

ISL95210EVAL1Z

ISL95210 10A Integrated FET Regulator Evaluation Board Setup Procedure

AN1485
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This document describes the setup procedure for the ISL95210EVAL1Z Rev B board.

Description

Increasing demand for circuit board real estate necessitates the use of a higher integration to reduce component count. To that end, Intersil introduces the ISL95210 regulator. It features integrated power MOSFET switches that are capable of delivering 10A continuous load current at elevated temperatures and maintaining high efficiency. Leveraging a highly digital feature set and the new R4™ modulator allows the ISL95210 to provide a fully regulated point of load solution with only four external components. For more information on the features of the ISL95210, see the data sheet [FN6938](#)

What's Inside

The Evaluation Board Kit contains the following materials:

- ISL95210EVAL1Z REV B Board
- ISL95210 Data Sheet
- ISL95210 Evaluation Board Setup Procedure (this document)

What's Needed

The following materials will be needed to perform testing:

- +5V, 10A Power Supply
- Precision Digital Multi-Meter
- Electronic Load
- 4-Channel Oscilloscope

NOTE: Amperage rating of power supplies are determined by maximum expected loading plus a percentage margin of error.

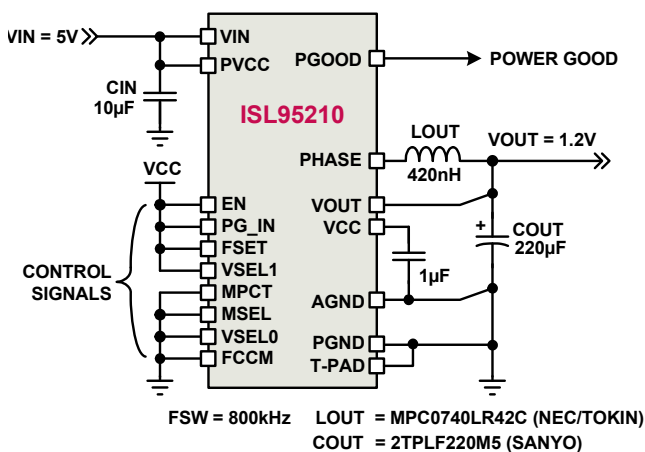


FIGURE 1. ISL95210 800kHz TYPICAL APPLICATION CIRCUIT

Quick Setup Guide

- Step 1: Set the +5.0V power supply to +5V and place in the "STANDBY" or "OFF" position. Connect the positive terminal (+) of the supply to the +5V terminal TP4 and the negative terminal (-) of the supply to GND TP3.
- Step 2: Connect the positive terminal (+) of the electronic load to the V_{OUT} terminal TP1. Connect the negative terminal (-) of the electronic load to the GND terminal TP2. Make sure the electronic load is set to the 0A condition.
- Step 3: Check to ensure all jumpers and switches are in their default positions prior to application of power (refer to "Detailed Description of Switch Settings" and "Detailed Description of Jumper Settings" on page 2).
- Step 4: Set the power supply to the "ON" position. LED D1 should show Red. Check all power supply outputs with a DMM to ensure correct voltage levels. Adjust if necessary.
- Step 5: Move the ENABLE jumper to the "ON" position. LED D1 should show Green.
- Step 6: Measure V_{OUT} with a DMM from TP5(+) to TP8(-). It should read 1.2V (±1%).

At this point, the board has been properly powered up. Normal testing can begin.

NOTE: If you need technical assistance, or other assistance, with the ISL95210 Evaluation Board, call 1-888-INTERSIL (468-3774).

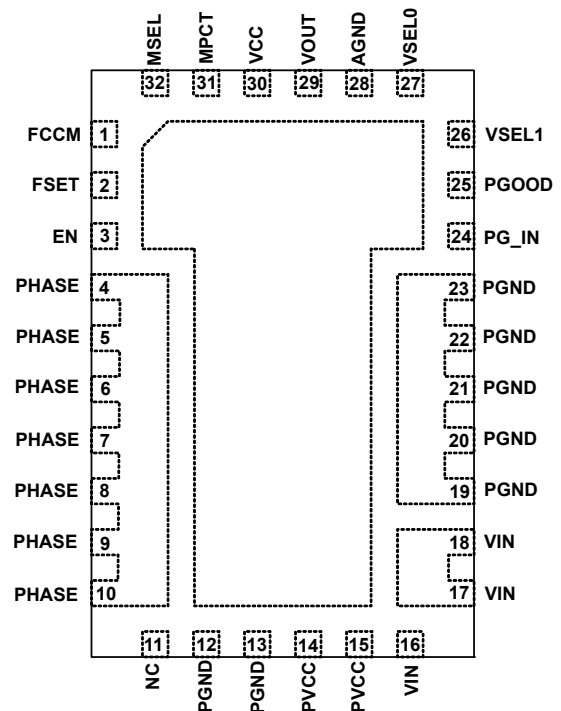


FIGURE 2. ISL95210 PINOUT 4x6mm 32 LD QFN (TOP VIEW)

Detailed Description of Test Points

| TEST POINT | FUNCTION |
|------------|---|
| J1 | V _{OUT} Scope Probe Jack |
| J2 | PHASE Scope Probe Jack |
| TP5 | V _{OUT} |
| TP6 | GND (V _{IN}) |
| TP7 | V _{IN} |
| TP8 | GND (V _{OUT}) |
| TP16 | PG_IN (external source if J4 is OPEN) |
| TP17 | PGOOD |
| TP18 | +12V_AUX (if charge pump is disabled with J3) |

Detailed Description of Switch Settings

| SWITCH | POSITION | FUNCTION |
|--------|----------|--------------------------------|
| S1 | OFF | ENABLE On-Board Load Transient |

NOTE: The POSITION column reflects the default state of each switch or jumper.

Detailed Description of Jumper Settings

| JUMPER | POSITION | FUNCTION |
|--------|----------|---|
| S1 | OFF | OFF = Regulator is disabled ON = Regulator is enabled |
| S2 | ON | OFF = 400kHz operation FLOAT = 533kHz operation ON = 800kHz operation |
| S3 | ON | OFF = Full DCM FLOAT = Ultra-sonic DCM ON = Full CCM |
| S4 | OFF | OFF = ±15% margin setpoint FLOAT = ±10% margin setpoint ON = ±20% margin setpoint |
| S5 | OFF | OFF = No margining FLOAT = Margin down ON = Margin up |
| S6 | OFF | OFF = VSEL0 logic low FLOAT = VSEL0 floating ON = VSEL0 logic high |
| S7 | ON | OFF = VSEL1 logic low FLOAT = VSEL1 floating ON = VSEL1 logic high |
| J3 | CLOSED | CLOSED = LED and charge pump ON OPEN = LED and charge pump OFF |
| J4 | CLOSED | CLOSED = LED and charge pump ON OPEN = LED and charge pump OFF |

ISL95210EVAL1Z Evaluation Board Schematics

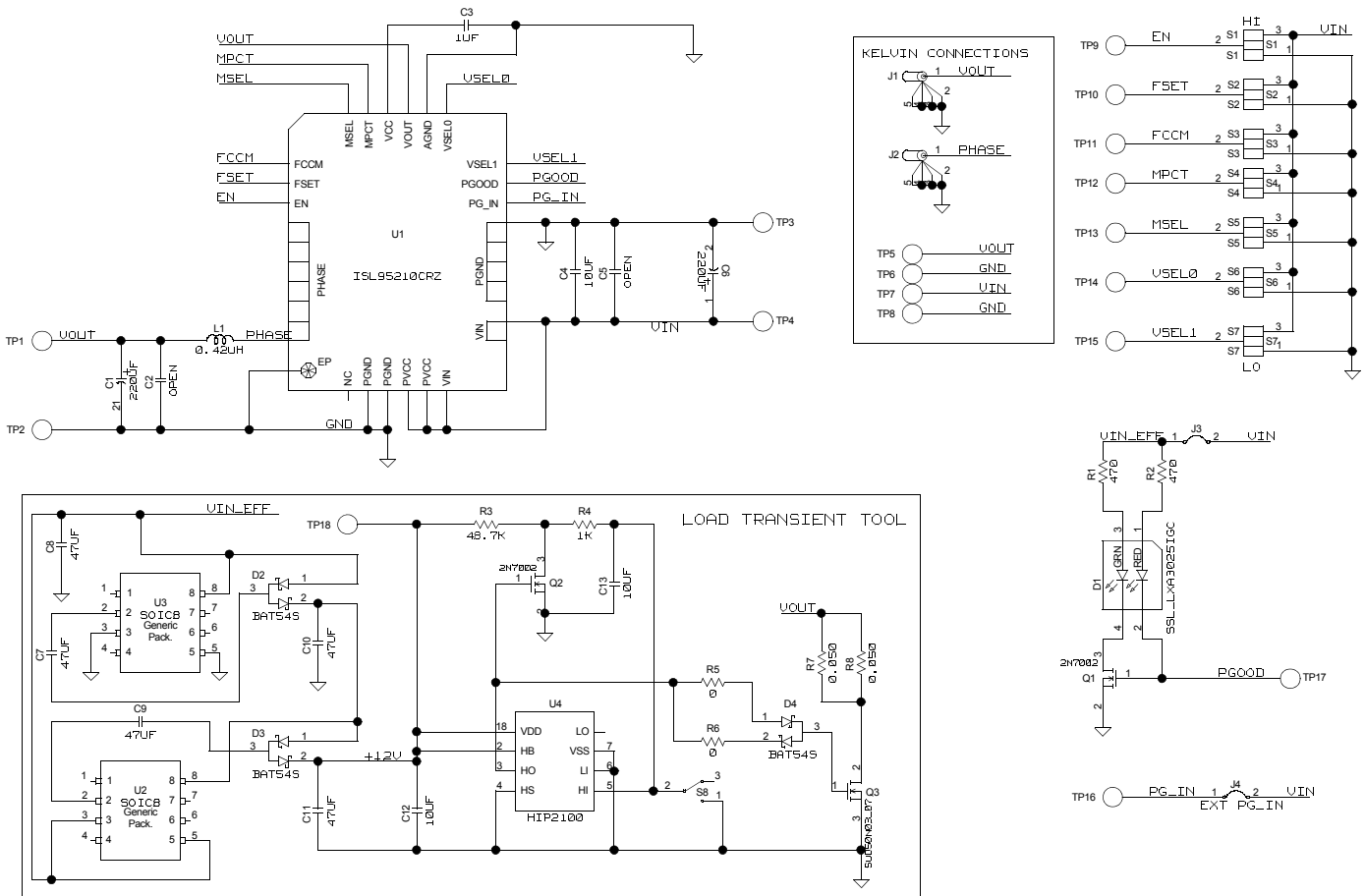


TABLE 1. BILL OF MATERIALS

| ITEM | QTY | REFERENCE | VALUE | TYPE | FOOTPRINT | VOLTAGE (V) |
|---------------------|----------|---------------------------------------|---------------------------------|--|-----------|-------------|
| TOP LAYER | | | | | | |
| 1 | 1 | C1 | 220μF | Sanyo-POSCAP 2TPLF220M5 | | 2 |
| 2 | 1 | C3 | 1μF | Generic MLCC X5R (or better) | 0603 | 6.3 |
| 3 | 1 | C4 | 10μF | Generic MLCC X5R (or better) | 1206 | 6.3 |
| 4 | 1 | L1 | 420nH | Tokin MPC0740LR42C | 2525 | |
| 5 | 1 | U1 | | ISL95210 10A Regulator | 4x6mm QFN | |
| 6 | 1 | D1 | | Lumex SSL_LXA3025IGC LED | 3x2 5mm | |
| 7 | 1 | S8 | | C&K GT11MSCBE SPDT Switch | | |
| BOTTOM LAYER | | | | | | |
| 8 | 1 | C2 | DNP | | | |
| 9 | 1 | C5 | DNP | | | |
| 10 | 1 | C6 | 330μF | Sanyo-POSCAP 6TPB330M | | 6.3 |
| 11 | 7 | C7, C8, C9, C10, C11, C12, C13 | 10μF | Generic MLCC (X5R or better) | 0805 | 16 |
| 12 | 2 | R1, R2 | 470Ω | 1% generic thick film chip resistor | 0603 | |
| 13 | 1 | R3 | 48.7kΩ | | | |
| 14 | 1 | R4 | 1kΩ | | | |
| 15 | 2 | R5, R6 | 249Ω | | | |
| 16 | 1 | R7 | 0.12Ω | | 2512 | |
| 17 | 1 | R8 | DNP | | | |
| 18 | 3 | D2, D3, D4 | | Generic BAT54S | SOT-23 | |
| 19 | 2 | Q1, Q2 | | Generic 2N7002 | SOT-23 | |
| 20 | 1 | Q3 | | Vishay SUD50N03-07-E3 | TO-252 | |
| 21 | 2 | U2, U3 | | Intersil ICL7660 charge pump | SOIC8 | |
| 22 | 1 | U4 | | Intersil HIP2100 half-bridge driver | SOIC8 | |

NOTES:

- Jumpers and test points not included in BOM as they represent non-critical components.
- Components in **BOLD** represent the required components for a real application. The remainder are for board flexibility and evaluation.

ISL95210EVAL1Z Layout

Board consists of 4 layers of 2 ounce copper

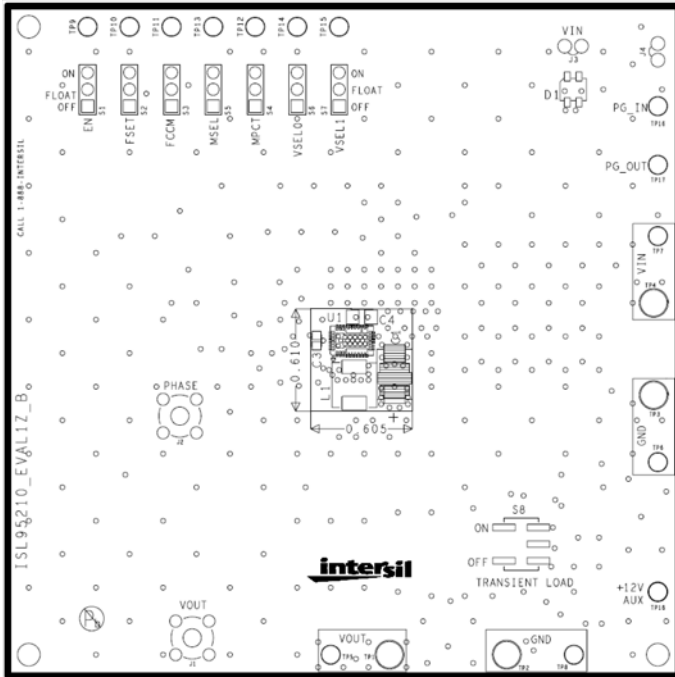


FIGURE 3. SILK SCREEN TOP

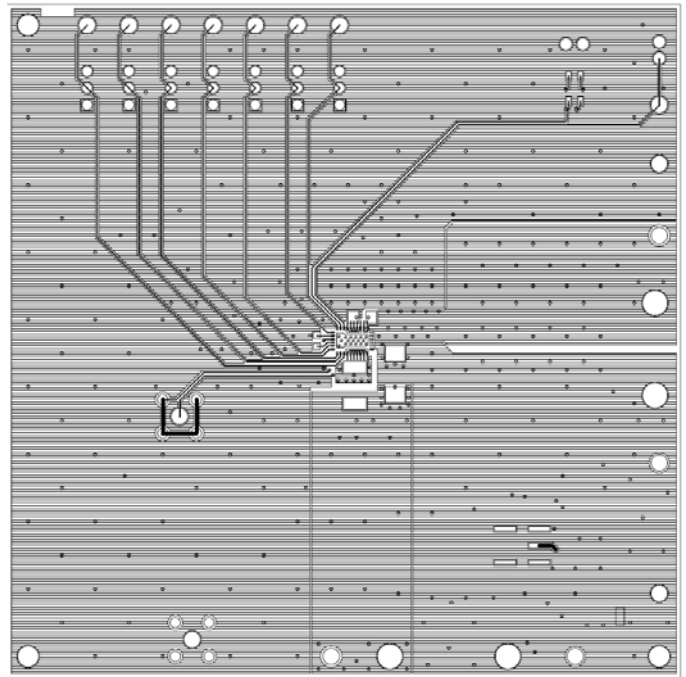


FIGURE 4. TOP LAYER

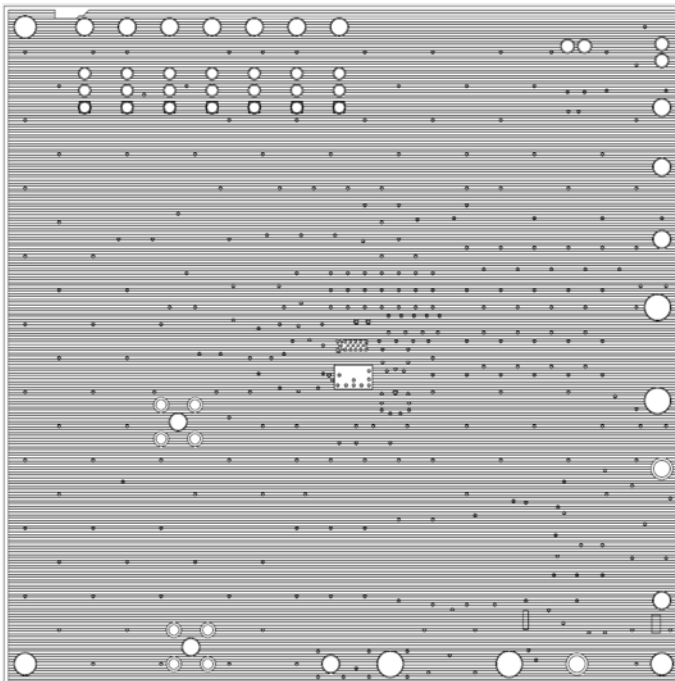


FIGURE 5. INTERNAL LAYER 1

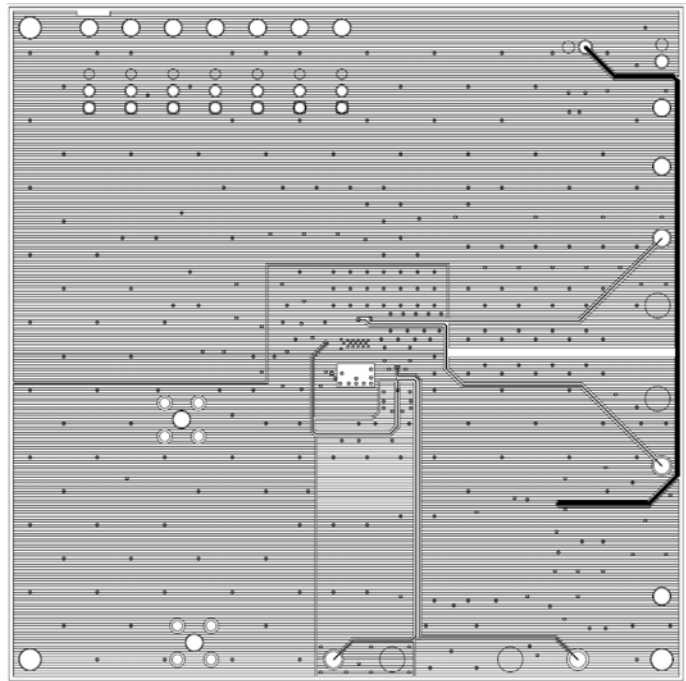


FIGURE 6. INTERNAL LAYER 2

ISL95210EVAL1Z Layout (Continued)

Board consists of 4 layers of 2 ounce copper

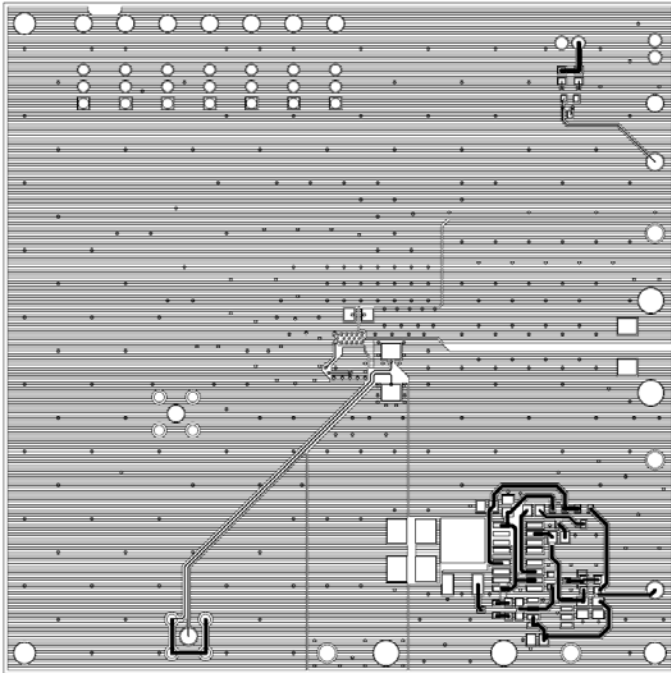


FIGURE 7. BOTTOM LAYER

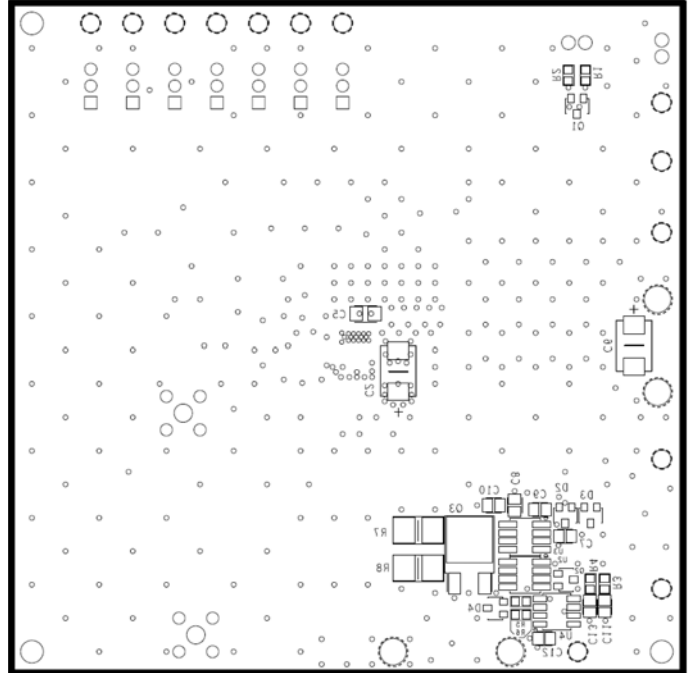


FIGURE 8. SILK SCREEN BOTTOM

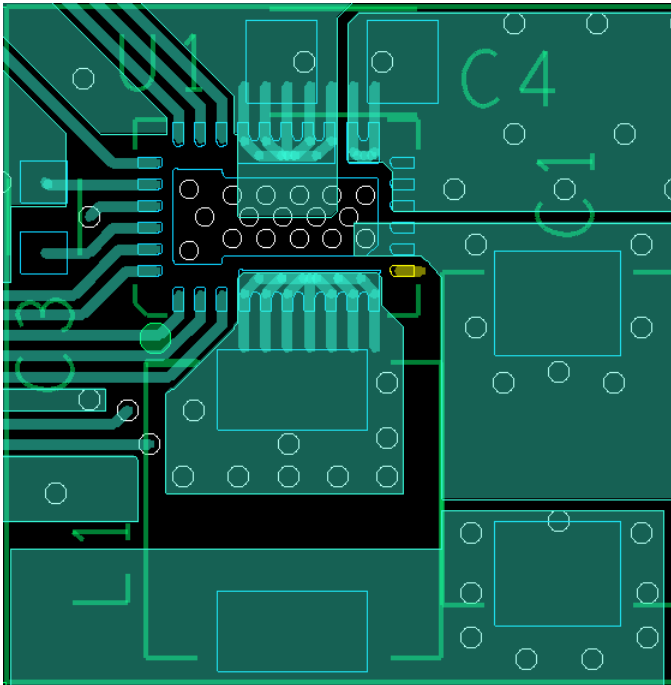


FIGURE 9. ZOOM OF APPLICATION ONLY (TOP LAYER)

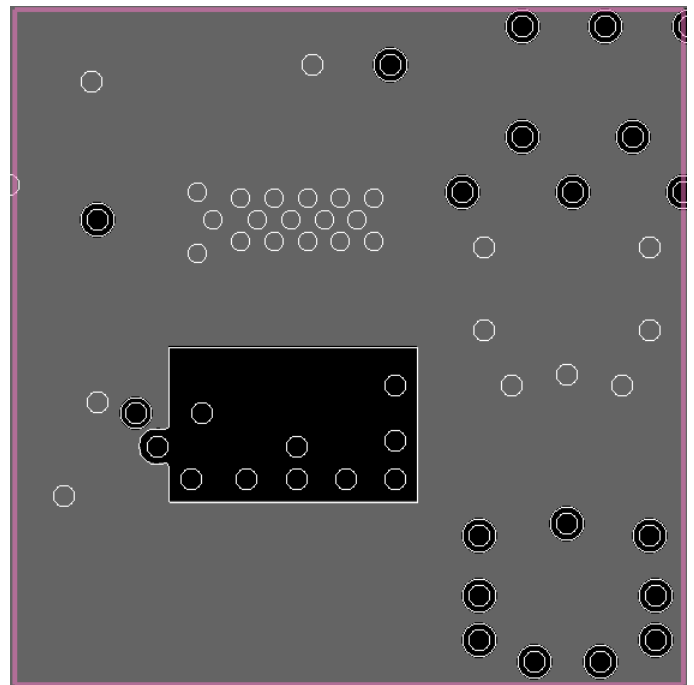


FIGURE 10. ZOOM OF APPLICATION ONLY (INTERNAL LAYER 1)

ISL95210EVAL1Z Layout (Continued)

Board consists of 4 layers of 2 ounce copper

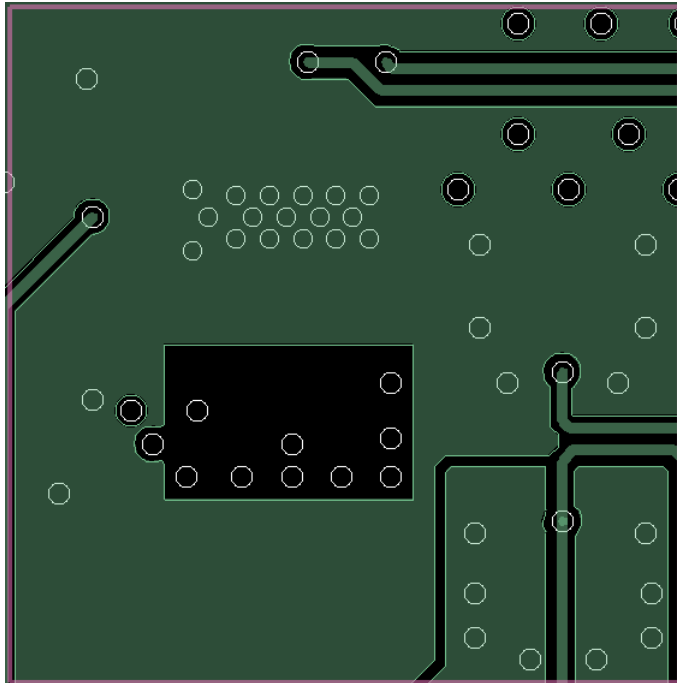


FIGURE 11. ZOOM OF APPLICATION ONLY (INTERNAL LAYER 2)

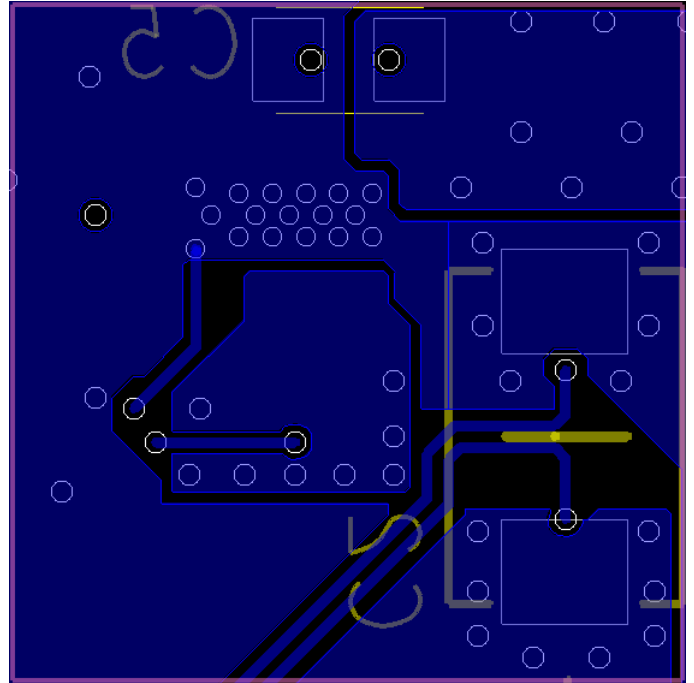


FIGURE 12. ZOOM OF APPLICATION ONLY (BOTTOM LAYER)

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