

Evaluating the **ADG5298**, High Temperature, High Voltage, Latch-Up Proof, 8-Channel Multiplexer

FEATURES

- Up to 210°C high temperature operation
- Supply voltages
 - Dual supply: $\pm 5\text{ V}$ to $\pm 22\text{ V}$
 - Single supply: 8 V to 44 V
- Parallel interface compatible with 3 V logic

EVALUATION KIT CONTENTS

EVAL-ADG5298EB1Z evaluation board

ONLINE RESOURCES

Documents Needed

- [ADG5298](#) data sheet
- [EVAL-ADG5298EB1Z](#) user guide

EQUIPMENT NEEDED

- DC voltage source
 - $\pm 22\text{ V}$ for dual supply
 - 44 V for single supply
- Digital logic supply: 3 V to 5 V
- Analog signal source
- Method to measure voltage, such as a digital multimeter (DMM)

GENERAL DESCRIPTION

The **EVAL-ADG5298EB1Z** is the evaluation board for the **ADG5298** high temperature 8:1 multiplexer. The board assembly is constructed with high temperature compliant materials and is suitable for short duration evaluation up to 210°C.

Figure 1 shows the **EVAL-ADG5298EB1Z** in a typical evaluation setup. The **ADG5298** is soldered to the center of the **EVAL-ADG5298EB1Z** evaluation board, and headers are provided to connect to each of the source and drain pins. A 4-pin header powers the device and provides a user defined digital logic supply voltage.

Full specifications on the **ADG5298** are available in the **ADG5298** data sheet, which should be consulted in conjunction with this user guide when using the **EVAL-ADG5298EB1Z** evaluation board.

TYPICAL EVALUATION SETUP



Figure 1. **EVAL-ADG5298EB1Z**, Power Supply, and Signal Generator

TABLE OF CONTENTS

Features	1	Input Signals.....	4
Evaluation Kit Contents.....	1	Board Construction	4
Online Resources.....	1	Jumper Settings.....	5
Equipment Needed.....	1	Switches and 0 Ω Resistors.....	5
General Description	1	SMB Connectors.....	5
Typical Evaluation Setup	1	Decoupling Capacitors	5
Revision History	2	Evaluation Board Schematics and Artwork.....	6
Getting Started	3	Ordering Information.....	10
Evaluation Board Setup Procedure	3	Bill of Materials.....	10
Evaluation Board Hardware	4		
Power Supply.....	4		

REVISION HISTORY

9/2016—Revision 0: Initial Version

GETTING STARTED

EVALUATION BOARD SETUP PROCEDURE

The EVAL-ADG5298EB1Z evaluation board operates independently and does not require any additional evaluation boards or software to operate.

Supply the EVAL-ADG5298EB1Z evaluation board with a dual power source of up to ± 22 V or a single supply of up to +44 V by connecting VSS and GND together.

Take the following steps to set up a functionality test:

1. Connect a power supply to J10. Connect VSS and GND together if a single supply is required.
2. LK1 through LK4 control the digital signals for the ADG5298. See Table 1 for the logic control truth table.

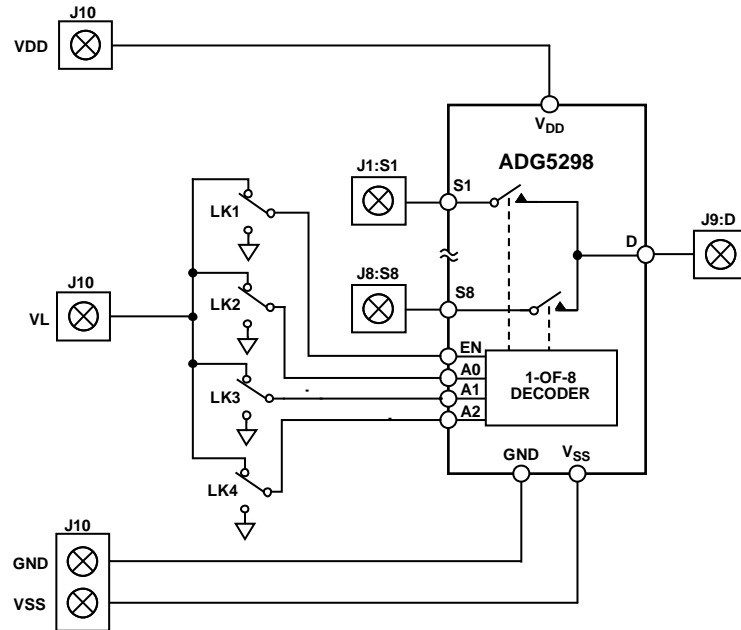


Figure 2. EVAL-ADG5298EB1Z Block Diagram of the Main Components

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EVALUATION BOARD HARDWARE

The operation of the [ADG5298](#) is evaluated using the [EVAL-ADG5298EB1Z](#). Figure 1 shows a typical evaluation setup where only a power supply and signal generator are required. Figure 2 shows the block diagram of the main components of the [EVAL-ADG5298EB1Z](#) evaluation board.

Using this evaluation board, the [ADG5298](#) passes signals from either the source or the drain connectors.

POWER SUPPLY

Connector J10 provides access to the supply pins of the [ADG5298](#). VDD, GND, and VSS on the J10 link to the appropriate pins on the [ADG5298](#). For dual-supply voltages, the [EVAL-ADG5298EB1Z](#) evaluation board can be powered from ± 5 V to ± 22 V. For single-supply voltages, the GND and VSS terminals must be connected together, and the [EVAL-ADG5298EB1Z](#) evaluation board must be powered with 8 V to 44 V. In addition, use the J10 header to supply the voltage, VL, used to control the digital logic.

INPUT SIGNALS

Headers connect to both the source and drain pins of the [ADG5298](#). Additional Subminiature Version B (SMB) connector pads are available if extra connections are required.

Each trace on the source and drain side includes two sets of 0805 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 0805 pads can create a simple resistor capacitor (RC) filter.

The [ADG5298](#) uses a parallel interface to control the operation of the switches. The switch operation can be manually controlled using the LK1 to LK4 switches, or an external controller can be interfaced directly to the control pins by using the SMB connector pads, if required (EN, A0, A1, and A2). See Table 1 for the logic control truth table.

BOARD CONSTRUCTION

The board assembly uses high temperature rated components, including passives, connectors, printed circuit board (PCB) materials, and solder. By using a polyimide PCB laminate, it can handle a high glass transition temperature (T_G), allowing it to maintain integrity at high temperatures where standard laminate deteriorates. The [EVAL-ADG5298EB1Z](#) evaluation board uses a Sn90Sb10 lead free solder due to its high melting point (245°C to 250°C). The [EVAL-ADG5298EB1Z](#) evaluation board also uses a nickel gold surface finish (plating) to avoid intermetallic formation between the tin in the solder and the copper PCB traces at high temperatures. In addition, the [EVAL-ADG5298EB1Z](#) evaluation board uses resistors, capacitors, and connectors rated for extended temperatures by their respective manufacturers. For further information on the [EVAL-ADG5298EB1Z](#) evaluation board construction, see the bill of materials in Table 3.

JUMPER SETTINGS

SWITCHES AND 0 Ω RESISTORS

Links control the [ADG5298](#) manually. Table 1 and Table 2 show the truth table and the summary of the links.

Use LK2 to LK4 to control the switches of the [ADG5298](#). Position L is tied to GND and sets the logic low, and Position H is tied to VL and sets the logic high.

Use LK1 to enable or disable the device. Position L is tied to GND and disables the device, and Position H is tied to VL and enables the device.

SMB CONNECTORS

The parallel interface of the [ADG5298](#) is controlled manually using the link headers (LK1 to LK4), or it can be accessed using the SMB front prints (EN, A0, A1, and A2). Note that these footprints are unpopulated.

DECOUPLING CAPACITORS

The [EVAL-ADG5298EB1Z](#) evaluation board comes with 0.1 μF decoupling capacitors populated on both the VDD and VSS power supplies, which provides sufficient decoupling for the [ADG5298](#). However, if extra decoupling is needed due to for example, a noisy power supply, C4 and C6 can add additional decoupling capacitors.

Table 1. ADG5298 Truth Table

LK4 (A2)	LK3 (A1)	LK2 (A0)	LK1 (EN)	Connected Sx
Don't care	Don't care	Don't care	Low	All switches off
Low	Low	Low	High	S1
Low	Low	High	High	S2
Low	High	Low	High	S3
Low	High	High	High	S4
High	Low	Low	High	S5
High	Low	High	High	S6
High	High	Low	High	S7
High	High	High	High	S8

Table 2. Switch and 0 Ω Resistor Descriptions

Label	Position	Description
LK1	Low	Logic 0 on the EN pin
	High	Logic 1 on the EN pin
LK2	Low	Logic 0 on the A0 pin
	High	Logic 1 on the A0 pin
LK3	Low	Logic 0 on the A1 pin
	High	Logic 1 on the A1 pin
LK4	Low	Logic 0 on the A2 pin
	High	Logic 1 on the A2 pin

EVALUATION BOARD SCHEMATICS AND ARTWORK

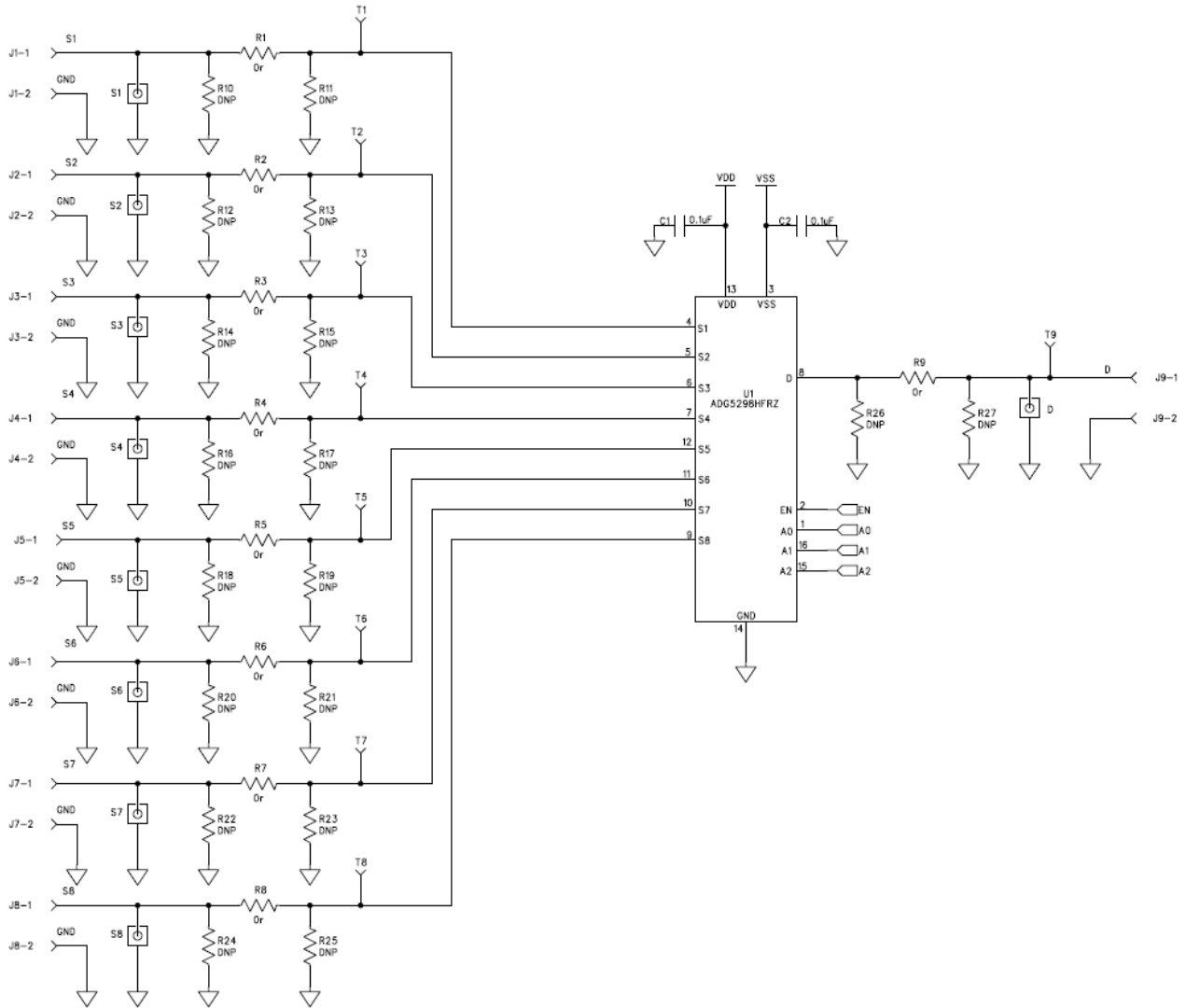
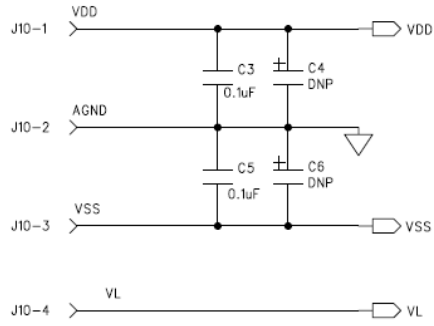
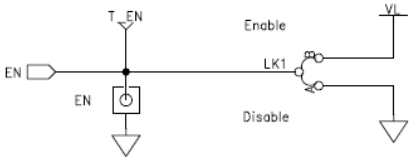


Figure 3. EVAL-ADG5298EB1Z Evaluation Board Schematic (Part 1)

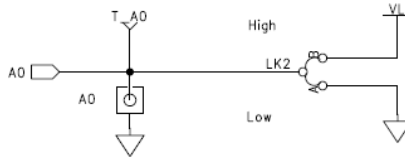
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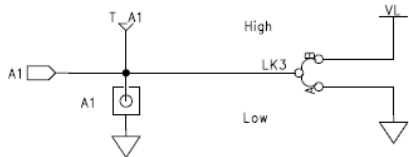
EN Input



A0 Input



A1 Input



A2 Input

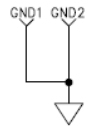
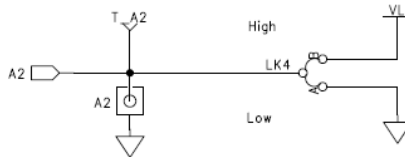


Figure 4. EVAL-ADG5298EB1Z Evaluation Board Schematic (Part 2)

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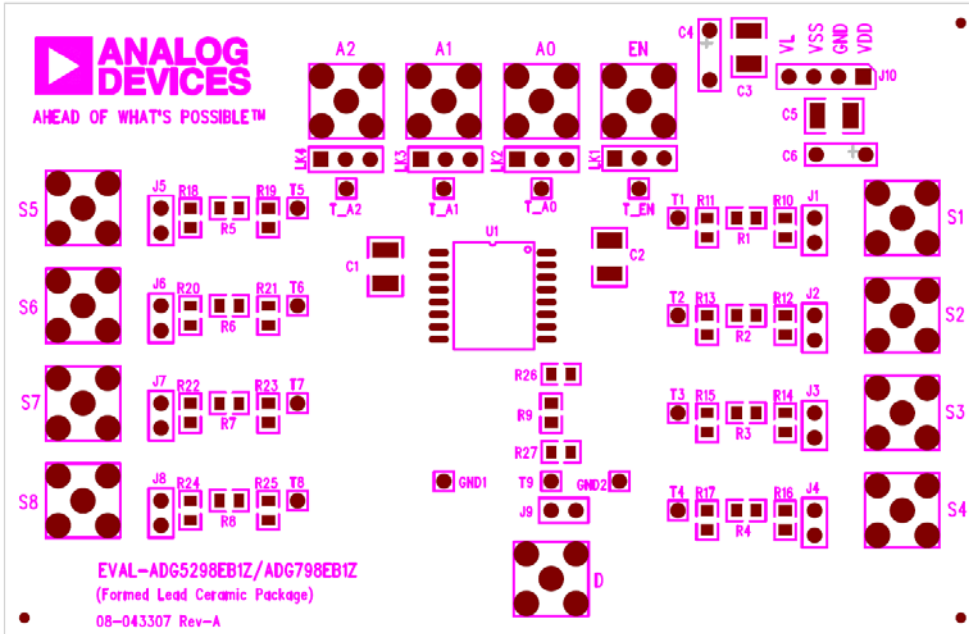


Figure 5. EVAL-ADG5298EB1Z Silkscreen

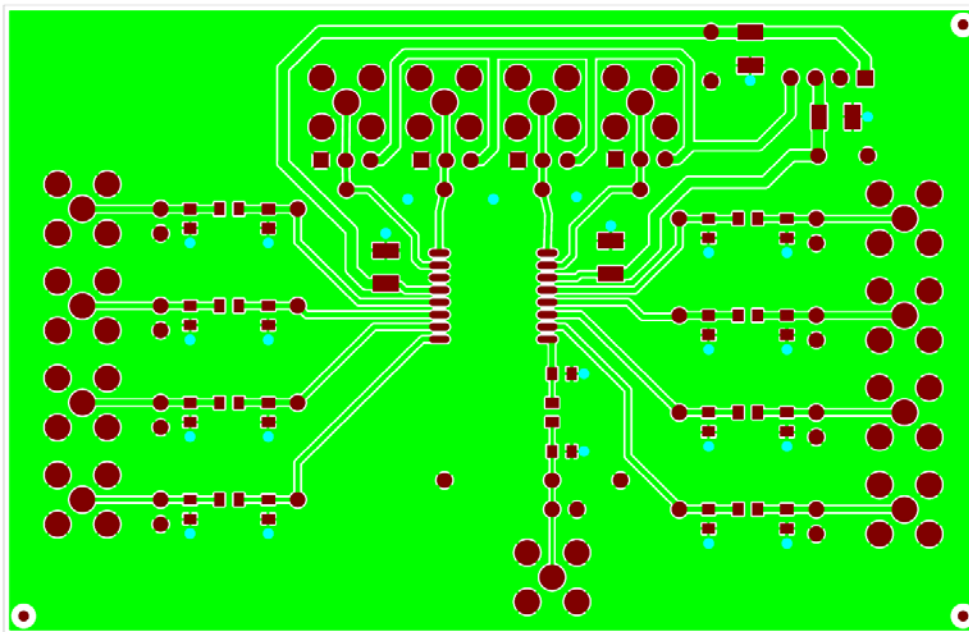


Figure 6. EVAL-ADG5298EB1Z Top Layer

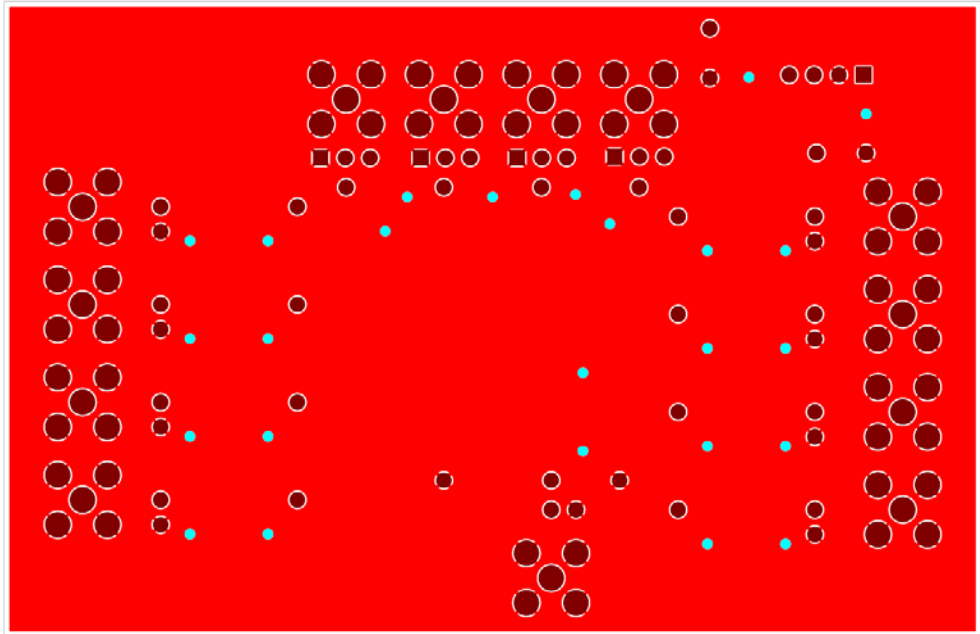


Figure 7. EVAL-ADG5298EB1Z Bottom Layer

ORDERING INFORMATION

BILL OF MATERIALS

Table 3.

Reference Designator	Description	Manufacturer Part Number	Stock Code
A0 to A2, EN, S1 to S8, D C1 to C3, C5 C4, C6 T1 to T9, T_A0 to T_A2, T_EN, GND1, GND2 J1 to J9	50 Ω , straight, SMB jacks 0.1 μ F ceramic capacitors, 100 V, NP0, 1210 Through hole, electrolytic capacitors Test points	Not applicable C1210H104J1GACTU Not applicable Not applicable	Do not insert Digi-Key 399-5748-2-ND Do not insert Do not insert
J10	Vertical, high temperature series, through hole, headers, 2-pin, 2.54 mm	YMC02SAAN	Digi-Key S9665-02-ND
R1 to R9	Vertical, high temperature series, through hole, headers, 4-pin, 2.54 mm	YMC04SAAN	Digi-Key S9665-04-ND
R10 to R27 LK1 to LK4	0 Ω , 0805, 0.125 W, maximum operating temperature = 300°C SMD, 0805, resistors	SPJ3003-ORN1	SPJ3003-ORN1
U1	Vertical, high temperature series, through hole, headers, 3-pin, 2.54 mm and shorting link High temperature, high voltage, latch-up proof, 8-channel multiplexer	Not applicable YMC03SAAN and WDC02SXNN ADG5298HFRZ	Do not insert Digi-Key S9665-03-ND and Digi-Key S9663-ND ADG5298HFRZ
Not Applicable	Solder, Sn90Sb10 alloy	Indium Corporation Indalloy 259 solder paste, 8.9 HF	Not applicable



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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