE

**STANDARD GUARANTEES**

**LINEAR PERFORMANCE WARRANTY**



<b>Manufacturing defects</b>	12 years.
<b>Performance</b>	90 % of rated power after 12 years of operation, 80 % of rated power after 25 years of operation.
<b>Lifespan</b>	> 30 years.

**ENVIRONMENTAL INFORMATION**

		kWh	Coal	Petrol/Gas	Combined
<b>Solar Hours Peak</b>	6 day				
<b>Irradiation rate</b>	1000 W/ m2		1	0,961	0,828
<b>Energy generated</b>	7,26 kWh/ day	<b>Avoid</b>		6,98	6,01
	218 kWh/ month	<b>CO2</b>		209,30	180,34
	2650 kWh/ year	<b>emissions</b>		2546,53	2194,10
					985,75 kg/CO2

**CERTIFICATES**

<b>ISO 9001</b>	Quality Management Systems.
<b>ISO 14001</b>	Environmental Management Systems.
<b>ISO 45001</b>	Occupational Health and Safety Management Systems.
<b>CE</b>	Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.
<b>IEC/EN 61215</b>	Crystalline silicon terrestrial photovoltaic (PV) modules. Design qualification and type approval.
<b>IEC/EN 61730-1</b>	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction.
<b>IEC/EN 61730-2</b>	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing.
<b>IEC 63092-1</b>	Photovoltaics in buildings - Part 1: Requirements for building-integrated photovoltaic modules.
<b>UL 1703</b>	Standard for Flat-Plate Photovoltaic Modules and Panels.
<b>EN 13501</b>	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.
<b>EN 14449</b>	Glass in building - Laminated glass and laminated safety glass - Evaluation of conformity/Product standard.
<b>EN 12543</b>	Glass in building - Laminated glass and laminated safety glass.
<b>EN 12600</b>	Glass in building - Pendulum test - Impact test method and classification for flat glass.
<b>EN 50583</b>	Photovoltaics in buildings - Part 1: BIPV modules.



**PACKING**

PANELS X PALLET	CONTAINER 20'		PANELS X PALLET	CONTAINER 40'HQ	
	PALLETS	TOTAL		PALLETS	TOTAL
-	-	-	26	22	572

**IEC 62759-1** Photovoltaic (PV) modules - Transportation testing - Part 1: Transportation and shipping of module package units.

**EXPORT INFORMATION**

<b>HS Code</b>	85.41.43.00	<b>TARIC code</b>	85.41.43.00
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**REGISTER OF ELECTRICAL AND ELECTRONIC EQUIPMENT PRODUCERS**

<b>WEEE</b>	7378	<b>Entity</b>	ECOASIMELEC
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**DESCRIPTION**

Silicon cell photovoltaic solar module sc-Si, BIPV-Noise Barriers series, for architectural integration, from the manufacturer SOLAR INNOVA, maximum power (Wp) 1209 W, voltage at maximum power (Vmp) 127,64 V, current at maximum power (Imp) 9,48 A, open-circuit voltage (Voc) 150,33 V, short-circuit current (Isc) 10,04 A, efficiency 15,12 %, composed of 220 cells, front layer tempered glass thick 12 mm, encapsulant layers of cells of PVB (UV+/IR+), back layer of tempered glass thick 12 mm, junction box (diodes, cables 4 mm2, 900 mm and connectors MC3/MC4), working temperature - 40 / + 85 °C, dimensions 2000 x 4000 x 27,46 mm, maximum wind load 41190 Pa, maximum snow load 41190 Pa, weight 513,91 kg.

**COMMENTS**

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**NOTICE**

The specifications and technical data may be subject to possible modifications without notice.  
This data sheet are conform to the requirements of the Standard EN 50380.  
Images for illustration purposes only.