Topic

"LDR"
(Light Dependent Resistor)
Or
"Photoresistor"

By
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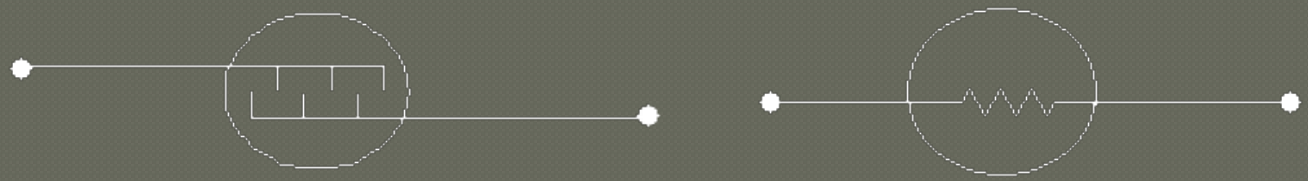
Introduction

- ***A photoresistor or light dependent resistor or cadmium sulfide (CdS) cell is a resistor whose resistance decreases with increasing incident light intensity.***

- ***It can also be referenced as a photoconductor.***

Symbol



or

Schematic Symbol of LDR

Structure

- *It a simple resistor packed in glass casing.*

Working Principle

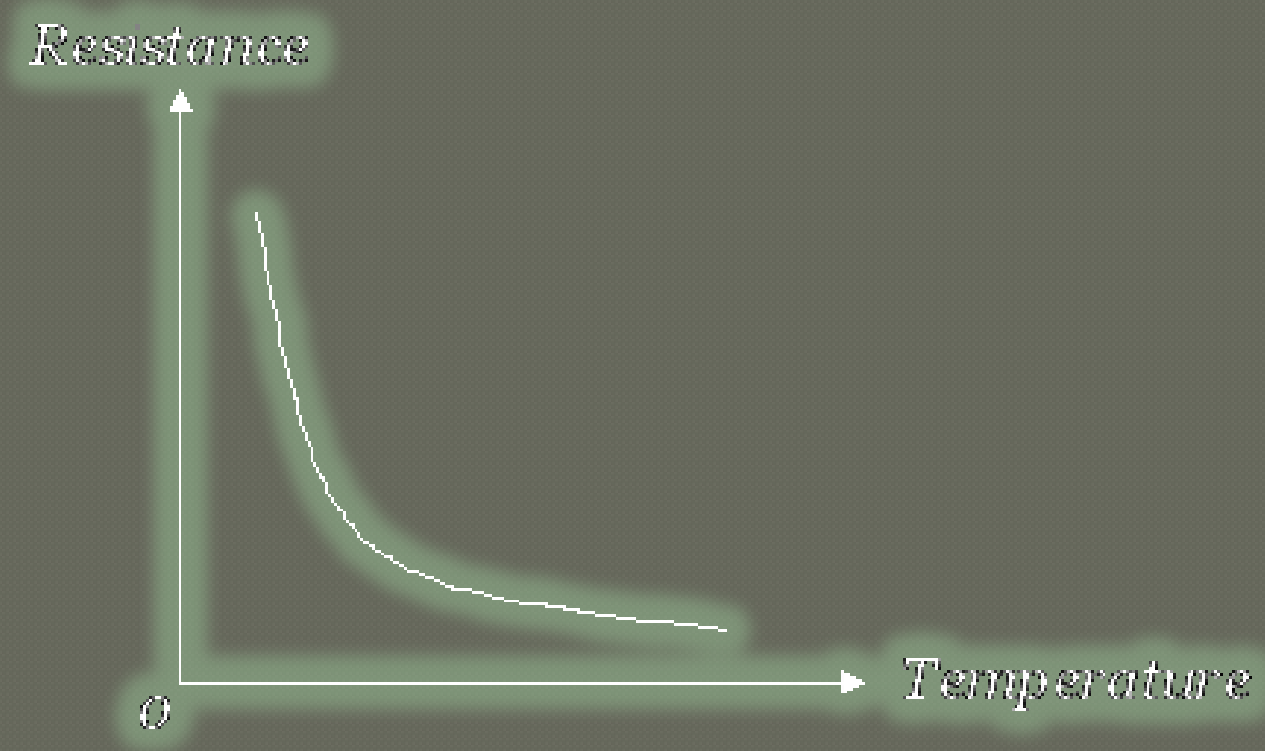
- *A photoresistor is made of a high resistance semi-conductor.*
- *If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band.*
- *The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.*

- The internal components of a photoelectric control for a typical American streelight.
- The photoresistor is facing rightwards, and controls whether current flows through the heater which opens the main power contacts.
- At night, the heater cools, closing the power contacts, energizing the street light.It is basically light dependent resistor. The heater/bimetal mechanism provides a built-in time-delay.

Theory

- *A photoelectric device can be either intrinsic or extrinsic.*
- *An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, e.g. silicon. In intrinsic devices the only available electrons are in the valence band, and hence the photon must have enough energy to excite the electron across the entire bandgap.*
- *An Extrinsic devices have impurities, also called dopants, added whose ground state energy is closer to the conduction band; since the electrons do not have as far to jump, lower energy photons (i.e., longer wavelengths and lower frequencies) are sufficient to trigger the device.*
- *If a sample of silicon has some of its atoms replaced by phosphorus atoms (impurities), there will be extra electrons available for conduction. This is an example of an extrinsic semiconductor.*

Curve between Resistance & Temperature



This curve shows that Resistance and Temperature has inverse relation with each other.

Applications

LDRs or Photoresistors come in many different types.

- ***Inexpensive cadmium sulfide cells can be found in many consumer items such as camera light meters, street lights, clock radios, alarms, and outdoor clocks.***
- ***They are also used in some dynamic compressors together with a small incandescent lamp or light emitting diode to control gain reduction.***

- **Lead sulfide and indium antimonide LDRs are used for the mid infrared spectral region.**

- **Germinium (Ge):Copper (Cu) photoconductors are among the best far-infrared detectors available, and are used for infrared astronomy and infrared spectroscopy.**