DESCRIPTION

The Saleng – ACS712 module is a hall-effect current sensor with a linear analog output voltage within common ADC voltage ranges. It is based on the popular ACS712 current sensor chip. It comes with the basic components needed for a single channel AC/DC current sensing, plus a larger sized terminal block rated to handle the maximum current of the module. The module includes a power indicator LED and 2.54mm standard pitched pin header for the host controller. The Saleng – ACS712 is part of Layad Circuits' Saleng series of innovation starter products.

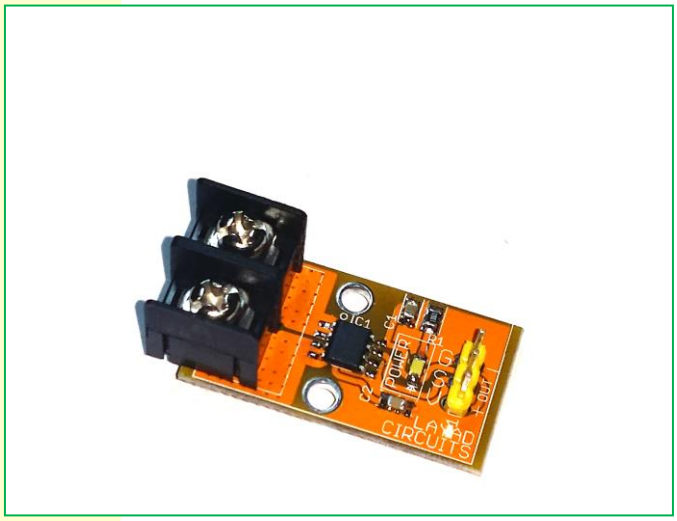


Figure 1: The Saleng ACS712 module

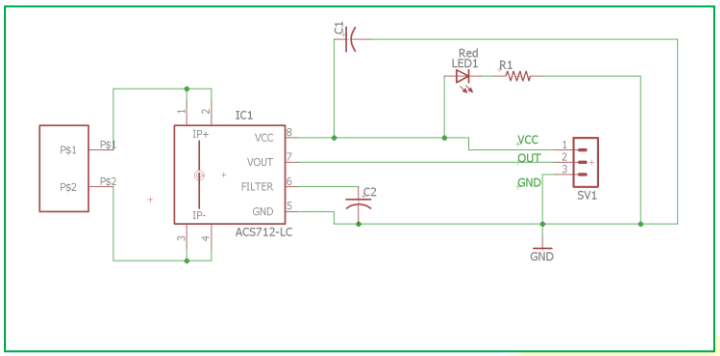
FEATURES

- Hall-Effect current sensor
- 5V operation
- Linear analog voltage output proportional to current under test5A,20, and 30A versions
- Sensitivity @ Temp=25C:
  - 5A version: 180~190mV/Ampere
  - 20A version: 96~104mV/Ampere
  - 30A version: 63~69mV/Ampere
- Easy to interface and implement in software
- 2.54mm pin headers
- 7.62mm Terminal block for sense side
- Power indicator LED
- Compact form factor. Board dimensions: 35x17mm.

PIN FUNCTIONS

Pin Label	Function/Operation/Remarks
VCC	5V power supply pin for the module.
OUT	Analog output pin. Voltage at this pin changes with current measured
GND	Ground pin.

SCHEMATIC



APPLICATION NOTES

Unlike voltage, current sensing is surprisingly not as simple. It involves special resistor shunts, current transformers, magneto-resistors and other methods. The popularity of the ACS712 chip comes from its ease of use: simply connect the device in series with the load and you get an output voltage linearly proportional to the current being measured. That makes it compatible with almost any microcontroller with an ADC, internal or external. The Saleng-ACS712 combines the basic circuit required by the sensor IC and combines that in a small 35x17mm PCB together with 2.54mm pin headers for the microcontroller side and a properly rated terminal block at the current sense side.

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Wiring

The module is very easy to use with an Arduino. It only requires a 5V source to work. The output voltage is accessible from the OUT pin and is to be connected to an ADC input of the Arduino. The terminal block is placed in series with the load.

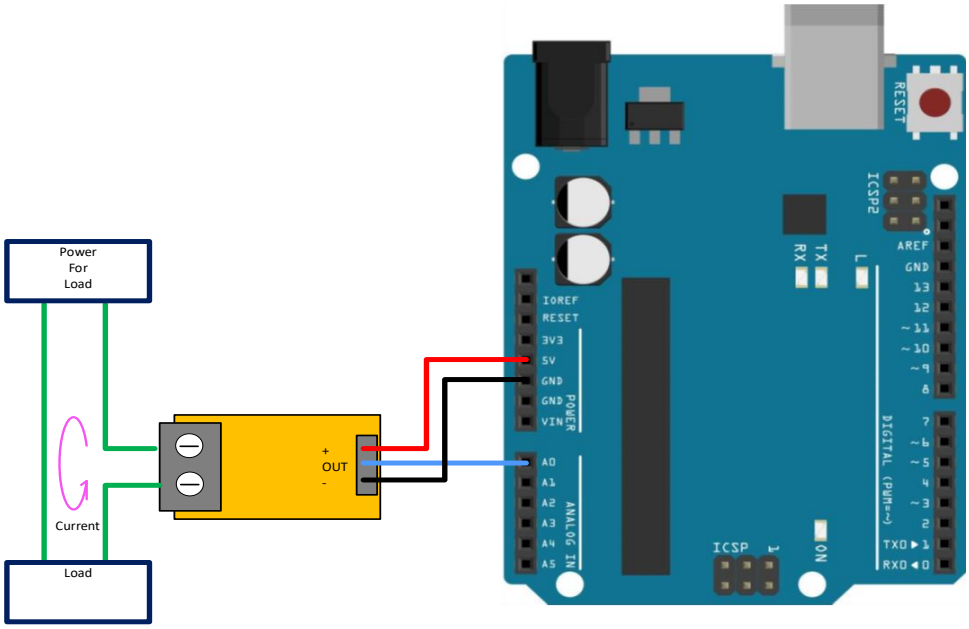

Figure 3: Connecting to an Arduino

The Saleng ACS712 module uses a larger than normal terminal block for the current sense side. There are several generic modules that have questionable terminal block current rating. See the side by side comparison of the Saleng ACS712 on the left and a generic ACS712 module on the right.

Figure 24: Saleng ACS712 vs a Generic ACS712 module

Referring to the datasheet, the output of the 5A version for -5A to 5A is around 1.5V to 3.5V or a sensitivity of typically 185mV/A. By simple linear interpolation, we arrive at the following Arduino Sketch example that demonstrates a simple ammeter application. It displays the raw ADC value and computed current value in mA in the Serial Monitor and in an I2C interfaced 16x2 LCD.

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x3F,16,2);
unsigned int rawValue; //reading from ADC
int currentMA; //computed, in mA
const byte SENSORPIN = A0;
char str[17]="";//temporary buffer

void setup()
{
  Serial.begin(9600);
  lcd.init();
  lcd.backlight();
  lcd.print(" SALENG ACS-712 ");
}


void loop()
{
  //read ADC and take average
  rawValue=0;
  for(byte i=0;i<5;i++)
  {
    rawValue += analogRead(SENSORPIN);
  }
  rawValue /= 5;

  // limit values
  if(rawValue<=322) rawValue = 322;
  if(rawValue>=700) rawValue = 700;

  // compute equivalent current
  currentMA = map(rawValue,322,700,-5000,5000);

  // display results in serial monitor
  Serial.print("Raw=");
  Serial.print(rawValue);
  Serial.print(" Calculated=");
  Serial.print(currentMA);
  Serial.println(" mA");

  // display in LCD
  sprintf(str,"Raw=%4d %4d mA",rawValue,currentMA);
  lcd.setCursor(0,1);
  lcd.print(str);

  delay(500);
}
```

There are few things to remember when using this module

- There are 3 versions of this module, 5A, 20A and 30A. Know the range you need.
- The wider the range is, the less sensitive the readings are
- The zero-point of this module is at around 2.5V but this may slightly vary with each chip. Do account for this in the software. You may also need to include additional calibration adjustment in the code to adjust the zero point for each module.

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