

## LEOI-37 Measurement of Photoelectric Characteristics of Photosensitive Sensors



Photosensitive sensors are sensors that convert light signals into electrical signals, also known as photoelectric sensors. They can be used to detect non-electric quantities that directly cause changes in light energy, such as light intensity, light illuminance, radiation temperature, and gas composition analysis, etc. They can also be used to detect other non-electric quantities that can be converted into changes in light energy, such as part size, surface roughness, displacement, speed, acceleration, object shape, working state recognition, etc. Photosensitive sensors have features of non-contact, fast response and reliable performance.

The physical basis of photosensitive sensors is the photoelectric effect, in which many electrical properties of semiconductor materials are changeable upon light exposure. The photoelectric effect is usually divided into external and internal two categories. The external photoelectric effect refers to the phenomenon of electrons escaping from the surface of the object under light exposure, also known as the photoelectric emission effect. This kind of photoelectric device based on external effect includes photoelectric tube, photoelectric multiplier tube, etc.

The internal photoelectric effect refers to the phenomenon of material conductivity changes upon light illumination, also known as photoconductive effect. Almost all photoelectric control applications are based on internal effect, such as photosensitive resistors, photosensitive diodes, photosensitive transistors, silicon photovoltaic cells, etc. Of course, in recent years, new photosensitive devices have emerged, such as: APD (avalanche photodiodes) with high-speed response and large amplification, semiconductor color sensors, photoelectric flow transistors, photograph tubes, CCD image sensors, etc., offered numerous possibilities for the further applications of photoelectric sensors.

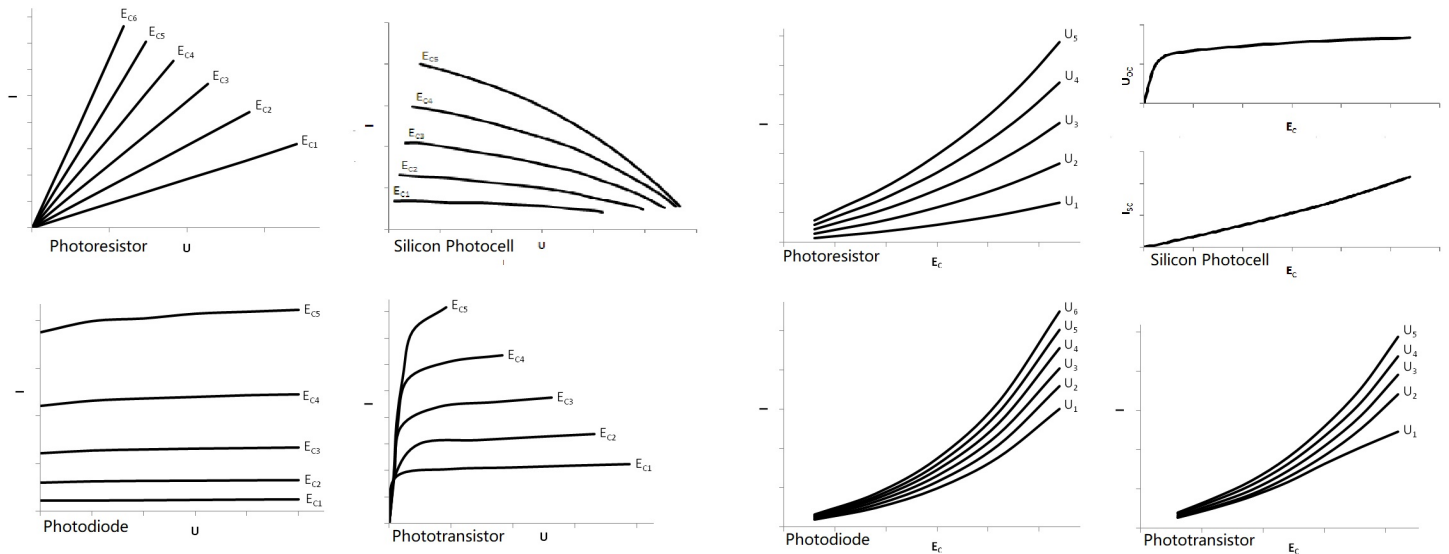
This experiment mainly studies the V-I characteristics and light illumination characteristics of the four photosensitive sensors: photosensitive resistance, silicon photocell, photosensitive diode and photosensitive transistor.

## Specification

Description	Specifications
Power supply	DC -12 V — +12 V adjustable, 0.3 A
Light source	3 scales, continuously adjustable for each scale, max luminance > 1500 LX
Digital voltmeter for measurement	3 ranges: 0 ~ 200 mV, 0 ~ 2 V, 0 ~ 20 V, resolution 0.1 mV, 1 mV and 10 mV respectively
Digital voltmeter for calibration	0 ~ 200 mV, resolution 0.1 mV
Optical path length	200 mm

## Parts

Description	Qty
Main Unit	1
Photosensitive sensor	1 set (with mount and calibration photocell, 4 sensors)
Incandescent bulb	2
Connection wire	8
Power cord	1
Instruction manual	1



V-I characteristics

Illuminance characteristics