

## APS13568 Proto Board

By Marvin Ng  
 Allegro MicroSystems

### Overview

The APS13568 integrates an ultrasensitive Hall-effect switch with a linear programmable current regulator that provides up to 150 mA for driving a string of high brightness LEDs. This document accompanies Allegro’s APS13568 proto board. This board is intended to provide the user with a small format platform for integrating the APS13568 into their own prototype designs.

Refer to the latest APS13568 datasheet for the operational specifications of the IC.

### Description

The APS13568 Proto Board is a small two-layer PCB with components on both sides. All of the basic components are provided, including a magnet to actuate the device; if the APS13568 Proto Board is ordered with an LED installed (see below), the only requirement is to connect a 9-volt battery to the battery connector, which is already soldered to power (VIN) and ground (GND) via two of the through-hole connections on P1 (see Figure 1, Figure 2, and Figure 3).

The default configuration includes a 4.7 kΩ pull-up resistor for the Hall switch output,  $\overline{SO}$  (pulled up to VIN), and ties the LED enable pin,  $\overline{EN}$ , to  $\overline{SO}$  so that the Hall switch will control the LED. The default polarity configuration uses a 0 Ω resistor on the POL pin, tying POL to GND. This results in LED activation with the removal of magnetic field; for inverted operation (LED on with magnet present), remove the 0 Ω resistor on POL.

Through-hole connections are provided for all external connections which may be required for the target application. All of the through-hole connections with square pads, which are not labelled, are ground connections. The remaining through-hole connections, the ones with round pads, are labelled for convenience on the bottom side of the board (see Figure 3).

A mounting hole for a #2 screw is also provided (see the upper right corner of Figure 2 and the upper-left corner of Figure 3). This screw should be non-ferrous to prevent interference with the operation of the Hall element.

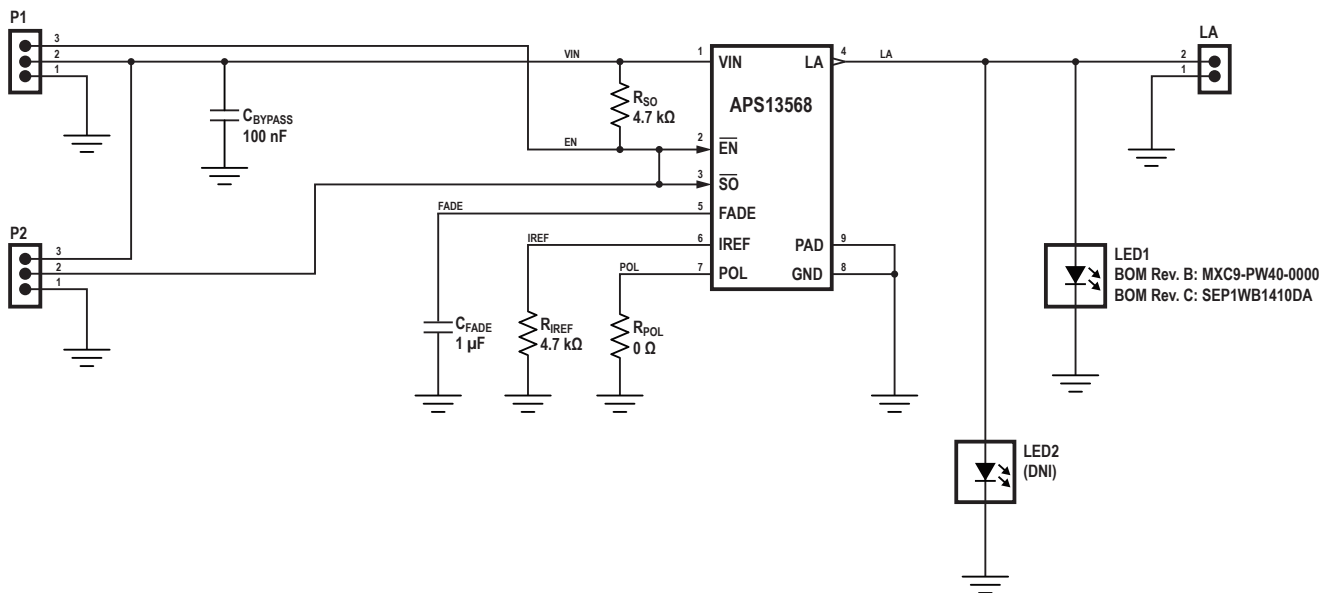


Figure 1: APS13568 Proto Board Schematic

## LED Placement

There are three placement options for the LED which are supported by the APS13568 Proto Board. Only one option should be selected at any given time, as the APS13568 is designed to drive a single string of LEDs.

The board can only be ordered with an LED pre-installed on the front side of the board (same side as shown in Figure 2); however, the board can support an LED installed on the back side of the board (opposite side as the APS13568 IC, as shown in Figure 3). If the LED will be located remotely, neither the front nor back LED should be installed.

## Basic Connections

Power and ground are applied to “P1”, shown in the upper-left corner of Figure 2. The VIN label can be seen on the bottom of the board, as shown in the upper-right corner of Figure 3. If desired, the included battery terminal can be replaced by connecting:

- Ground to the square pad (which has no additional labelling).
- VIN to the middle pad, which is round and is labelled on the bottom.

The default configuration has a  $0\ \Omega$  resistor on POL (polarity pin), grounding the pin. In this configuration, the  $\overline{SO}$  output will be high in the presence of sufficient magnetic field ( $B > B_{OPx}$ ), and since  $\overline{SO}$  is tied to  $\overline{EN}$ , the LED will turn off with a magnet. If the opposite behavior is desired, the removal of the  $0\ \Omega$  resistor will float the POL pin, causing  $\overline{SO}$  to be low in the presence of sufficient magnetic field ( $B > B_{OP}$ ), and will turn the LED on with the magnet. See Figure 4 for location of the POL resistor.

If it is desired to isolate the Hall switch output ( $\overline{SO}$ ) from the LED enable pin ( $\overline{EN}$ ), the trace on the top side/front of the board will need to be cut (see Figure 4). After severing this trace,  $\overline{SO}$  will be isolated from both its onboard pull-up resistor (will need

to be pulled up through an external resistor and to an external supply), as well as isolated from  $\overline{EN}$  (will not control LED activation). A connection to  $\overline{EN}$  can be made to Pin 3 of the P1 header.

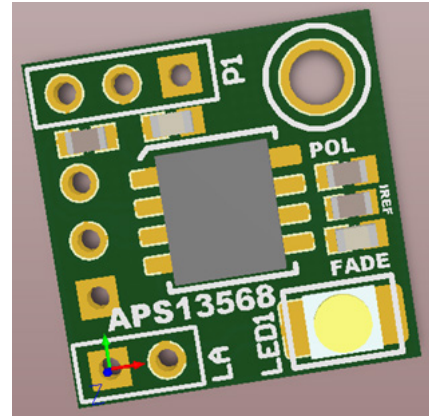


Figure 2: APS13568 Proto Board – Top

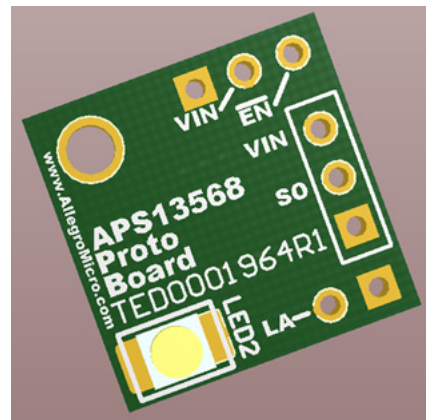


Figure 3: APS13568 Proto Board – Bottom

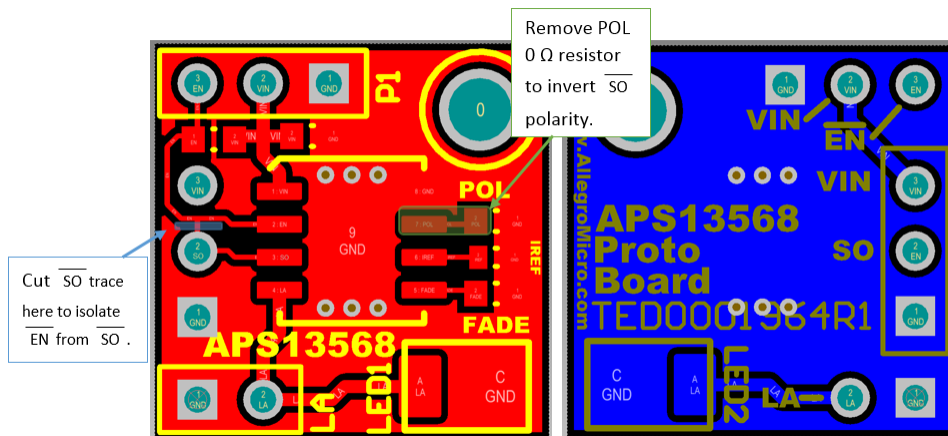


Figure 4: Proto board front (left, red) and rear (right, blue) layout

## Connecting Remote LEDs

The APS13568 Proto Board provides through-holes for connecting a string of LEDs which can be mounted remotely from the APS13568 Proto Board. To make use of this feature, remove the LED soldered to the LED1 position and ensure that there is no LED in the LED2 position.

The through-holes for connecting the remote LED string are available on the “LA” header—see the lower-left corner of Figure 2.

- The cathode of the remote LED string should be connected to the hole with the square pad (which has no additional labelling).
- The anode of the remote LED string should be connected to Pin 2 of the LA header, labelled “LA” on the back of the board, as shown in Figure 3).

## Connecting an External Hall Switch

It is possible to override the APS13568 internal Hall element and turn on the LED output current by driving the  $\overline{EN}$  input of the APS13568. This allows for a second sensing point, remote from the APS13568, to control the LED string connected to the

APS13568. Allegro provides a separate A1126 Proto Board as a mate to the APS13568 Proto Board for this application. Contact your Allegro sales representative for information on obtaining one of these boards.

Connect the external Hall Element to Pin 3 of the P1 header, as shown in the right hand side of Figure 3.

The connections to the A1126 Proto Board are as follows:

- The grounds of the two boards should be connected together using the square pads (which have no additional labelling).
- The OUT of the A1126 Proto Board should be connected to  $\overline{EN}$  of the APS13568 Proto Board. Both of these connections are labelled on the bottom side of their respective boards and are the middle connections with the round pads.
- The VIN through-hole adjacent to the  $\overline{SO}$  through-hole of the APS13568 Proto Board can be connected to the VIN of the A1126 Proto Board using the remaining round pads. Both are labelled on the bottom side of their respective boards. This will allow the A1126 Proto Board to share the same supply voltage as the APS13568 Proto Board.

Refer to the A1126 Proto Board User Manual for more information.

**Table 1: APS13568 Proto Board Component List**

Component	Manufacturer	P/N	Description
Sensor/LED Driver	Allegro	APS13568KLJ-T	SOIC8
Capacitor, BYPASS	AVX	06035C104K4T2A	0603, mono, X7R, 50 V, 100 nF
Capacitor, FADE	Taiyo Yuden	EMK107B7105KA-T	0603, mono, X7R, 16 V, 10%, 1 $\mu$ F
LED	Lumileds (discontinued) [1]	MXC9-PW40-0000 (discontinued) [1]	LED, SMD, white
	Sanken [2]	SEP1WB1410DA [2]	
Resistor, POL	Panasonic	ERJ-3GEY0R00V	0603, 0 $\Omega$ jumper
Resistor, IREF, SO	Panasonic	ERJ-3GEYJ472V	0603, 5%, 4.7 k $\Omega$
Battery clip	Keystone	232	Battery clip, 9 V, with wires
Magnet	Officemate	OIC92515	Officemate Push Pin Magnet

[1] BOM Rev. B.

[2] BOM Rev. C.

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## Revision History

Number	Date	Description
–	February 3, 2017	Initial release
1	August 31, 2017	Updated Figure 1, Description, LED Placement, Basic Connections, and Table 1
2	April 4, 2018	Updated LED manufacturer and part number
3	May 14, 2019	Minor editorial updates

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