MQ-6 Gas Sensor: What It Is and How It Works

What is the MQ-6 Gas Sensor?

The **MQ-6** is a semiconductor gas sensor designed to detect **flammable gases** such as **LPG (Liquefied Petroleum Gas), propane, butane, and methane**. It is widely used in applications like **gas leak detectors, industrial safety systems, and home safety devices**.

How Does the MQ-6 Sensor Work?

The MQ-6 sensor works based on **metal oxide semiconductor (MOS) technology**, also known as **chemiresistor technology**. Here's how it operates:

1. **Heated Tin Dioxide (SnO_2) Layer**
    - The sensor has an **internal heating element** that keeps a layer of **tin dioxide (SnO_2)** at an optimal temperature.
    - When gases come into contact with this heated SnO_2 surface, their molecules **react** with the material.
2. **Resistance Changes with Gas Concentration**
    - In **clean air**, the SnO_2 surface has **high resistance**.
    - When **flammable gases** like **LPG or propane** are present, they **reduce the resistance** of the sensor.
    - The sensor converts this change in resistance into an **analog voltage output**.
3. **Analog & Digital Outputs**
    - The sensor provides an **analog output (A0)**, which gives a continuous voltage corresponding to the gas concentration.
    - It also has a **digital output (D0)**, which can be triggered at a certain gas concentration threshold.

Gas Sensitivity of MQ-6

Gas Type	Sensitivity Level
LPG	High
Propane	High
Butane	High
Methane (CH_4)	Moderate
Hydrogen (H_2)	Low
Alcohol (Ethanol)	Low
Carbon Monoxide (CO)	Very Low

Key Features of the MQ-6 Sensor

- **Operating Voltage: 5V DC**
- **Analog Output (A0):** Varies with gas concentration
- **Digital Output (D0):** Triggers when gas exceeds the set threshold
- **Preheat Time: At least 20 seconds** for stable readings
- **Sensing Range:** 200–10,000 ppm (parts per million)
- **Heater Power Consumption:** ~750mW

Applications of MQ-6

1. **LPG and Gas Leak Detection** – Used in homes and industries to detect **leaks of LPG, propane, or butane**.
2. **Fire Safety Systems** – Helps detect **flammable gas buildups** before they reach explosive levels.
3. **Industrial Gas Monitoring** – Ensures workplaces with **gas cylinders or pipelines** remain safe.
4. **Home Automation** – Can be integrated with smart home systems for **automatic gas shutoff**.

Conclusion

The **MQ-6 gas sensor** is a crucial safety device for detecting **LPG, propane, and butane**. It operates using a **tin dioxide sensing layer** and outputs a voltage based on gas concentration. It is widely used in **home safety, industrial monitoring, and fire prevention** systems. Proper **calibration** ensures accurate detection and reliable gas leak warnings.

LPG gas sensor interface with Arduino (MQ6)

How to Use MQ-6 SENSOR LPG GAS: Examples, Pinouts, and Specs

Development and Comparison of Arduino Based MQ-2 and MQ-6 LPG Leak Sensors

Arduino MQ6

LPG Leakage Detector With MQ - 6 Sensor

Early Detection of Leaks on Gas Cylinders Using Arduino Based MQ-6 Sensors