**Evaluation Board for the ADG798 High Temperature, Low Voltage, 8-Channel Multiplexer**

**FEATURES**
- High temperature operation up to 210°C
- Supply voltages
  - Dual supply: ±2.5 V
  - Single supply: 3.0 V to 5.5 V
- Parallel interface compatible with 3 V logic

**GENERAL DESCRIPTION**
The EVAL-ADG798EB1Z is the evaluation board for the ADG798, which is a high temperature, 8:1 multiplexer. The entire 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-ADG798EB1Z in a typical evaluation setup. The ADG798 is soldered to the center of the 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 ADG798 are available in the ADG798 data sheet, which should be consulted in conjunction with this user guide when using the evaluation board.

**EVALUATION KIT CONTENTS**
- EVAL-ADG798EB1Z evaluation board

**ONLINE RESOURCES**
Documents Needed
- ADG798 data sheet
- EVAL-ADG798EB1Z user guide

**EQUIPMENT NEEDED**
- DC voltage sources
  - ±2.5 V for dual supply
  - 3.0 V or 5.5 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-ADG798EB1Z, 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-ADG798EB1Z evaluation board operates independently and does not require any additional evaluation boards or software to operate.

Supply the evaluation board with a dual power source of ±2.5 V, or a single supply from 3.0 V to 5.5 V, by connecting VSS and GND together.

Set up a functionality test as follows:
1. Connect a power supply to J10. Connect VSS and GND together if a single supply is required.
2. Use LK1 through LK4 to control the digital signals for the ADG798. See Table 1 for the logic control truth table.

Figure 2. EVAL-ADG798EB1Z Block Diagram
EVALUATION BOARD HARDWARE

Evaluate the operation of the ADG798 using the EVAL-ADG798EB1Z. 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 evaluation board.

Using the EVAL-ADG798EB1Z evaluation board, the ADG798 passes signals from either the source or drain connectors.

POWER SUPPLY

Connector J10 provides access to the supply pins of the ADG798. VDD, GND, and VSS on J10 link to the appropriate pins on the ADG798. For dual-supply voltages, the evaluation board can be powered by ±2.5 V. For single-supply voltages, the GND and VSS terminals must be connected together, and the evaluation board must be powered with a 3.3 V to 5.5 V voltage range. Use the J10 header to supply the voltage that controls the digital logic voltage level (VL).

INPUT SIGNALS

Headers connect to both the source pins and the drain pins of the ADG798. 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 be used to 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, creates a simple resistor-capacitor (RC) filter.

The ADG798 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 entire board assembly uses high temperature rated components, including passives, connectors, printed circuit board (PCB) material, and solder material. A polyimide PCB laminate is used due to its very high glass transition temperature ($T_g$), which allows the board to maintain integrity at high temperature when standard laminate typically deteriorates. Sn90Sb10, Pb-free solder is used due to its high melting point (245°C to 250°C). NiAu surface finish (plating) is used on the PCB to avoid intermetallic formation between the tin in the solder with copper PCB traces at high temperatures. The resistors, capacitors, and connectors used are rated for extended temperature by their respective manufacturers. For more details on the board construction, see the bill of materials in Table 3.
JUMPER SETTINGS

SWITCHES AND 0 Ω RESISTORS

Links are used to control the ADG798 manually. Table 2 shows a summary of the links.

Use LK2 to LK4 to control the switches of the ADG798. 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 ADG798 is controlled manually using the link headers of LK1 to LK4. The parallel interface can also be accessed using the SMB footprints: EN, A0, A1, and A2. Note that these footprints are unpopulated.

DECOUPLING CAPACITORS

The board comes with 0.1 μF decoupling capacitors populated on both the VDD and VSS power supplies. This provides sufficient decoupling for the ADG798. However, if extra decoupling is required due to a particular reason, such as a noisy power supply, use C4 and C6 to add additional decoupling capacitors.

Table 1. ADG798 Truth Table

<table>
<thead>
<tr>
<th>LK4 (A2)</th>
<th>LK3 (A1)</th>
<th>LK2 (A0)</th>
<th>LK1 (EN)</th>
<th>Connected</th>
<th>Sx</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>L</td>
<td>All switches off</td>
<td></td>
</tr>
<tr>
<td>Position L</td>
<td>Position L</td>
<td>Position L</td>
<td>Position H</td>
<td>S1</td>
<td></td>
</tr>
<tr>
<td>Position L</td>
<td>Position L</td>
<td>Position H</td>
<td>Position L</td>
<td>S2</td>
<td></td>
</tr>
<tr>
<td>Position L</td>
<td>Position L</td>
<td>Position L</td>
<td>Position H</td>
<td>S3</td>
<td></td>
</tr>
<tr>
<td>Position L</td>
<td>Position L</td>
<td>Position H</td>
<td>Position H</td>
<td>S4</td>
<td></td>
</tr>
<tr>
<td>Position H</td>
<td>Position L</td>
<td>Position L</td>
<td>Position H</td>
<td>S5</td>
<td></td>
</tr>
<tr>
<td>Position H</td>
<td>Position L</td>
<td>Position H</td>
<td>Position H</td>
<td>S6</td>
<td></td>
</tr>
<tr>
<td>Position H</td>
<td>Position L</td>
<td>Position H</td>
<td>Position L</td>
<td>S7</td>
<td></td>
</tr>
<tr>
<td>Position H</td>
<td>Position H</td>
<td>Position H</td>
<td>Position H</td>
<td>S8</td>
<td></td>
</tr>
</tbody>
</table>

1 X means don’t care.

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>L</td>
<td>Logic 0 on the EN pin</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Logic 1 on the EN pin</td>
</tr>
<tr>
<td>LK2</td>
<td>L</td>
<td>Logic 0 on the A0 pin</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Logic 1 on the A0 pin</td>
</tr>
<tr>
<td>LK3</td>
<td>L</td>
<td>Logic 0 on the A1 pin</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Logic 1 on the A1 pin</td>
</tr>
<tr>
<td>LK4</td>
<td>L</td>
<td>Logic 0 on the A2 pin</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Logic 1 on the A2 pin</td>
</tr>
</tbody>
</table>
Figure 3. ADG798 Evaluation Board Schematic (Part 1)
Figure 4. ADG798 Evaluation Board Schematic (Part 2)

Figure 5. EVAL-ADG798EB1Z Silkscreen
ORDERING INFORMATION

BILL OF MATERIALS

Table 3.

<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>Do not insert</td>
</tr>
<tr>
<td>C1 to C3, C5, C4, C6</td>
<td>Ceramic capacitor, 0.1 μF, 100 V, NP0 1210</td>
<td>C1210H104J1GACTU</td>
<td>Digikei 399-5748-2-ND</td>
</tr>
<tr>
<td>T1 to T9, T_A0 to T_A2, T_EN, GND1, GND2</td>
<td>Through hole, electrolytic capacitor</td>
<td>Not applicable</td>
<td>Do not insert</td>
</tr>
<tr>
<td>J1 to J9</td>
<td>Test point</td>
<td>YMC02SAAN</td>
<td>Digikei 59665-02-ND</td>
</tr>
<tr>
<td>J10</td>
<td>Vertical, high temperature series, through hole, header, 4 positions, 2.54 mm</td>
<td>YMC04SAAN</td>
<td>Digikei 59665-04-ND</td>
</tr>
<tr>
<td>R1 to R9</td>
<td>Vertical, high temperature series, through hole, header, 2 positions, 2.54 mm</td>
<td>SPJ3003-0RN1</td>
<td>Trendsetter Electronics</td>
</tr>
<tr>
<td>R10 to R27</td>
<td>0 Ω, 0805, 0.125 W, maximum operating temperature = 300°C</td>
<td>Not applicable</td>
<td>Do not insert</td>
</tr>
<tr>
<td>LK1 to LK4</td>
<td>SMD, 0805 resistors</td>
<td>YMC03SAAN and WDC02XNN</td>
<td>Digikei 59665-03-ND and Digikei 59663-ND</td>
</tr>
<tr>
<td>U1</td>
<td>High temperature, high voltage, latch-up proof, 8-channel multiplexer;</td>
<td>ADG798HFRZ</td>
<td>ADG798HFRZ</td>
</tr>
<tr>
<td>Not applicable</td>
<td>Solder, Sn90Sb10 alloy</td>
<td>Indium indalloy 259 solder paste, 8.9 HF</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

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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