Evaluating the ADG6436, 0.5 Ω On Resistance, ±20 V, +36 V, Dual SPDT Switch

FEATURES

- Low R_{ON}: 0.5 Ω
- High continuous current of up to 847 mA
- Flat R_{ON} across signal range: 0.003 Ω
- Improved balance between on resistance and on capacitance
- 1.8 V logic compatibility
- 16-lead, 4 mm × 4 mm LFCSP
- Pin to pin compatible with the ADG5436 and ADG5436F
- Fully specified at ±20 V and +36 V
- Operational with asymmetric power supplies
- V_{SS} to V_{DD} − 2 V analog signal range

EVALUATION KIT CONTENTS

- EVAL-ADG6436EBZ evaluation board

DOCUMENTS NEEDED

- ADG6436 data sheet

EQUIPMENT NEEDED

- DC voltage source
  - ±22V, ±10% for dual supply
  - 36V, ±10% for single supply
- Optional digital logic supply
- Analog signal source
- Method to measure voltage, such as a digital multimeter (DMM) or oscilloscope

GENERAL DESCRIPTION

The EVAL-ADG6436EBZ is the evaluation board for the ADG6436. The ADG6436 is an analog multiplexer, containing two independently selectable single-pole, double throw (SPDT) switches. An EN input is used to disable all of the switches. For use in multiplexer applications, both switches exhibit break-before-make switching action. Each channel conducts equally well in both directions when on, and each switch has an input signal range that extends from V_{SS} to V_{DD} − 2 V. When switches are disabled, signal levels up to the supplies are blocked. The digital inputs are compatible with 5 V, 3.3 V, and 1.8 V logic inputs without the requirement for a separate digital logic supply pin. The on-resistance profile is exceptionally flat over the full analog input range, which ensures good linearity and low distortion when switching audio signals.

Figure 1 shows the EVAL-ADG6436EBZ evaluation board. The ADG6436 is located in the center of the evaluation board, and wire screw terminals are provided to connect to each of the source and drain pins. Three screw terminals power the device, and a fourth terminal provides users with a defined digital logic supply voltage, if required. Alternatively, the digital logic supply voltage can be supplied from the ADP7142 that is on the board.

Full specifications on the ADG6436 are available in the ADG6436 data sheet available from Analog Devices, Inc., and must be consulted with this user guide when using the EVAL-ADG6436EBZ evaluation board.

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REVISION HISTORY

7/2024—Revision 0: Initial Version

EVAL-ADG6436EBZ EVALUATION BOARD LAYOUT

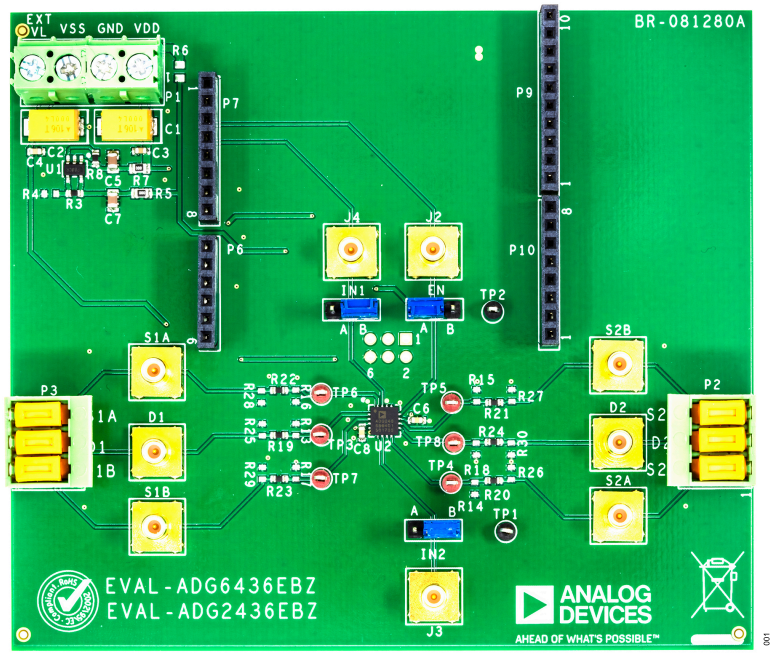

Figure 1. Evaluation Board Layout

EVALUATION BOARD HARDWARE

POWER SUPPLIES

Connector P1 provides access to the supply pins on the ADG6436. The V_{DD}, GND, and V_{SS} pins on P1 link to the appropriate pins on the ADG6436. For dual-supply voltages, the EVAL-ADG6436EBZ evaluation board can be powered from ±18 V to ±22 V. For single-supply voltages, the GND and V_{SS} terminals must be connected, and V_{DD} kept between 18 V to 39.6 V. Additionally, 5 V from the ADP7142 regulator can be supplied to INx logic pins of the ADG6436 via links IN1 and IN2. To utilize the 5 V from ADP7142 for the logic inputs, then use the default setting of R5 populated and R6 not inserted. For supplying a custom logic voltage via the IN1, IN2, and EN headers, the EXT_VL on P1 can be supplied with a suitable logic voltage. To use EXT_VL on P1, do not insert R5 and populate R6.

INPUT SIGNALS

Screw connectors, P2 and P3, are provided to connect to both the source and drain pins of the ADG6436. Additional Subminiature Version B (SMB) connectors are available to connect cables to the source and drain pins.

Each trace on the source and drain side includes two sets of 0603 pads, which can place a load on the signal path to ground. A 0 Ω resistor is placed in the signal path and can be replaced with a user-defined value. The resistor combined with the 0603 pads can create a simple RC filter.

LINK OPTIONS

Several link options are provided on the EVAL-ADG6436EBZ evaluation board. The functions of these link options and how they are used on the evaluation board are described in Table 1.

Use IN1 and IN2 to control the switches of the ADG6436. Use EN to enable or disable the device.

Position A is tied to VL and sets the logic high, whereas Position B is tied to GND and sets the logic low.

Table 1. ADG6436 Truth Table

EN	IN1	IN2	ADG6436 Switch States
B	X[1]	X[1]	All switches off
A	A	A	S1A, S2A (on) and S1B, S2B (off)
A	A	B	S1A, S2B (on) and S1B, S2A (off)
A	B	A	S1B, S2A (on) and S1A, S2B (off)
A	B	B	S1B, S2B (on) and S1A, S2A (off)

[1] X is don't care.

DIGITAL INTERFACE OPTIONS

The digital interface of the ADG6436 can be controlled either manually using the IN1, IN2, and EN link headers or accessed by using the J2, J3, and J4 SMB connectors. To use the SMB connectors, remove the IN1, IN2, and EN link headers.

Connecters P6, P7, P9, and P10 can also be used with a controller board such as the SDP-K1 or Arduino. If a controller board is used to control the ADG6436, remove the IN1, IN2, and EN link headers.

EVALUATION BOARD SCHEMATICS AND ARTWORK

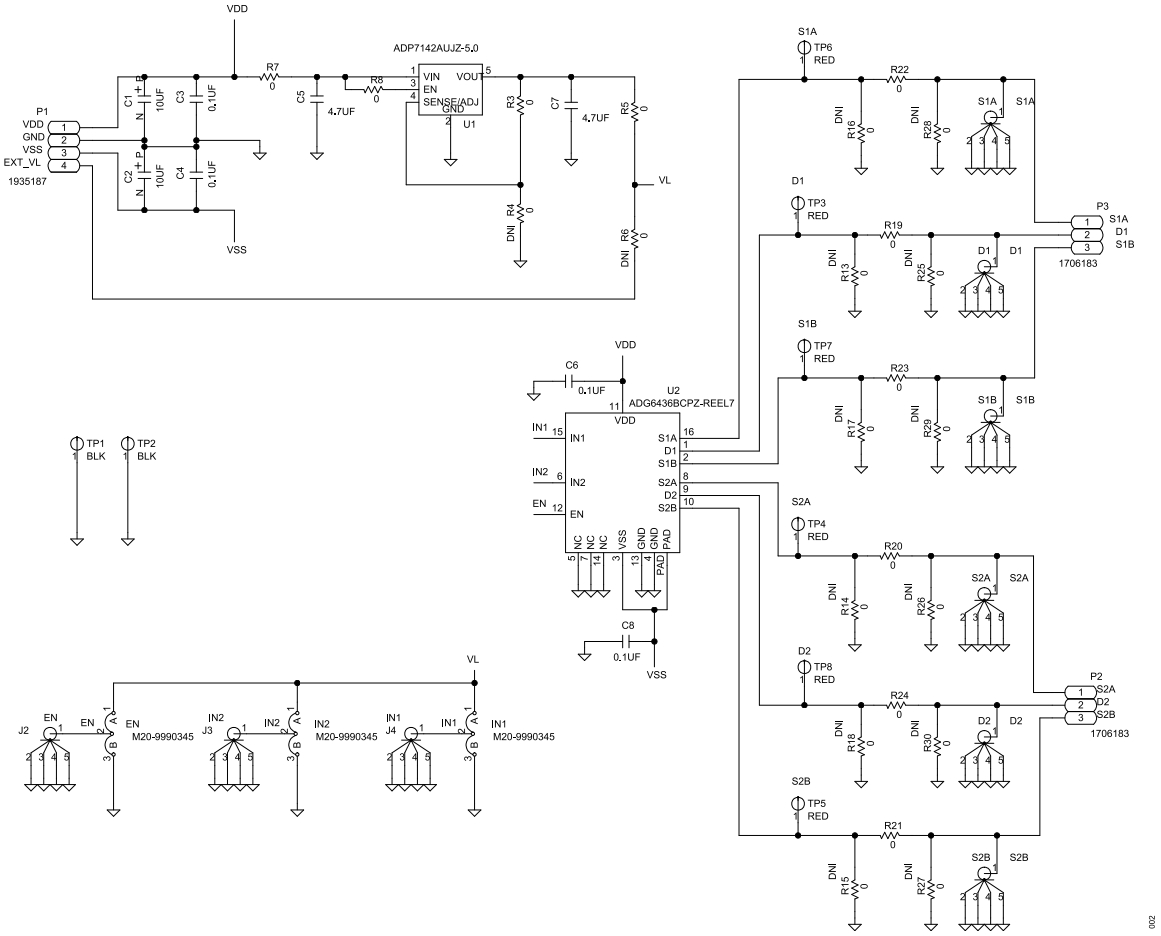

Figure 2. EVAL-ADG6436EBZ Schematic Part 1

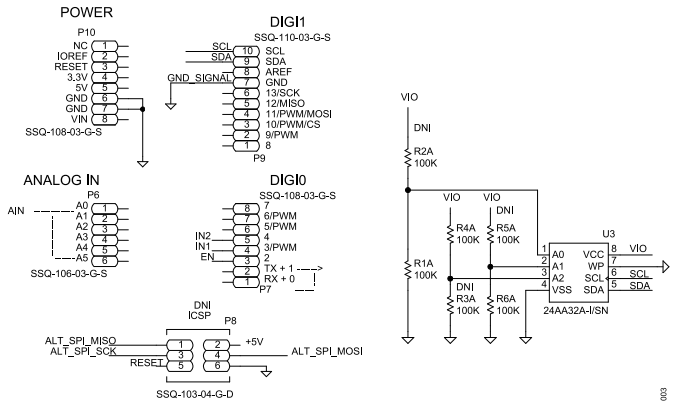

Figure 3. EVAL-ADG6436EBZ Schematic Part 2

EVALUATION BOARD SCHEMATICS AND ARTWORK

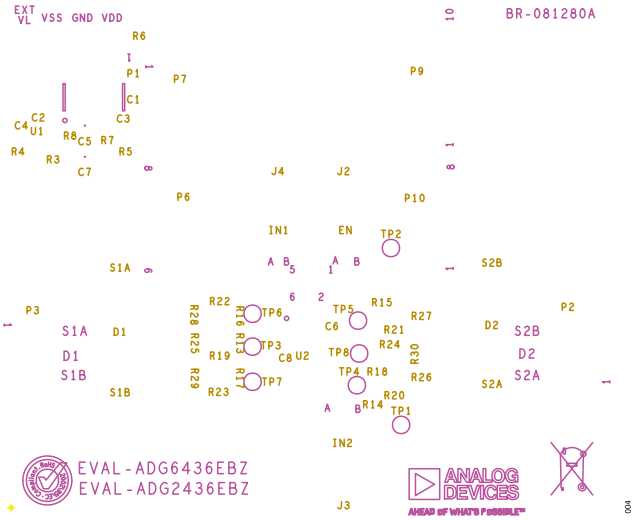

Figure 4. EVAL-ADG6436EBZ Silkscreen

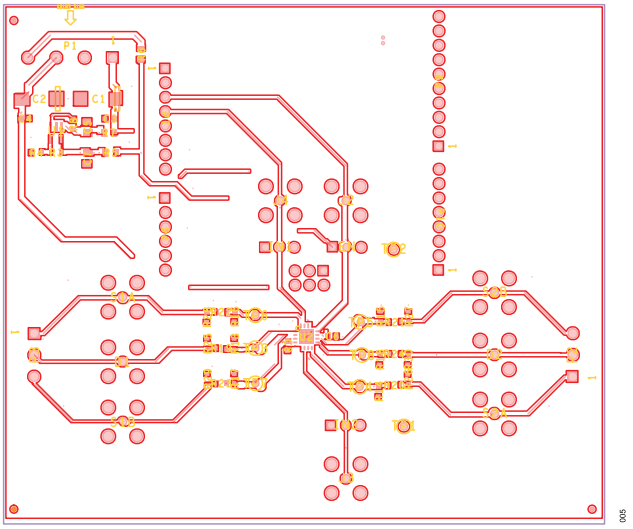

Figure 5. EVAL-ADG6436EBZ Top Layer

EVALUATION BOARD SCHEMATICS AND ARTWORK

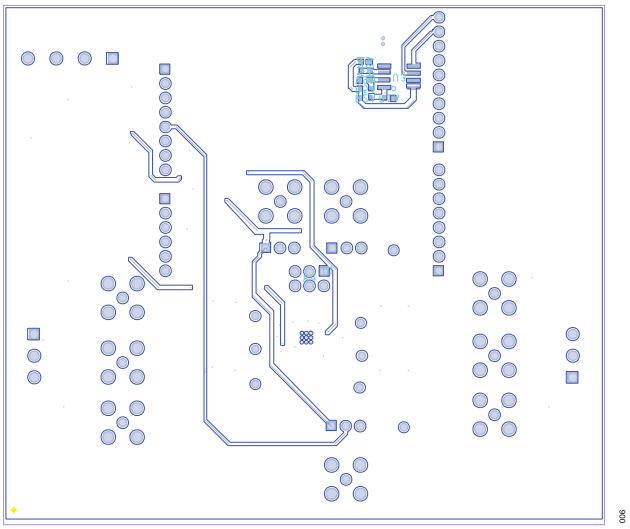

Figure 6. EVAL-ADG6436EBZ Bottom Layer

ORDERING INFORMATION

BILL OF MATERIALS

Table 2. Bill of Materials

Reference Designator	Description	Manufacturer	Part Number
C1, C2	50 V, 10 uF tantalum capacitors, 7343-31, 0.8 Ω	AVX	TAJD106M050RNJ
C3, C4, C6, C8	0.1 µF, 50 V, ceramic capacitors, X7R, 0603	Samsung	CL10B104KB8NNNC
C5, C7	4.7 µF, 50 V, ceramic capacitors, X5R, 0805	TDK	C2012X5R1H475K125AB
D1, D2, J2, J3, J4, S1A, S1B, S2A, S2B	SMB sockets	Amphenol	SMB1251B1-3GT30G-50
EN, IN1, IN2	Jumper blocks using 3-pin SIP header	Harwin	M20-9990345
P1	4-pin terminal, 5 mm	Phoenix Contact	1935187
P7, P10	Socket strips, square tails, 2.54 mm pitch	Samtec	SSQ-108-03-G-S
P2, P3	2-pin terminals, 5 mm	Phoenix Contact	1935161
P6	Socket strip, square tails, 2.54 mm pitch	Samtec	SSQ-106-03-G-S
P9	Socket strip, square tails, 2.54 mm pitch	Samtec	SSQ-110-03-G-S
R5, R7	0 Ω resistors, SMD, 1/8 W, 0805	Vishay	RCG08050000Z0EA
R3, R8, R19 to R24	0 Ω jumpers, SMD, 1/4 W, 0603, AEC-Q200	Vishay	CRCW06030000Z0EAHP
R1A to R6A	100 kΩ resistors, SMD, 1%, 1/16 W, 0603	Multicomp (SPC)	MC 0.063W 0603 1% 100K
TP1, TP2	PCB test points	Keystone Electronics	5001
TP3 to TP8	PCB test points	Keystone Electronics	5000
U1	40 V, 200 mA, low noise, CMOS LDO linear regulator	Analog Devices	ADP7142AUJZ-5.0-R7
U2	0.5 Ω R_{ON}, ±20 V, +36 V, dual SPDT switch	Analog Devices	ADG6436BPCZ
U3	IC, 32 Kb serial EEPROM	Microchip Technology	24AA32A-I/SN

ESD Caution
ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.