FuseGuard - Circuit Overload Protection System

1. Project Overview

FuseGuard is a smart circuit protection system designed to detect and respond to overload conditions in real-time. It utilizes an ACS712 current sensor to monitor current flow and uses an Arduino Uno to control a relay that disconnects the load in case of overload. The system displays the current on an LCD, activates a buzzer, and switches LEDs to indicate the status.

2. Components Used

- Arduino Uno
- ACS712 Current Sensor
- Relay Module (5V)
- 16x2 LCD Display with I2C
- Red and Green LEDs (with 220 Ohm resistors)
- Buzzer
- Fuse (appropriate rating)
- Jumper wires and Breadboard

3. Working Principle

The ACS712 sensor reads the current flowing through the load. This value is processed by the Arduino. If the current exceeds a preset threshold (e.g., 5A), the Arduino disconnects the circuit using a relay. It then alerts

the user via a red LED and buzzer. If the current is normal, a green LED remains on and the load stays connected.

4. Arduino Code Summary

The Arduino code reads analog values from the ACS712, calculates current, and compares it with a threshold. It displays the current on the LCD. If an overload is detected, it cuts off the relay and alerts via LED and buzzer.

5. Circuit Diagram