



# Outdoor Low Light Energy Harvesting Photovoltaic Cells

## High Power Density

Ambient low light photovoltaic cells deliver the highest performance available on the market. Compared to conventional outdoor crystalline solar cells, Ambient photovoltaic cells produce 250% more energy at typical outdoor low light levels (20,000 lux) and up to 400% more energy at very low outdoor light levels (5,000 lux).

## Strong Performance in Shaded and Diffuse Outdoor Light

Ambient's thin and lightweight dye sensitized PV cells deliver consistent power in diffuse natural light. The cells perform well regardless of the position of the light source and continue to generate proportional power when part of the cell is in shadow.

## Environmentally Superior

Ambient's energy efficient production system provides a 77% reduction in carbon footprint compared to conventional silicon-based solar cells. Cells employ non-toxic, green energy harvesting chemistry.

## Flexible Applications

We offer a turnkey solution with custom-sized cells, application expertise, as well as reference designs for embedded energy harvesting circuits.

## Power is the Meta Resource

More power and a smaller form factor delivers greater functionality at a higher value:

- Run more software on your processor
- Layer in more security protocols
- Extend communications range
- Increasing sensing capabilities

Ambient's endless power technology eliminates the hassle, expense and environmental cost of battery replacement by harvesting low indoor light, making Ambient cells ideal for powering the next generation of smart home, consumer electronics and IoT devices.

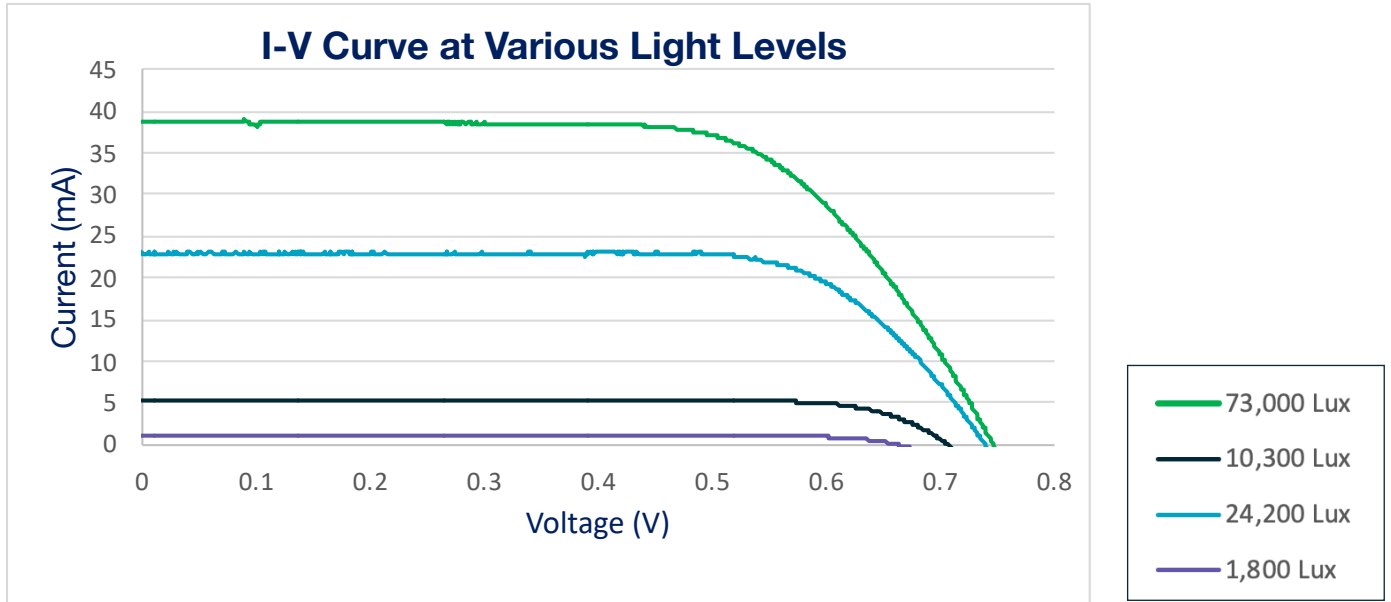
## Single Cell Architecture

Ambient cells are monolithic, single cells for pleasing aesthetics and easy scalability.

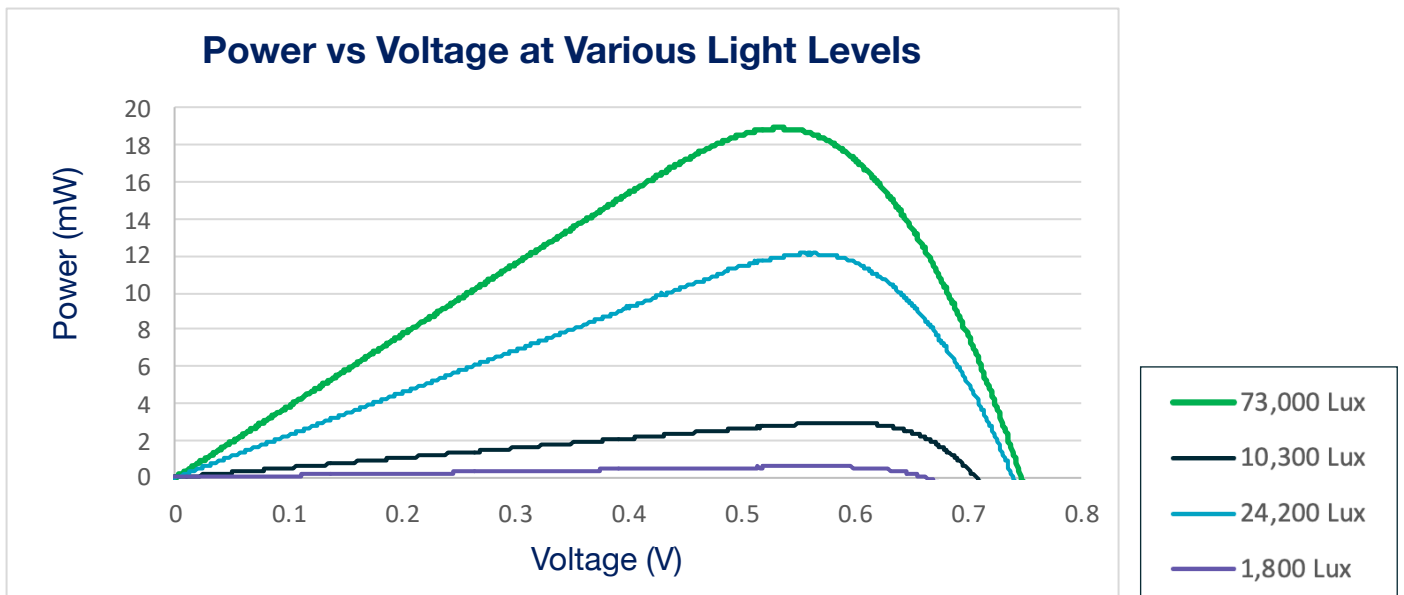
## Flexible Form Factor

Cells can be made in nearly arbitrary shapes. Typical sizes range from 5 cm<sup>2</sup> to 225 cm<sup>2</sup> and anywhere in between. Indicative cell thickness is 4.4 mm.

## I-V Curve

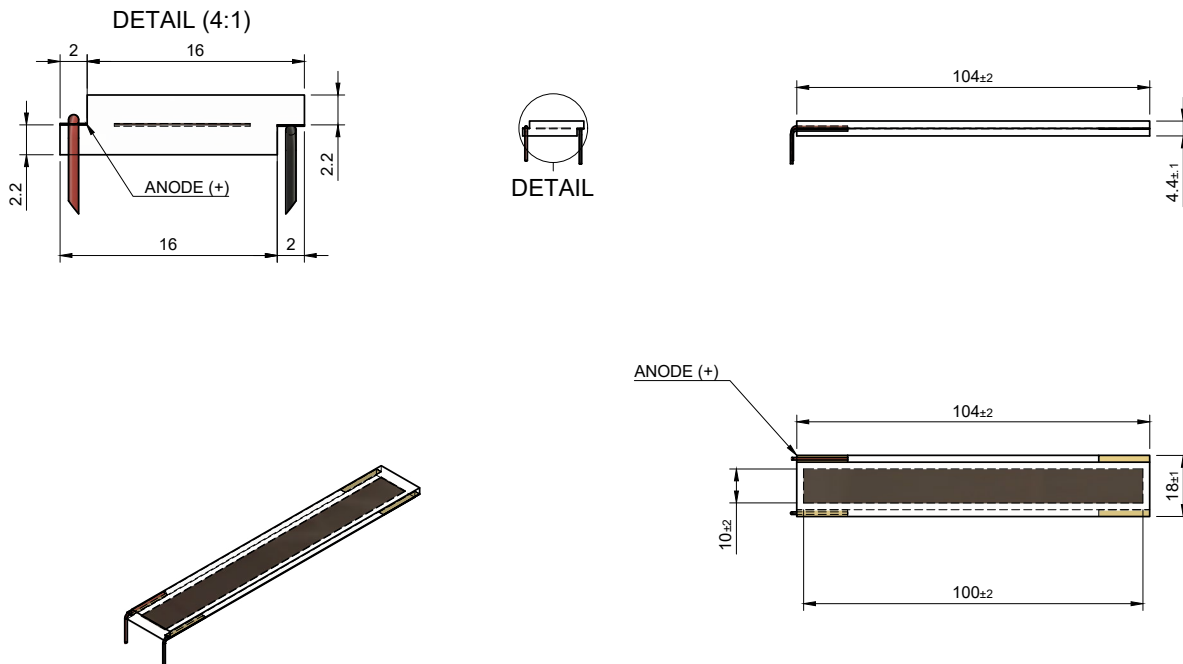


## Maximum Powerpoint



## Indicative Dimensions

Ambient cells can be manufactured in a range of aspect ratios and sizes from 5 cm<sup>2</sup> to 225 cm<sup>2</sup>. The diagram below depicts indicative dimensions for a 10 cm<sup>2</sup> cell.



### NOTE

1. Overall PV volume is: 104 +/- 2 mm x 18 +/- 1mm x 4.4 +/- 0.1 mm
2. Dimensions without tolerance are indicative only
3. Wire attachments and regions are indicative only
4. Drawing scale is 1:1 unless otherwise noted
5. Drawing units are millimeters unless otherwise noted

## Electrical Specifications (10 cm<sup>2</sup> cell)

Item	Unit	Minimum	Typical	Maximum
Operating Voltage ( $V_{ope}$ )	V	520	550	580
Operating Current ( $I_{ope}$ )	μA	7800	8000-8500	9000
Maximum Power ( $P_{max}$ )	μW	4300	4600	5400
Open Circuit Voltage ( $V_{oc}$ )	V	0.65	0.66-0.70	0.74
Short Circuit Current ( $I_{sc}$ )	μA	8000	8500-9000	10000

All above specifications at 10,000 lux with white LED at 25° C operating temperature.

## Operating Conditions

Item	Unit	Minimum	Maximum
Surface Temperature	°C	-30	65
Ambient Humidity	%RH	non-condensing	

## Storage Conditions

Item	Unit	Minimum	Maximum
Surface Temperature	°C	-30	65
Ambient Humidity	%RH	0	90

## Precautions

Do not apply a current or voltage exceeding the maximum rating from the outside the external interface (lead wire).

Item	Unit	Maximum Rating
Forward Voltage	mV	Maximum Voc +10%
Reverse bias maximum	mV	-100

## Ten Years Effective Service Life

The following Highly Accelerated Life Tests (HALT) have been designed to demonstrate an effective service life of ten years provided that the device is used in accordance with applicable specifications. Devices which pass the test demonstrate less than 20% degradation in electrical performance following the HALT procedure.

Test Condition	Test Parameters
Light soaking (Open circuit and load)	1,000 hours at 1 sun/45o C
Thermal Aging (dark)	1000 hours at 65o C
Damp heat	1000 hours at 65o C/85 % RH
Temperature cycling	50 cycles -40 to 85o C
Humidity Freeze test	10 cycles -40 to 85o C/100 % RH

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