

## Hall Effect Isolated Current Sensor

P/N IS-3-80A 80amps

P/N IS-3-160A 160amps

### Features:

- Linear Sensing Bipolar DC and AC current
- Isolated (sensing wire passes thru 1/4" opening)
- Bandwidth 30khz response time 10usec
- Open circuit(see attached full schematic)
- Dual comparator on board to trigger over positive or negative current
- small size .90" x .82" opening .25" (6.3mm)
- Low cost
- +5volt operation (4.5v to 5.5v operating range)
- Low power consumption ~6mA
- Shut down mode
- On board reconfigurable OPAMP gain&offset
- Output RC filter

### Applications:

- Measuring high currents without loss
- Over Current protection
- Motor current control

## Specifications for (P/N IS-3-80A)

Operating Voltage	4.5V to 5.5v
Power Supply Current	6 mA typical
Over Current Response Time	~10us
Bandwidth	30khz
DC Offset (with no applied field current)	75mv(MAX) 25mV(typical)
Sensitivity	23 mV/Amp typical
Output Center Voltage	1/2 Supply - ~25mV
Inductance	~30nh

## Input/Output Pins:

Pin	Name	Function
1(top)	Vc	DC power supply input voltage (5v)
2	Gnd	Unit ground input
3	En	Shutdown/Enable digital input pin Shutdown when low Normal operation when high onboard 100k pull-up to 5v
4	Vs	5v shutdown output When En(Pin 3) is low =5v When En is high or open =0v
5	Out	Analog output (~2.5v nominal)Out
6	CH	High side comparator output Goes low when current above limit High when below current Open drain(collector output) can be tied to CL
7	CL	Low side comparator output Goes low when current below negative limit High when below negative current Open drain(collector output) can be tied to CH

## Description

The devicecraft hall effect sensor is a low cost current sensor useful for many applications. The device consists of a special core, hall effect sensor, shutdown switch, OPAMP, dual comparator, and miscellaneous capacitors and resistors. The circuit schematic is attached to the data sheet allowing for user customization and simulation.

The standard device is set to have a center voltage of 1 half the supply voltage minus ~25mv for resistor and switch losses. Depending on the direction of current the output voltage will rise or fall with increasing current. To reverse the polarity simply pass the wire through the in opposite direction. The device can be configured to be unipolar by adjusting the offset and increasing the OPAMP gain to x2. The device can also be set as a overcurrent trigger by adjusting the offset voltage and setting the OPAMP gain to a large value or feedback resistor left open.

The device can also be configured for increased sensitivity. The sensitivity can be increased by increasing the gain of the OPAMP. Keep in mind, increasing the gain of the OPAMP will also multiply and any offset voltages. The device can also be made more sensitive by passing the sense wire though the loop multiple times. The output voltage will be linear multiple with the number of turns.

## Shutdown

The devicecraft hall effect sensor has a shutdown or disable feature. The shutdown is controlled with the Enable line (pin 3). To enable the unit the Enable line must be pulled low, to ground. To disable the unit the Enable line is left open or pulled to the power supply rail. There is a on board 100k ohm pull-up resistor to the supply rail allowing the unit to be disabled by opening the enable line. Tying the line to ground will permanently enable the unit. There is a ground via close to the EN pin for permanent ON operation. During shutdown the unit will draw 0 mA from the power supply line, allowing use in low power systems. The shut down line can also be used to sample the current and shutdown when not in use.

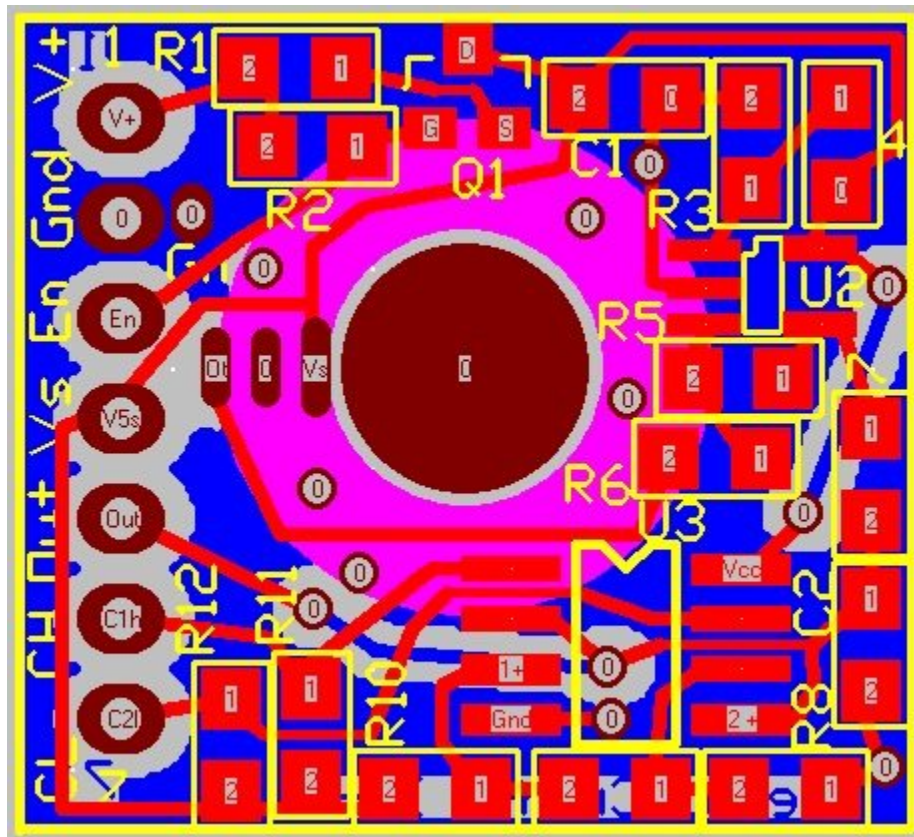
## Output Filter

The devicecraft hall effect sensor has a output filter. The output filter can be seen on the schematic. The output filter consist of the R7 C2 combination. The output filter helps isolated the output of the OPAMP from transients, filters the output, and provides short circuit protection.

The filter can be modified. The noise from the Hall Effect sensor can be reduced further by decreasing the bandwidth. The user may also desire to decrease the bandwidth to delay the response time for any over current condition. The filter bandwidth is reduce by increasing either C2 or R7.

## Comparator Outputs

The IS-3 hall effect current sense module features a on board dual comparator. The dual comparator can be used to trigger a over current condition. The output of the filtered analog signal is applied to a 20k/100k/20k window comparator. The 20k/100k/20k combination set the high trigger point to 4.28v equivalent to 78 Amps. The low side will trigger at .714v equivalent to triggering at -78 Amps. The output of the comparators can be tied together to allow for 1pin to sense either over current situation. The 20k/100k/20k can be modified to trigger at any trip point.



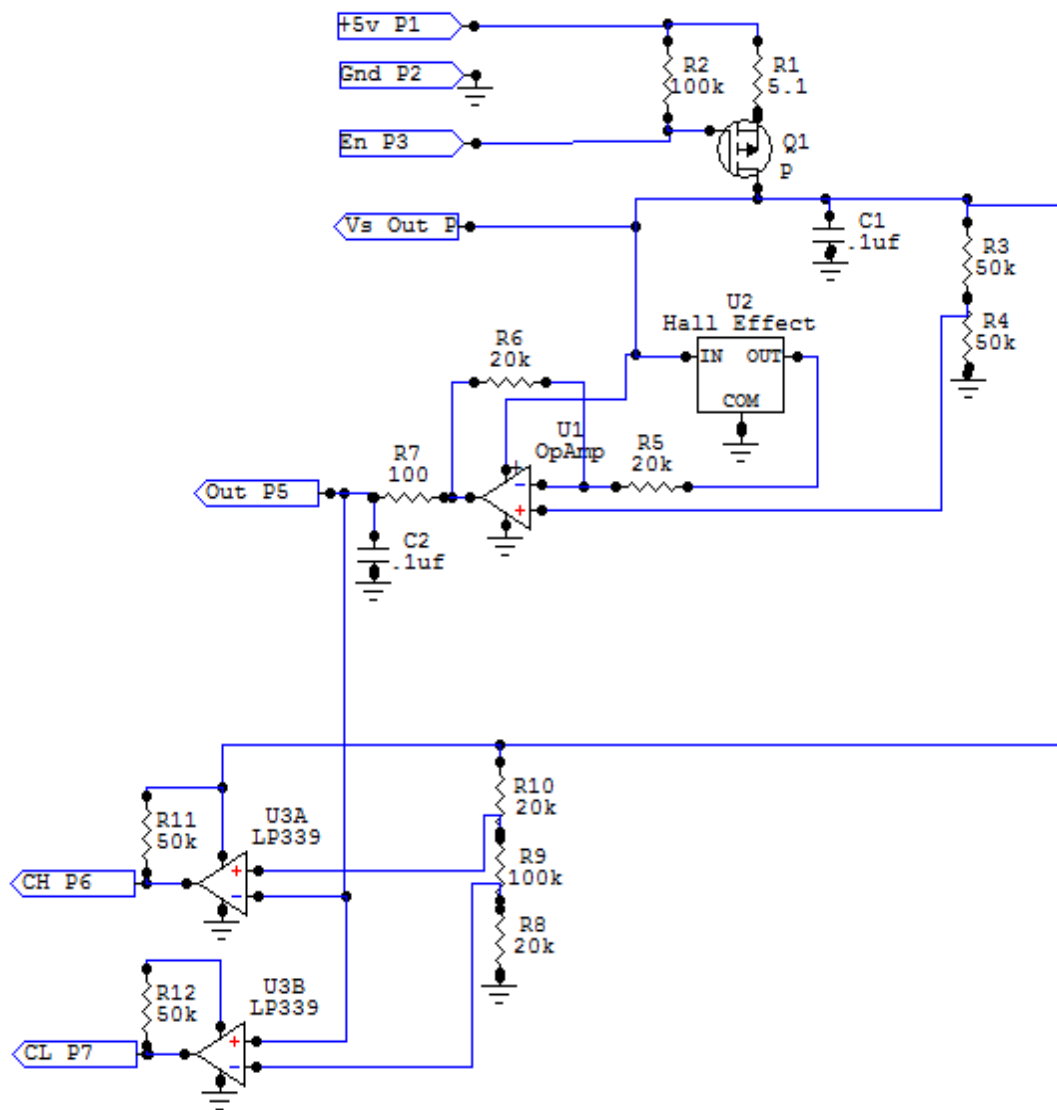


Illustration 1: Current Schematic (subject to change)