

**Evaluating the ADG6412, 0.5  $\Omega$  On Resistance,  $\pm 20$  V,  $\pm 36$  V, Quad SPST Switch****FEATURES**

- ▶ Low  $R_{ON}$  0.5  $\Omega$
- ▶ High continuous current of up to 847 mA
- ▶ Flat  $R_{ON}$  across signal range, 0.003  $\Omega$
- ▶ Improved balance between on resistance and on capacitance
- ▶ Low  $R_{ON}$  (0.5  $\Omega$ ) and  $C_{ON}$  (33 pF)
- ▶ 1.8 V Logic compatibility
- ▶ 16-lead, 4 mm x 4 mm LFCSP
- ▶ Pin to pin compatible with the [ADG5412](#) and [ADG5412F](#)
- ▶ Fully specified at  $\pm 20$  V and +36 V
- ▶ Operational with asymmetric power supplies
- ▶  $V_{SS}$  to  $V_{DD} - 2$  V analog signal range

**EVALUATION KIT CONTENTS**

- ▶ EVAL-ADG6412EBZ evaluation board

**DOCUMENTS NEEDED**

- ▶ [ADG6412](#) data sheet

**EQUIPMENT NEEDED**

- ▶ DC voltage source
  - ▶  $\pm 22$  V for dual-supply
  - ▶ 39.6 V 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-ADG6412EBZ is the evaluation board for the ADG6412. The ADG6412 contains four independent single-pole/single-throw (SPST) switches. The ADG6412 switches turn on with Logic 1. Each switch 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 the switches are open, signal levels up to the supplies are blocked. The ADG6412 does not have a  $V_L$  pin. The digital inputs are compatible with 1.8 V logic inputs over the full-operating supply range. The on-resistance profile is very flat over the full-analog input range, which ensures good linearity and low distortion when switching audio signals.

[Figure 1](#) shows the EVAL-ADG6412EBZ evaluation board. The ADG6412 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 ADG6412 are available in the ADG6412 data sheet available from Analog Devices, Inc., and must be consulted with this user guide when using the EVAL-ADG6412EBZ evaluation board.

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**REVISION HISTORY**

**1/2023—Revision 0: Initial Version**

EVAL-ADG6412EBZ EVALUATION BOARD LAYOUT

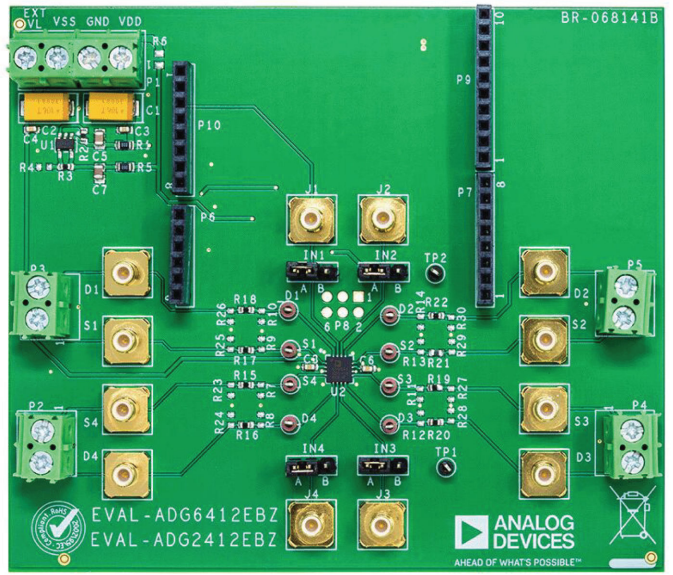


Figure 1. Evaluation Board Layout

## EVALUATION BOARD HARDWARE

### POWER SUPPLIES

Connector P1 provides access to the supply pins on the [ADG6412](#).  $V_{DD}$ , GND, and  $V_{SS}$  on P1 link to the appropriate pins on the ADG6412. For dual-supply voltages, the EVAL-ADG6412EBZ evaluation board can be powered from  $\pm 18$  V to  $\pm 22$  V. For single-supply voltages, the GND and  $V_{SS}$  terminals must be connected and  $V_{DD}$  between 18 V to 39.6 V. Additionally, 5 V from the [ADP7142](#) regulator can be supplied to INx logic pins of the ADG6412 via links IN1, IN2, IN3, and IN4. To use the 5 V from ADP7142 for the logic inputs, then use the default setting of R5 populated and R6 not inserted. If there is a wish to supply a custom logic voltage via the IN1, IN2, IN3, and IN4 headers, then 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, P3, P4, and P5 are provided to connect to both the source and drain pins of the ADG6412. 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  $\Omega$  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-ADG6412EBZ evaluation board. The functions of these link options are described in [Table 1](#).

**Table 1. Link Options**

Link Number	Options	
IN1, IN2, IN3, IN4	A = switch closed	B = switch open

### DIGITAL INTERFACE OPTIONS

The digital interface of the ADG6412 can either be controlled manually using the IN1, IN2, IN3, and IN4 link headers or accessed by using the J1, J2, J3, and J4 SMB connectors. To use the SMB connectors, remove the IN1, IN2, IN3, and IN4 link headers.

Connectors 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 ADG6412, remove the IN1, IN2, IN3, and IN4 link headers.

EVALUATION BOARD SCHEMATICS AND ARTWORK

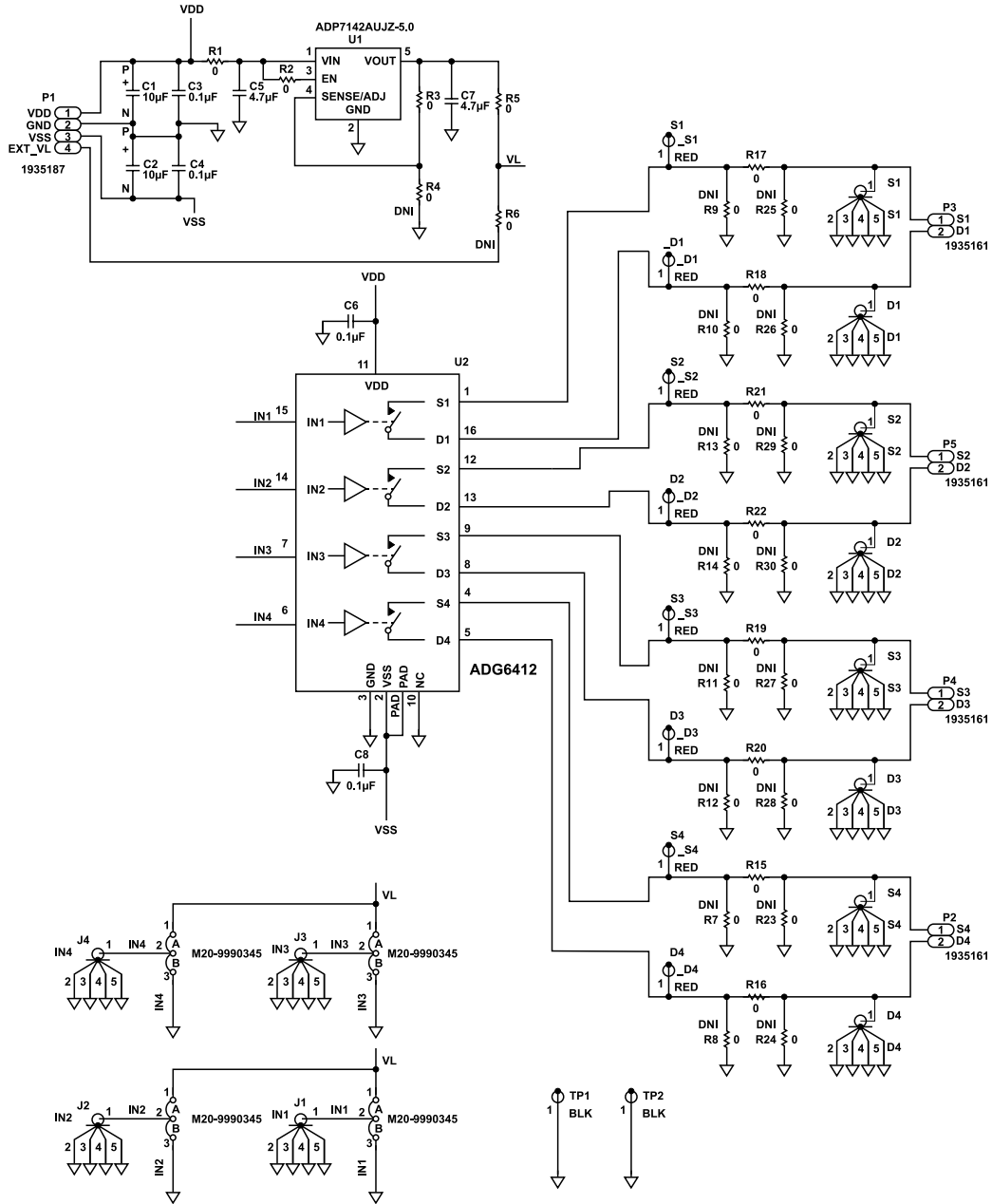


Figure 2. EVAL-ADG6412EBZ Schematic Part 1

EVALUATION BOARD SCHEMATICS AND ARTWORK

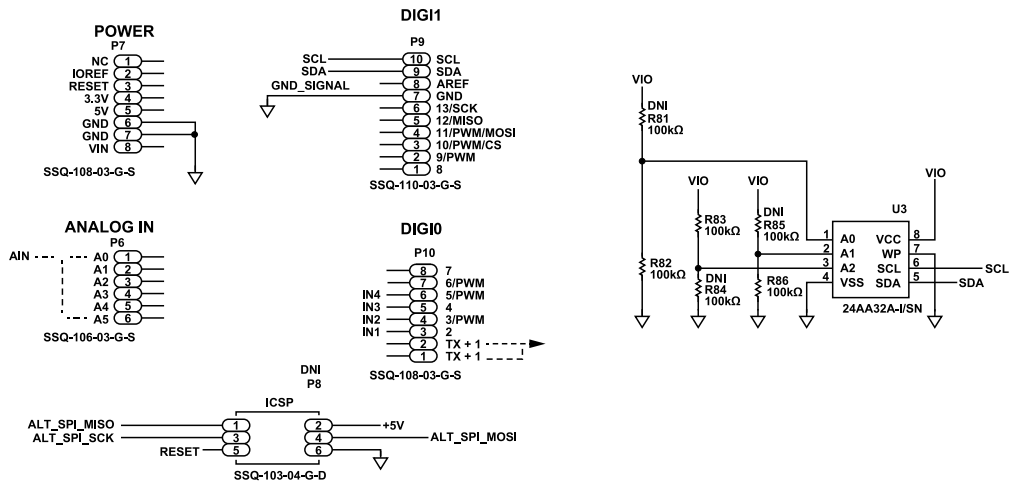


Figure 3. EVAL-ADG6412EBZ Schematic Part 2

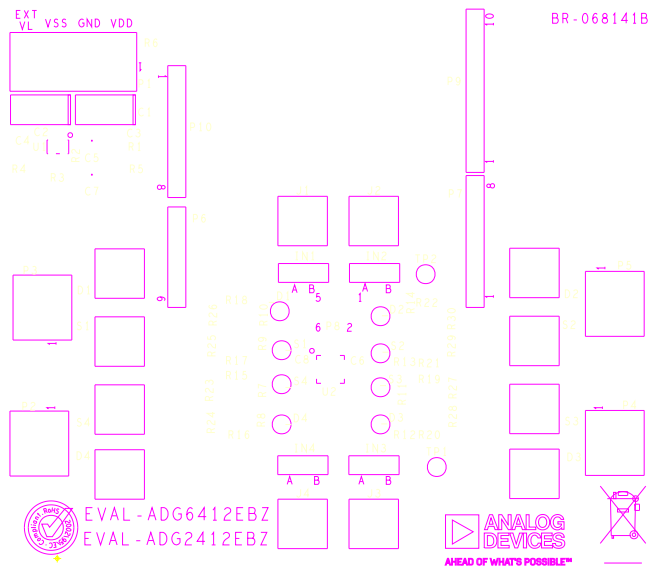


Figure 4. EVAL-ADG6412EBZ Silkscreen

EVALUATION BOARD SCHEMATICS AND ARTWORK

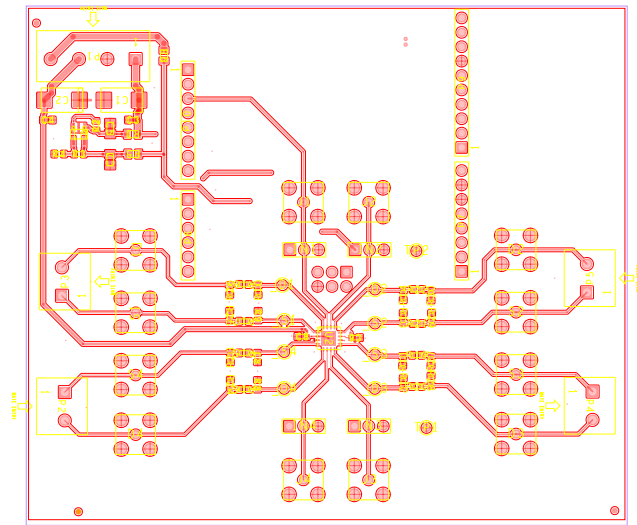


Figure 5. EVAL-ADG6412EBZ Top Layer

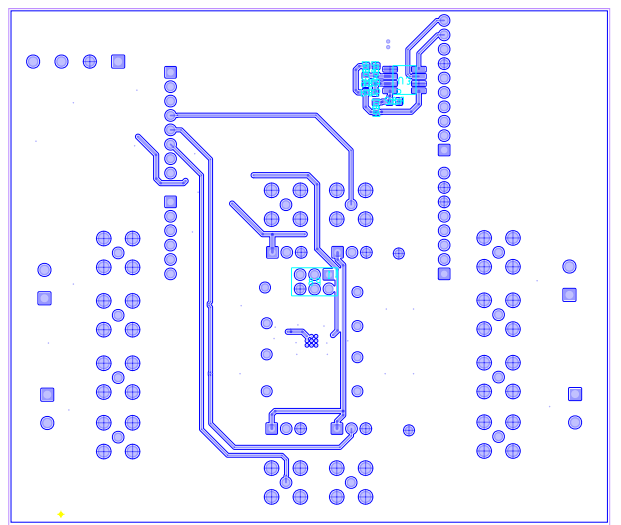


Figure 6. EVAL-ADG6412EBZ Bottom Layer

## 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 $\Omega$	AVX	TAJD106M050RNJ
C3, C4, C6, C8	0.1 $\mu$ F, 50 V, ceramic capacitors, X7R, 0603	Samsung	CL10B104KB8NUNC
C5, C7	4.7 $\mu$ F, 50 V, ceramic capacitors, X5R, 0805	TDK	C2012X5R1H475K125AB
D1 to D4, J1 to J4, S1 to S4	SMB sockets	Amphenol	SMB1251B1-3GT30G-50
IN1 to IN4	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 to P5	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
R1, R5	0 $\Omega$ resistors, SMD, 1/8 W, 0805	Vishay	RCG08050000Z0EA
R2, R3, R15 to R22	0 $\Omega$ jumpers, SMD, 1/4 W, 0603, AEC-Q200	Vishay	CRCW06030000Z0EAHP
R82, R83, R86	100 k $\Omega$ resistors, SMD, 1%, 1/16 W, 0603	Multicomp (SPC)	MC 0.063W 0603 1% 100K
TP1, TP2	PCB test points	Keystone Electronics	5001
U1	40 V, 200 mA, low noise, CMOS LDO linear regulator	Analog Devices	<a href="#">ADP7142AUJZ-5.0-R7</a>
U2	0.5 $\Omega$ R <sub>ON</sub> , $\pm$ 15 V, +12 V, $\pm$ 5 V, +5 V/-12 V, quad SPST switch	Analog Devices	<a href="#">ADG6412BPCZ</a>
U3	IC, 32 kb serial EEPROM	Microchip Technology	24AA32A-I/SN
_D1 to _D4, _S1 to _S4	PCB test points	Keystone Electronics	5000

**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.

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