

EL-54/6P (PVT) High Efficiency PV-Thermal Module

Everlight Solar modules EL-54/6P (PVT) Series are leaders in sunlight conversion efficiency. The PVT modules offer high performance and are designed specifically to meet customer demands for commercial and residential applications.



COMBINATION

The thermal water circuit guarantees stability and maximum solar power yields. Yield reductions as a result of excessive heating in the summer or snow in the winter are prevented. The heat carrier fluid can effectively cool or warm the solar cells equally when needed.

DEFROSTING SNOW

Water can be pumped through the PVT module until the snow has defrosted or slid down.

WATER PUMP

The combination water/ water heat pump can be seen as the most effective form of the connection to PVT module. The heated up stored substance is increased to a higher temperature while the return flow is cooled.

USE OF A BLOWER

Using an electrical blower, the flow temperature of the module can be lowered to reach an electrical increase in capacity in a closed circuit.

MIN POWER LOSSES

A PV System that uses the EL-60/6T modules becomes a high efficient system that minimizes power losses due to the fact that the PV modules interact with a thermal exchanger and recovers excess heat using a medium, maintaining the module's temperature at 35°C.

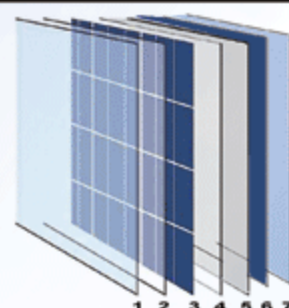
High Efficiency PV-Thermal Module

FEATURES

- 20% increased efficiency compared to conventional photovoltaic modules.
- Lowers thermal stressing.
- Produces more electricity than conventional models at elevated temperatures.
- Highly efficient operation of the modules by controlling the temperature of the PV panels.
- Advanced surface texturing process increase light absorption and efficiency.
- Tempered glass, EVA laminated and weatherproof back sheet provide long-life and enhanced cell performance.
- Special glass treatment ensures outstanding performance even in low-light conditions.
- Bypass diodes ensure functionality even if module is partially shaded.
- During winter months, the hot water can be used to supply homes and commercial buildings with heat.
- Lighter weight and cost effective installation.
- 25-year limited warranty on power output, 5-year limited warranty on materials and workmanship.

MODULE CHARACTERISTICS AND DIAGRAM

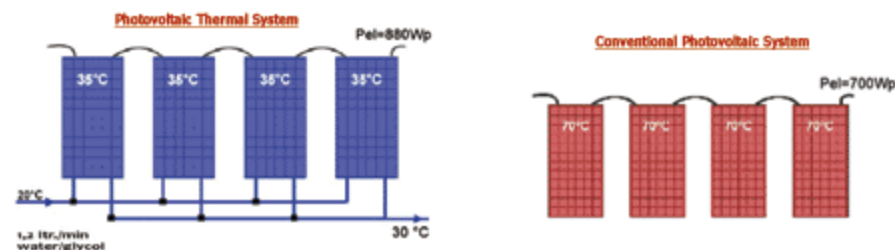
| | |
|-----------------------------|------------------------------|
| Type | PV-Thermal |
| Capacity | 180W-210W |
| Cell type | Polycrystalline Si |
| No of Cells and connections | 54 in series |
| Cell size | 156x156 mm |
| Weight (PV + Thermal) | 17.8 kg |
| Frame | Anodized aluminum alloy type |
| Connection | Lead wire with MC connector |
| Operating Temperature | -40.....+85°C |



1. Tempered glass
2. EVA
3. Cells
4. EVA
5. Triple-layer back sheet
6. Thermal Collector
7. Plexiglass

THERMAL CHARACTERISTICS

| | | |
|----------------------------------|------------------------|------------------------|
| No of EL-60/6PVT220 modules | 1 module | 5 module in series |
| Thermal Power (P _{th}) | 300-600 Watt | 1500-3000 Watt |
| Pressure (dyn) | 0.15 bar (1.2 lt/min) | 0.8 bar (1.2 lt/min) |
| Pressure (test) | 10 bar | 10 bar |
| Pressure (differential) | <0.05 bar | <0.05 bar |
| Flow rate | 0.1 lt/min to 2 lt/min | 0.1 lt/min to 2 lt/min |
| Cooling Liquid (water/glycol) | 60% / 40% | 60% / 40% |



A PV System that uses the EL-60/PVT module becomes a Photo-Voltaic/Thermal System, a system that minimizes power loss due to high module temperatures, because the PV module interacts with a thermal exchanger and recovers excess thermal energy using a medium, in this case a water/glycol mix, and keeps the module at 35°C.



Worldwide Sales Agent
Blue Dragon Trade Limited
 Room 2301, 23/F, World-Wide House, 19 Des
 Voeux Road, Wan Chai, Hong Kong
 Tel: +852 2916 8888 Fax: +852 2830 8800
 URL: www.bd-trade.com



Manufacture-China
Helios Photovoltaic Co., Ltd.
 Unit 3A, 86 West Wujin Avenue, 213164, Changzhou,
 Jiangsu Province, China
 Tel: +86 519 8648 8901/2/3 Fax: +86 519 8648 2889
 URL: www.helios-pv.com

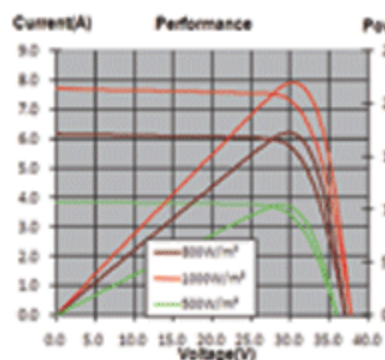


Headquarters
Everlight Corporation Ltd.
 2506, West Tower, Shun Tak Centre, 168-200 Connaught
 Road, Central, Hong Kong
 Tel: +852 6614 4916 Fax: +852 2815 1975
 URL: www.everlight-solar.com

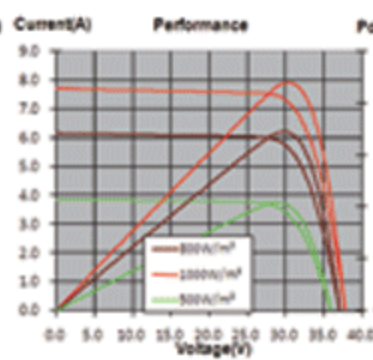
| ELECTRICAL CHARACTERISTICS | | | | |
|----------------------------------|--|-------------|-------------|-------------|
| Model | EL-54/6P180 | EL-54/6P190 | EL-54/6P200 | EL-54/6P210 |
| Maximum power (Pmax) | 180W | 190W | 200W | 210W |
| Voltage at max. power (Vmp) | 26.5V | 26.7V | 27.4V | 27.8V |
| Current at max. power (Imp) | 6.79A | 7.15A | 7.29A | 7.55A |
| Open circuit voltage (Voc) | 34.1V | 34.1V | 34.2V | 34.2V |
| Short circuit current (Isc) | 7.05A | 7.43A | 7.75A | 8.18A |
| Temperature coefficient of Isc | (0.065 ± 0.015)%/°C | | | |
| Temperature coefficient of Voc | -(160 ± 20)mV/°C | | | |
| Temperature coefficient of power | -(0.45 ± 0.05)%/°C | | | |
| Operating temperature | -40/+85 °C | | | |
| MECHANICAL CHARACTERISTICS | | | | |
| Cell type | 156 x 156 Polycrystalline solar cell | | | |
| Cell array | 54 pieces in a 9 x 6 matrix connected in series | | | |
| Dimensions (mm) | 1482 X 992 X 35 | | | |
| Weight (kg) | 17.8 | | | |
| Frame | Clear anodized aluminum alloy type universal frame; silver color | | | |
| Construction | Front: High-transmission 3.2 mm tempered glass Back: Polyester Encapsulant: EVA | | | |

Electrical Curves

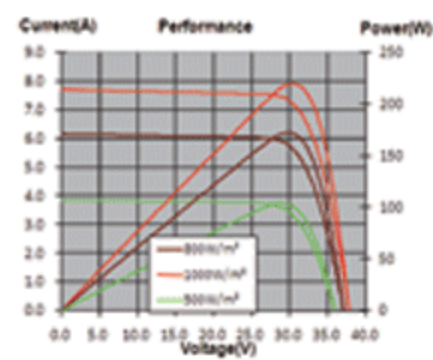
Electrical performance
(Cell temperature: 25°C)



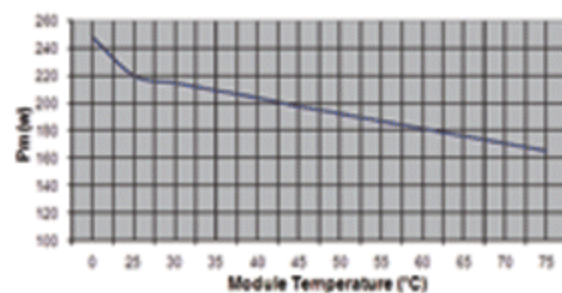
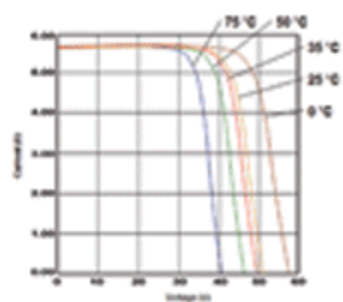
Temperature dependence
of Isc, Voc and Pmax



Irradiance dependence of Isc,
Voc and Pmax (Cell temp:25°C)



Power Output of Conventional modules over temperature



Standard Test Conditions (STC):1000W/m2 solar irradiance, 1.5 air mass and cell temperature 25 °C.

Module Warranty: 25 year limited warranty for 80% power output, 10 year limited warranty for 90% power output, and 5 year limited warranty for materials and workmanship.

Stabilization period: The first few months of de-ployment; module power may decrease by approx. 1.5%.

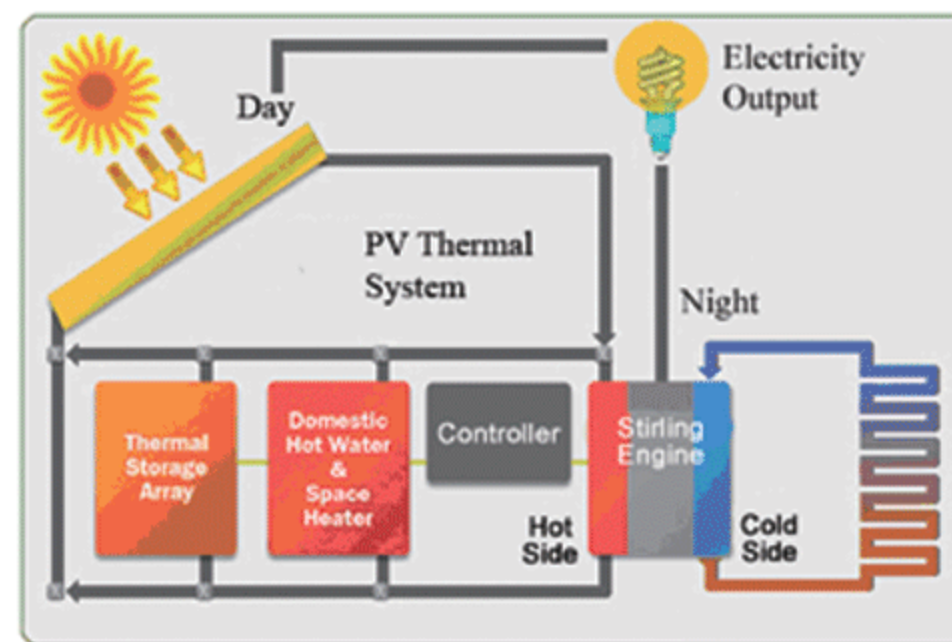
Photovoltaic Thermal Collector Applications

PVT technology provides homes and buildings with renewable sources of hot water, heat and electric power.

The energy recovered can be used in numerous applications. In case of roof-top applications, 6 EL-60/6T modules can cover the need in hot water for a family, just like a solar water heater with 4m² absorber area. An underfloor heated house could also benefit from a PV/T system, since it can at least partially provide the thermal energy needed to heat the water, during daytime. If thermal storage is used, then a home can benefit from the PV/T System all day long. With the EL-60/6T a home can become truly environment friendly, reducing its CO2 emissions to a minimum

A PV/T System combined with a low temperature differential engine puts a house one step closer to energy independence and reduces further its carbon footprint. Using the combination of EL-60/6T and a low temperature differential engine, a PV Park's owner can benefit, not only from the higher efficiency provided by the module, but with transforming the amount of thermal energy collected to electrical power.

The components of the System include a Stirling engine, solar thermal collectors (EL-60, thermal storage, a hot water & space heater, and a Controller. The System provides the lowest cost of energy (heat and electricity) of any renewable energy system.



Larger PV/T Systems can be used in hotels covering at least a part of their need in hot water, and heating, especially in occasions that only a fraction of the hotel's capacity is booked, since using utilities that are designed to cover the maximum capacity, would be extremely uneconomical. Also a maintaining a heated pool during the winter would become a lot less expensive and environment friendly.

Order information: AC Heliotechniki is the wholesaler of Everlight products for the Mediterranean region. For any product information you can contact directly the local offices in Athens.

Note: Due to continuous innovation, research and production improvement, the specifications on the information sheet are subject to change without any notice. No rights can be derived from this product information sheet and Everlight assumes no liability whatsoever connected to or resulting from the use of any information contained herein.

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