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: ±5 V to ±22 V
  - Single supply: 8 V to 44 V
- Parallel interface compatible with 3 V logic

**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.

**EVALUATION KIT CONTENTS**
- EVAL-ADG5298EB1Z evaluation board

**ONLINE RESOURCES**
- Documents Needed
  - ADG5298 data sheet
  - EVAL-ADG5298EB1Z user guide

**EQUIPMENT NEEDED**
- DC voltage source
  - ±22 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)

**TYPICAL EVALUATION SETUP**

![Figure 1. EVAL-ADG5298EB1Z, Power Supply, and Signal Generator](image-url)
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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
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 Ω 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 (Tg), 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.

Table 1. ADG5298 Truth Table

<table>
<thead>
<tr>
<th>LK4 (A2)</th>
<th>LK3 (A1)</th>
<th>LK2 (A0)</th>
<th>LK1 (EN)</th>
<th>Connected Sx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't care</td>
<td>Don't care</td>
<td>Don't care</td>
<td>Low</td>
<td>All switches off</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Don't care</td>
<td>High</td>
<td>S1</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>S2</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>S3</td>
</tr>
<tr>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>S4</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>S5</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>S6</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>S7</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>S8</td>
</tr>
</tbody>
</table>

Table 2. Switch and 0 Ω Resistor Descriptions

<table>
<thead>
<tr>
<th>Label</th>
<th>Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LK1</td>
<td>Low</td>
<td>Logic 0 on the EN pin</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Logic 1 on the EN pin</td>
</tr>
<tr>
<td>LK2</td>
<td>Low</td>
<td>Logic 0 on the A0 pin</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Logic 1 on the A0 pin</td>
</tr>
<tr>
<td>LK3</td>
<td>Low</td>
<td>Logic 0 on the A1 pin</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Logic 1 on the A1 pin</td>
</tr>
<tr>
<td>LK4</td>
<td>Low</td>
<td>Logic 0 on the A2 pin</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Logic 1 on the A2 pin</td>
</tr>
</tbody>
</table>

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.
Figure 3. EVAL-ADG5298EB1Z Evaluation Board Schematic (Part 1)
Figure 4. EVAL-ADG5298EB1Z Evaluation Board Schematic (Part 2)
ORDERING INFORMATION

BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Reference Designator</th>
<th>Description</th>
<th>Manufacturer Part Number</th>
<th>Stock Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A0 to A2, EN, S1 to S8, D</td>
<td>50 Ω, straight, SMB jacks</td>
<td>Not applicable</td>
<td>200 MHz</td>
</tr>
<tr>
<td>C1 to C3, C5</td>
<td>0.1 μF ceramic capacitors, 100 V, NPO, 1210 Through hole, electrolytic capacitors</td>
<td>C1210H104J1GACTU</td>
<td>Digi-Key 399-5748-2-ND</td>
</tr>
<tr>
<td>C4, C6</td>
<td>Test points</td>
<td>Not applicable</td>
<td>200 MHz</td>
</tr>
<tr>
<td>T1 to T9, T_A0 to T_A2, T_EN, GND1, GND2</td>
<td>Vertical, high temperature series, through hole, headers, 2-pin, 2.54 mm</td>
<td>YMC02SAAN</td>
<td>Digi-Key S9665-02-ND</td>
</tr>
<tr>
<td>J1 to J9</td>
<td>Vertical, high temperature series, through hole, headers, 4-pin, 2.54 mm</td>
<td>YMC04SAAN</td>
<td>Digi-Key S9665-04-ND</td>
</tr>
<tr>
<td>J10</td>
<td>Vertical, high temperature series, through hole, headers, 2-pin, 2.54 mm</td>
<td>SPJ3003-0RN1</td>
<td>SPJ3003-0RN1</td>
</tr>
<tr>
<td>R1 to R9</td>
<td>0 Ω, 0805, 0.125 W, maximum operating temperature = 300°C</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>R10 to R27</td>
<td>SMD, 0805, resistors</td>
<td>YMC03SAAN and</td>
<td>Digi-Key S9665-03-ND and</td>
</tr>
<tr>
<td>LK1 to LK4</td>
<td>Vertical, high temperature series, through hole, headers, 3-pin, 2.54 mm and shorting link</td>
<td>WDC02SXNN</td>
<td>Digi-Key S9663-ND</td>
</tr>
<tr>
<td>U1</td>
<td>High temperature, high voltage, latch-up proof, 8-channel multiplexer</td>
<td>ADG5298HFRZ</td>
<td></td>
</tr>
<tr>
<td>Not Applicable</td>
<td>Solder, Sn90Sb10 alloy</td>
<td>Indium Corporation Indalloy</td>
<td></td>
</tr>
</tbody>
</table>

Not applicable Solder, Sn90Sb10 alloy

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