

Si8920ISO-EVB USER'S GUIDE

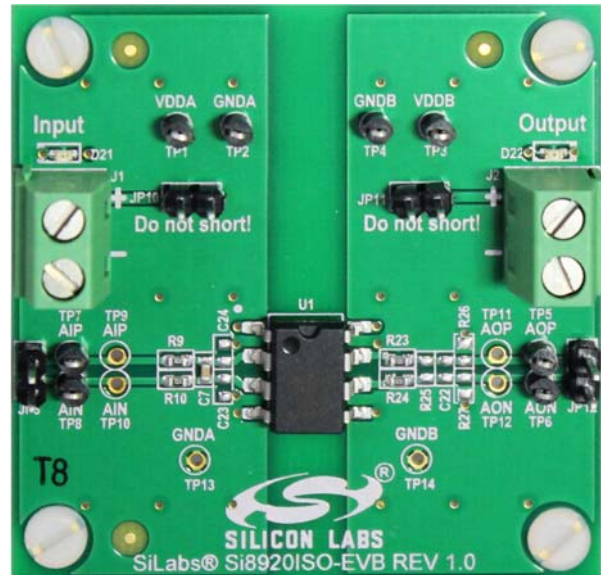
Description

This document describes the operation of the Si8920ISO-EVB.

Kit Contents

- The Si8920ISO Evaluation Kit contains the following items:
 - Si8920ISO-EVB.
 - Si8920BC-IP installed on the evaluation board.

Si8920ISO-EVB Overview



1. Hardware Overview and Setup

1.1. Connecting to the EVB

Power the EVB by applying isolated 3.0 to 5.5 V_{DC} supplies to terminal blocks J1 and J2. LEDs D21 and D22 will light up. Use separate test points TP1, TP2, TP3, and TP4 for observing VDDA, GNDA, VDDB, and GNDB, respectively.

Note: DO NOT place jumpers across JP10, JP11, or JP12. These are redundant test points for VDDA, VDDB, and AOP/AON, respectively.

There are three connection points for applying and observing differential signals to the inputs of Si8920:

1. Through a two conductor ribbon cable to 2x1 header JP8.
2. Clipping wires to test points TP7 and TP8.
3. Soldering wires directly to through holes located at TP9 and TP10.

The same connector options are available for observing and taking the output signals off circuit board:

1. Through a two conductor ribbon cable at 2x1 header JP12.
2. Clipping wires to test points TP5 and TP6.
3. Soldering wires directly through holes located at TP11 and TP12.

1.2. Driving Si8920 Inputs

Drive the inputs with a low impedance source. The Si8920 has a typical input impedance of 37.2 k Ω . A high source impedance will affect the gain error of the amplifier. The maximum specified differential voltage is 200 mV and the common mode must be within -250 mV to 1 V with respect to GNDA.

Note: When driving inputs from a single-ended source, short the unused input to GNDA. If driving AIP input, install 0 Ω resistor across C23 pads. If driving AIN input, install a 0 Ω resistor across C24 pads.

1.3. Input Configuration

To measure input offset, install a jumper (not provided) at JP8 to short AIP and AIN together, and measure the difference voltage between AOP and AON.

Si8920 has a channel bandwidth of approximately 750 kHz. R9-C7-R10 are populated providing low pass filtering with cutoff frequency of approximately 400 kHz. If a different cutoff frequency is desired, replace C7 per Table 1. If it is necessary to replace R9 and R10 for a specific cutoff frequency, ensure that $R9 = R10 < 33 \Omega$.

Table 1. Input Filter Cutoff Frequency for Common Capacitor Values with $R9 = R10 = 20 \Omega$

| C7 (nF) | Cutoff Frequency (kHz) |
|-------------------------|------------------------|
| 10* | 398 |
| 15 | 265 |
| 22 | 181 |
| 33 | 121 |
| 47 | 85 |
| *Note: Installed value. | |

Si8920 has excellent immunity to common mode transients. This EVB provides provisions for capacitors C23 and C24 (not populated) between each input pin and GNDA. Placing a small capacitor at C23 and C24 can assist with charge swapping between the inputs and GNDA during common mode transients. However, any mismatch between C23 and C24 will result as a gain error at the output.

1.4. Observing Si8920 Outputs

Use a differential probe when observing the output using an oscilloscope. Most differential oscilloscope probes will connect to the 2x1 headers JP12 without adapters. If only single-ended oscilloscope probes are available, use two and set oscilloscope to subtract the two channels as one channel will only show half of the output.

1.5. Output Configuration

By default, R23 and R24 are populated with 0 Ω resistors that pass the output signal to the output connectors. If low pass filtering at the output is required, replace R23 and R24 and populate C22.

R25 can be populated to measure the differential output drive strength. R26 and R27 can be populated to measure the common mode drive strength to GNDB.

Table 2. Test Point Descriptions

| Test Point | Description | Reference |
|------------|-------------|-----------|
| TP1 | VDDA | GNDA |
| TP2 | GNDA | N/A |
| TP3 | VDDDB | GNDB |
| TP4 | GNDB | N/A |
| TP5 | AOP | GNDB |
| TP6 | AON | GNDB |
| TP7 | AIP | GNDA |
| TP8 | AIN | GNDA |
| TP13 | GNDA | N/A |
| TP14 | GNDB | N/A |

Table 3. Jumper Descriptions

| Jumper | PIN 1 | PIN 2 | Default Position | Description |
|--------|-------|-------|------------------|---|
| JP8 | AIN | AIP | Not Installed | Analog Input Connector, Short to Measure Offset |
| JP10 | VDDA | GNDA | Not Installed | DO NOT SHORT – test points only |
| JP11 | VDDDB | GNDB | Not Installed | DO NOT SHORT – test points only |
| JP12 | AON | AOP | Not Installed | DO NOT SHORT – test points only |

2. Si8920ISO-EVB Schematics

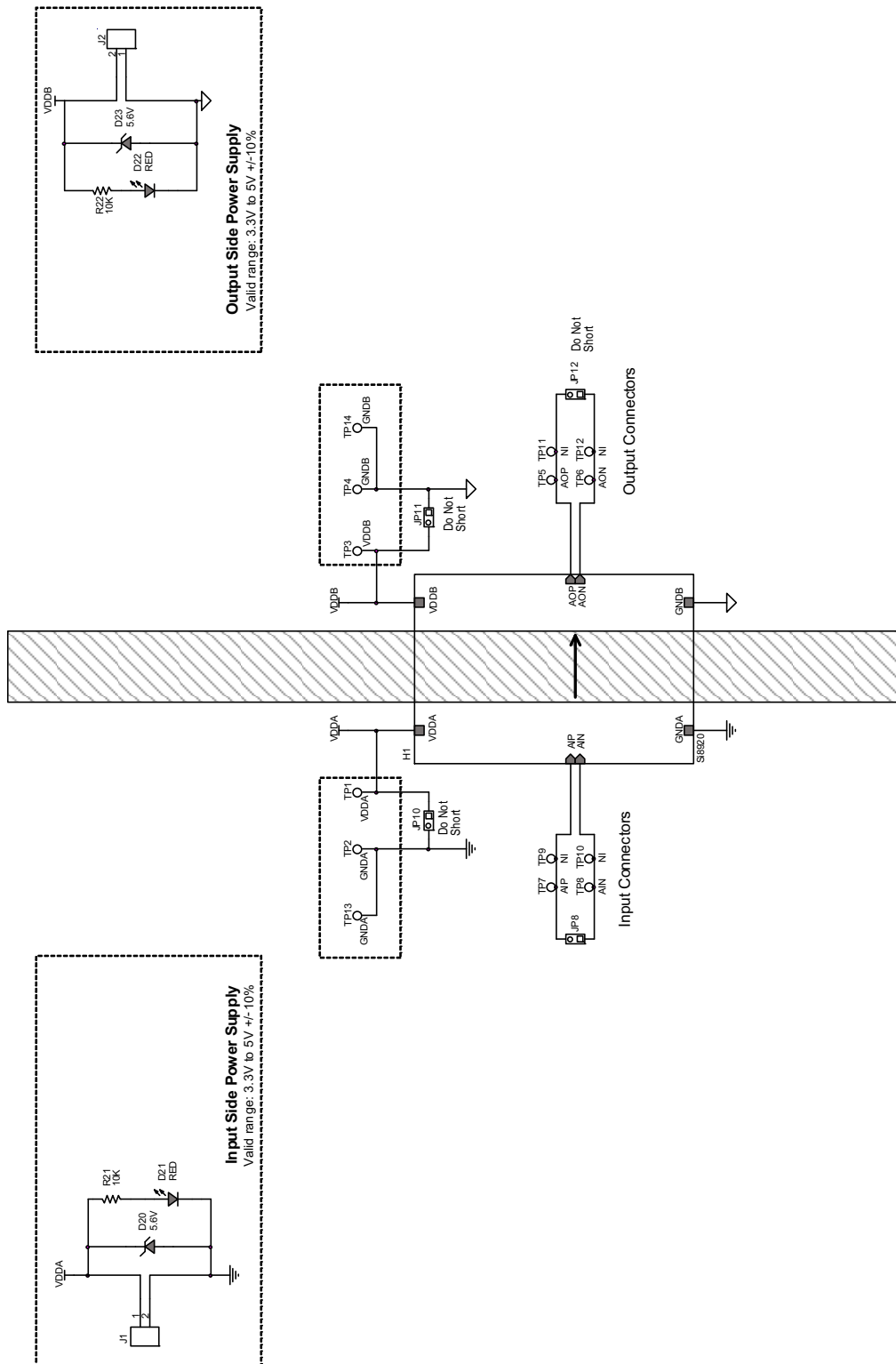


Figure 1. Si8920ISO-EVB Schematic (1 of 2)

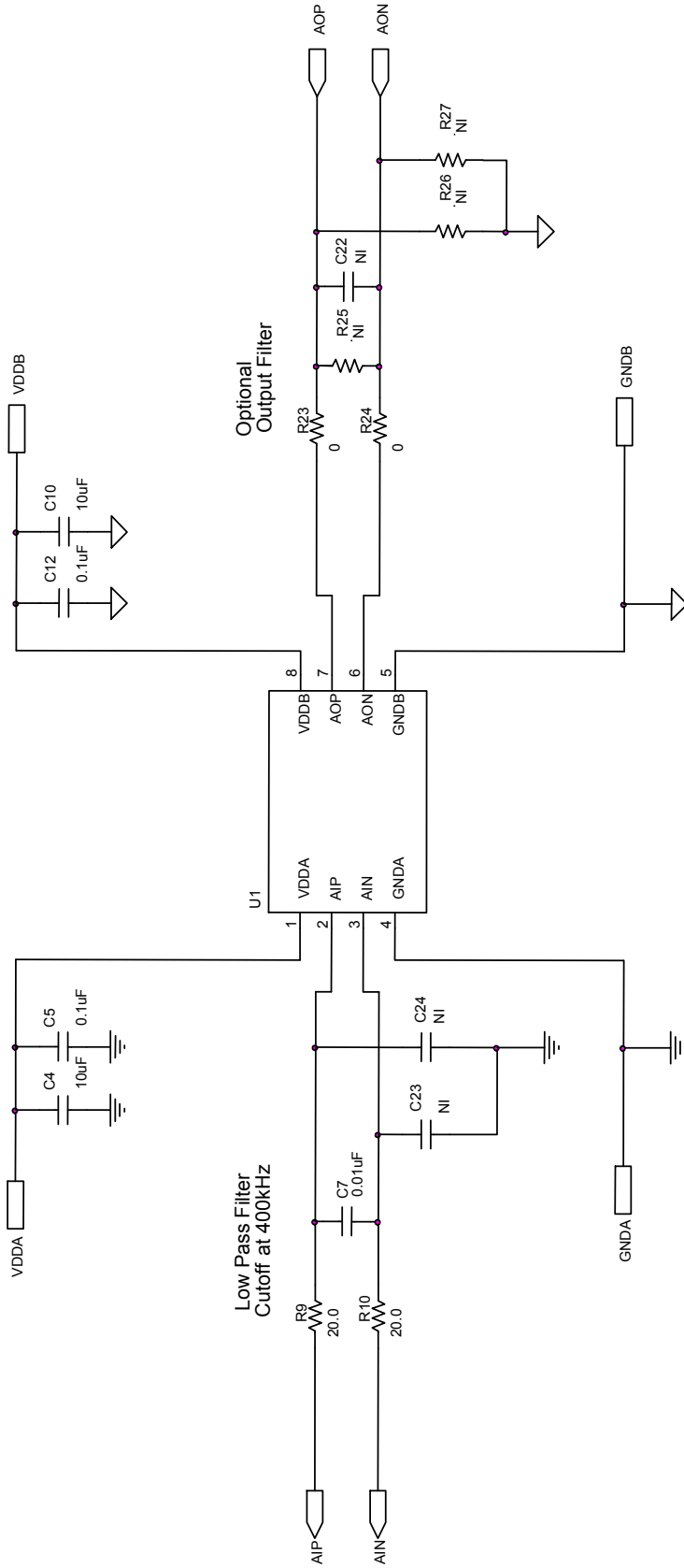
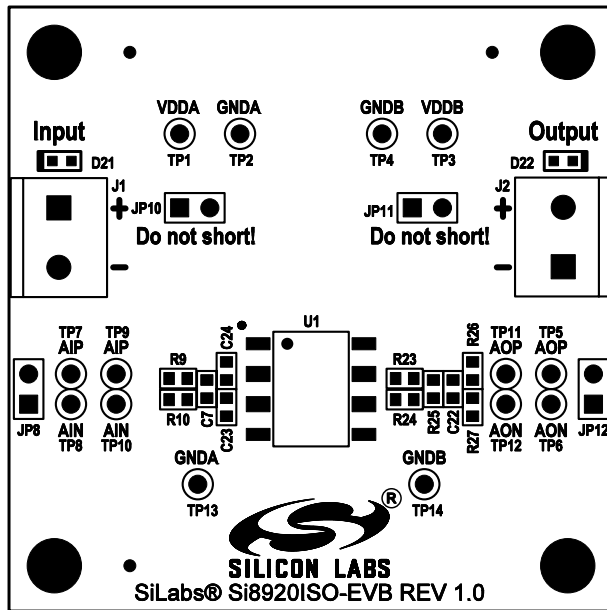
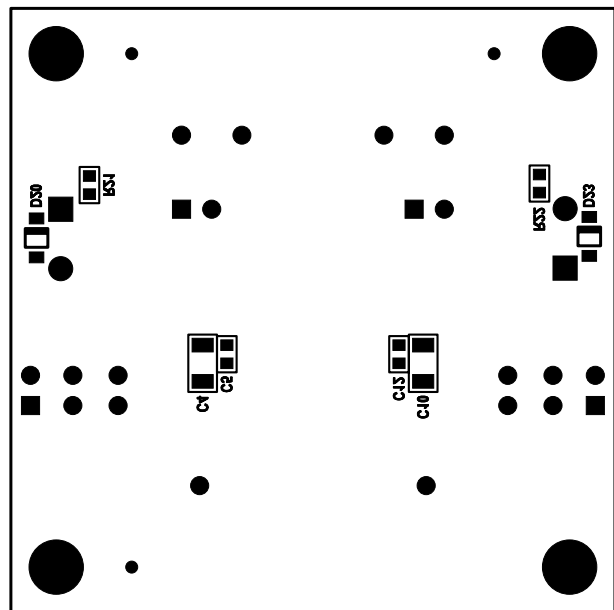


Figure 2. Si8920ISO-EVB Schematic (2 of 2)

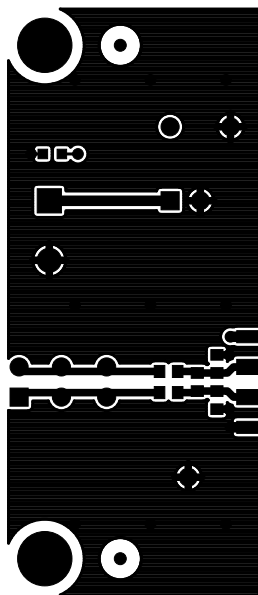
3. Si8920ISO-EVB Layout



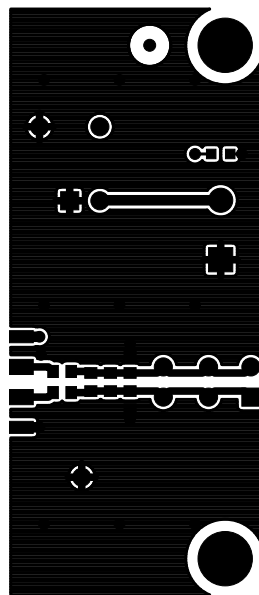
Top Silkscreen



Bottom Silkscreen



Top



Bottom

Figure 3. Si8920ISO-EVB Layout

Si8920ISO-EVB

4. Bill of Materials

Table 4. Si8920ISO-EVB Bill of Materials

| Part Reference | Description | Manufacturer | Manufacturer Part Number |
|--|--|-------------------|--------------------------|
| C4, C10 | CAP, 10 μ F, 10 V, \pm 20%, X7R, 1206 | Venkel | C1206X7R100-106M |
| C5, C12 | CAP, 0.1 μ F, 10 V, \pm 10%, X7R, 0603 | Venkel | C0603X7R100-104K |
| C7 | CAP, 0.01 μ F, 16 V, \pm 10%, X7R, 0603 | Venkel | C0603X7R160-103K |
| D20, D23 | DIO, ZENER, 28 V, 500 mW, SOD123 | On Semi | MMSZ5255BT1G |
| D21, D22 | LED, RED, 631 nM, 20 mA, 2 V, 54mcd, 0603 | Lite-On | LTST-C190KRKT |
| J1, J2 | CONN, TERM BLOCK 2POS, 5MM PCB | Phoenix Contact | 1729018 |
| JP8, JP10, JP11, JP12 | Header, 2x1, 0.1" pitch, Tin Plated | Samtec | TSW-102-07-T-S |
| MH1, MH2, MH3, MH4 | HDW, Screw, 4-40 x 1/4" Pan Head, Slotted, Nylon | Richco Plastic Co | NSS-4-4-01 |
| R9, R10 | RES, 20.0 Ω , 1/10 W, \pm 1%, ThickFilm, 0603 | Venkel | CR0603-10W-20R0F |
| R21, R22 | RES, 10 K, 1/10 W, \pm 5%, ThickFilm, 0603 | Venkel | CR0603-10W-103J |
| R23, R24 | RES, 0 Ω , 1A, ThickFilm, 0603 | Venkel | CR0603-16W-000 |
| SO1, SO2, SO3, SO4 | HDW, STANDOFF, 1/4" HEX, 4-40x3/4", NYLON | Keystone | 1902D |
| TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8 | TESTPOINT, BLACK, PTH | Kobiconn | 151-203-RC |
| U1 | IC, ISOLATED AMPLIFIER FOR CURRENT SHUNT MEASUREMENT, 8PIN SMD GULL WING | Silicon Labs | Si8920BC-IP |

5. Ordering Guide

Table 5. Si8920ISO-EVB Ordering Guide

| Ordering Part Number (OPN) | Description |
|----------------------------|---|
| Si8920ISO-KIT | Si8920 Analog isolator evaluation board kit |

CONTACT INFORMATION

Silicon Laboratories Inc.

400 West Cesar Chavez

Austin, TX 78701

Tel: 1+(512) 416-8500

Fax: 1+(512) 416-9669

Toll Free: 1+(877) 444-3032

Please visit the Silicon Labs Technical Support web page:

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