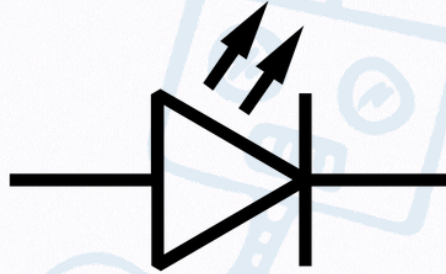


# Light Emitting Diodes (LED)

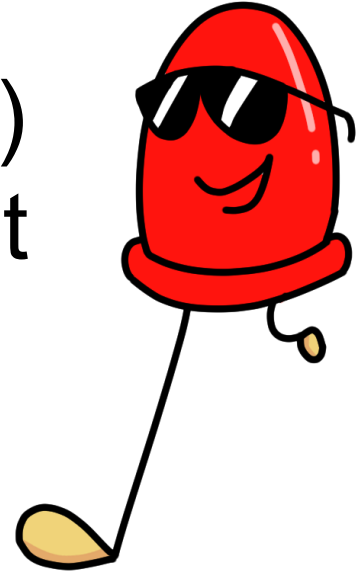


LIGHT EMITTING DIODE [LED]

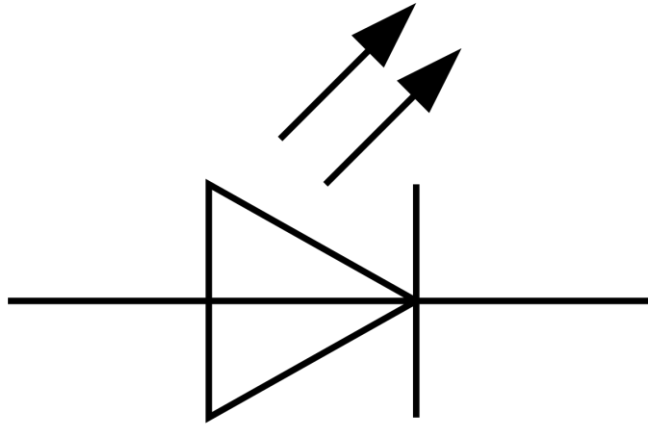


# What is a LED?

An **LED** (**L**ight **E**mitting **D**iode) is an electrical component that emits light when electricity flows through it.



# LED Schematic Symbol



The schematic symbol for a **LED**



# Types of LEDs



Through-Hole LEDs



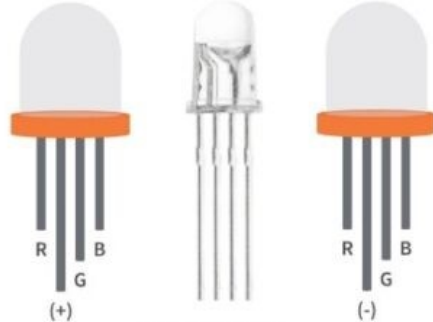
Surface Mount LEDs



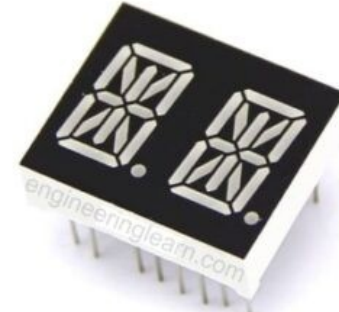
Bi-Color LEDs



High-Power LEDs



Common Anode RGB LEDs Common Cathode



Alphanumeric LEDs

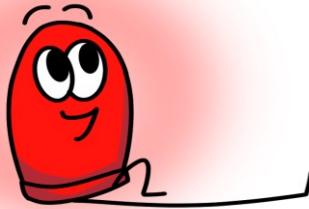


# Who Invented the LED?

In 1962, Nick Holonyak Jr. invented the first visible light LED. He has earned the honor of being called the "*Father of the light-emitting diode*".



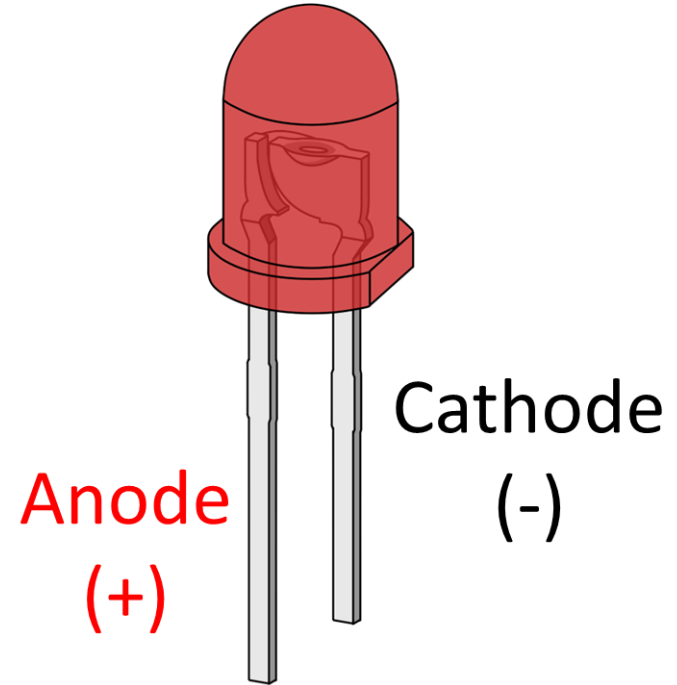
**Nick Holonyak, Jr.**  
**1928-Present**



# The Parts of an LED

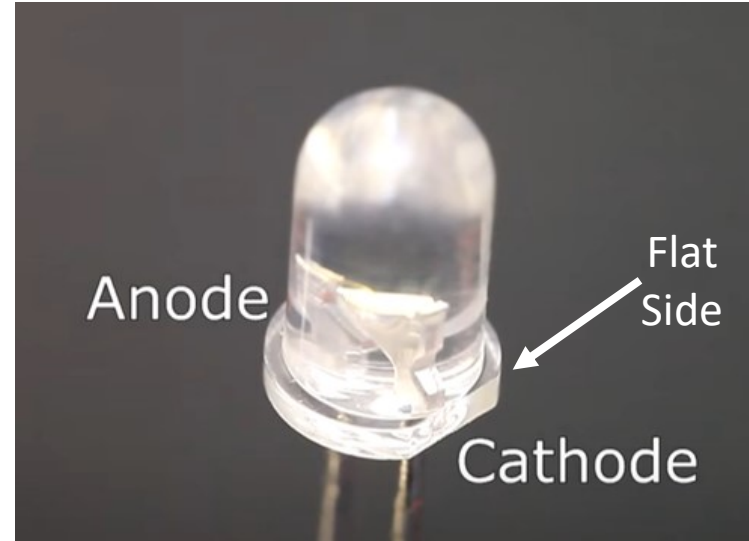
The longer pin is  
the **ANODE (+)**

The shorter pin is  
the **CATHODE (-)**

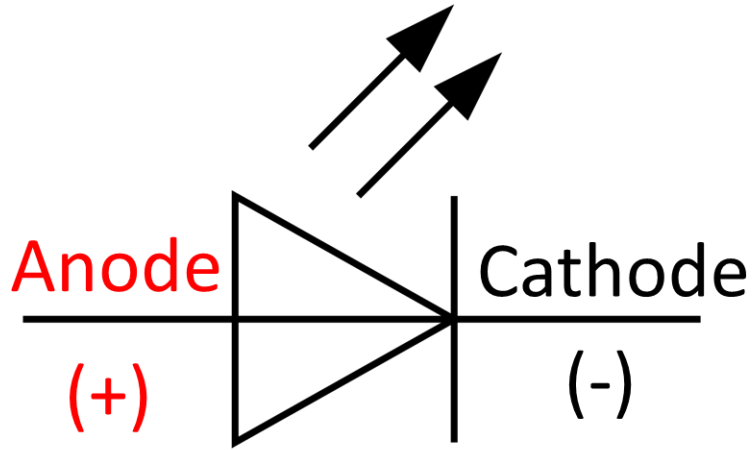


# The Parts of an LED

You can also use the bottom of the lens to figure out the **ANODE (+)** and the **CATHODE (-)**



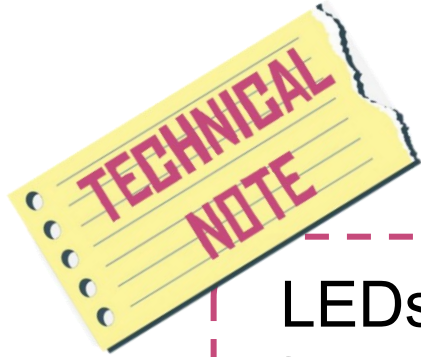
# The Parts of an LED



The current flow can only flow from the **ANODE (+)** to the **CATHODE (-)**.





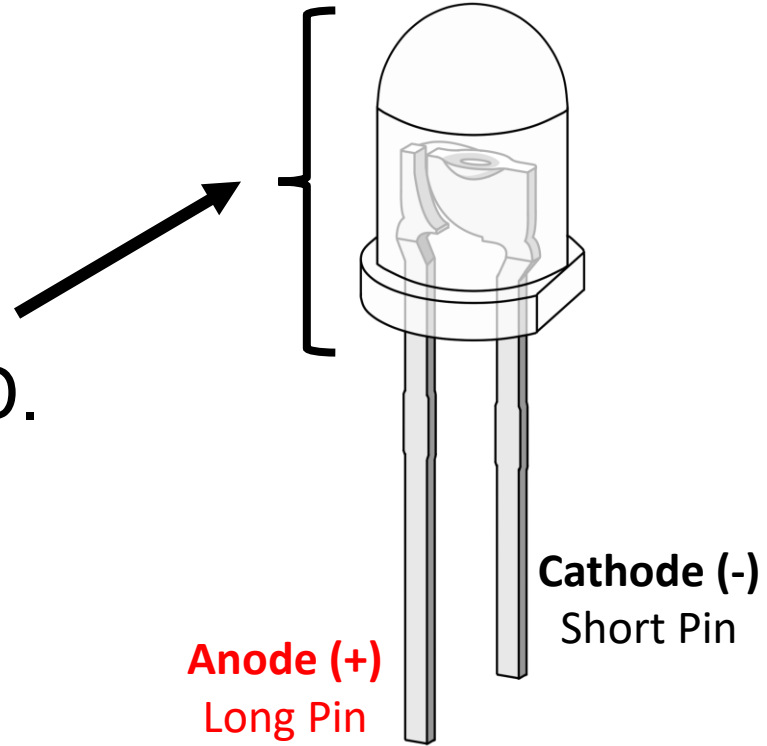


LEDs only allow electrical current to flow in one direction. When a LED is connected in the wrong direction, it will not light up.

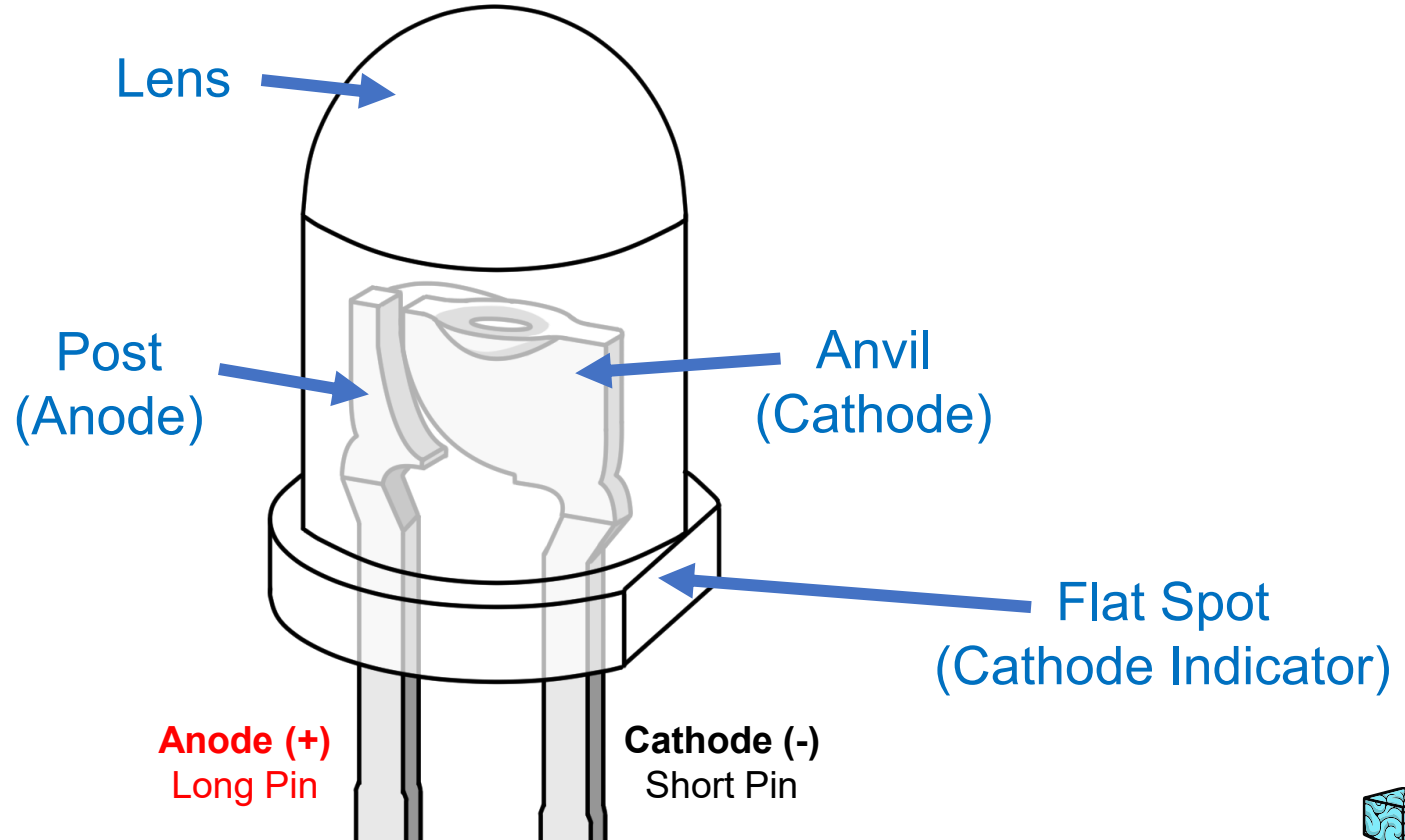


# The Parts of an LED

Let's zoom into the  
inside parts of the LED.



# The Parts of an LED

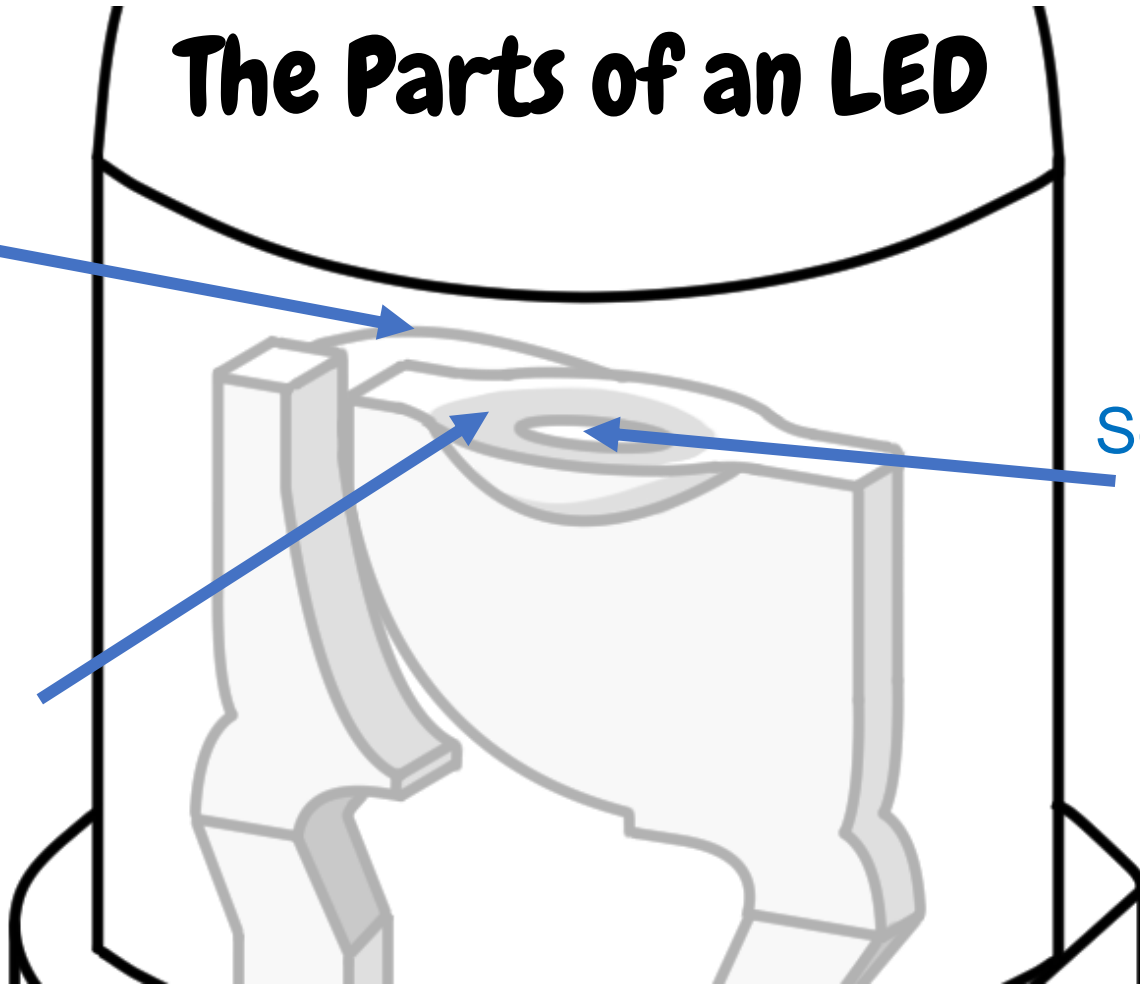


# The Parts of an LED

Wire  
Bond

Semiconductor  
“The Light”

Reflective  
Cavity





The type of colors an LEDs gives off is based on the type of semiconducting materials used to affect the wavelength of light produced!



Here are some examples of semiconductor compounds and the colors they create.

**Gallium Arsenide Phosphide** (GaAsP) produces **red** light!

**Aluminum Gallium Phosphide** (AlGaP): produces **green** light!

**Zinc Selenide** (ZnSe) produces **blue** light!





When the maximum current limit for the LED is exceeded, it is destroyed! Resistors are used to limit current so that this does not happen!



# FUN FACT



On average, LEDs can last for up to 10 years with continuous usage.



# FUN FACT

LEDs use up to 90% less energy, and last up to 25 times longer, than incandescent lighting.





# FUN FACT



**LEDs are everywhere:**  
TVs, computers, cars, phones,  
streetlamps, homes, remote  
controls, microprocessors,  
schools, robots, airplanes,  
just to name a few!



# SQUARE BRAIN

Light Emitting Diode  
(LED)

