

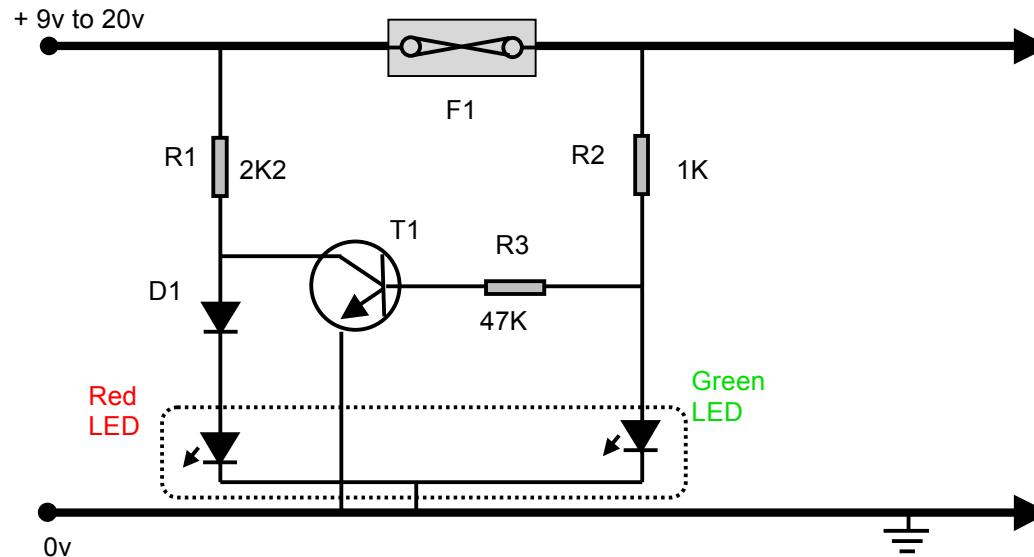
FUSE CONDITION INDICATOR FOR SINGLE RAIL DC SUPPLY

What Is Desired To Be Achieved

1. Protection of the incoming supply in the event of a short circuit with auto reset.
2. Indication of the state of the output supply rail.

Benefits Of This Circuit

1. Simplicity
 2. Low cost
- As a result of popular demand this is a simplified version of MGE106a for split rail power supplies.



F1

This may be any interruption device like a fuse, self-resetting trip, magnetic breaker or even a limit switch.

How The Circuit Works

1. **F1 Not Operated** The full supply flows to output. This is the normal condition and the Green LED will be illuminated via R2. It's value is chosen to allow 7-16mA to flow in it. The forward voltage across the Green LED (anywhere between 2.6 and 5.5v depending on brand) turns on T1 and bypasses and current for the Red LED.
2. **F1 Operated** No output is present and the Green LED has no power. Thus T1 is not turned on. Current passing through R1 is not bypassed through T1 but passes directly through D1 and Red LED illuminates. R1 is chosen to give 3-8mA through the Red LED when not bypassed. Red LED's require half the current to operate compared with green. When small transistors turn on there is a drop of ~0.6v between base and emitter (V_{BE}) this may be enough to cause some red LEDs to illuminate dimly. D1 is added to ensure that the Red LED will only illuminate when there is well above 1v present at the lower end of R1 which can only happen if T1 is off. Thus when T1 is on D1 is reverse biased and thus shut off hard. Assuming the average gain of a transistor to be at least x50 R3 is chosen to ensure that only a small amount of current destined for the green LED is pilfered yet T1 is turned on hard so that all current available from R1 for Red LED will be bypassed.

Sources Of Components

1. **Resettable Fuses** May also be known as Circuit Breakers. Normally quick acting thermal devices available in many sizes. Most NOT for mains. Maplin used to sell them at ~£1.50ea. However they are no longer trading. Amazon only offer high value automotive versions so I now buy from www.railwayscenics.com
2. **LED** Either separate LEDs or any three terminal bi-colour device. This circuit not suitable for two terminal "back-to-back" type.
3. **Transistor** T1 may be any standard low current NPN type eg BC108.
4. **Diode** D1 may be any small signal silicon type eg 100mA