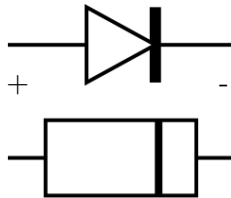


Electronics Diode Measurement

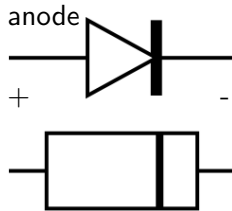
Terry Sturtevant

Wilfrid Laurier University

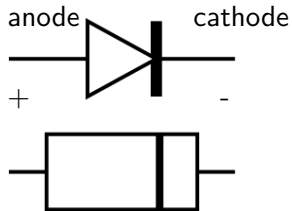
May 1, 2014



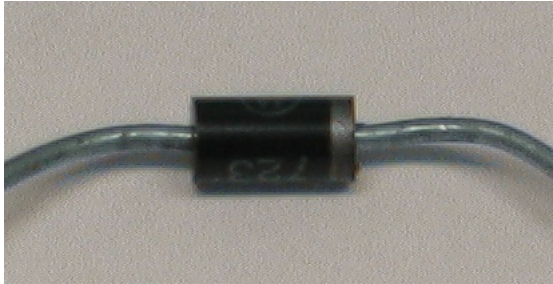
Diode symbol and physical appearance



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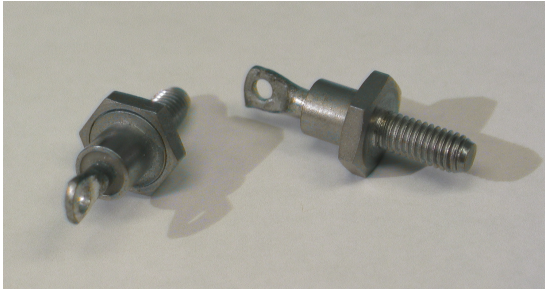
Diode symbol and physical appearance



- Signal diodes (one type)



- Signal diodes (another type)



- Power diodes

Digital Multimeter (DMM)

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- allows measurement of multiple things

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voltage, current, resistance

Digital Multimeter (DMM)

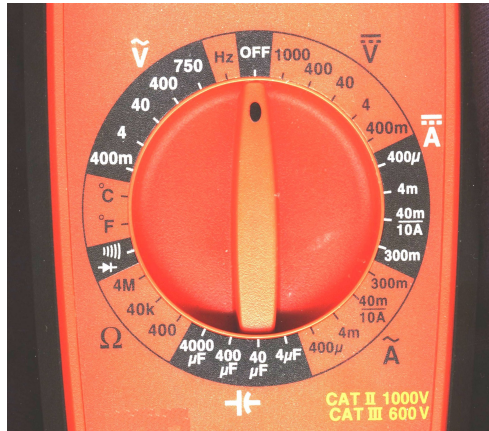
- allows measurement of multiple things
voltage, current, resistance
- allows *testing* of diodes (including LEDs)



Sample multimeter - Amprobe 33XR



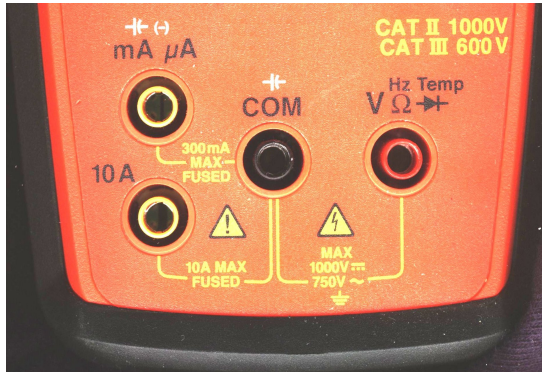
Display section - Amprobe 33XR



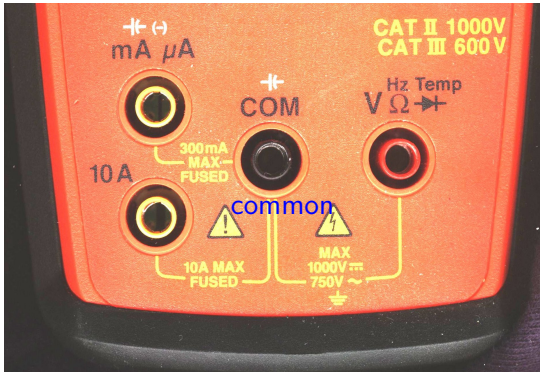
Control section - Amprobe 33XR



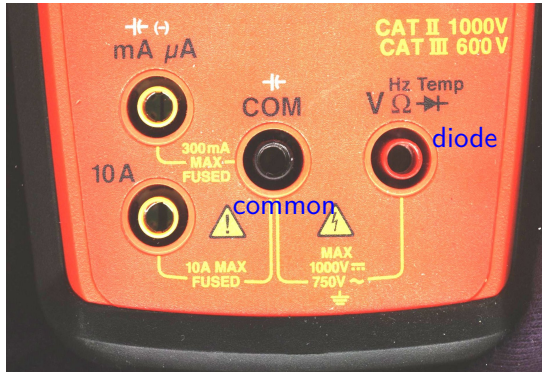
Control section - Amprobe 33XR



Connection section - Amprobe 33XR



Connection section - Amprobe 33XR



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Checking regular diodes

Checking regular diodes

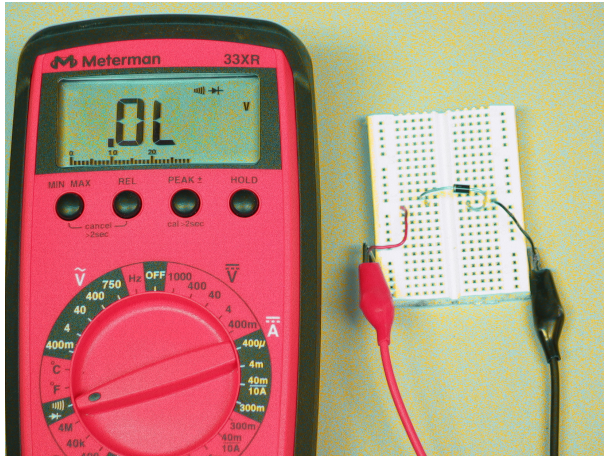
- To check any diode, connect it to the leads and observe the reading, then reverse the leads and observe the reading again.

Checking regular diodes

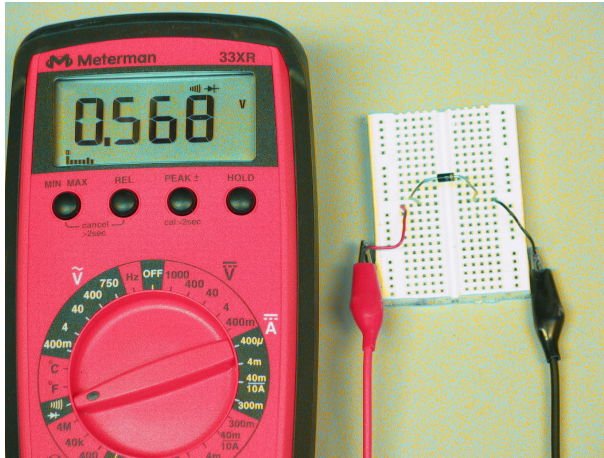
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Checking regular diodes

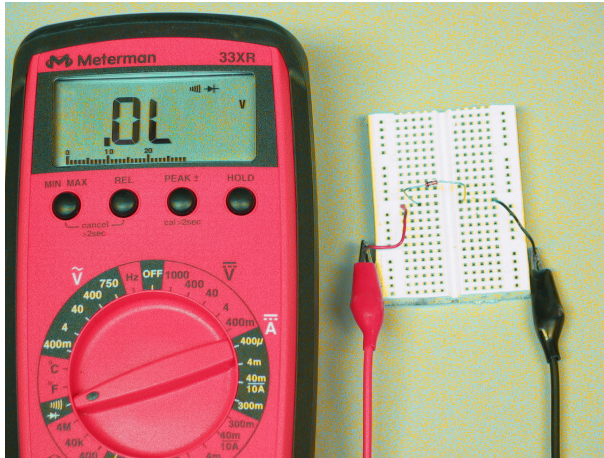
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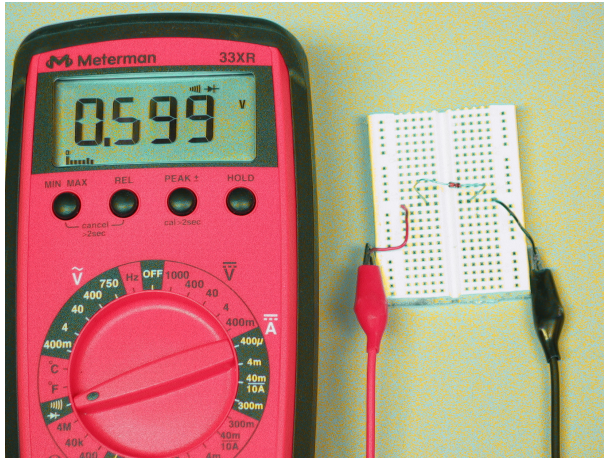
Diode measurement - reverse bias



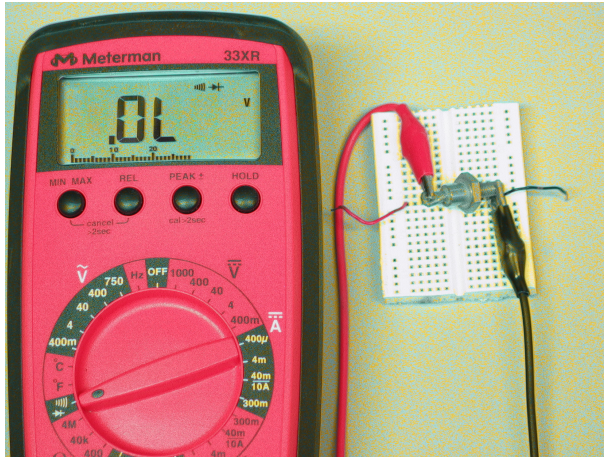
Diode measurement - forward bias



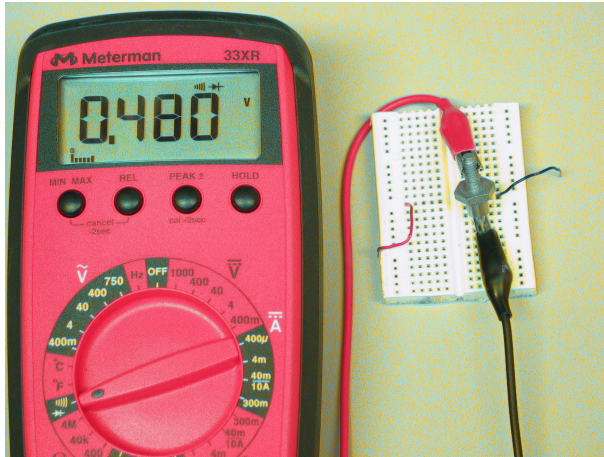
Diode measurement - reverse bias



Diode measurement - forward bias



High current diode measurement - reverse bias



High current diode measurement - forward bias

Checking LEDs

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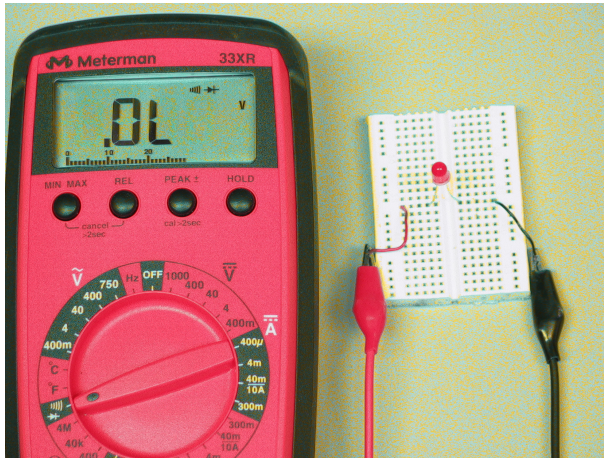
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Checking LEDs

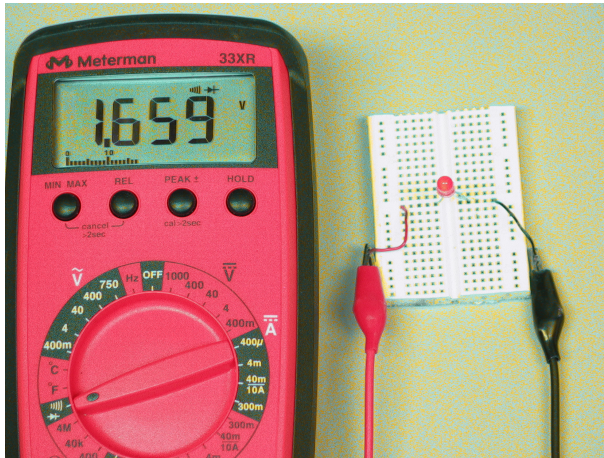
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The *voltage* will be higher for a visible LED than for a regular diode.

Checking LEDs

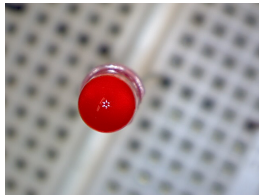
- To check an LED, do the same as for any other diode.
- In the *reverse bias condition* the meter should show an *open circuit*.
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- For an LED, in the *forward bias condition* the LED may be lit; (i.e. ON).



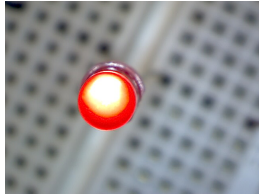
Diode measurement - LED in reverse bias (i.e. OFF)



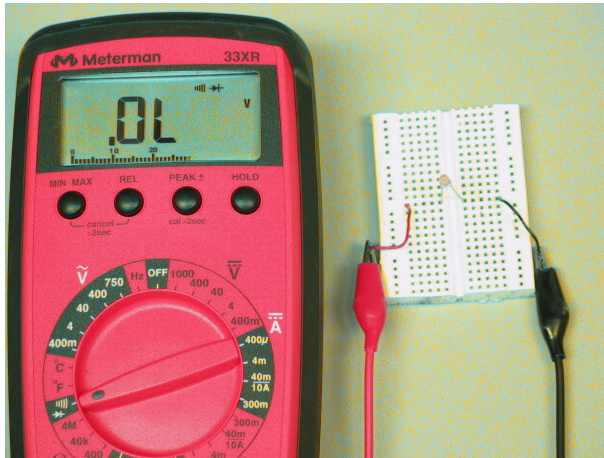
Diode measurement - LED in forward bias (i.e. ON)



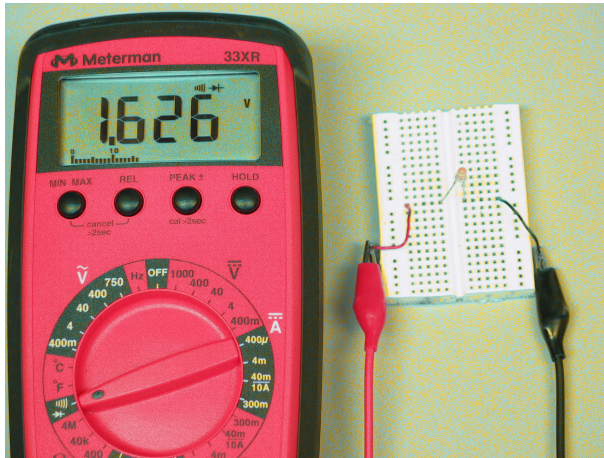
- Reverse bias (OFF)



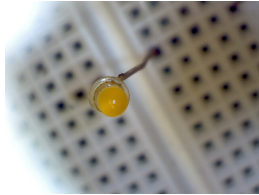
- Forward bias (ON)



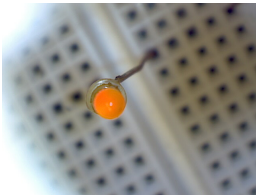
Higher frequency (yellow) LED in reverse bias (i.e. OFF)



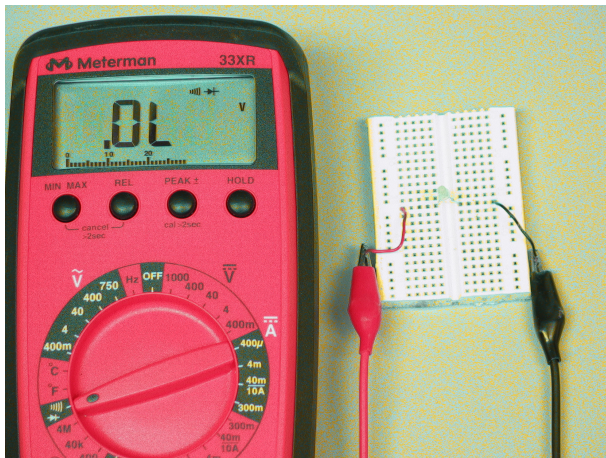
Higher frequency (yellow) LED in forward bias (i.e. ON)



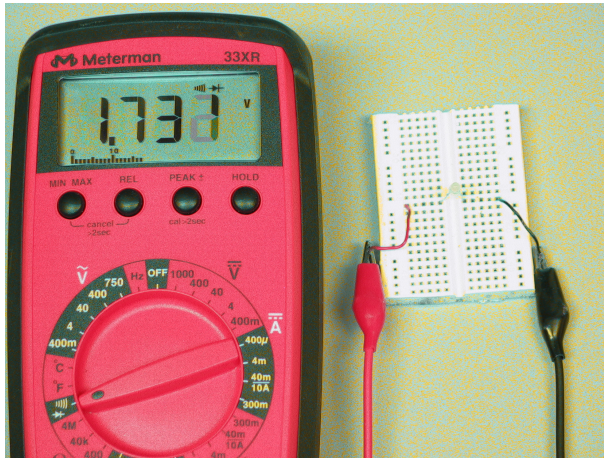
- Reverse bias (OFF)



- Forward bias (ON)



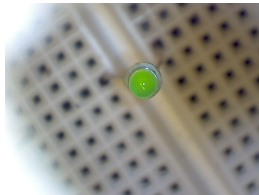
Still higher frequency (green) LED in reverse bias (i.e. OFF)



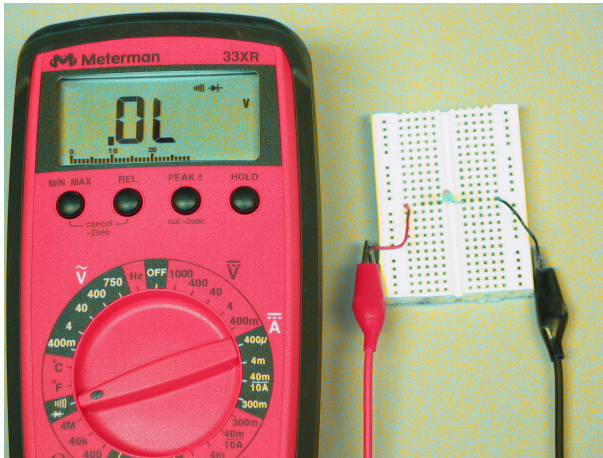
Still higher frequency (green) LED in forward bias (i.e. ON)



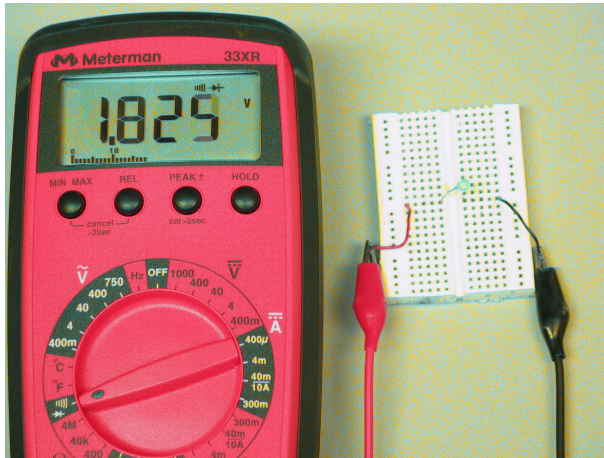
- Reverse bias (OFF)



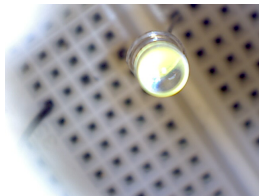
- Forward bias (ON)



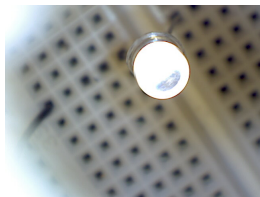
White LED in reverse bias (i.e. OFF)



White LED in forward bias (i.e. ON)

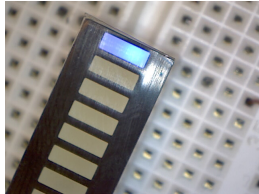


- Reverse bias (OFF)

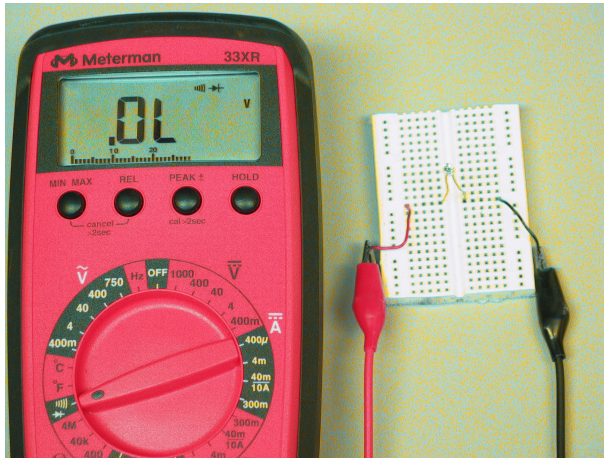


- Forward bias (ON)

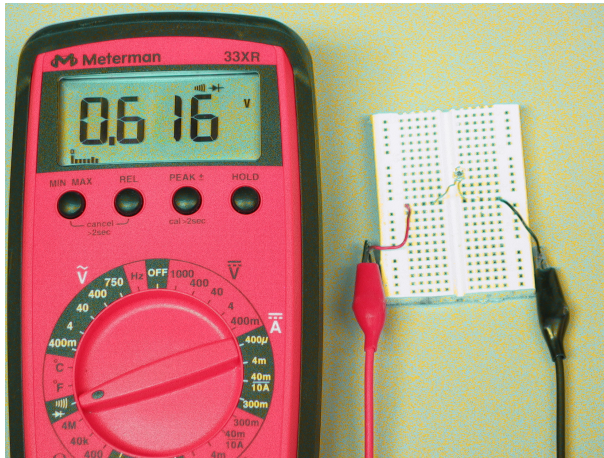
Individual LEDs in 7 segment displays or bargraph displays can be checked as well.



- Forward bias (ON)



Lower frequency (infrared) LED in reverse bias (i.e. OFF)



Lower frequency (infrared) LED in forward bias (i.e. ON)

LED variations

LED variations

- For infrared LEDs, you won't see if they are lit; (i.e. ON).

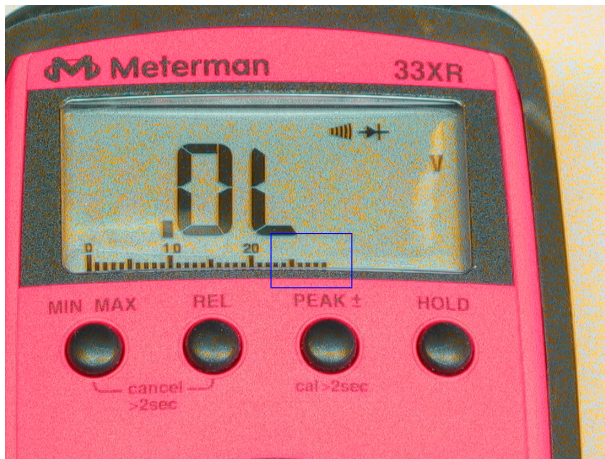
LED variations

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- For some white LEDs, you might not see a voltage either way because the turn-on voltage is too high for the meter to recognize it as an LED.

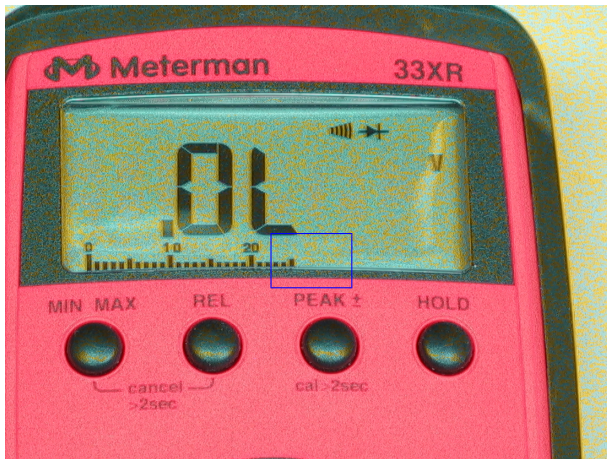
LED variations

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In that case, you should still see a variation in the bar graph display between forward and reverse bias, so you can still recognize it as an LED.



- Reverse bias (OFF)



- Forward bias (ON)

Recap:

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