



Photovoltaic module SHM-190

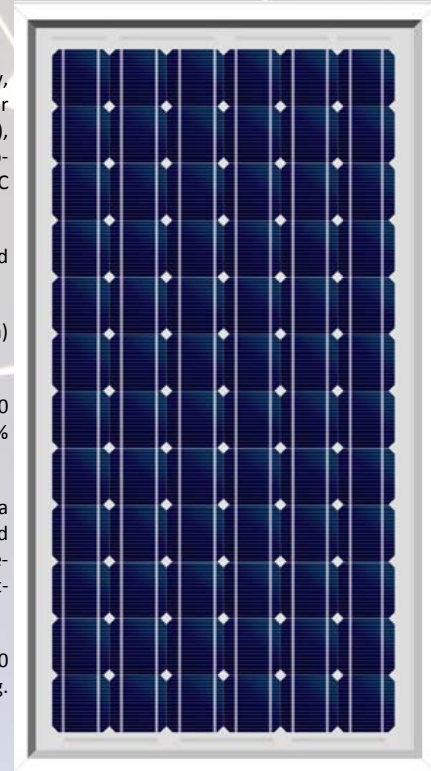
Highly efficiency mono-crytalline Modules

- ◆ By-pass diode minimizes the power drop by the shade
- ◆ The conversion efficiency of cell is over 15,5%
- ◆ Optical white tempered glass, EVA resin, weather proof film and anodized aluminum frame provide efficient protection from tough weather conditions
- ◆ Water proof junction box (UL94, V-O) provides 24 DC output. Best option for grid connected application

Quality and Safety

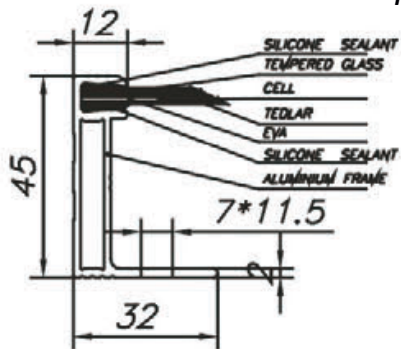
Manufactured in our ISO9001 certified factory, who is listed by Underwriter's Laboratories for electrical and fire safety (Class C fire rating), certified by TÜV Rheinland and Class II equipment and comply with the requirements of IEC 61215 including :

- ◆ Repetitive cycling between -40°C and 85°C at 85% relative humidity,
- ◆ Simulated impact of 25 mm (one-inch) hail at terminal velocity,
- ◆ A "damp heat" test, consisting of 1000 hours of exposure to 85°C and 86% relative humidity,
- ◆ A "hot-spot" test, which determines a module's ability to tolerate localized shadowing (which can cause reverse-biased operation and localized heating),
- ◆ Static loading, front and back, of 2400 pascals (50 psf), front loading (e.g. snow) of 5400 pascals (113 psf)

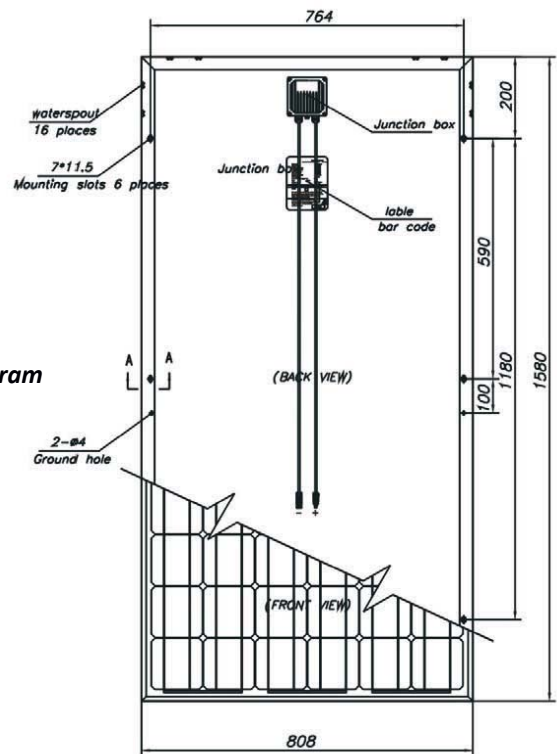


Warranty

- ◆ 90% power output over 12 years
- ◆ 80% power output over 25 years
- ◆ 2 years product warranty with free replacement for defective material



Module Diagram



SES Société d'Énergie Solaire SA - Route de Saint-Julien 129 - CH 1228 Plan-les-Ouates

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Technical specifications are subject to change without notice

SHM190 02-2010.001



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Electrical Performance

	SHM-190
Maximum power at STC (P_{max})	190 Wp
Power tolerance	± 3%
Open circuit voltage (Voc)	43.2 V
Optimum operating current (I_{mpp})	5.28 A
Optimum operating voltage (V_{mp})	36 V
Short circuit current (I_{sc})	5.91 A
NOCT (Nominal Operating Cell Temperature)	48° C (±2° C)
Temperature coefficient of P_{max}	-0.47%/°C
Temperature coefficient of Voc	-0.35%/°C
Temperature coefficient of I_{sc}	0.05%/°C

STC : Irradiance 1000 W/m², Module temperature 25°C, AM = 1.5

Specifications

Type of solar cell	Monocrystalline silicon solar cells
Size of cells	125 x 125 mm - diagonal 165 mm
Number of cells	72 (12*6)
Dimension of module	1580 x 808 x 45 mm
Weight	15.5 kg

Output

Cable	LAPP—4 mm ²
Asymmetrical Lengths	900 mm (-) 900 mm (+)
Connection	Type IV



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