

Zener-Regulated Power Supply

Elementrix Classes

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A Zener-regulated power supply is a simple and cost-effective circuit that uses a Zener diode to maintain a constant output voltage, despite fluctuations in the input voltage or changes in the load current.

Here's a breakdown of its key components and operation:

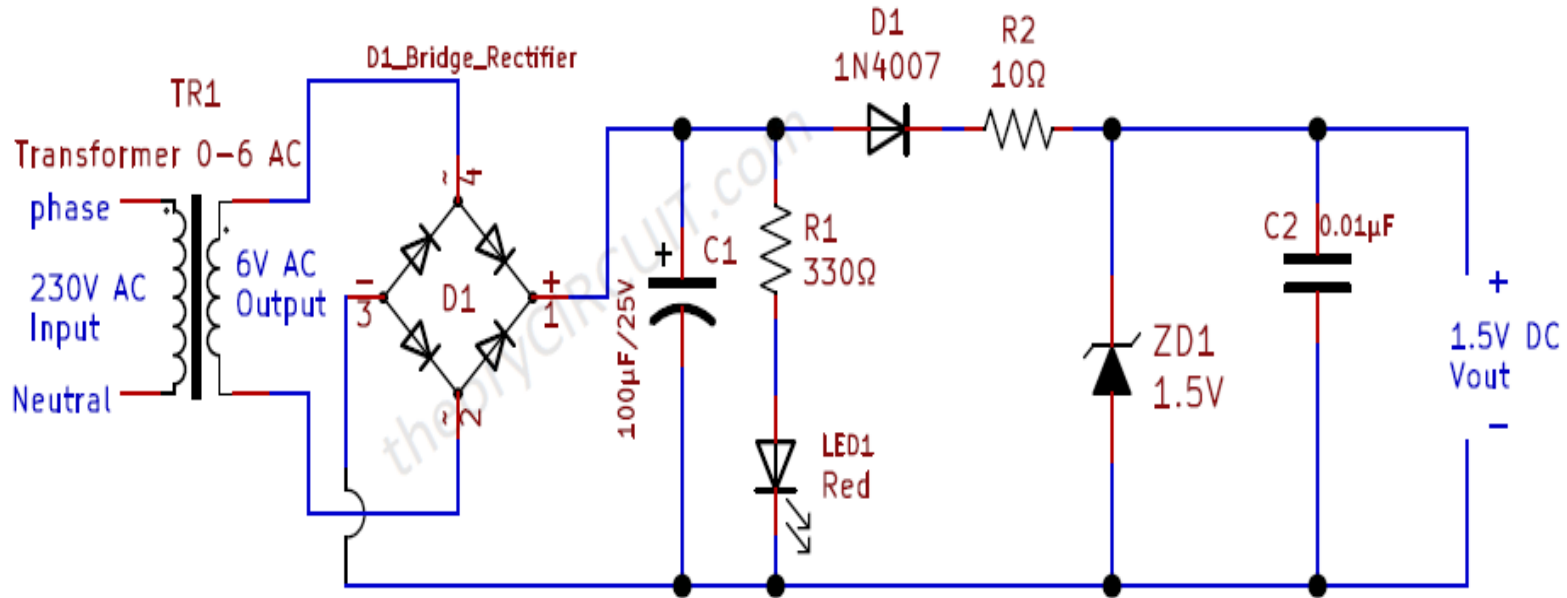
Components:

- ❑ **Transformer:** Steps down the AC mains voltage to a lower suitable level.
- ❑ **Rectifier (bridge or center-tapped):** Converts the AC voltage from the transformer to DC voltage.

- ❑ **Filter capacitors:** Smooth out the pulsating DC voltage from the rectifier, reducing ripple.
- ❑ **Zener diode:** Acts as the voltage regulator, maintaining a constant voltage across the load by shunting excess current when the output voltage tends to rise.
- ❑ **Series resistor:** Limits the current through the Zener diode to prevent damage.
- ❑ **Load (e.g., electronic device):** The circuit provides a regulated DC voltage to this device.

Working

1.5V DC Zener Diode Regulator Circuit



- ❑ This Circuit Gives Constant Regulated 1.5V DC supply from unregulated DC. This is a standalone power supply circuit hence direct 230V mains supply is reduced to 6V AC by using stepdown transformer, then bridge Rectifier module (or Four 1N4007 Diode in bridge form) Converts 6V AC into 6V DC supply then this DC supply Filtered by Capacitor C1, then LED1 indicates the presence of input DC to the Zener Regulator circuit, Here diode 1N4007 is used as Reverse supply protection device.
- ❑ 1.5V Zener Diode connected parallel and in Reverse bias to the unregulated DC supply. When the Input DC Supply to this Zener diode reaches 1.5V then Zener breakdown occurs and allows only 1.5V at the output end. Capacitor C2 acts as High frequency ripple filter.

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