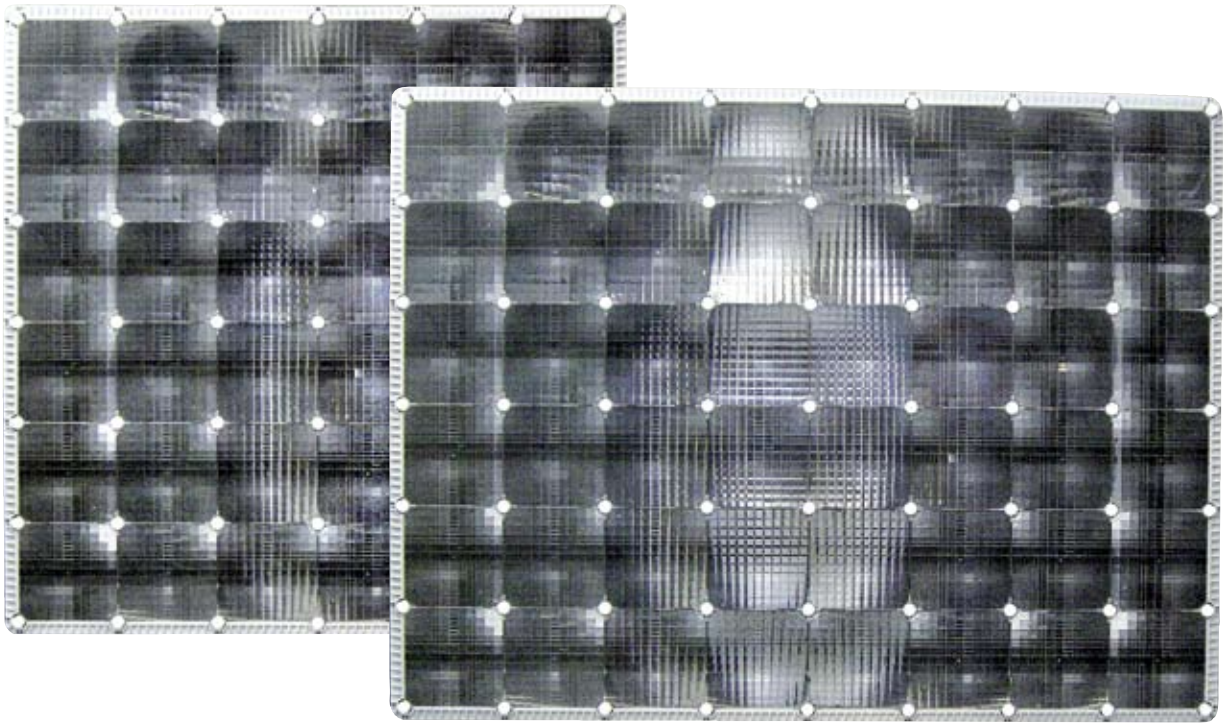
Silicon CPV plc

Technology of the Future

Si-Con™ 120X Medium Concentration PV

The Si-Con 120X MCPV is a medium concentration ratio module with the following features:

- **Patented 120X concentrator system**
- **Extremely cost effective for rapid ROI**
- **Designed for long term durability and reliability**
- **Suitable for large grid connected applications and solar farms**



Si-Con™ 120X MCPV

Generating electricity from solar energy is becoming increasingly important considering the rapidly rising costs of fossil fuels such as gas. This trend looks likely to increase in rate over the coming years and therefore the total electricity generated from renewable energy sources such as the Sun needs to be rapidly scaled up if demands are to be met and maintained.

Although solar power plants have been in existence for many years the electricity generated by them has been costly in comparison to conventional generating methods. This problem has been compounded by the shortage of solar grade Silicon which has become expensive.

A solution to this problem was found by developing technologies which enable the solar radiation to be concentrated onto a smaller geometric area of Silicon. Using concentrator technology requires a significantly smaller area of costly Silicon while still producing the desired level of power.

Current CPV(Concentrated Photovoltaic) systems on the market (or under development) offer typical concentration ratios of 500X and greater. These systems however are difficult to manufacture and require precision components with very tight tolerances. This results in products that are difficult to manufacture at the required levels of quality and reliability. They are also critical in terms of installation, setup, tracking accuracy, and operating support required. The advantage gained by using a high concentration ratio is lost due to negative effect of the above factors.

The intensive research conducted by Silicon CPV plc has determined that medium concentration ratio systems will provide the most effective route for reaching cost parity with conventional energy production methods. The disruptive technology built into the Si-Con module will result in a rapid reduction in the cost of generated electricity, rapidly bringing forward the point of grid cost parity.

The Si-Con MCPV module incorporates a patented concentrator system which requires no individual and critical on site module alignment. The innovative prismatic lens refracts the Sun's radiation onto the cell with a very uniform energy distribution pattern, unlike many concentrator lenses which are based on traditional focusing technology and do not distribute the energy efficiently.

In all PV systems today a percentage of the energy from the Sun's radiation is converted to heat rather than electrical power. In high concentration systems the heat density profile can become a major issue affecting the overall efficiency and long term reliability of the cell and special heat sinks are therefore required. This increases the manufacturing complexity of the module. Due to the lower concentration ratio, the Si-Con module generates a lower heat density profile and the innovative design provides excellent passive heat dissipation which removes the requirement for individual cell heat sinks. This greatly simplifies the manufacturing process, reduces costs, improves reliability and ensures the cells operate at their optimum efficiency throughout their lifetime.

At the heart of 'Si-Con' technology is a specially designed single junction mono crystalline Silicon cell only 20mm by 20mm and with conversion efficiency of 18%. The 'Si-Con' cell design is optimised for our chosen 120 sun concentration and has low series resistance and capable of high current density. 'Si-Con' is making use of single junction silicon technology which is inherently reliable, easy to manufacture and proven to be long lasting. The simplicity of design makes it easy to manufacture at a low price and only uses about 1% of the silicon required to produce conventional Flat plate modules.

The entire module is structurally very strong, extremely robust and durable making it one of the best products on the market.

Silicon CPV plc advantages…

- **We have a manufacturability advantage over our competitors**
- **We have a major cost advantage over our competitors**
- **No one has the simplicity of our technology**
- **Our product reliability is outstanding**

Specifications		MCPV-36	MCPV-48
ELECTRICAL			
Maximum Power*	Pmax	115W	150W
Open Circuit Voltage	Voc	22.08	29.39
Max Power Point Voltage	Vmpp	17.41	23.22
Short Circuit Current	Isc	7.18A	7.18A
Max Power Point Current	Imp	6.62A	6.62A
Cells per module		36	48
DIMENSIONS			
CELL (L) x (W)	cm	2.0 x 2.4	2.0 x 2.4
MODULE (L) x (W) x (D)	cm	102 x 102 x 21	134 x 102 x 21
Module Weight	kg	21	27

* Power rating is at 850 W/M^2 DNI with cell operating temperature 60°c

MECHANICAL	
Frame:	Pc + ABS
Front	PMMA Lens
Back	Aluminium
Cell Encapsulation	EVA
Junction Box	PPE– IP65
Connector	MC Type 4
TEMPERATURE COEFFICIENT	
Current Temperature Coefficient	+4.40 mA/K
Power Temperature Coefficient	-0.46 %/K
NOCT Normal Operating Cell Temperature	70°C ± 2°C
LIMITS	
Operating Temperature Limits	-25°C to +85°C
Power Tolerance	±3%
Maximum System Voltage	1,000V DC

Silicon CPV plc, Akhter House, Perry Road, Harlow, Essex, CM18 7PN, UK
Tel: 01279 821260 Fax: 01279 821300
Email: sales@SiliconCPV.com
www.SiliconCPV.com

Silicon CPV plc

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