

Building a tri-color light.

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UBC, Department of Physics and Astronomy Outreach Program

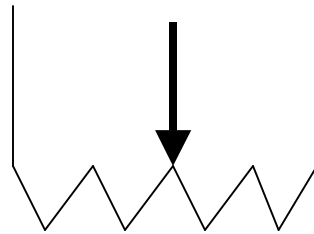
LEDs

- What are they
- Efficiency up to 115 lm/W compared to 15 lm/W for incandescent bulb and 100 lm/W for fluorescent lights. Notice the importance of directionality in comparison.
- Examples
- Future of illumination?

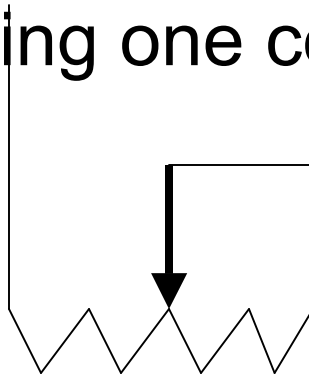
RGB elements in every day life

- Why we can make any color from RGB (red, green, blue)
- Examples of RGB elements emitters and filters
 - TV
 - Monitor
 - Projector
 - LCD screen
- RGB sensors

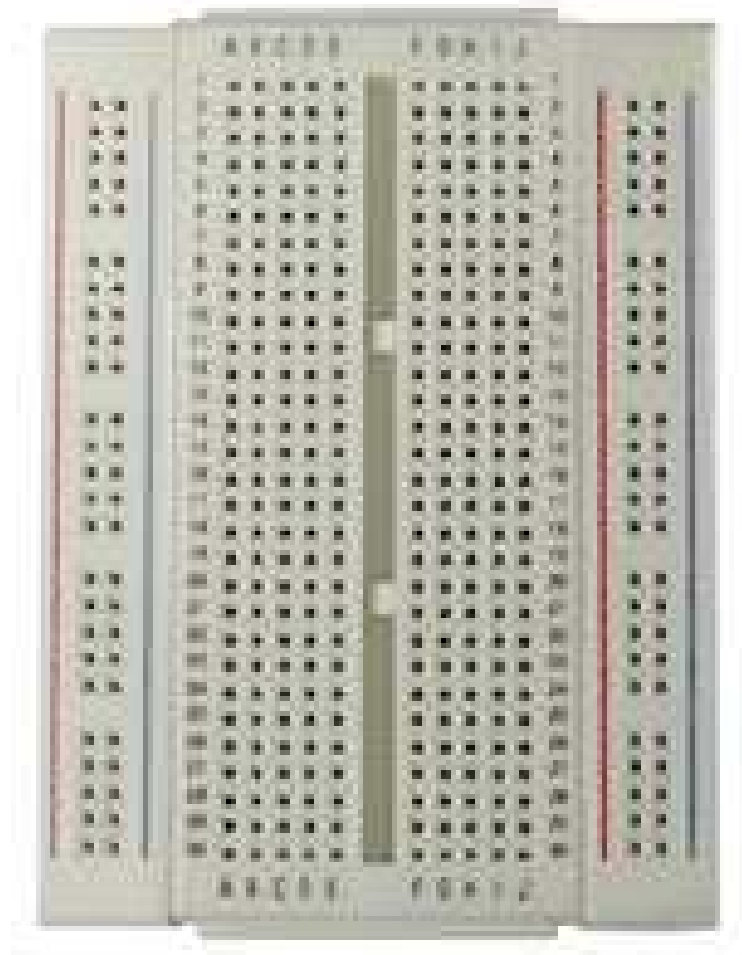
- Potentiometers (2 kilo-ohm potentiometers Model: VTP-2K, 2K VERTICAL TRIMPOT from <http://www.allelectronics.com/>)



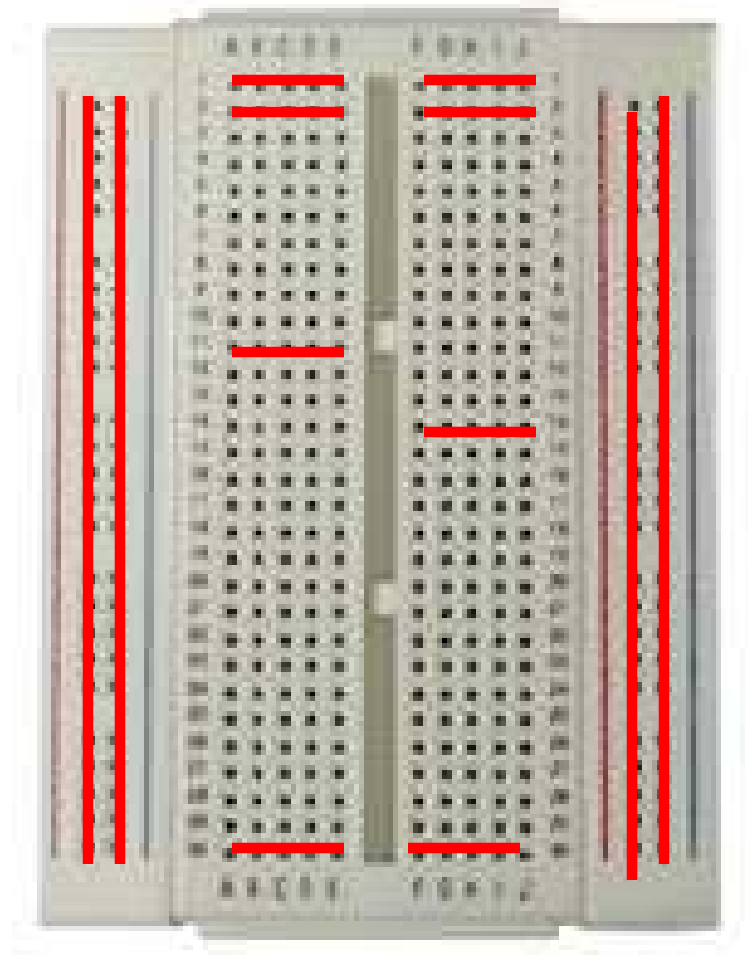
- One can convert a potentiometer into variable resistor by making one connection



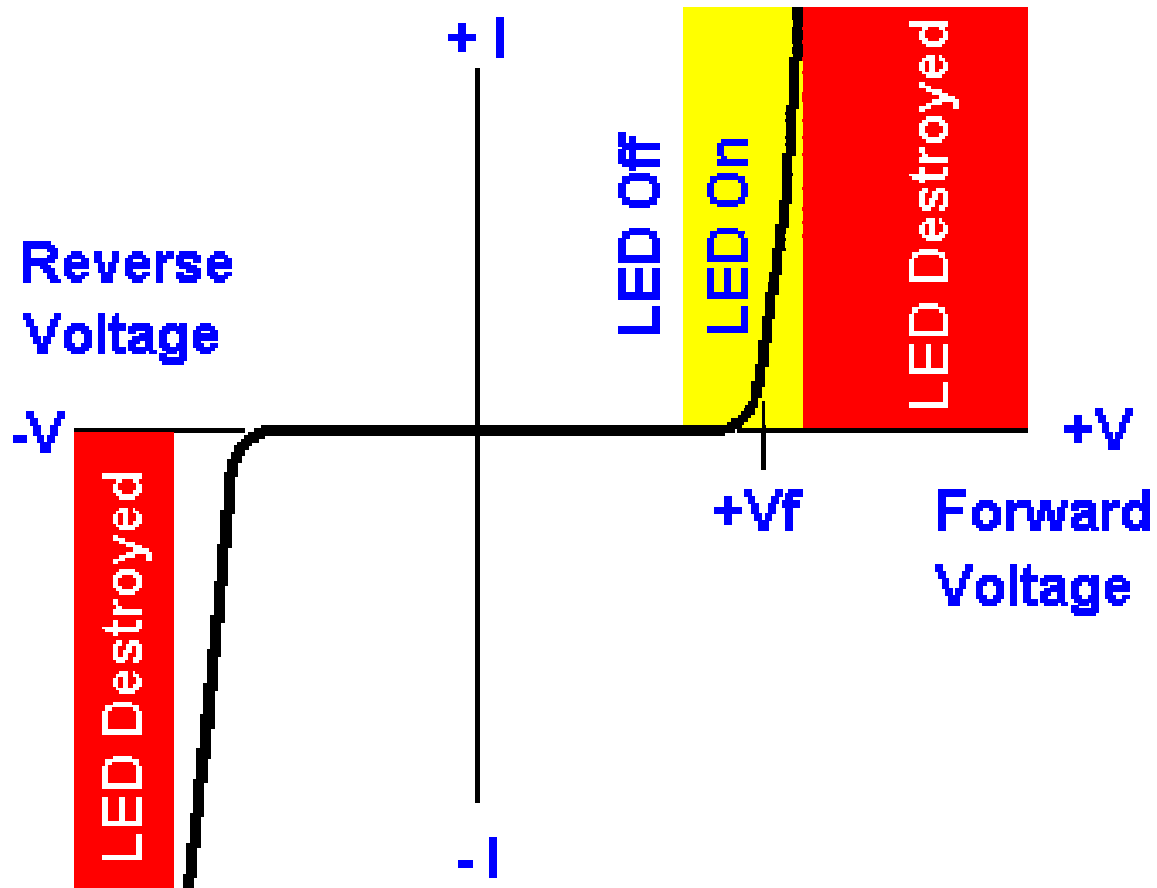
- SOLDERLESS BREADBOARD
- Model: PB-400 from <http://www.allelectronics.com/>



- Breadboard (design board)
 - connections between the holes are shown in red
 - Use only the specified wire

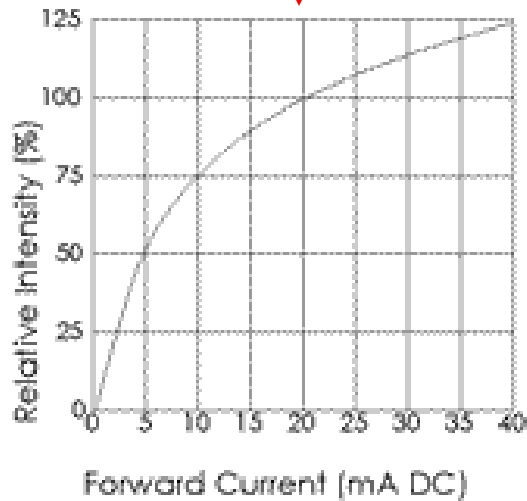


- Light Emitting Diodes LEDs
 - voltage –current characteristics,



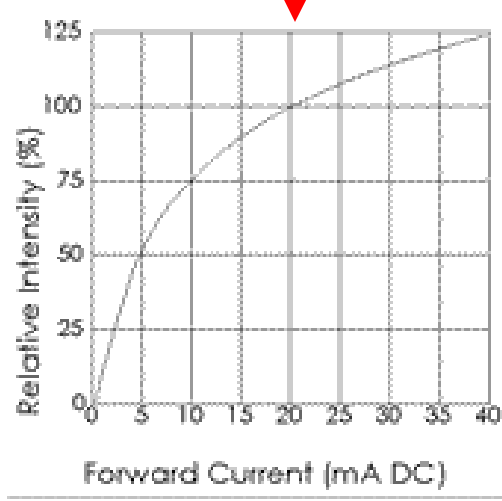
Voltage –current characteristics

Blue



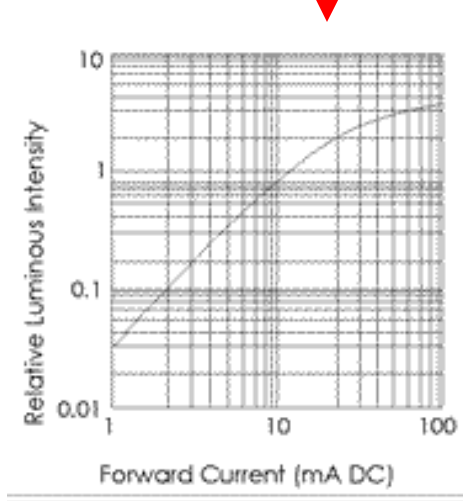
Forward Voltage 3.5

Green



Forward Voltage 3.5

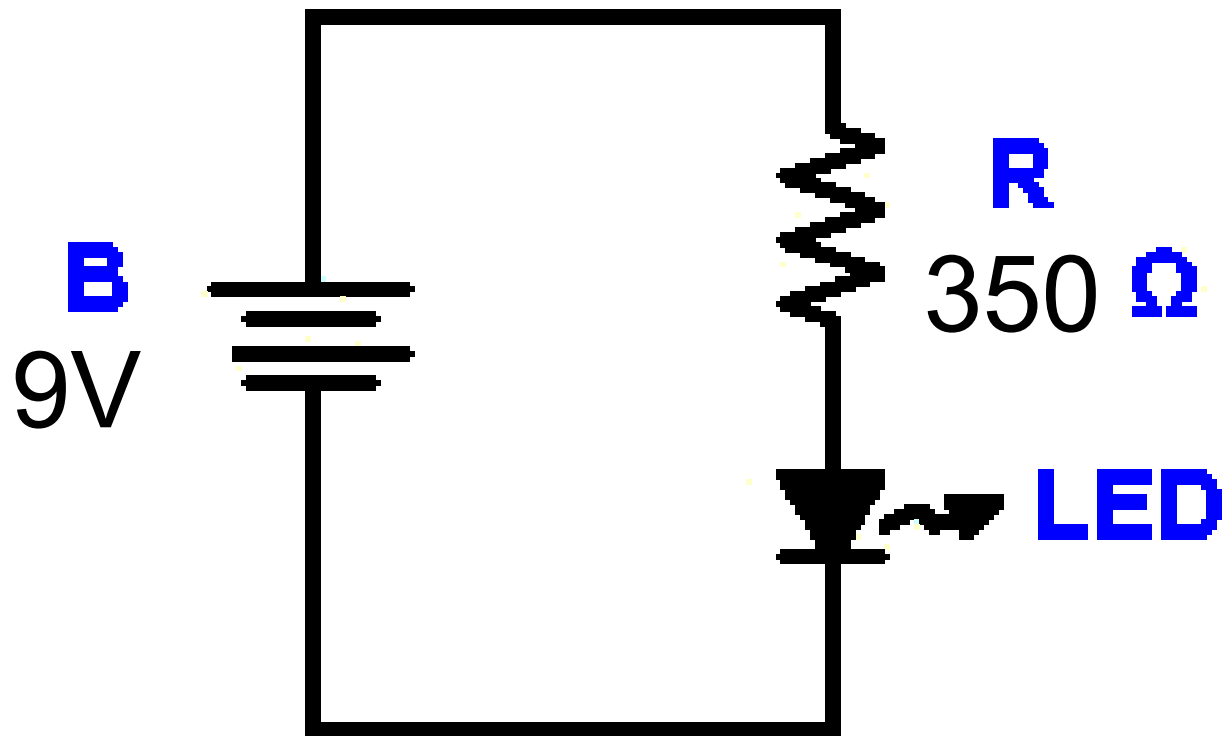
Red



Forward Voltage 2.5

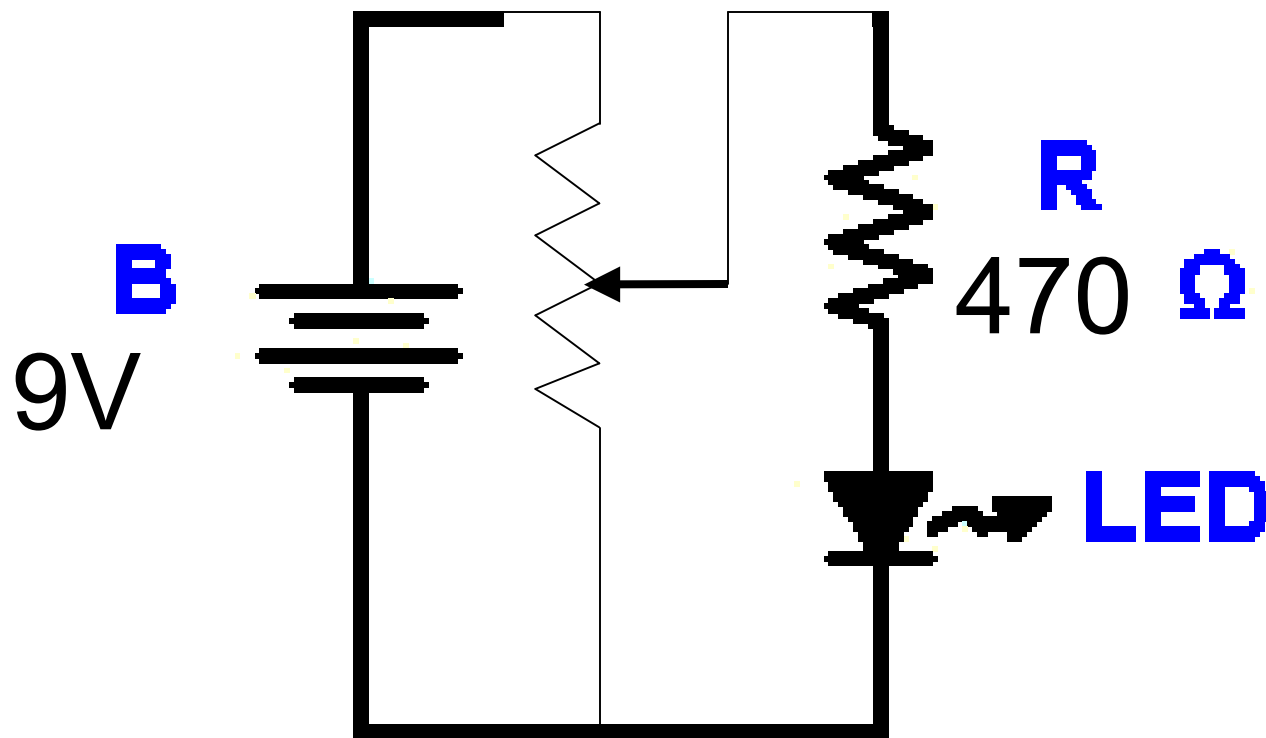
Red arrows show maximum continues current

- Light Emitting Diodes LEDs
 - example circuit



- Light Emitting Diodes LEDs

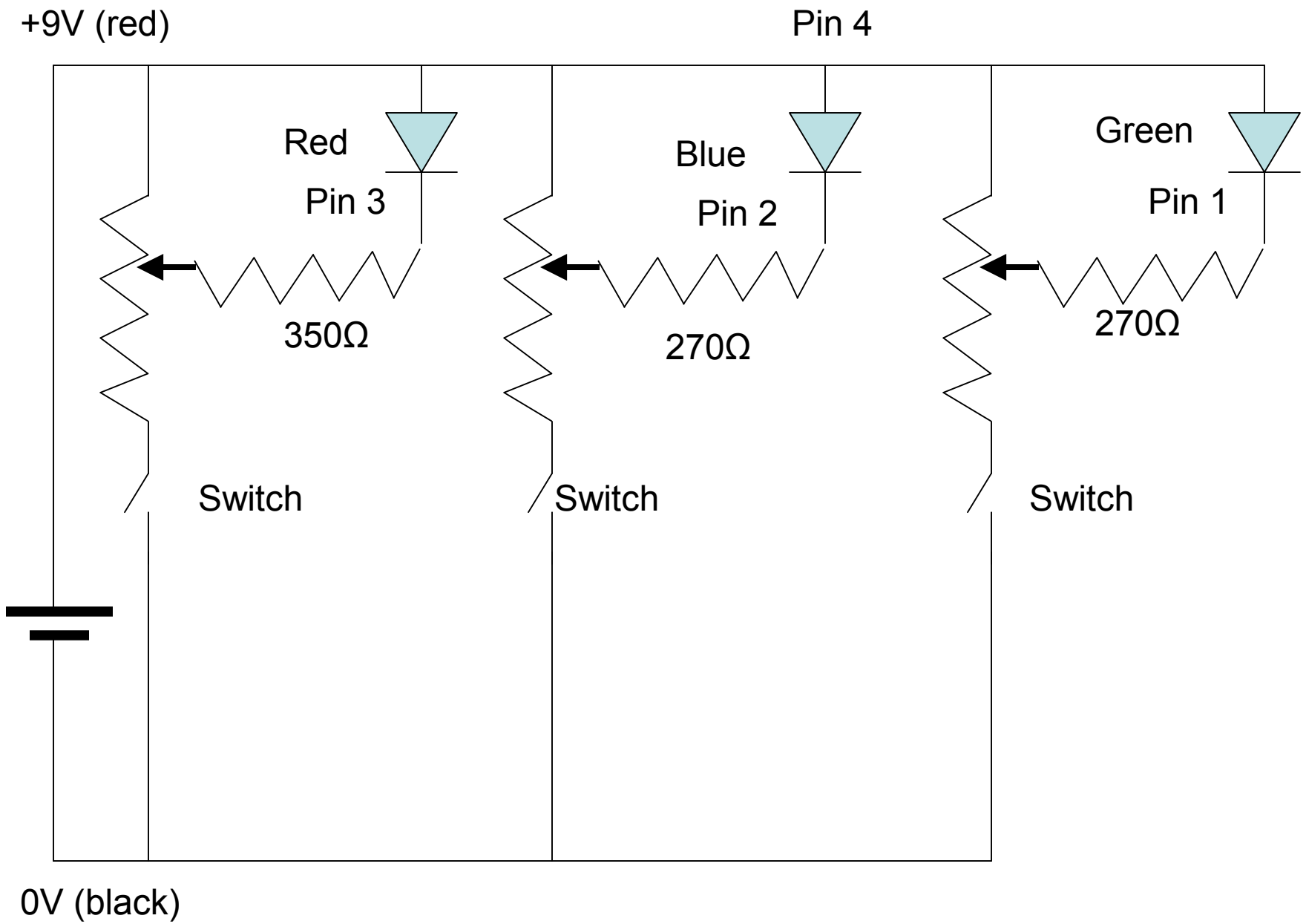
Example circuit. What if we want to control the light intensity?



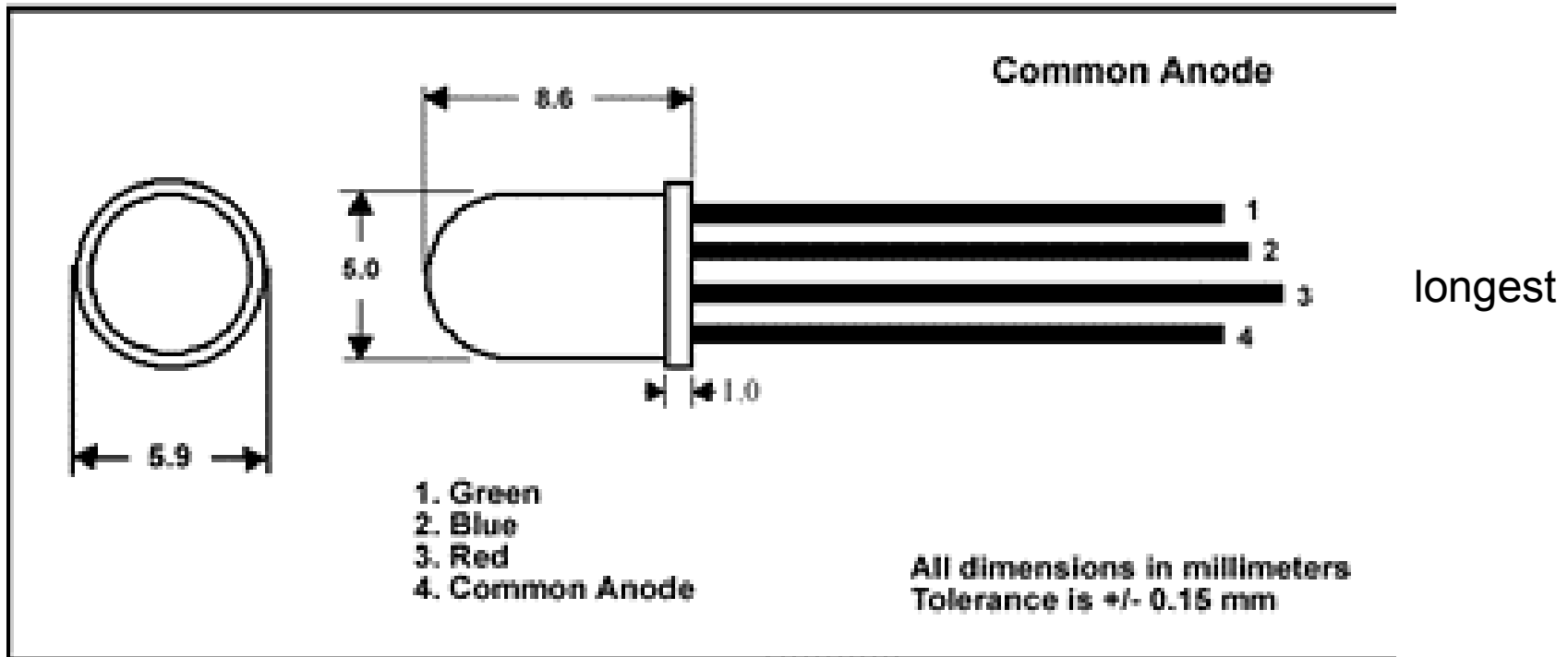
- Tri-color LEDs (RGB)

Model: RL5-RGB-C TriColor LED from
<http://www.superbrightleds.com/>

- If we want to mix color we have to control the brightness of each color component of the RGB diode individually:



- Tri-color Light Emitting Diodes LEDs
 - Pin assignment 4 pins



Other parts

- 1. Triple dip switch
- 2. 275 ohm resistors
- 3. 350 ohm resistors
- 4. 9V battery
- 5. 9V battery snap