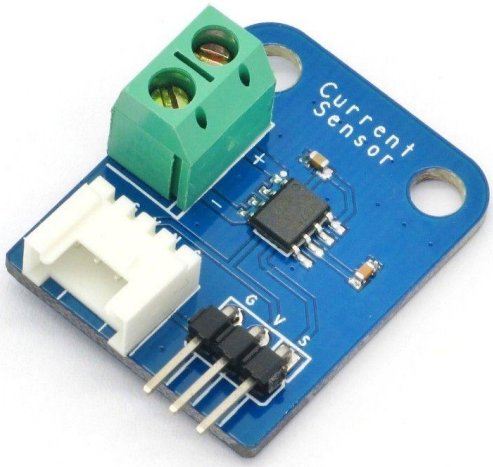
Electronic Brick of Current Sensor

Overview

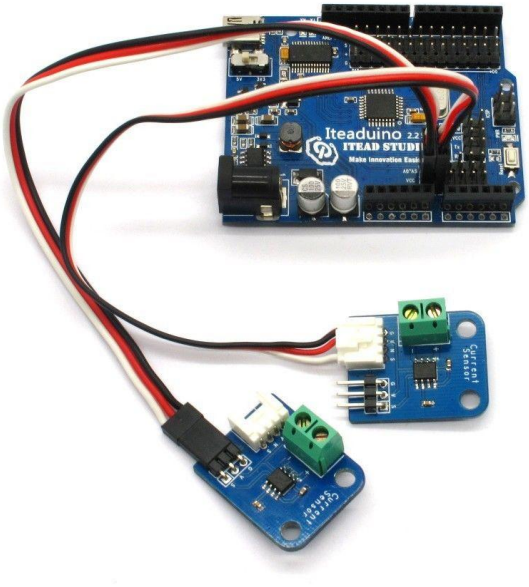


What is an electronic brick? An electronic brick is an electronic module which can be assembled like Lego bricks simply by plugging in and pulling out. Compared to traditional universal boards and circuit modules assembled with various electronic components, electronic brick has standardized interfaces, plug and play, simplifying construction of prototype circuit on one’ s own. There are many types of electronic bricks, and we provide more than twenty types with different functions including buttons, sensors, Bluetooth modules, etc, whose functions cover from sensor to motor drive, from Ethernet to wireless communication via Bluetooth, and so on. We will continue to add more types to meet the various needs of different projects.

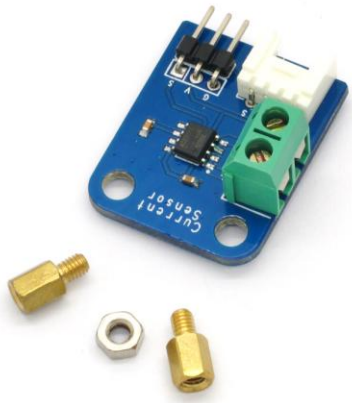
Electronic brick of current sensor is based on ACS712 sensor, which can accurately detect AC or DC signals. The maximum AC or DC that can be detected can reach 5A, and the present current signal can be read via analog I / O port.

Features

1. Plug and play, easy to use. Compatible with the mainstream 2.54 interfaces and 4-Pin Grove interfaces in the market.



2. With use of M4 standard fixed holes, compatible with M4-standard kits such as Lego and Makeblock.



3. Terminals with screws for easy wiring and removing

Specifications

PCB Size	30.0mm X 24.0mm X 1.6mm
Working voltage	5V
Input current type	AC or DC
Compatible interfaces	2.54 3-pin interface and 4-pin Grove interface(1)
Wiring interface	Power terminal(2)

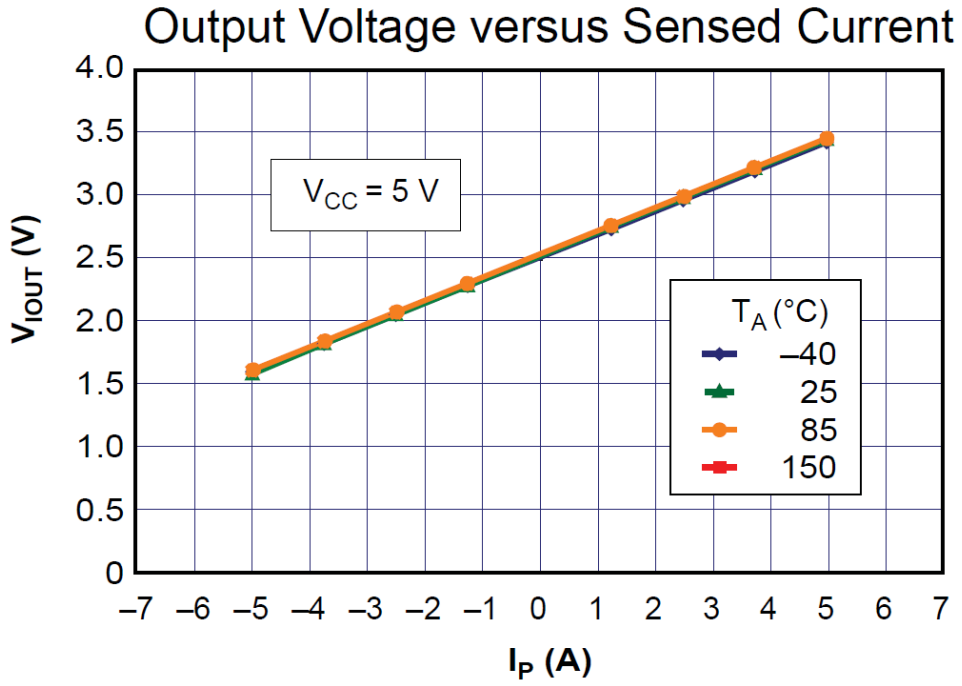
Note 1 : S for analog output port, V and G for voltage at the common collector and ground respectively

Note 2: "+" for current inflow port "-" for current outflow port

Electrical characteristics

Parameter	Min.	Typical	Max.	Unit
Supply voltage	4.5	5	5.5	VDC
Working current (VCC=5V)	-	10	13	mA
Output impedance R_{LOAD} (V_{IOUT} to GND)	4.7	-	-	KΩ
Bandwidth(1)	-	34	-	Hz
Input current range	-5	-	5	A
Sensitivity	180	185	190	mV/A

Note 1 : After removing C1, bandwidth can reach 80kHz



Relationship between output voltage and induced current

DEMO

Connect S port of electronic brick of current sensor to A0 port of Arduino board, and we will use the following program to read the analog value and send it to the computer for display via serial port.

```
#define CURRENT_SENSOR A0 // Analog input pin that sensor is attached to

float amplitude_current;                    //amplitude current
float effective_value;          //effective current

void setup()
{
    Serial.begin(9600);
    pins_init();
}
void loop()
{
    int sensor_max;
    sensor_max = getMaxValue();
    Serial.print("sensor_max = ");
    Serial.println(sensor_max);
    //the VCC on the Grove interface of the sensor is 5v
    amplitude_current=(float)(sensor_max-512)/1024*5/185*1000000;
    effective_value=amplitude_current/1.414;
    //minimum_current=1/1024*5/185*1000000/1.414=18.7(mA)
    //Only for sinusoidal alternating current
    Serial.println("The amplitude of the current is(in mA)");
    Serial.println(amplitude_current,1);//Only one number after the decimal point
    Serial.println("The effective value of the current is(in mA)");
    Serial.println(effective_value,1);
}
void pins_init()
{
    pinMode(CURRENT_SENSOR, INPUT);
}
/*Function: Sample for 1000ms and get the maximum value from the S pin*/
int getMaxValue()
{
    int sensorValue;                //value read from the sensor
    int sensorMax = 0;
    uint32_t start_time = millis();
    while((millis()-start_time) < 1000)//sample for 1000ms
    {
        sensorValue = analogRead(CURRENT_SENSOR);
        if (sensorValue > sensorMax)
```

```
        {
            /*record the maximum sensor value*/
            sensorMax = sensorValue;
        }
    }
    return sensorMax;
}
```

Revision record

Version	Description	Date	Written by
v1.0	Initial edition	17th, April, 2013	Stan Lee