Evaluation Board for the **ADuM4120** and **ADuM4120-1** Isolated Precision Gate Drivers with 2 A Output

**FEATURES**
- 2 A peak drive output capability
- Output power device resistance: <2 Ω
- Low propagation delay: <51 ns
- Operating temperature range: −40°C to +125°C
- Output voltage range to 35 V
- Output and input undervoltage lockout (UVLO)
- Pad placement for multiple switch types
- Screw terminals for easy connectivity

**EVALUATION KIT CONTENTS**
- EVAL-ADuM4120EBZ evaluation board or the EVAL-ADuM4120-1EBZ evaluation board

**EQUIPMENT NEEDED**
- Suggested test equipment
  - Primary side power supply: 0 V to 6 V at 100 mA
  - Secondary side supply: 0 V to 35 V at 250 mA
  - Square wave generator: 0 V to 5 V

**GENERAL DESCRIPTION**

The evaluation boards EVAL-ADuM4120EBZ and EVAL-ADuM4120-1EBZ support the ADuM4120/ADuM4120-1 single-channel gate drivers with an integrated miller clamp. Analog Devices, Inc., iCoupler® technology provides isolation between the input signal and the output gate driver. The EVAL-ADuM4120-1EBZ option is populated with the ADuM4120-1 that does not contain an internal input glitch filter, resulting in lower propagation delays.

The instructions and components in this user guide apply to both the EVAL-ADuM4120EBZ and EVAL-ADuM4120-1EBZ. The ADuM4120/ADuM4120-1 provides operation with voltages of up to 35 V. The high common-mode transient immunity (CMTI) and robust drive strength makes the ADuM4120/ADuM4120-1 an excellent fit for fast switching technologies.

The EVAL-ADuM4120EBZ evaluation board facilitates testing of the propagation delay, drive strength, and input logic of the device.

For complete information about the ADuM4120/ADuM4120-1, refer to the ADuM4120/ADuM4120-1 data sheet that should be consulted in conjunction with this user guide when using the evaluation board.

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Figure 1.
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REVISION HISTORY
4/2017—Revision 0: Initial Version
SETTING UP THE EVAL-ADUM4120EBZ AND EVAL-ADUM4120-1EBZ
INITIAL CONFIGURATION

Before initial use, certain steps must be completed to prepare the
EVAL-ADUM4120EBZ or EVAL-ADUM4120-1EBZ evaluation
board for operation. In the stock configuration (see Figure 1),
the R1 to R4 resistors are not placed. These are the locations of
the series external resistors for the charging and discharging paths
of the device being driven. It is recommended to use 1206 surface-
mount resistors with values between approximately 1 Ω and 10 Ω,
depending on the load being driven. R1 and R2 provide parallel
placements, whereas R3 and R4 are in series. An actual insulated
gate bipolar transistor (IGBT) or metal-oxide semiconductor
field effect transistor (MOSFET) can be placed in the provided
Q1, Q2, or Q3 landing patterns. Jumper P1 allows shorting
across the series external resistors to observe overshoot and/or
allow the user to probe voltage to quantify peak currents.
Resistor R6 is provided if the user must terminate the VIN input
with a 50 Ω load. Placing a jumper in P4 connects the stock 50 Ω
load to the VIN pin. R6 is not required, and, if the P4 jumper is not
placed, the evaluation board accepts high impedance signal
generator signals.

Figure 2 shows the top layer artwork for the dual-gate driver circuit.
Evaluation board components include the following:

- **U1** is the footprint for the ADuM4120 or ADuM4120-1.
- **C1 and C2** are 0.1 μF bypass capacitors; **C3** is a 10 μF bypass capacitor.
- **Q1, Q2, and Q3** can be populated with TO-246, TO-252, or TO-220 MOSFETs or IGBTs (see Figure 2).
- **R1 to R4** are gate resistors that control the edges of the
  outputs. By default, no resistors are installed; these resistors
  must be populated with low value 1206 resistors, generally
  in the 1 Ω to 10 Ω range.

POWER CONNECTIONS

Follow these steps to connect the ADuM4120 or ADuM4120-1 evaluation board to a power supply:

1. Connect the input supply (2.5 V to 5.5 V) with the positive
terminal on VDD1 and the ground on GND1.
2. Connect the ADuM4120 or ADuM4120-1 VDD2 supply
voltage (4.5 V to 35 V) to the VDD2 pin and return to the
GND2 pin.

GND1 and GND2 are isolated from each other. The
emitter/source of the IGBT or MOSFET is tied to GND2.

INPUT/OUTPUT CONNECTIONS

The VIN pin is a complementary metal-oxide semiconductor
(CMOS) input. To drive the gate driver with positive logic,
connect the input signal to the VIN pin.

The EVAL-ADUM4120EBZ evaluation board has screw
terminals for both the input and output connections. These
terminals facilitate connection options but are not the best
option for high performance transient testing. The best
measurements performed on the load, whether it is an IGBT,
MOSFET, or load capacitor, come from small loop measurements
performed at the load. Using the screw terminals as either the
sensing node or for the connection of the load often results in
observing extra overshoot during measurement.
EVALUATION BOARD SCHEMATICS AND ARTWORK

Figure 3. Schematic of the EVAL-ADuM4120EBZ

Figure 4. EVAL-ADuM4120EBZ Evaluation Board Top Layer

Figure 5. EVAL-ADuM4120EBZ Evaluation Board Bottom Layer
### BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Reference Designator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>ADuM4120ARIZ or ADuM4120-1ARIZ</td>
</tr>
<tr>
<td>R6</td>
<td>Resistor, 50 Ω, 1/8 W, 1206</td>
</tr>
<tr>
<td>C1, C2</td>
<td>Capacitor, 0.1 μF, 25 V, 10%, 1206</td>
</tr>
<tr>
<td>C3</td>
<td>Capacitor, 10 μF, 50 V, 10%, 1206</td>
</tr>
<tr>
<td>R1 to R5, Q1 to Q3</td>
<td>Not installed</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.