HCPL-7800A, HCPL-7800, HCPL-7840 & ACPL-782T

Isolation Amplifier Evaluation Board User Manual

User Manual

Board Description

The HCPL-7800A/7800/7840 and ACPL-782T evaluation boards (shown in Figure 1) demonstrate the high linearity and low-offset capability of HCPL-7800A/7800/7840 & ACPL-782T over a wide range of input current conditions. It allows a designer to easily test the performance of the HCPL-7800A, HCPL-7800, HCPL-7840 or ACPL-782T high-precision isolation amplifier in an actual application under real-life operating conditions. Many of the circuit recommendations discussed in Application Note 1078 are implemented on the board. Operation requires merely the addition of a 9V battery and a low-resistance shunt resistor on the input side of the isolation amplifier. The board has holes for mounting a through-hole shunt, and pads for mounting a surface-mount shunt. The board may also be used for general voltage isolation without any shunt resistor.

The circuit used on the board (see Figure 2) is nearly the same circuit recommended in the datasheet and Application Note 1078.

As can be seen on the board, the isolation circuitry is easily contained within a small area while maintaining adequate spacing for good voltage isolation and easy assembly. The overall size of the evaluation board has been enlarged to allow mounting of feet for stand-alone use (using the 4 drilled holes at the corners of the board).

Figure 1. HCPL-7800A/7800/7840 & ACPL-782T Evaluation Board (Top View)

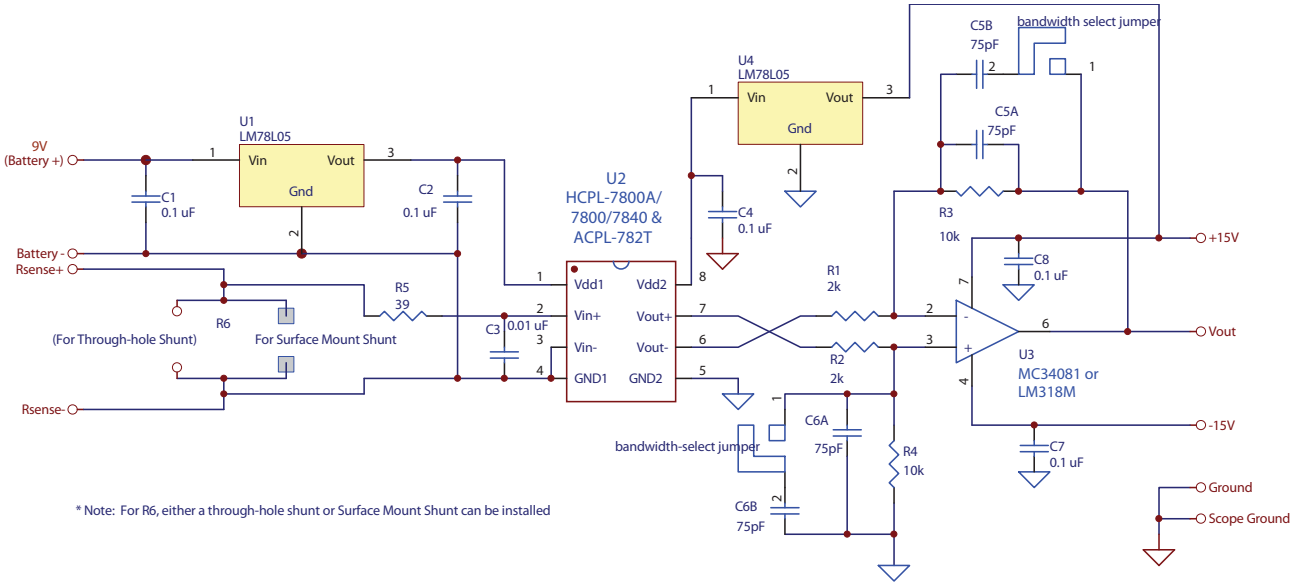

Figure 2. Evaluation Board Circuit Schematics

Using the Board

The evaluation board is easy to prepare and use. Only minor preparations (just by soldering of shunt resistor, wires for power / sense current path and output signal) are required.

1. First, decide which resistor is most appropriate for current and application. Solder the shunt resistor of choice on the board, at location R6, using the through-holes (or pads for surface-mount shunt resistor);
2. Next, connect a twisted pair of wires (16-gauge recommended) to the current input holes (one wire to +Rsense and another wire to –Rsense);
3. Connect a 9V battery or other isolated power supply by wires (22-gauge recommended) to the appropriate pins labeled "+9V" and "GND1" at the input side of the board;
4. Connect a +/-15V power supply (with Gnd) to the "+15V", "-15V", and "GND2" pins at the output side of the board. Then connect a wire to the "Vout" pin;

   (Note: For use with HCPL-7840 IC only - apply solder to the bandwidth-select jumper pads. This will connect C5B and C6B and effectively halve the post-amplifier bandwidth, thus filtering out noise in that frequency range. These jumper pads are designated as J1 and J2);
5. The output signal is measured between the "Vout" and "GND2" terminals (at the output side of the board). With all connections made and power supplies turned on, the approximate relationship of output voltage to input current is:

   Vout = 40 x Vin, where

   Vin = Rsense x Iin;

   With the shunt resistor in place, the maximum differential input voltage swing for linear operation is +/-200mV as specified in the datasheet. However, input voltage as high as 250mV can be safely applied with minimal performance degradation.

Output Measurement

A sample Vout against Vin waveforms are captured and shown in Figure 3 below.

(Green and Purple traces are the input and output voltages respectively).

$V_{IN+} = \pm 100$ mV, 50kHz.

Vout is taken at U3 Vout node.

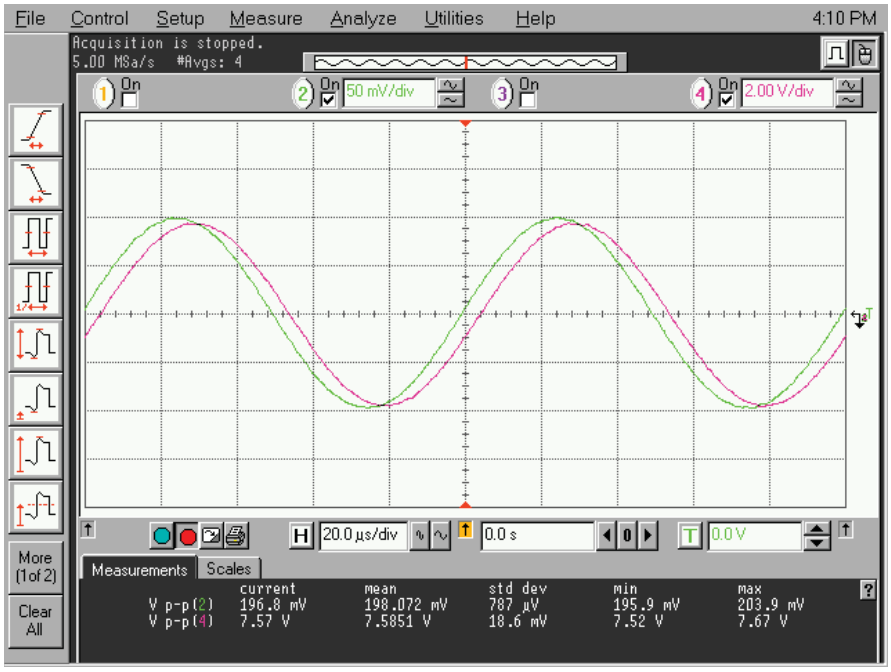

Figure 3. Vout vs Vin Voltage Waveforms

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