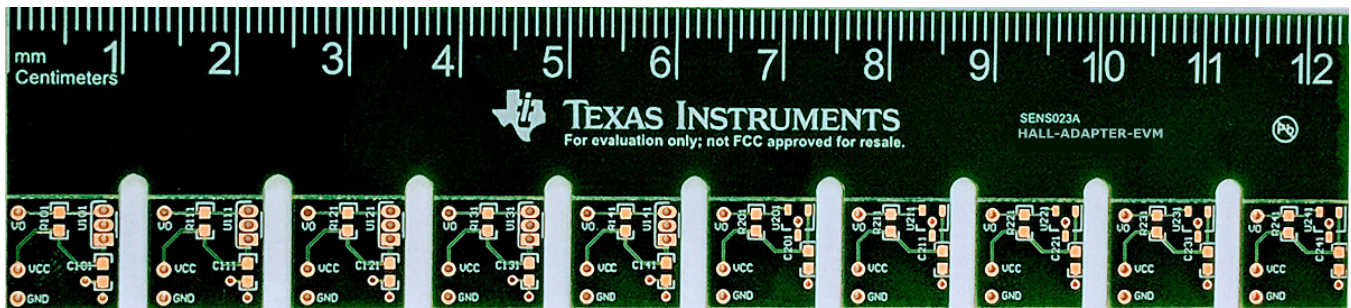


HALL-ADAPTER-EVM



This user's guide describes the characteristics, operation, and use of the HALL-ADAPTER-EVM. This EVM is designed to evaluate the performance of many of the DRV50xx Hall sensors in a variety of configurations. Throughout this document, the terms evaluation board, evaluation module, and EVM are synonymous with the HALL-ADAPTER-EVM. This document includes a schematic, reference printed-circuit board (PCB) layouts, and a complete bill of materials.

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1 Overview

Hall effect sensor products from TI, including switches, latches, and linear response products come primarily in two packages: a 3-pin SOT-23 and a TO-92. To simplify prototyping and experimenting with these various devices, mounting these devices on a PCB with a bypass capacitor is often necessary. Sometimes a pull-up resistor is required, as in the case of open drain outputs. This EVM provides 10 breakout (coupon, adapter) boards to facilitate testing, five with an appropriate SOT-23 footprint, and five with a TO-92 footprint. This EVM also comes with a magnet for quick experimenting and gross functional testing, as well as a PCB ruler to approximate activation distances. [Table 1](#) lists a summary of compatible Hall effect sensors.

Table 1. Compatible Hall Sensor Device Summary

Product	Compatible Packages	Function
DRV5011	SOT-23	Latch
DRV5013	SOT-23, TO-92	Latch
DRV5023	SOT-23, TO-92	Unipolar Switch
DRV5032	SOT-23	Omnipolar, Unipolar Switches
DRV5033	SOT-23, TO-92	Omnipolar Switch
DRV5053	SOT-23, TO-92	Bipolar Linear, Analog Output
DRV5055-Q1	SOT-23, TO-92	Bipolar Linear, Analog Output

1.1 Kit Contents

[Table 2](#) lists the contents of the HALL-ADAPTER-EVM kit. Contact the nearest [Texas Instruments Product Information Center](#) if any component is missing. TI highly recommends checking the DRV50xx family product folders on the TI website at www.ti.com for further information regarding this product.

Table 2. Kit Contents

Item	Quantity
HALL-ADAPTER-EVM PCB	1
Neodymium Iron Boron Cylindrical Axial Magnet	1
SAMTEC TS-104-G-AA Pin Header	1

1.2 Related Documentation From Texas Instruments

The following document provides information regarding TI's integrated circuits intended for use with the HALL-ADAPTER-EVM. This user's guide is available from the TI website under literature number SLYU043. Any letter appended to the literature number corresponds to the document revision that is current at the time of the writing of this document. Newer revisions are available from www.ti.com or the Texas Instruments' Literature Response Center at (800) 477-8924 or the Product Information Center at (972) 644-5580. When ordering, identify the document by both title and literature number. [Table 3](#) lists documentation related to this EVM.

Table 3. Related Documentation

Document	Literature Number
DRV5011 product data sheet	SLYSCY6
DRV5013 product data sheet	SLIS150
DRV5023 product data sheet	SLIS151
DRV5032 product data sheet	SLVSDC7
DRV5033 product data sheet	SLIS152
DRV5053 product data sheet	SLIS153
DRV5055-Q1 product data sheet	SBAS639

2 Hardware

The HALL-ADAPTER-EVM is intended to provide basic functional evaluation of this device family. The fixture layout is not intended to be a model for the target circuit, nor is it laid out for electromagnetic compatibility (EMC) testing. The HALL-ADAPTER-EVM consists of one PCB with an option to break apart eight individual PCBs.

2.1 Features

The layout of the HALL-ADAPTER-EVM printed-circuit board (PCB) is designed to provide the following features:

- Evaluation of most of the Hall sensor products from TI
- Ease of access to device pins with 100-mil-spaced test points
- Ruler for measuring activation distance and responsiveness to magnetic fields
- Ten breakout boards allow for multiple sensor evaluation (up to five SOT-23 and five TO-92 packaged sensors)

3 Quick Start Setup and Use

The following steps list the instructions to set up and use the HALL-ADAPTER-EVM:

- Step 1. Before separating the coupon boards from the main PCB, consider that soldering parts to the boards may be easier before snapping them apart. Follow safe soldering practices and observe ESD precautions when handling devices.
- Step 2. Solder the appropriate sample devices to the PCBs, and solder an appropriate bypass capacitor for the device as well.
- Step 3. Determine if the device requires a pull-up resistor, and solder an appropriate resistor, if needed.
- Step 4. If cleaning the board is required at this time, follow appropriate and safe PCB cleaning procedures.
- Step 5. Use mini-grabbers or other clip-leads to attach a power supply, ground, and some kind of voltage meter to the three test points. Another option is to solder prototyping headers (such as SAMTEC TS-132-G-AA, included) to the test points and plug the board into a protoboard with 100-mil-spaced holes.
- Step 6. After appropriately connected and powered, move and rotate the magnet near the device. Observe the change in output voltage as the magnet position changes proximity and orientation.

4 Circuitry

This section summarizes the HALL-ADAPTER-EVM components. For the following components, x = 0, 1, 2, 3, or 4, corresponding to the appropriate breakout board.

4.1 C1x1 and C2x1

These are pads provided to mount an 0603-size supply bypass capacitor.

4.2 R1x1 and R2x1

These are pads provided to mount an 0603-size pull-up resistor.

4.3 U1x1 and U2x1

U1x1 is the location in a TO-92 package where the Hall sensor device must be soldered. U2x1 is the location in a SOT-23 package where the Hall sensor device must be soldered. Five TO-92 breakout boards and five SOT-23 breakout boards are supplied with the HALL-ADAPTER-EVM. These boards enable users to test the devices, and determine the gain settings that are best suited for a given application.

5 Schematics, PCB Layouts, and Bill of Materials (BOM)

NOTE: Board layouts are not to scale. These figures are intended to show how the board is laid out. The figures are not intended to be used for manufacturing HALL-ADAPTER-EVM PCBs.

5.1 Schematics

Figure 1 and Figure 2 show the SOT-23 and TO-92 schematics, respectively, for the HALL-ADAPTER-EVM PCB.

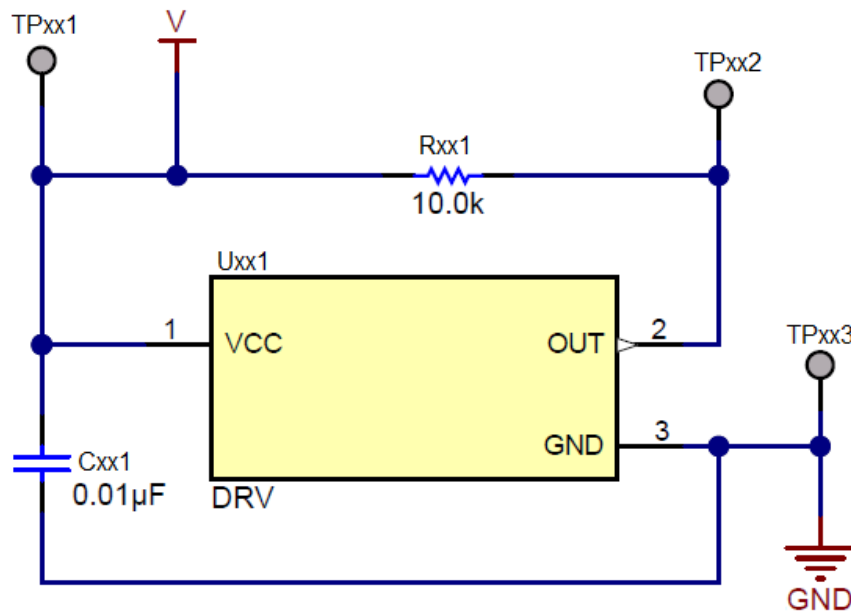


Figure 1. SOT-23 Schematic

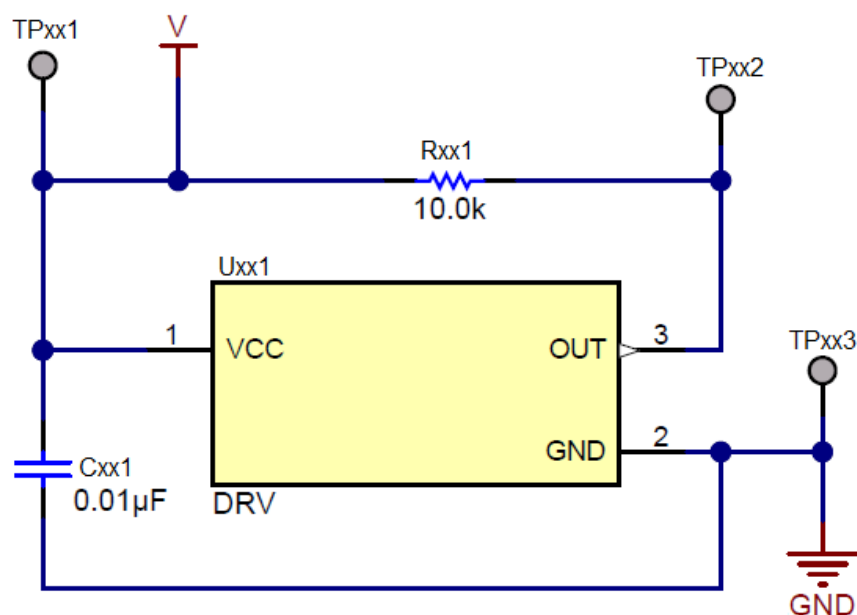


Figure 2. TO-92 Schematic

5.2 PCB Layout

Figure 3 through Figure 5 illustrate the PCB layout for the HALL-ADAPTER-EVM.

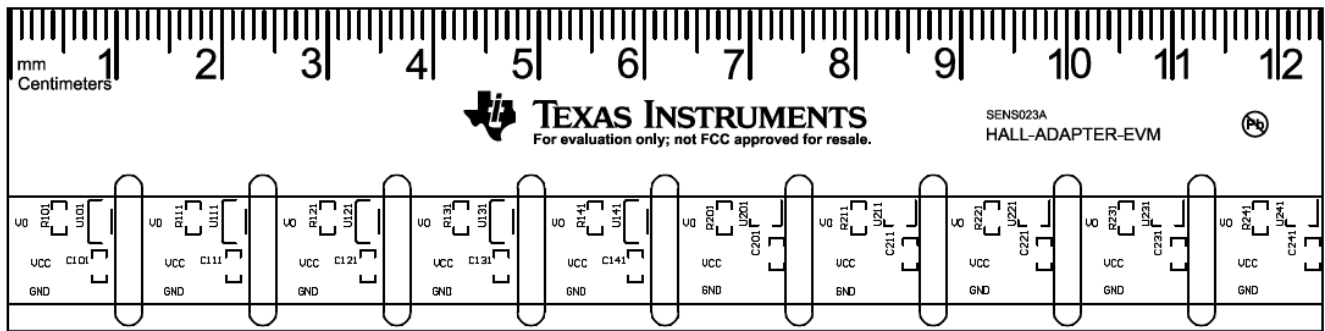


Figure 3. Top Overlay

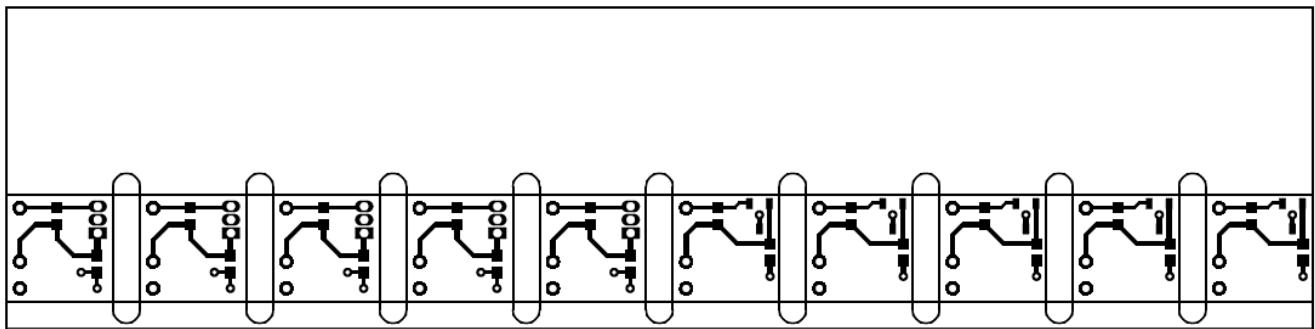


Figure 4. Top Layer

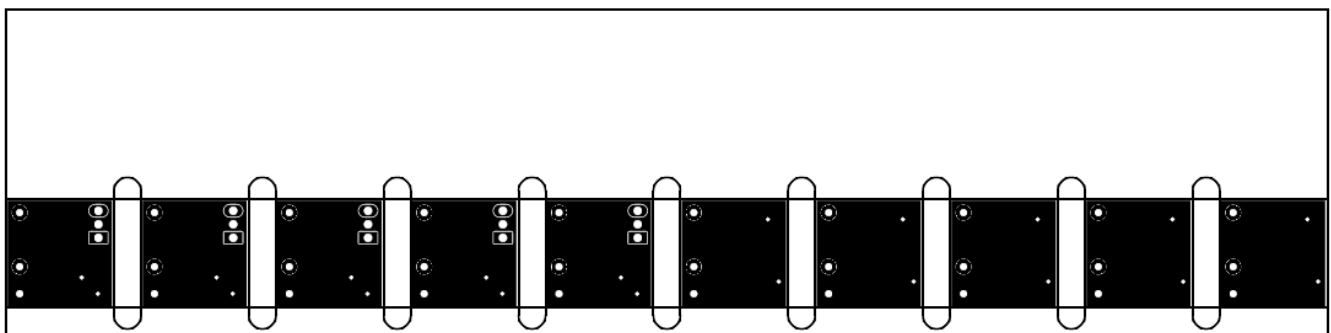


Figure 5. Bottom Layer

6 Bill of Materials

Table 4 provides the parts list for the HALL-ADAPTER-EVM.

Table 4. Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
C101, C111, C121, C131, C141, C201, C211, C221, C231, C241	0	0.01uF	CAP, CERM, 0.01 μ F, 16 V,+/- 10%, X7R, 0603	0603	GRM188R71C103KA01D	MuRata
R101, R111, R121, R131, R141, R201, R211, R221, R231, R241	0	10k	RES, 10.0 k, 1%, 0.1 W, 0603	0603	ERJ-3EKF1002V	Panasonic
Pin Headers labeled VO, VCC, GND	1		Header, 2.54mm, 4x1, Gold, Black, TH. Not to be soldered on PCB. It will be loose in ESD bag with PCB.	Header, 2.54mm, 4x1, TH	TS-104-G-AA	Samtec

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