



## High Efficiency PV-Thermal Module

### 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.



**EL-60/6T**

Everlight Solar modules EL-60/6PT 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. Designed to withstand rigorous operating conditions, these modules offer high power output per square meter of solar array. The unique, fully automated production process ensures the highest level of precision and consistently high production quality. Every single cell is tested and electrically matched to maximise output.

The solar photovoltaic modules are manufactured according to the strict requirements of international standards in an ISO 9001: 2000 certified plant – Helios Photovoltaic Co. Ltd

### Features

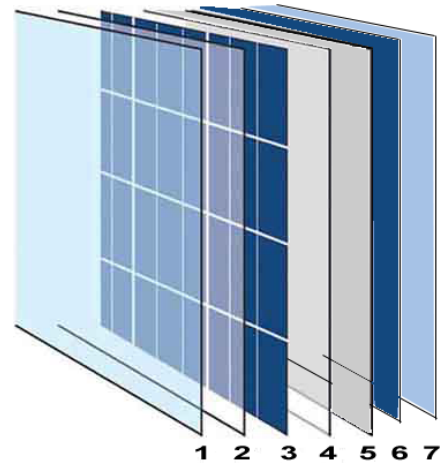
- Increased efficiency of up to 20% when compared to conventional photovoltaic modules
- Lower thermal stressing of the solar module.
- As temperature rise, the PVT panel produces more electricity than a conventional crystalline silicon solar panel at the same temperature.
- Highly efficient operation of the modules by controlling the temperature of the PV panels
- The modules incorporate an advanced surface texturing process to increase light absorption and improve efficiency.
- Tempered glass, EVA laminated and weatherproof backsheets provide long-life and enhanced cell performance.
- The modules provide outstanding performance even in low-light conditions due to its special glass treatment.
- All modules are equipped with bypass diodes so the modules will function even if 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
- Output Tolerance 0-3%
- 25-year limited warranty on power output, 5-year limited warranty on materials and workmanship.



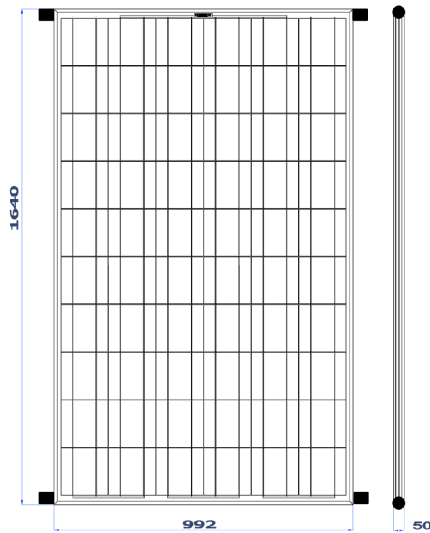
Everlight Corporation Ltd.  
2506, West Tower, Shun Tak Centre,  
168-200 Connaught Road, Central, Hong Kong  
Tel: +852 6614 4916 Fax: +852 2815 1975  
URL: [www.everlight-solar.com](http://www.everlight-solar.com)

### MODULE CHARACTERISTICS AND DIAGRAM

Type	PV-Thermal
Capacity	200W-230W
Cell type	Polycrystalline Si
No of Cells and connections	60 in series
Cell size	156x156 mm
Weight (PV + Thermal)	20kg + 8kg
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

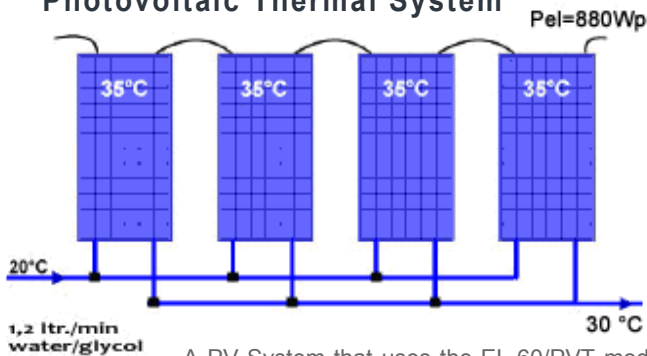


### THERMAL CHARACTERISTICS

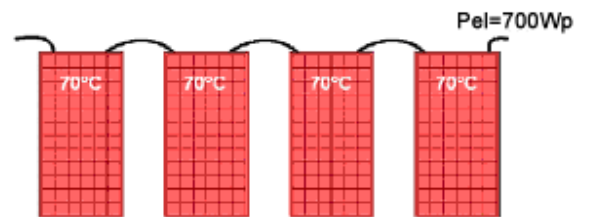
No of EL-60/6PVT220 modules	1 module
Thermal Power (Pth)	300-600 Watt
Pressure (dyn)	0.15 bar (1.2 lt/min)
Pressure (test)	10 bar
Pressure (differential)	<0.05 bar
Flow rate	0.1 lt/min to 2 lt/min
Cooling Liquid (water/glycol)	60% / 40%

5 module in series
1500-3000 Watt
0.8 bar (1.2 lt/min)
10 bar
<0.05 bar
0.1 lt/min to 2 lt/min
60% / 40%

#### Photovoltaic Thermal System



#### Conventional Photovoltaic System



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.

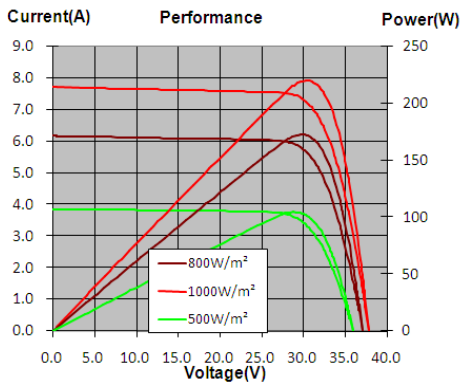
## ELECTRICAL CHARACTERISTICS

Model	EL-60/6PVT200	EL-60/6PVT210	EL-60/6PVT220	EL-60/6PVT230
Nominal Max Power (Pmax)	200W	210W	220W	230W
Max Power Voltage (Vmp)	29.4V	29.7V	30.30V	30.7V
Max Power Current (Imp)	6.85A	7.07A	7.26A	7.49A
Open Circuit Voltage (Voc)	37.1V	37.1V	37.8V	37.6V
Short Circuit Current (Isc)	7.18A	7.56A	7.72A	8.15A
Temperature Coefficient (Isc)	(0.065±0.015)%/°C	(0.065±0.015)%/°C	(0.065±0.015)%/°C	(0.065±0.015)%/°C
Temperature Coefficient (Voc)	-(160±20)mV/°C	-(160±20)mV/°C	-(160±20)mV/°C	-(160±20)mV/°C
Temperature Coefficient (Pm)	-(0.5±0.05)%/°C	-(0.5±0.05)%/°C	-(0.5±0.05)%/°C	-(0.5±0.05)%/°C
Module Efficiency (η)	12.29%	12.9%	13.52%	14.14%
Nominal Voltage	24V	24V	24V	24V
Max System Voltage	1000V	1000V	1000V	1000V
Tolerance	±3%	±3%	±3%	±3%

## Electrical Curves

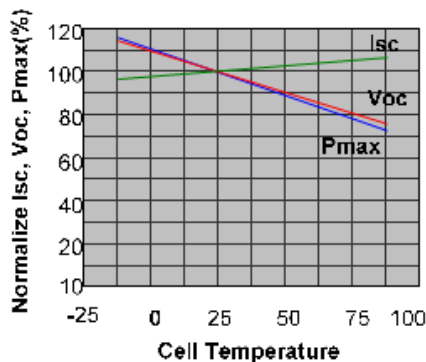
### Electrical performance

(Cell temperature: 25 °C)



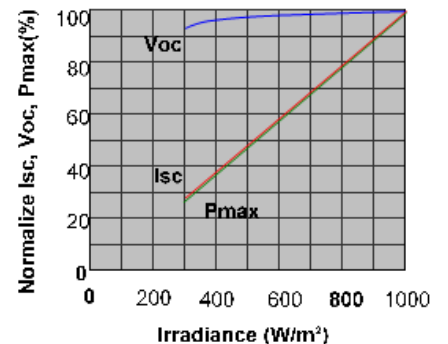
### Temperature dependence

of Isc, Voc and Pmax

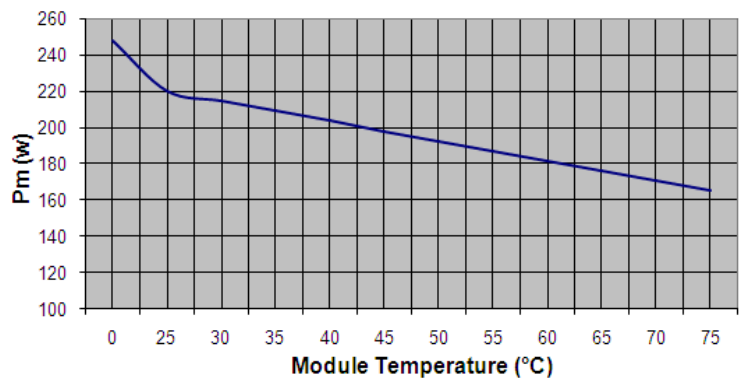
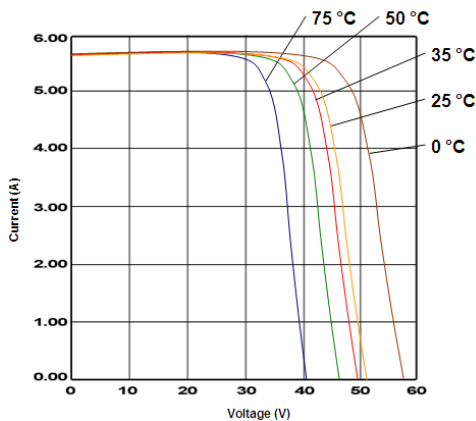


### Irradiance dependence of Isc, Voc and Pmax

(Cell temp: 25 °C)



### Power Output of Conventional modules over temperature



**Standard Test Conditions (STC):** 1000W/m<sup>2</sup> 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 deployment; module power may decrease by approx. 1.5%.

CE ISO9001

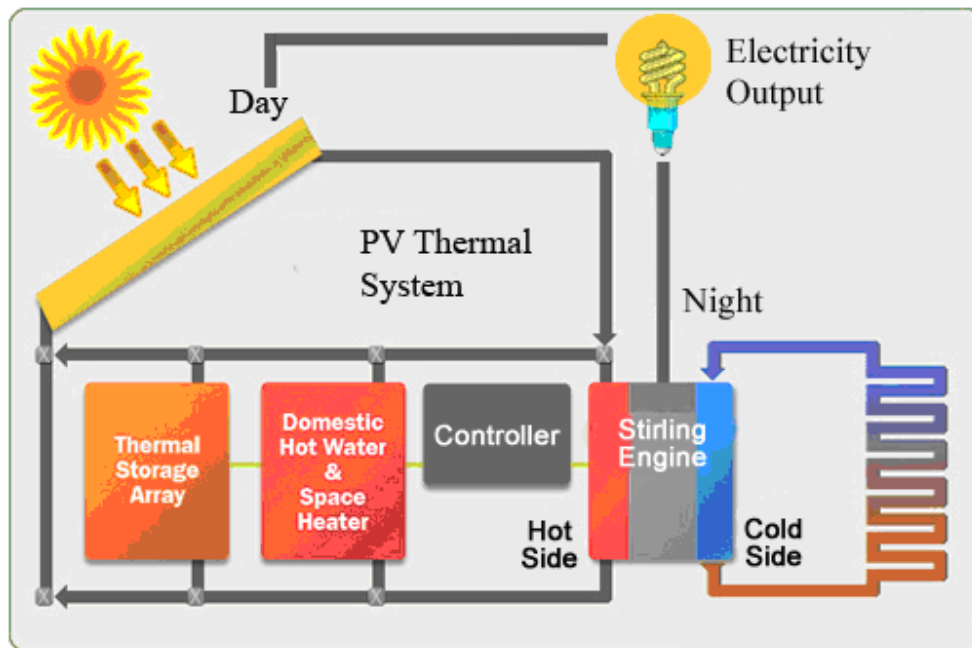
## Photovoltaic Thermal Collector Applications

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/PVT modules can cover the need in hot water for a family, just like a solar water heater with 4m<sup>2</sup> 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/PVT a home can become truly environment friendly, reducing its CO<sub>2</sub> 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/PVT 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.