

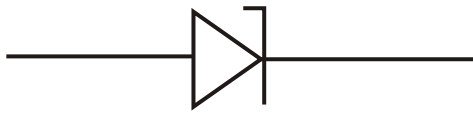
Zener Diode Tester Circuit

DEEPAK GUPTA



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A Zener Diode is a special kind of diode which permits current to flow in the forward direction as normal, but will also allow it to flow in the reverse direction when the voltage is above a certain value - the breakdown voltage known as the Zener voltage.



The Zener voltage of a standard diode is high, but if a reverse current above that value is allowed to pass through it, the diode is permanently damaged. Zener diodes are designed so that their zener voltage is much lower - for example just 2.4 Volts.

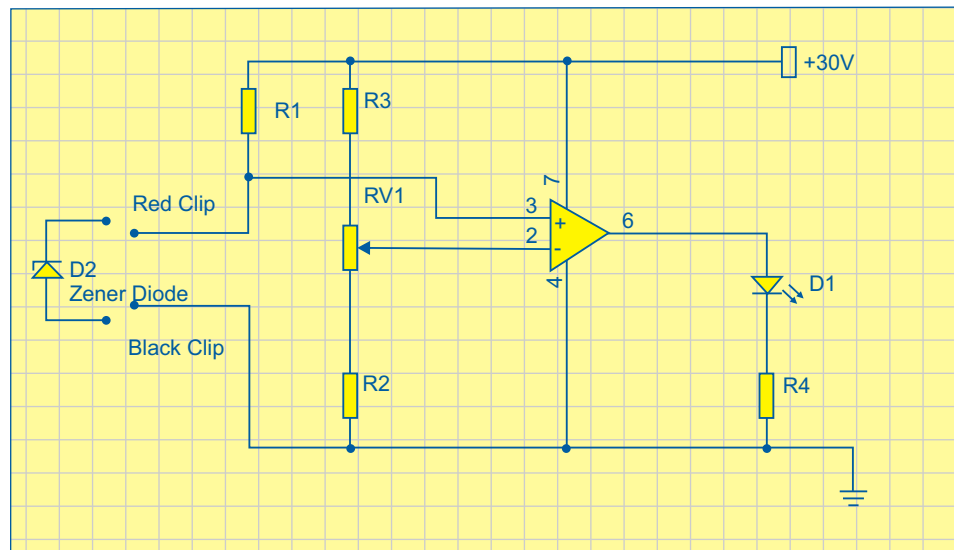
When a reverse current above the Zener voltage passes through a Zener diode, there is a controlled breakdown which does not damage the diode. The voltage drop across the Zener diode is equal to the Zener voltage of that diode no matter how high the reverse bias voltage is above the zener voltage.

With a zener diode connected in the forward direction, it behaves exactly the same as a standard diode - i.e. a small voltage drop of 0.3 to 0.7V with current flowing through pretty much unrestricted. In the reverse direction however there is a very small leakage current between 0V and the Zener voltage - i.e. just a tiny amount of current is able to flow. Then, when the voltage reaches the breakdown voltage (V_z), suddenly current can flow freely through it. Zener diodes are typically used to regulate the voltage in

voltage of the zener diode used and so can be used to power devices requiring a fixed voltage.

The testing of zener diodes requires a variable dc power supply. A simple circuit can be built using OP-AMP in differential mode.

The 47k linear potentiometer's dial is calibrated in terms of voltages between 0 and 27V, either by using various known zeners in the range, or by applying a known voltage at pin 3 of IC 741. The position of the potentiometer where the LED gets turned off, gives the breakdown voltage of zener. The power supply voltage can be between 9V and 30V. But zener to be tested, and should not be changed once the dial is calibrated. You can also check the polarity of zener. The cathode side should



be connected to the red clip.(i.e. pin 3 of IC 741) If you connect the zener the other way round, then it will just behave as a diode, and the LED will remain off at all positions of the potentiometer. In case of a zener that is shorted from inside, the LED will remain off with zener connected either way to the clips. In case of a zener that is open-circuit from inside, the LED keeps glowing at all positions, with zener connected either way to the clips.