ACS712 Low Current Sensor Breakout

SEN-08883 RoHS✔




9.95	
◉	quantity
	101 in stock
9.95	1+ units
8.96	10+ units
7.96	100+ units

Description: This current sensor gives precise current measurement for both AC and DC signals. These are good sensors for metering and measuring overall power consumption of systems. The ACS712 current sensor measures up to 5A of DC or AC current. We added an opamp gain stage for more sensitive current measurements. By adjusting the gain (from 4.27 to 47) you can measure very small currents.

The ACS712 Low Current Sensor Breakout outputs an analog voltage that varies linearly with sensed current. To calibrate, first set the output offset to the desired level (with zero current on the sense lines, read output with a DVM). Then with a known current input (a 100mA limited supply works well for this), set the output deflection with the gain pot. Sensitivity is then calculated as (Vref - Vdeflect)/(current input).

The bandwidth on the ASC712 Low Current Sensor Breakout has been set to 34Hz to reduce noise when using at high gains. The full 80KHz bandwidth that the sensor is capable of can be recovered by removing C1. See schematic for more details.

Documents:

- Schematic
- Eagle Files
- ACS712 Datasheet

Comments

42 comments

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ebader18 | about 3 years ago ★ 3

What is the sensitivity of that current sensor with the op-amp?
miliamps? microamps?

> Macka | about 3 years ago ★ 2
>
> From the data sheet, 66 to 185 mV/A, now multiply it by your gain factor (4.27 to 47)
>
> > KloudVine | about 10 months ago ★ 1
> >
> > The 5A version has a sensitivity of 185 mV.

Fantom1107 | about 3 years ago * ★ 2

Yes

Member #500929 | about 4 months ago * ★ 1

Hello

i have the 5A version of ACS712, and i would like to measure 50mA from a LED stripe, using Energymicro STK 3700. after making all connection the GND Pin and the VCC pin of the ACS712 are signaling a contact that mean something is wrong with my circuit.

As I am a begginner,could someone please tell me how i could design my circuit to avoid this problem ?

I use a 12V power supply for the LED, and a 5V power supply for the ACS712 separately.

Thanks

> Pete-O | about 4 months ago ★ 1
>
> That’s a fairly big answer, especially for this comment section. Can I get you to contact tech support or post in the forums? You’ll have a lot better success that

way.

IQLogic | about 5 months ago * ★ 1

R3 & R4 values please :)

EDIT Both 10K

Member #461283 | about 9 months ago ★ 1

Do you have the version 20 A (ACS712ELCTR-20A-T)? Instead of the chip ACS712ELCTR-05B-T.

Member #204950 | about 10 months ago ★ 1

I have a line that sometimes carries 230V AC and other times ~400DC when it is rectified. I could not identify from the datasheet if AC and DC have different properties for this sensor, if voltage is much of an issue or if it is ONLY the current it senses…

I will probably swap out the op-amp for a peak detector amplifier, I just need a Current/No Current detector that does not need re-calibrating with every current change . Can anyone advise me!!

Member #276435 | about 10 months ago ★ 1

This may sound a little dense, but i'm not an EE…i'm in marketing! Can this breakout be used to accurately sense 4-20 mA signals from a loop powered pressure sensor (powered by 12vDC, 2A)?

KloudVine | about 10 months ago * ★ 1

Sensitivity on this is 185 mV/A with 21mV of noise. Page 5 of the datasheet. 20mA results in a rise of 3.7 mV. Since SF has enabled the noise filter, lets say this is reliably measurable (YMMV aka: no - probably not that reliably measureable).

That results in roughly 174mV at 20mA (at max gain of 47x). Arduinos can measure from 0 to 5V with 10 bits or 4.8mV. This ends up with roughly 30 measurements in 4 to 20mA. Not great precision.

Tl;dr: No. This is not the right way to measure the current output.

You can more easily measure your output with a precision resistor. Pass the current from the sensor through a resistor (say 100Ohm). That means at 4mA you have a voltage of 400mV across the resistor and at 20mA you get 2000mV across the resistor. You could measure this with the arduino directly, or if you wanted more precise measurements, measure it after amplification with an op amp or using an external adc.

> See: http://forums.adafruit.com/viewtopic.php?f=8&t=12473
>
> > Krb686 | about a month ago ★ 1
> >
> > Don't forget, you can supply a Vref to the arduino the change its analog read scale. Supply say a 500mV reference, and you've got ~350ish measurements in the 0 to 174mV range.

Member #406212 | about a year ago ★ 1

Lots of questions here, where arethe answers? I want to use this board to measure 120VAC that is less than 3 amps. Hard to tell from the schematic how this is can be done, do i need to rectify to DC prior?

Member #367986 | about a year ago ★ 1

I'm doing a project to measure a very small current. I need to measure currents of 0.1mA to 0.8mA ….

I've spent researching. I Don't understand what value require to set "Vref" and "GAIN" of the tablet ACS712 …

I am using this code: https://forum.sparkfun.com/viewtopic.php?f=6&t=33605&p=150265&hilit=acs712#p150265

Someone could help me, please …

nemoskull | about a year ago ★ 1

i wonder if you can read a 0.5mah change with this. if you could, this could be used for a Wide Band O2 sensor.

Member #275028 | about 2 years ago ★ 1

I would like to assemble a similiar board replacing the trimmers with fixed resistors. Which is the range of the two trimmers R3 and R4?

> IQLogic | about 5 months ago ★ 1
>
> Both 10K ;)

MTS | about 2 years ago ★ 1

I purchased 30 of this for a project. My thought so far are as follows.

With a line unloaded there is a lot of noise in the system. You will have to sample the sensor at high rate and then average out so many samples to get something reasonable. I have an idle system at 20mA and it's very difficult to detect, however

when running it at 300mA then once can see the change in output voltage from the current sensor.

Arduino Uno Analog In from Vout on Current Break out board.

To calibrate, I used a multimetere and connected it in series with this sensors with the load turned off. Using the map() function in Arduino IDE, I remapped the analog 10-bit back into voltages, then maxed out the Vref. Read it's value in arduino (mine was 4.93V) the lowered Vref and keep gain as high as possible. Once your arduino reads Vout as something lower than 4.93V, you can lower Vred (Slowly) till you have a voltage you want to work with (I used ~2V) then apply a current. (20mA) and check out how much Vout changed in arduino. (Mine changed from 2.0 to 1.98V) I did noticed that with this method you will get an inverting effect. Meaning more current actually lowers the voltage. This can easily be fixed with map() again.

So far I wasn't able to really measure 20mA decent since all the noise causes lots of errors in reading. Sampling at 1kH and then averging every ¼ of a second should give decent results.

> Frustrated | about 2 years ago ★ 1
>
> Check the datasheet because that's normal. See the FAQ but due to the internal noise the smallest amount the ACS712 can measure is between 100ma and 500ma depending on your bandwidth. You might want to think about a current sense amplifier instead.
>
> MTS | about 2 years ago ★ 1
>
> Forgot to mention. my system that this is connected to uses 28V.

CatsWhisker | about 2 years ago ★ 1

It appears that this breakout board could easily have been designed to plug straight into a breadboard by simply shifting one set of header pin holes by 0.05".

Could this please be a suggestion for a new version?

> DanZ | about 2 years ago ★ 1
>
> I logged in to comment on just that.
>
> When you plug it in to a breadboard with just the little ip-/ip+ the board is crooked.
>
> If the eagle files were posted I'd just submit the changes.

Member #275028 | about 2 years ago ★ 1

I still did not get how to tune this sensor.

I've tried to set the vref in such a way to read 2.5V on vout when no current is flowing

trough the sensor. The I apply a small current (e.g. 50 mA) and I set the gain in such a way to get a reading of about 4.5V.

However I would like to have a vref very small and to use ideally the full range 0-5V to measure the current. I then tried to set the vref to 1V and the gain to the maximum, but all I can get is a reading of 1.37V in the vout when the same 50mA is flowing trough the sensor.

Any idea?

> Member #335744 | about 2 years ago ★ 1
>
> why? What do you need to do? My view point you need a range value like 1,27 untill 3,0 volts. why do you need a exactly five volts?

djdan | about 2 years ago ★ 1

Hey All, got a question about using this board. I want to use this to measure the current in a 120V AC line. The current should always be under 5 Amps. My question is about the output, since the bandwidth of the board is limited by the filter capacitor to 34Hz, does that mean that for a constant AC current say 2*cos(120*t), that the output would be a DC signal proportional to the average current in the AC line? Or would I be getting an AC signal proportional to the instantaneous current in the AC line?

> Progwhiz | about 2 years ago ★ 1
>
> Hi All,
>
> Is it possible to use this sensor to measure the input voltage being supplied to the controller to which this sensor is attached? Or is this only used to measure voltage/current on everythign but the power source to allow the sensor to operate?
>
> Thanks

oceanwanderlust | about 3 years ago ★ 1

Am I correct that this device should be able to easily detect an existing 24vAC doorbell without the need for a $30+ ELK 930 or diy multiple component bridge-optocoupler-etc design?

walnut49 | about 3 years ago ★ 1

This board can measure both forward and reverse currents, correct?

tunell | about 3 years ago ★ 1

I need a sensor for down to 10 microamps on a 0-5V system will this device work?

What is the highest sensitivity it can reach?

Member #76446 | about 3 years ago ★ 1

I sent Sparkfun Tech support an email about this product a week ago and zero response!

Member #76446 | about 3 years ago ★ 1

Some better specs would be nice. It looks like this board comes with the 5 amp version of the ACS712?? is that correct??
and if i read the data sheet correctly. the 5amp version has a 185mv per amp output?? which is then feed to an op-amp stage with a min of gain of 4.27 so if i am figuring this out correctly.
.185x4.27 = 0.789mv per amp minimum output correct??
and if 5V is the maximum output, then with the gain set for 47 then max output would = about 0.58amp measured???

> Member #335744 | about 2 years ago ★ 2
>
> friend, my view point, we use this only with very low currents. I need to use this to measure currents near 0.10mA.
>
> example: I know that for one 1A = 1000mA. each 1000mA = 0.185mV Arduino with 10 bit value = analogic read means = 5v/1023 bit = 0.0048V
>
> acs 712 = .185/1000 = 0.000185 = I need 0.10mA = 0.00185V this is very low to me and the arduino, to arduino measure this value I will need at least 0.20mA.
>
> So I can use this Amp to increase the number near to 10 times.
>
> If we have currents near to limit 5A we must make sure the output value, or we will damage the Analogic reader (in my case arduino).
>
> see you

amir15 | about 3 years ago * ★ 1

Hi guys. i need to sense currents as low as 0.08 amper. can i do it using this product? any better suggestions?
tanx.

Faze | about 3 years ago ★ 1

Stupid Question, but would this work to take readings from a standard PH probe (my current project is a water PH tester)

Member #147958 | about 3 years ago ★ 1

What are the values of the GAIN and Vref pots R3 and R4?

> IQLogic | about 5 months ago ★ 1
>
> Both 10K ;)

mr.marmot | about 3 years ago ★ 1

Would it be possible to combine this board with something like this: 582-1004-ND to non-intrusively sense appliance current use? I'd like to be able to tell when my washing machine is running.

> Jeff23 | about 3 years ago ★ 1
>
> Yes it is, you need to measure the current running through the burden resistor for the secondary side of the current sense transformer. That being said, you could probably configure the burden resistor network to give you an analog to digital converter friendly voltage, allowing a direct measurement.

arkhos | about 4 years ago ★ 1

What kind of waveform, AC/DC value (Pk-Pk or RMS) this sensor outputs? Can an RMS value be set using the trimPots?

Blizok | about 4 years ago ★ 1

Input holes are 2mm (as i see of documentation), screws 2-56 are 2.2mm diameter, which screws should i use for input connection?

Smoerijf | about 5 years ago ★ 1

I got the simplified version, without opamp, and the holes on my board are 2mm. More then width enough for 5 amps.

Member #58365 | about 5 years ago ★ 1

Have you used this for monitoring current to a device using AC mains (120v ac)?
How big are the holes for the input lines – i.e., what gauge of wire will fit into the holes?
Thanks.

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24.95

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BOB-00099
14.95

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DEV-09716
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SEN-09028
19.95

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