

Assembly Tips for the Blank Evaluation **ADIsimPower** Board

OVERVIEW

The **ADIsimPower™** (EVAL-ADIsimPower) blank/unpopulated evaluation boards are designed to accommodate a wide range of designs. This is accomplished by having component footprints that allow the placement of various size components, as well as accommodating different package types.

This user guide illustrates assembly tips used for soldering components to the **EVAL-ADIsimPower** blank/unpopulated boards. **ADIsimPower** is a collection of over 30 design tools and more than 50 unpopulated evaluation boards. Not all compatible boards are discussed in this user guide; only a few broad product types are discussed. To identify which board is

suitable for a design, run the **ADIsimPower** selector and design tools first. This ensures ordering the correct board for the design.

Each board has a unique product number (labeled PRD, for example, PRD1270R2) that can support multiple products from the same family. Figure 1 and Figure 2 show an **ADP2323/ADP2325** board supporting a single external FET per channel. Another version of the board supports a dual low side FET shared between channels.

The boards are designed to have most components on the top side of the board. However, they may have a few optional or supporting components on the bottom side of the board.

SAMPLE DIGITAL PICTURES OF THE BOARD

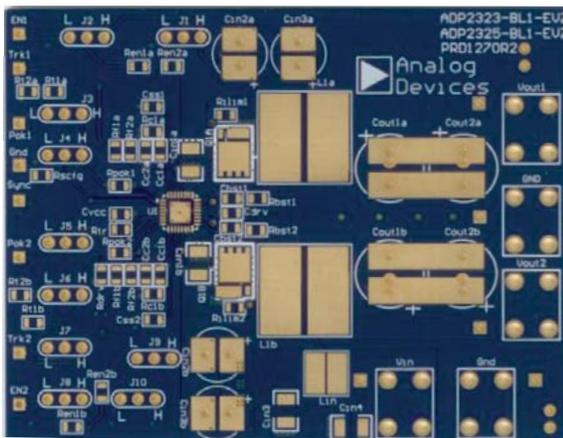


Figure 1. Board Top Side

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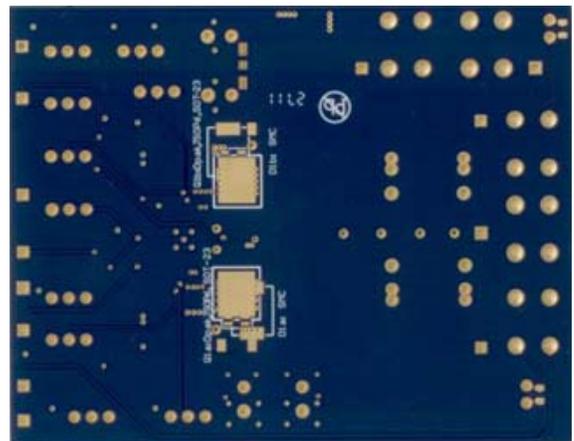


Figure 2. Board Bottom Side

13236-002

TABLE OF CONTENTS

Overview.....	1	Placing the SOT Style MOSFET.....	4
Sample Digital Pictures of the Board.....	1	Placing the D-PAK Style MOSFET.....	5
Revision History.....	2	Placing the Inductor.....	5
Getting Started.....	3	Placing the Capacitor.....	6
Soldering the LFCSP Components.....	3		
Placing the 8-Lead SOIC Style MOSFET.....	3		

REVISION HISTORY

7/15—Revision 0: Initial Version

GETTING STARTED

Visit www.Analog.com/ADIsimPower, or device product pages to download the ADIsimPower tool. Run the design tool and request a blank evaluation board. See the [EVAL-ADIsimPower Quick Start Guide](#) for more information on using the tool.

The boards are designed for hand assembly. Most of the resistors and capacitors are 0805 with some 0603 size parts.

Many ICs come in nonleaded packages and may be harder to solder by hand. The following section describes how to mount these components by hand. It also helps identify some of the unique footprints developed for board option flexibility.

SOLDERING THE LFCSP COMPONENTS

To hand solder the lead frame chip scale package (LFCSP), use the following steps:

1. Use a hot air rework tool to heat the pads.
2. Apply flux to the pads then solder them.
3. Use a hot air tool to reflow the solder on the pads. Add flux as needed, the solder levels out as it reaches its melting point.
4. Apply flux paste (sticky flux) to the soldered pads.
5. Place the component on the pads; ensure the pins are aligned.
6. Use a hot air rework tool to carefully reflow the solder. The molten solder wicks to the pins and pulls the component into place.
7. Touch up with a soldering iron.

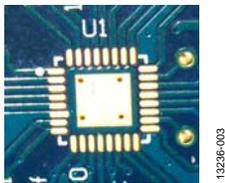


Figure 3. LFCSP Solder Pads

8. In most LFCSP footprints, it is important to solder the belly pad. It is used to dissipate heat as well as a ground connection. Be careful not to use too much solder, it can cause shorting issues.



Figure 4. Tinned LFCSP Pads

9. Use a soldering iron to melt the solder to the pads. Be sure to use the hot air rework tool to level out the solder. If the solder is not level, it is more difficult to place the IC.



Figure 5. IC Soldered to Pads

10. Apply flux paste (sticky flux) to the pads. Set the IC on the pads. Ensure good alignment of the IC and pads. Use a hot air rework tool with controllable airflow. Too much airflow blows the IC off the pads. Reflow the solder. It melts and wicks the IC into place.
11. Once cool, clean around the IC and visually inspect to confirm that all pins are soldered.
12. Touch up unsoldered pins with a soldering iron.

PLACING THE 8-LEAD SOIC STYLE MOSFET

The ADIsimPower blank boards have three different MOSFET footprints. The footprint shown in Figure 6 accommodates 8-Lead SOIC, 5 mm × 7 mm PowerPAK® 8 (PP5×7), and 3 mm × 3 mm PowerPAK (PP3×3).

To place a MOSEFET, use the following steps:

1. Solder the PowerPAK style parts using the same process as the LFCSP IC example (see the Soldering the LFCSP Components section).
2. Heat up the pad area with the hot air rework tool.
3. Add flux paste (sticky flux) and then solder the pads.
4. Reflow the solder with the hot air rework tool to ensure the solder is level.
5. Apply flux paste (sticky flux) to the pads and place the component.
6. Reflow the solder with the hot air rework tool.

In Figure 6, the upper left pad is the gate. The three pads to the right of the gate are the source. The big pad below is the drain.

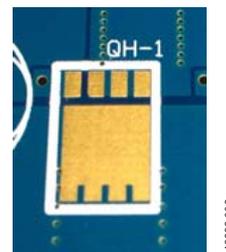


Figure 6. 8-Lead SOIC, PP5×7, PP3×3 Empty

- Fitting the smaller 3 mm × 3 mm MOSFET on these pads requires that the solder mask be removed between the source pads, as seen in Figure 7.

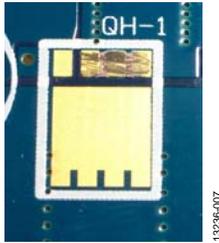


Figure 7. 8-Lead SOIC, PP5×7 with Solder Mask Removed

- Once the solder mask on the source node is removed, flux the pads, and carefully place the FET as illustrated in Figure 8.

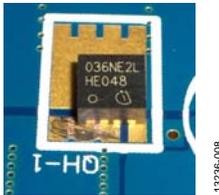


Figure 8. PP3×3 on Pads

- Use a soldering iron to solder the PP3×3. Solder the source and gate first. Take special care when soldering the gate and source pins, the tight pin spacing makes it easy for solder shorts.
- Inspect for solder shorts.
- Use a hot air rework tool or soldering iron to touch up solder.

PLACING THE SOT STYLE MOSFET

The ADIsimPower blank board accommodates physically smaller MOSFETS, such as the SOT-23, SOT-6, 6-lead TSOP, and 1206-8 ChipFET®. Figure 9 shows the multipurpose footprint. The top left pad is the gate, the bottom left pad is the source. The four pads on the right are the drain. A soldering iron works well to solder these components. A hot air rework tool with adjustable air flow also works well.

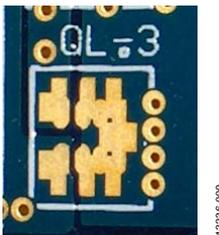


Figure 9. Empty Pads

To place a SOT style MOSFET, use the following steps:

- Apply flux paste (sticky flux) to the soldered pads.
- Place the component on the pads, ensure the pins are aligned.
- Use a soldering iron to solder pins.
- Touch up with a hot air rework tool.
- Visually inspect for solder shorts.

Figure 10 shows the placement of a SOT-23 N-channel FET.

The upper left pin is the gate. A soldering iron works well for soldering this component.

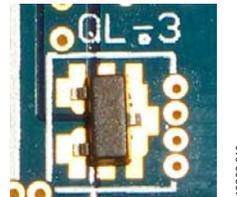


Figure 10. Placing a SOT-23

Figure 11 shows the placement of the N-channel SOT-6 FET or 6-lead TSOP. The upper left pin/pad is the gate. After the pins are aligned to the pads, use a soldering iron to solder the pins in place.

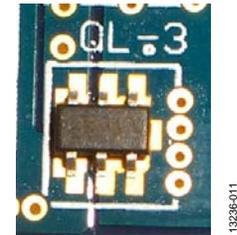


Figure 11. Placing a SOT-6 or 6-Lead TSOP

The 1206-8 ChipFET has a tight pitch between the pins (see Figure 12). A soldering iron is recommended when soldering by hand. Always visually inspect the board for solder shorts.

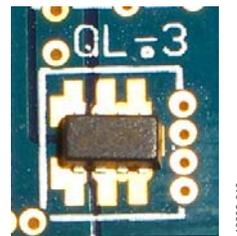


Figure 12. Placing a 1206-8 ChipFET

PLACING THE D-PAK STYLE MOSFET

The footprint in Figure 13 accommodates a D-PAK, SOT-6, TSOP6, and SOT-23. Use a hot air rework tool to heat the pads.

To place a D-PAK style MOSEFET, use the following steps:

1. Apply flux to the drain pads then solder it.
2. Use hot air rework tool to reflow the solder on the pads. Add flux as needed, the solder levels out as it reaches its melting point.
3. Apply flux paste (sticky flux) to the soldered pads.
4. Place the component on the pads; ensure that the pins are aligned.
5. Use a soldering iron to solder the gate and source pins.
6. Use a hot air rework tool to carefully reflow the solder. The molten solder wicks to the pins and pulls the component into place.
7. Touch up with a soldering iron.

The pad on the lower right in Figure 13 is the gate. The big pad to the left is the drain. The top pad on the right is the source.

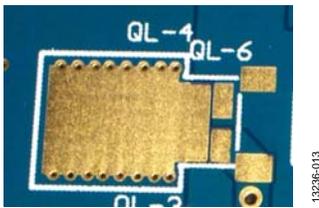


Figure 13. Empty Pads

Figure 14 illustrates the placement of a D-Pak FET.

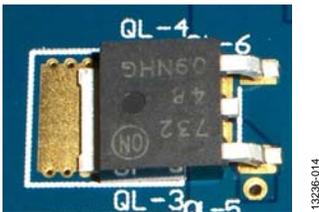


Figure 14. D-PAK FET

Figure 15 illustrates a 6-lead TSOP FET placed on the footprint. The lower right pad is the gate, the upper right pad is the source, and the four pads on the left are the drain connections. Use a soldering iron to solder this device.

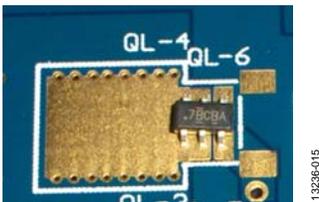


Figure 15. 6-Lead TSOP FET

PLACING THE INDUCTOR

The ADIsimPower blank evaluation board accommodates a variety of inductors as small as an 0603 or as large as 20 mm × 20 mm.

To place an inductor, a hot air rework tool works well on larger inductors while a soldering iron works well for the smaller inductors.

Figure 16 is an illustration of a common inductor pad used on the evaluation boards. The pad on the right is a mounting tab for a series of inductors like the SER series.

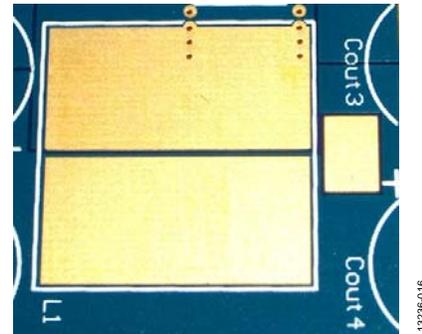


Figure 16. Empty Pad

Figure 17 illustrates the placement of an SER2009 series inductor on the universal inductor pad. Note the mounting tab location.



Figure 17. SER Series Inductor

Figure 18 illustrates the placement of an XAL series inductor.

To place an XAL series inductor, use the following steps:

1. Apply flux to the drain pads then solder it.
2. Use a hot air rework tool to reflow the solder on the pads. Add flux as needed, the solder levels out as it reaches its melting point.
3. Apply flux paste (sticky flux) to the soldered pads.
4. Reflow the solder with the hot air rework tool to ensure that the solder is level.
5. Apply flux paste (sticky flux) to the pads and place the component.
6. Reflow the solder with the hot air rework tool.

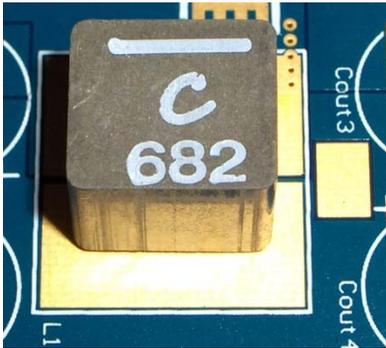


Figure 18. XAL Series Inductor

Figure 19 illustrates the placement of a much smaller inductor. Place an inductor as small as a 0805 footprint.

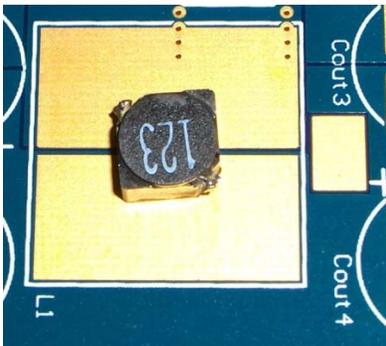


Figure 19. LPS Series Inductor

PLACING THE CAPACITOR

The ADIsimPower evaluation board accommodates a wide variety of capacitors. The footprint illustrated in Figure 20 accepts 0603 to 1210 ceramic surface-mount capacitors, 6 mm/8 mm/10 mm through-hole electrolytic capacitors, and tantalum capacitors.

- Multiple ceramic capacitors can be placed on a footprint. Three 1210 ceramic capacitors can fit on one of the pads if placed side by side.
- Multiple size through-hole electrolytic capacitors can also be placed. Notice the lead multiple holes included in the generic pad.

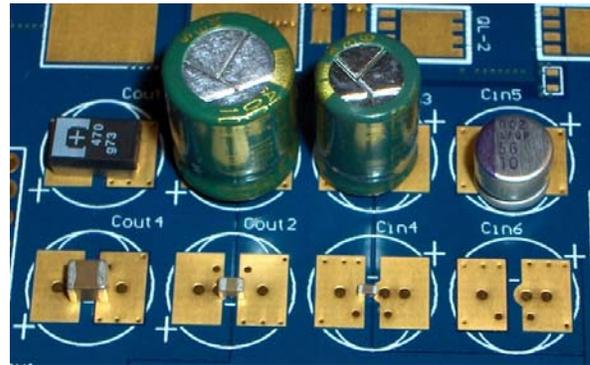


Figure 20. Multiple Capacitors Options

NOTES



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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