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Evaluation Board for 32-Channel, 14-Bit, Serial Input, High Voltage Output DACs

EVAL-AD5535EB

FEATURES

Full-featured evaluation board
On-board reference
Link options
Direct hook-up to printer port of PC
PC software for control of DACs

INTRODUCTION

This evaluation board is for the AD5535, 32-channel, 14-bit high voltage output DAC. The AD5535 contains 32 14-bit DACs in one package. They have a maximum output voltage span of 200 V derived from a reference voltage of 4.096 V.

The AD5535 has a serial SPI interface that is compatible with SPI®, QSPI™, MICROWIRE™, and DSP interface standards.

The DAC outputs are updated on reception of new data into the DAC registers.

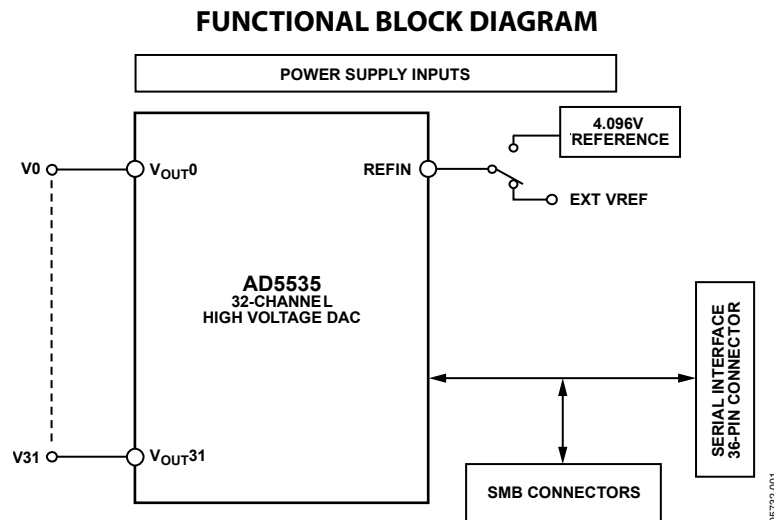See the AD5535 data sheet for product details.

AD5535 EVALUATION BOARD POWER SUPPLIES

The following external supplies must be provided:

- 5 V between the DV_{CC} and DGND inputs for the digital supply of the AD5535.

- 5 V between the AV_{CC} and AGND inputs for the analog supply of the AD5535.

- −5 V between the V− and AGND inputs for the analog supply of the AD5535.

- +5 V between the V+ and AGND inputs for the analog supply of the AD5535.

- 210 V between the V_{PP} and AGND inputs for the analog supply of the AD5535.

Both AGND and DGND inputs are provided on the board. The AGND and DGND planes are connected at one location close to the AD5535. It is recommended not to connect AGND and DGND elsewhere in the system to avoid ground loop problems.

Each supply is decoupled to the relevant ground plane with 10 µF and 0.1 µF capacitors. Each device supply pin is again decoupled with a 10 µF and 0.1 µF capacitor pair to the relevant ground plane.

FUNCTIONAL BLOCK DIAGRAM

Figure 1.

EVAL-AD5535EB

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REVISION HISTORY

10/05—Revision 0: Initial Version

LINK OPTIONS

The link options on the evaluation board should be set for the required operating setup before using the board. The functions of the link options are described in Table 1.

Table 1. Link Options

Link No.	Function
LK1	This link selects the voltage reference source for the AD5535:
	• Position A selects an external source via J3 as the voltage reference.
	• Position B selects the on-board 4.096 V reference as the voltage reference source, resulting in a full-scale output value of 200 V.
	• Position C selects a divided down value of the on-board reference as the voltage reference source (See LK2).
LK2	This link selects one of three divided down voltage reference values:
	• Position A selects a value of 3.072 V, resulting in a full-scale output value of 154 V.
	• Position B selects a value of 2.048 V, resulting in a full-scale output value of 102 V.
	• Position C selects a value of 1.024 V, resulting in a full-scale output value of 51 V.
LK3	This link selects the state of the TEST pin:
	• In the on position, TEST is connected to DGND, and therefore all DACs are updated on loading of any one DAC.
	• In the off position, TEST is connected to DV$_{CC}$, and therefore only the addressed DAC is updated.
LK4	This link connects the two 5 V (V+ and AV$_{CC}$) input connectors together:
	• In the on position, the two connectors are connected together and only one requires a power supply connection.
	• In the off position, the two connectors are not connected together and require individual power supply connections.

DEFAULT LINK OPTIONS SETUP

Table 2. Default Link Options

Link No.	Option
LK1	B
LK2	B
LK3	Off
LK4	On

EVALUATION BOARD SOFTWARE

SOFTWARE INSTALLATION

The AD5535EB evaluation kit includes self-installing software on CD-ROM. If the set-up file does not run automatically, you can run setup.exe from the CD-ROM.

The evaluation board software is compatible with Microsoft® Windows® 95 or better. Ensure that the Centronics cable connects the PC to the AD5535 evaluation board.

1. On the Analog Devices menu, click **AD5535 Evaluation Software**.

The **AD5535 Evaluation Software** dialog box is displayed. Figure 2 shows this box.
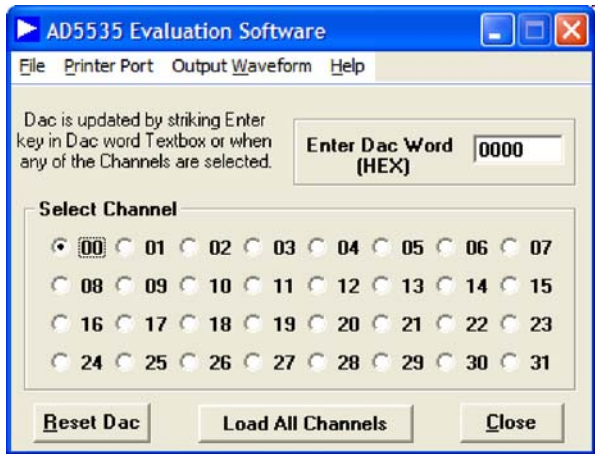

Figure 2.

SOFTWARE OPERATION

The software automatically selects the parallel printer port address in use by the host PC. Alternative port addresses can be selected from the **Printer Port** drop-down menu; the selected port address is indicated with a check mark.

To load a single code to a DAC channel

1. Select the desired channel.

2. Type the desired hexadecimal word.

3. Press ENTER.

4. Click on **Load All Channels** to load all of the 32 DAC channels with the entered hexadecimal value.

Also, selecting a channel automatically updates that channel with the value already entered.

To output a squarewave on a DAC channel

1. Select **Output Squarewave** from the **Output Waveform** drop-down menu.

2. A new dialog box opens, as shown in Figure 3.

3. Type the desired values, pressing ENTER after each entry.

4. Click **Output Waveform** to output the squarewave.
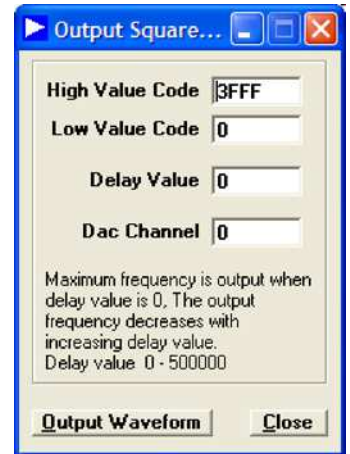
5. Press any key to stop the waveform output.

Figure 3.

COMPONENT LISTING

Table 3.

Qty	Reference Designator	Description	Supplier/Number
1	U1	AD5535	Analog Devices
1	U2	REF198AR	Analog Devices
1	U3	AD711KN	Analog Devices
4	R1 to R4	1 kΩ, 0.1 W 1% resistor (0805 package)	FEC 911-859
1	R5	4k7, 0.1 W 1% resistor (0805 package)	FEC 911-938
13	C8 to C12, C14 to C17, C19, C26, C31, C33	0.1 µF multilayer ceramic capacitor (0603 package)	FEC 499-687
11	C1 to C6, C20 to C23, C25	10 µF tantalum capacitor (TAJ-B package)	FEC 498-660
2	C7, C24	10 µF electrolytic 450 V	FEC 322-8010
5	C27 to C30, C38	470 pF, 100 V NPO capacitor (0805 package)	FEC 499-195
2	C13, C18	0.01 µF, 1000 V	FEC 219-496
1	C32	1µF 35 V tantalum capacitor (TAJ-B package)	FEC 498-920
1	D1	SD103C Schottky diode (DO-35 case)	Digikey SD103CCT-ND
1	D2	RS1G	FEC 547-062
1	J1	36-lead Centronics connector (IEEE 488 style)	FEC 147-753
1	J2	40 way 0.1" header (2 × 20)	FEC 148-535
9	J3 to J7, J11 to J13, J18	Gold 50 Ω SMB jack	FEC 310-682
2	J16, J17	Black banana socket	FEC 150-040
3	J9, J14, J15	Red banana socket	FEC 150-039
1	J8	Blue banana socket	FEC 150-042
1	J10	Green banana socket	FEC 150-041
2	LK1, LK2	3 way 0.1" header (3 × 1)	FEC 511-717
2	LK3, LK4	2 way 0.1" header (2 × 1)	FEC 511-705
40	TP1 to TP7, TP40, V0 to V31	Test point	FEC 240-345

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

WARNING!
ESD SENSITIVE DEVICE
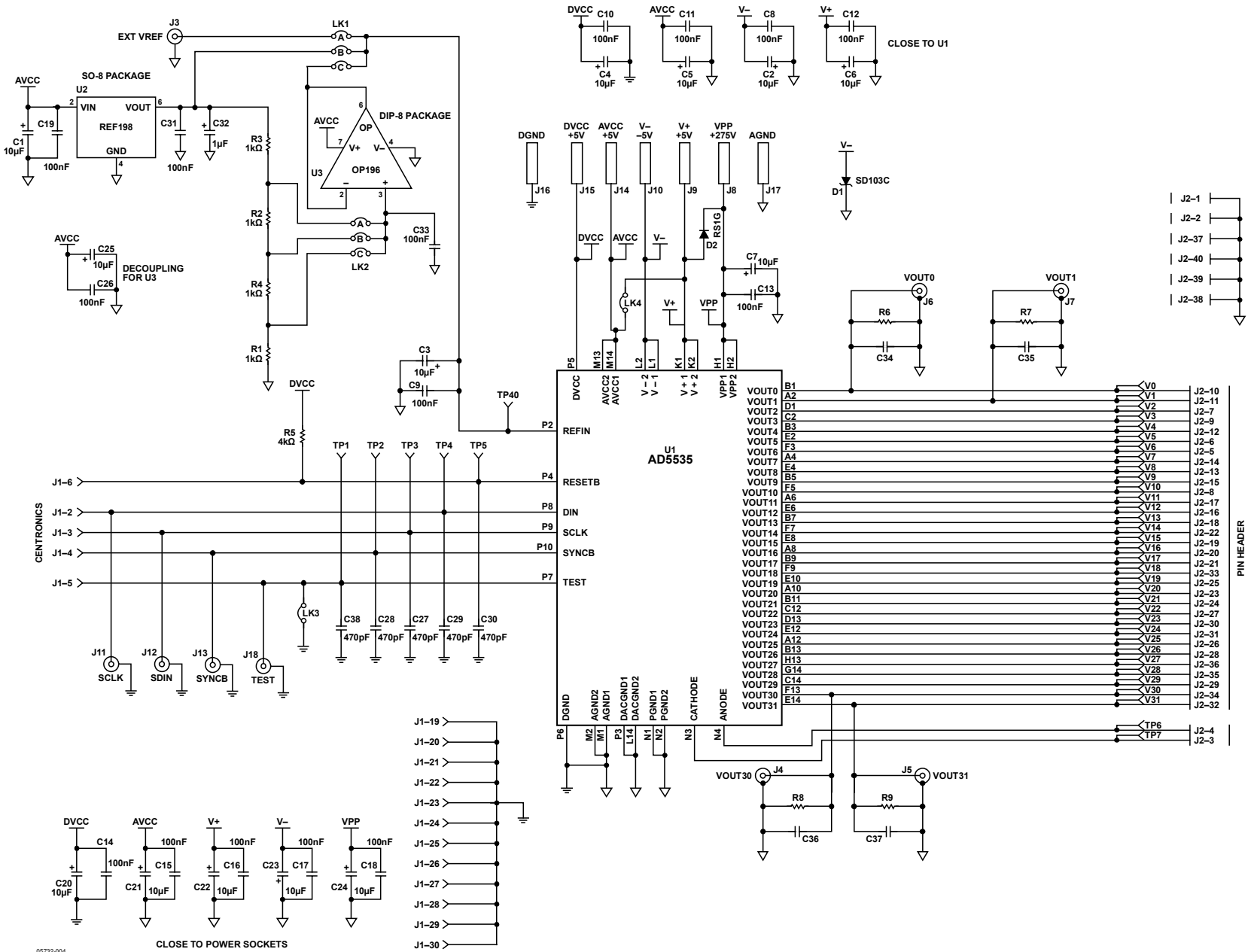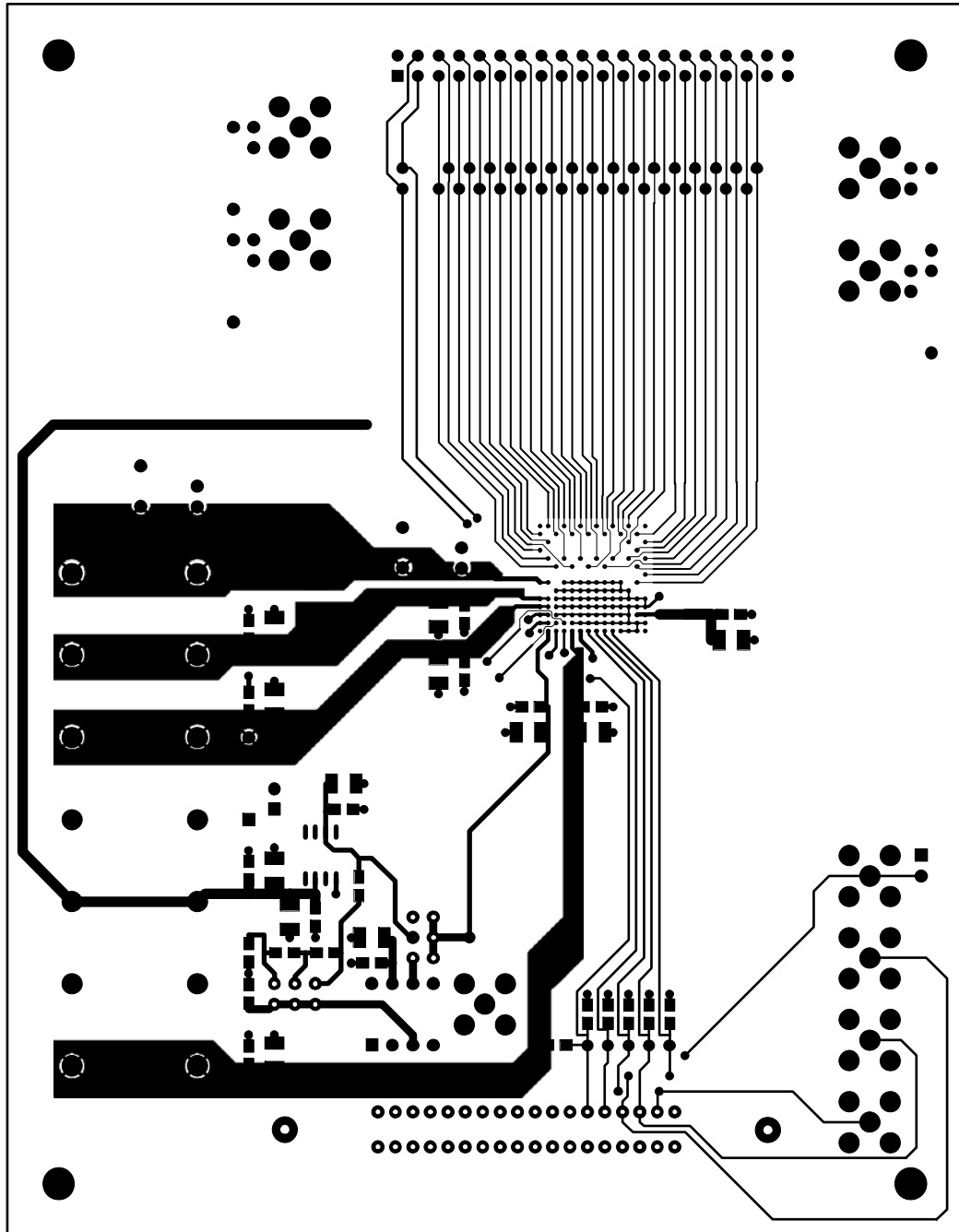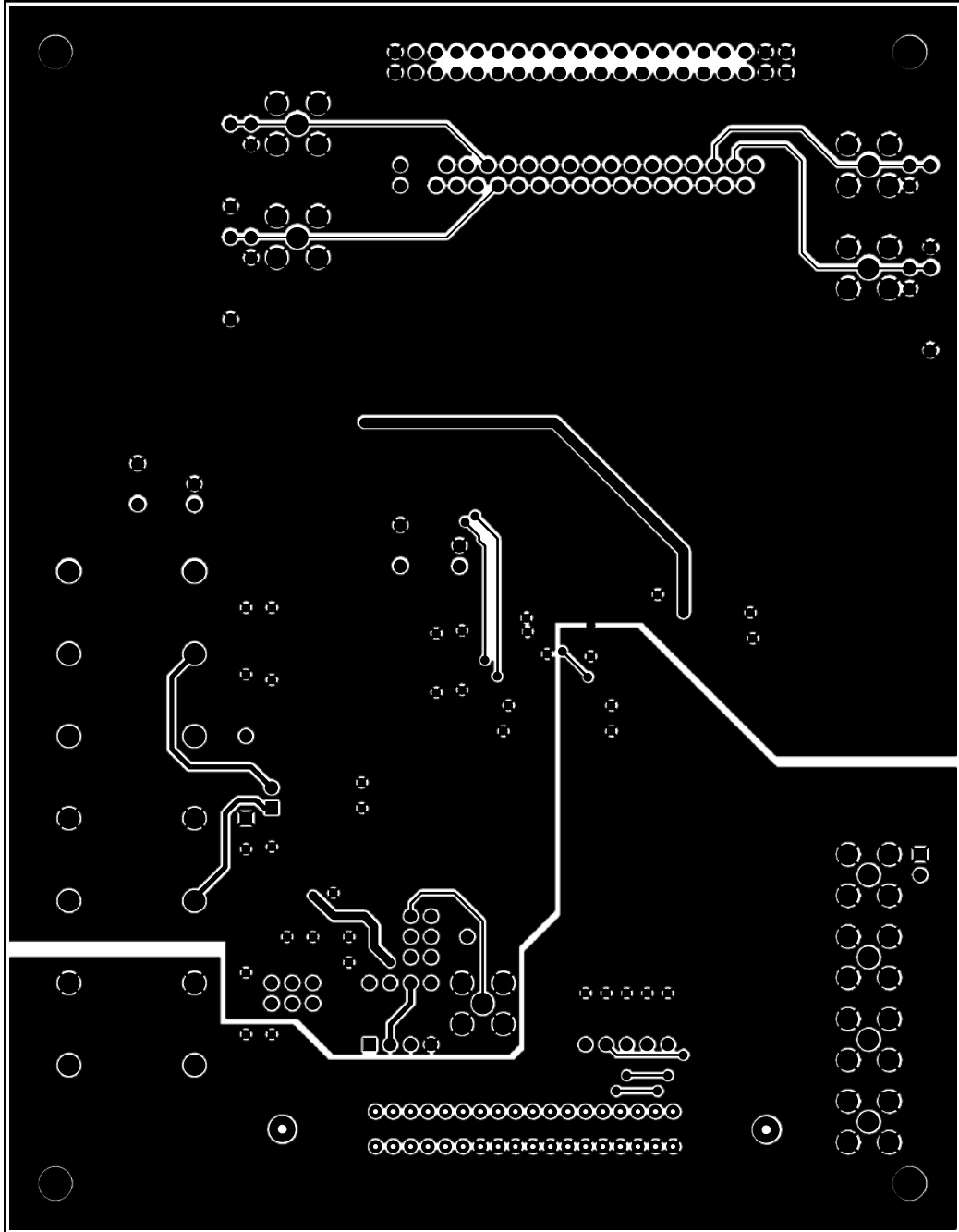
Figure 4. Evaluation Board Circuit Diagram

05732-004

Figure 5. Component Side PCB Layout Diagram

05732-005

Figure 6. Solder Side PCB Layout Diagram

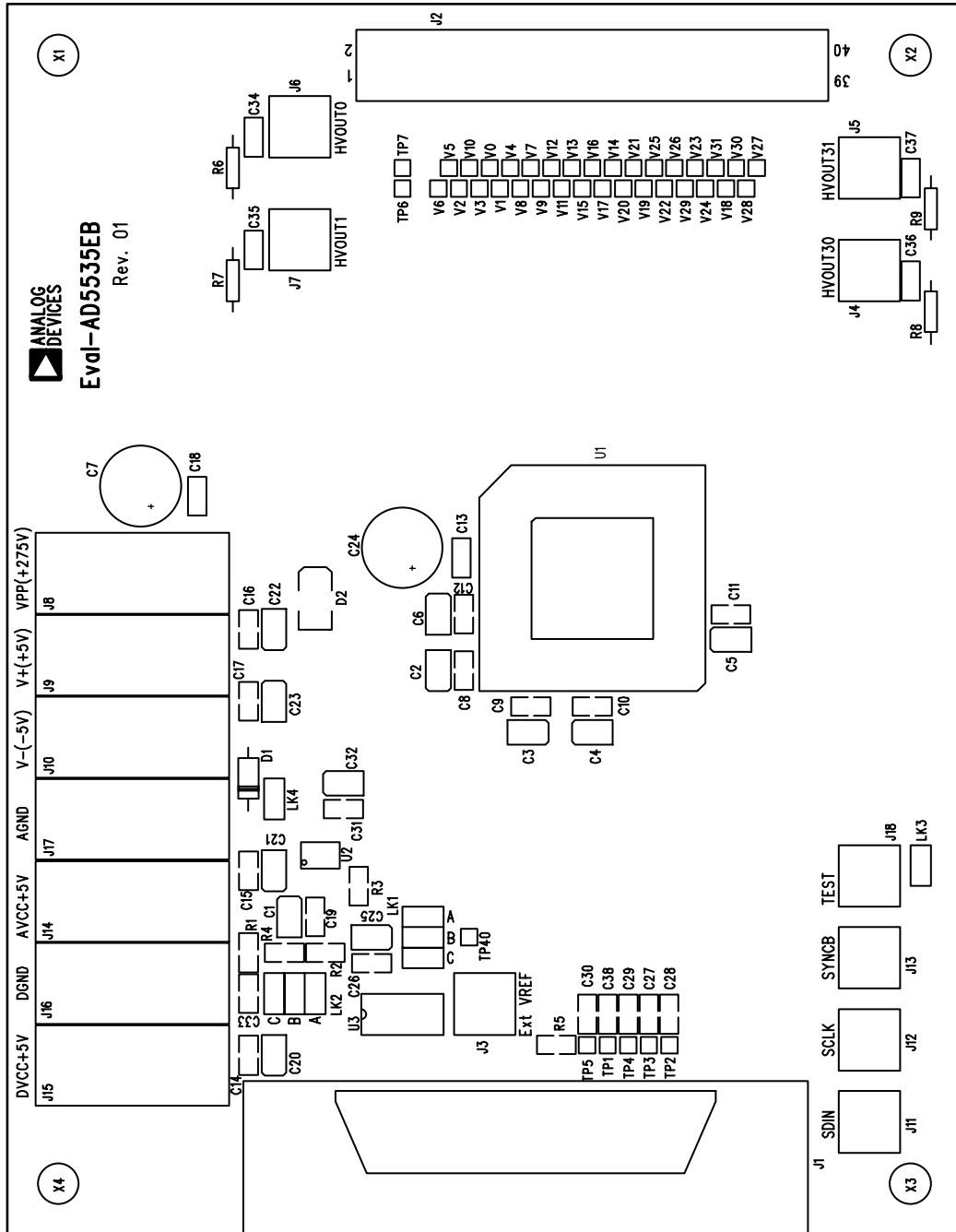Figure 7. Component Placement Diagram

EVAL-AD5535EB

ORDERING GUIDE

Model	Description
EVAL-AD5535EB	AD5535 Evaluation Board Kit

NOTES

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**ANALOG
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