

Solar cells

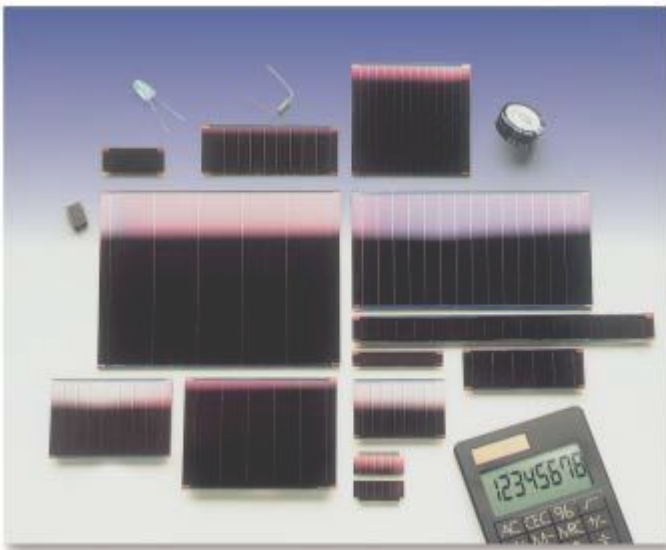
Thin-film solar cells for low and high illumination

Amorphous silicon material

Adapted to any artificial and natural day light

Simple protection for indoor or in-housing use

Standard or custom designed size and voltage



- Very sensitive to low light down to 20 lux, and in cloudy weather
 - Protection adapted indoor use, or in a **weatherproof housing** for outdoor use
 - On **glass substrates**, square or rectangular, thickness 2, 1.1 ou 0.55 mm
 - **Voltage range** : 1.5V, 2.5V, 5.5VDC or else ...
- **RoHS** conform

- Full product range next page -

Examples of use : low consumption electronic



Swimming pool water purification ionizer



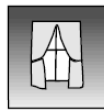
LCD shading windows for welding helmets



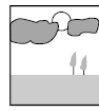
Smart surge arrester monitor



200 Lux



1000 Lux



200 W/m²



1000 W/m²

New items

CURRENT / VOLTAGE at maximum power point

| Part nb. | LOW ILLUMINATION | | HIGH ILLUMINATION | | Dimensions (mm) | | | Weight (g) |
|----------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------|---------|------------|
| | 200 lux | 1000 lux | 200 W/m² | 1000 W/m² | Length | Height | Thick.* | |
| Range 3 | at 1.2 V : | at 1.3 V : | at 1.5 V : | | * except on contact areas | | | |
| 03/017/013 | 4 µA / 1.2V | 20 µA / 1.3V | 0.5 mA / 1.5V | 2 mA / 1.8V | 17 | 13 | 1.1 | 0.6 |
| 03/048/016 | 17 µA / 1.2V | 95 µA / 1.3V | 2 mA / 1.5V | 8 mA / 1.5V | 48 | 16 | 1.1 | 2 |
| 03/048/032 | 40 µA / 1.2V | 200 µA / 1.3V | 5 mA / 1.5V | 18 mA / 1.5V | 48 | 32 | 1.1 | 4 |
| Range 5 | at 2 V : | at 2.2 V : | at 2.5 V : | at 2.7 V : | | | | |
| 05/035/013 | 7 µA | 39 µA | 1 mA | 4.5 mA | 35 | 13 | 1.1 | 1.2 |
| 05/040/009 | 6 µA | 30 µA | 0.8 mA | 3.5 mA | 40 | 9 | 0.55 | 0.5 |
| 05/048/016 | 11 µA | 55 µA | 1.6 mA | 7 mA | 48 | 16 | 2* | 4 |
| 05/048/032 | 24 µA | 120 µA | 3.4 mA | 15 mA | 48 | 32 | 2* | 8 |
| 05/072/032 | 42 µA | 210 µA | 6 mA | 18 mA | 72 | 32 | 2* | 11 |
| 05/072/048 | 65 µA | 325 µA | 9 mA | 27 mA | 72 | 48 | 2* | 17 |
| 05/072/072 | 98 µA | 490 µA | 14 mA | 42 mA | 72 | 72 | 2* | 25 |
| Range 7 | at 2.8 V : | at 3 V : | at 3.5 V : | at 3.7 V : | | | | |
| 07/040/009 | 4 µA | 19 µA | 0.8 mA | 3.5 mA | 40 | 9 | 0.55 | 0.5 |
| 07/036/024 | 8 µA | 40 µA | 1 mA | 6 mA | 36 | 24 | 2* | 4 |
| 07/048/016 | 8 µA | 40 µA | 1 mA | 6 mA | 48 | 16 | 2* | 4 |
| 07/048/032 | 17 µA | 85 µA | 2.3 mA | 12 mA | 48 | 32 | 2* | 8 |
| 07/048/040 | 20 µA | 100 µA | 2.7 mA | 14 mA | 48 | 40 | 1.1 | 5 |
| 07/048/048 | 26 µA | 130 µA | 3.4 mA | 18 mA | 48 | 48 | 1.1 | 6 |
| 07/055/020 | 12 µA | 62 µA | 1.8 mA | 9.6 mA | 55 | 20 | 1.1 | 3 |
| 07/063/124 | 95 µA | 525 µA | 16 mA | 60 mA | 63 | 124 | 3.2 | |
| 07/072/032 | 30 µA | 150 µA | 4 mA | 17 mA | 72 | 32 | 2* | 11 |
| 07/072/048 | 45 µA | 220 µA | 6 mA | 26 mA | 72 | 48 | 2* | 17 |
| 07/072/072 | 68 µA | 340 µA | 9.5 mA | 40 mA | 72 | 72 | 2* | 25 |
| 07/096/048 | 65 µA | 325 µA | 9 mA | 28 mA | 96 | 48 | 2* | 22 |
| 07/096/072 | 100 µA | 500 µA | 13 mA | 43 mA | 96 | 72 | 2* | 33 |
| 07/096/096 | 133 µA | 660 µA | 17 mA | 65 mA | 96 | 96 | 2* | 44 |
| Range 9 to 13 | | | | | | | | |
| 09/055/020 | 9 µA / 3.6V | 45 µA / 4V | 1.3 mA / 4.5V | 7 mA / 5V | 55 | 20 | 1.1 | 3 |
| 10/048/012 | 3 µA / 4V | 15 µA / 4.5V | 0.5 mA / 5V | 2.5 mA / 5.5V | 48 | 12 | 1.1 | 3 |
| 10/048/024 | 8 µA / 4V | 40 µA / 4.5V | 1.2 mA / 5V | 5.5 mA / 5.5V | 48 | 24 | 2* | 6 |
| 10/072/048 | 28 µA / 4V | 140 µA / 4.5V | 4 mA / 5V | 20 mA / 5.5V | 72 | 48 | 2* | 17 |
| 10/096/072 | 54 µA / 4V | 282 µA / 4.5V | 8 mA / 5V | 37 mA / 5.5V | 96 | 72 | 2* | 10 |
| 12/072/024 | 8 µA / 4.8V | 40 µA / 5.4V | 1.6 mA / 6V | 7 mA / 6.8V | 72 | 24 | 2* | 8 |
| 12/072/032 | 15 µA / 4.8V | 75 µA / 5.4V | 2 mA / 6V | 10 mA / 6.8V | 72 | 32 | 2* | 11 |
| 12/096/072 | 50 µA / 4.8V | 250 µA / 5.4V | 7 mA / 6V | 33 mA / 6.8V | 96 | 72 | 2* | 33 |
| 13/096/013 | 7 µA / 5.2V | 35 µA / 5.6V | 1 mA / 6.5V | 4.8 mA / 7V | 96 | 13 | 1.1 | 4 |
| Range 14 | at 5.6 V : | at 6.3 V : | at 7 V : | at 7.3 V : | | | | |
| 14/046/046 | 9 µA | 47 µA | 1.4 mA | 7 mA | 46 | 46 | 3 | 17 |
| 14/096/048 | 28 µA | 140 µA | 4 mA | 20 mA | 96 | 48 | 2* | 22 |
| 14/096/096 | 59 µA | 290 µA | 8 mA | 42 mA | 96 | 96 | 2* | 44 |
| 14/144/072 | 70 µA | 350 µA | 10 mA | 42 mA | 144 | 72 | 2* | 50 |
| 14/144/144 | 138 µA | 690 µA | 20 mA | 85 mA | 144 | 144 | 2* | 100 |
| Range > 14 | | | | | | | | |
| 15/096/018 | 9 µA / 6V | 47 µA / 6.7V | 1.4 mA / 7.5V | 7 mA / 8 V | 96 | 18 | 1.1 | 5 |
| 18/072/048 | 18 µA / 7.2V | 88 µA / 8V | 2.5 mA / 9.5V | 10 mA / 9.5V | 72 | 48 | 2* | 17 |
| 22/090/040 | 13 µA / 8.8V | 64 µA / 9.9V | 2 mA / 11V | 9 mA / 13V | 90 | 40 | 1.1 | 10 |
| 28/124/124 | 46 µA / 11V | 230 µA / 12.6V | 7 mA / 14V | 32 mA / 16V | 124 | 124 | 2* | 72 |

* 2mm-thick solar cells can be have thickness changes (1.8 – 2.2 mm)

LOW ILLUMINATION : Values tolerance ±10% under a fluorescent source

HIGH ILLUMINATION : Values tolerance ±10% under AM1.5 solar spectrum 25°C

You need a different solar cell ?
Send your drawing and electrical specs.
www.solems.com
SOLEMS S.A.

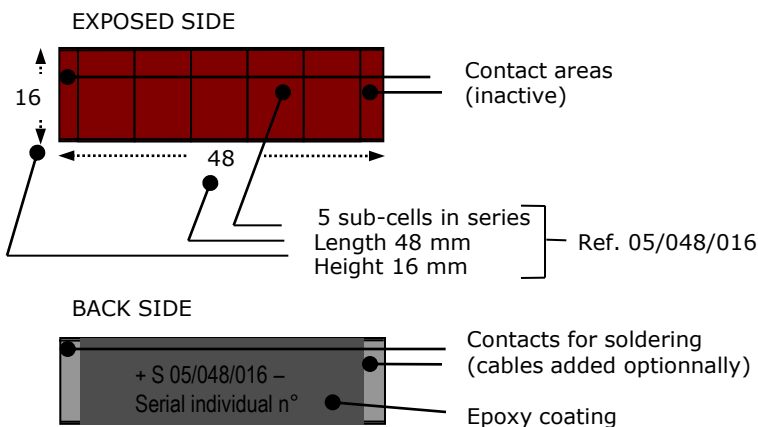
3 rue Leon Blum F- 91120 PALAISEAU – France - Phone : 33 (0) 1 69 19 43 40 – Fax : 33 (0) 1 60 13 37 43 - info@solems.com

Product ref. and technical description

- The active material, **thin film amorphous silicon**, about $0.3\mu\text{m}$ thick, is produced under vacuum on a transparent electrode on glass. Afterwards, the active surface is covered with a metallic electrode and an epoxy coating.
- Each solar cell is divided in individual photovoltaic segments, or "sub-cells" that are **electrically connected in series** by laser etching and lift-off masking technology.

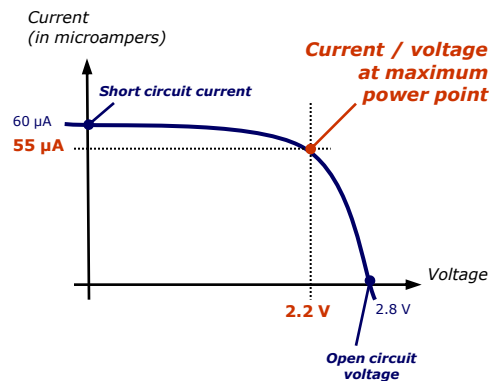
- **The DC voltage** delivered under illumination increases with the number of sub-cells in series, and with the illumination level (but less).
- The current depends on the surface of the sub-cell and the illumination level.

Example : Solar cell ref. 05/048/016



Front and back side of the cell

Dimensions in mms. General tolerance : - 0 /+0.5 mm



Current-voltage curve under light

1000 lux - fluorescent source

Conditions of use

• Electrical connections

The 2 contact areas on the back of the cell are tinned (RoHS). It is recommended to solder thin flexible cables with a welding iron (or by dipping) below 320°C and RoHS solder material. Do not use a wave solder machine. Do not heat the whole component above 120°C . For direct assembly on a PC-board, apply to us. No damage when short circuited.

• Assembly

Can be assembled with flexible non-acidic glue, or clamped with a flexible fixture. Take into account the temperatures the component will go through during use. The supporting material is glass.

• Climatic category

-40°C / $+70^{\circ}\text{C}$ and 75% R.H.

The epoxy coating supplied is sufficient for all indoor types of use.

For an outdoor use, place the cell inside a weatherproof housing, behind a transparent UV-stable window, or turn to one of our TD type SOLAR MODULE, ready to use outdoor, under any climate.

• Warranty / lifetime

For an indoor use, the solar cells are warranted 5 years, and have a lifetime around 10 years in normal conditions (neutral atmosphere, not salty, nor corrosive). Same warranties for outdoor use if an adequate protection is added.

• Electrical use

These solar cells can supply power to low consumption electronic devices, for the following currents :

- in microamps full-time or in milliamps part-time under low illumination (indoor light)
- in milliamps full-time under high illumination (outside under natural light).

They can be connected directly or through a storage device : super capacitor, NiCad, NiMH or Li rechargeable battery with an adequate charge limitation system (especially in case of Li).

The short circuit current of these cells being proportional to light intensity (and not their current at maximum power point) they can be used as light sensors in given conditions. See our LIGHT SENSORS leaflet.

www.solems.com