

Wide V_{IN} Dual Integrated Buck Regulator With 6A/6A Continuous Output Current and LDOs

Specifications

F _{SW} POSITION	SWITCHING FREQUENCY (kHz)	V _{IN} RANGE (V)	V _{OUT} RANGE (V)	PART SIZE (2mm)
F _{SW} = GND	300	4.5V to 16V	0.6V to 5V	5X6
F _{SW} = OPEN	500			
F _{SW} = VCC	1000			

NOTES:

- The Evaluation Kit default configuration is V_{OUT1} = 3.3V, V_{OUT2} = 5V, F_{SW} = 1MHz.
- V_{REF} is 0.8.

Description

The ISL95901EVAL1Z kit is intended for use by customers with requirements for Point-of-Load applications sourcing from 4.5V to 16V. The ISL95901EVAL1Z evaluation board is used to demonstrate the performance of the ISL95901 dual high-efficient buck regulator and LDOs.

The ISL95901 is offered in a 5mmx6mm 46 Ld QFN package.

Key Features

- Wide input voltage range from 4.5V to 16V
- Adjustable output voltages with continuous output current up to 6A
- 1% Accuracy over-temperature and V_{CC} range
- Built-in low-power LDO for external μ C
- Built-in compensation
- Internally Set SS and OCP
- Independent enable, power-good, and standby control inputs for each output
- Innovative R⁴(™) modulator
- Boot undervoltage detection

Recommended Equipment

The following materials are recommended to perform testing:

- 0V to 20V power supply with at least 10A source current capability or 5V battery
- Electronic loads capable of sinking current up to 7A
- Digital Multimeters (DMMs)
- 100MHz quad-trace oscilloscope
- Signal generator

Quick Setup Guide

1. Ensure that the circuit is correctly connected to the supply and loads prior to applying any power.
2. Connect the bias supply to V_{IN}, the plus terminal to V_{IN1}, P1 and the negative return to PGND, P2.
3. Connect the output load to V_{OUT1} and V_{OUT2}, the plus terminal to V_{OUT1}, P6 and V_{OUT2}, P8. The negative return to PGND, P7 and P9.
4. Verify that the position is ON for SW1 and SW4.
5. Turn on the power supply.
6. Verify the output voltage is 3.3V for V_{OUT1} and 5V for V_{OUT2}.

Evaluating the Other Output Voltage

The ISL95901 kit output is preset to 3.3V (V_{OUT1}) and 5V (V_{OUT2}), however, output voltages can be adjusted from 0.8V to 5V. The output voltage programming resistor, R₃, R₄ will depend on the desired output voltage of the regulator. The value for the feedback resistor is typically between 10 Ω and 200k Ω , as shown in Equation 1.

$$R_{3,4} = R_{1,2} \left(\frac{V_O - V_{FB}}{V_{FB}} \right) \quad (\text{EQ. 1})$$

If the output voltage desired is 0.8V, then R_{3,4} is left unpopulated and R_{1,2} is shorted. For faster response performance, add 100pF in parallel to R_{3,4}. Check bode plot to insure optimum performance.

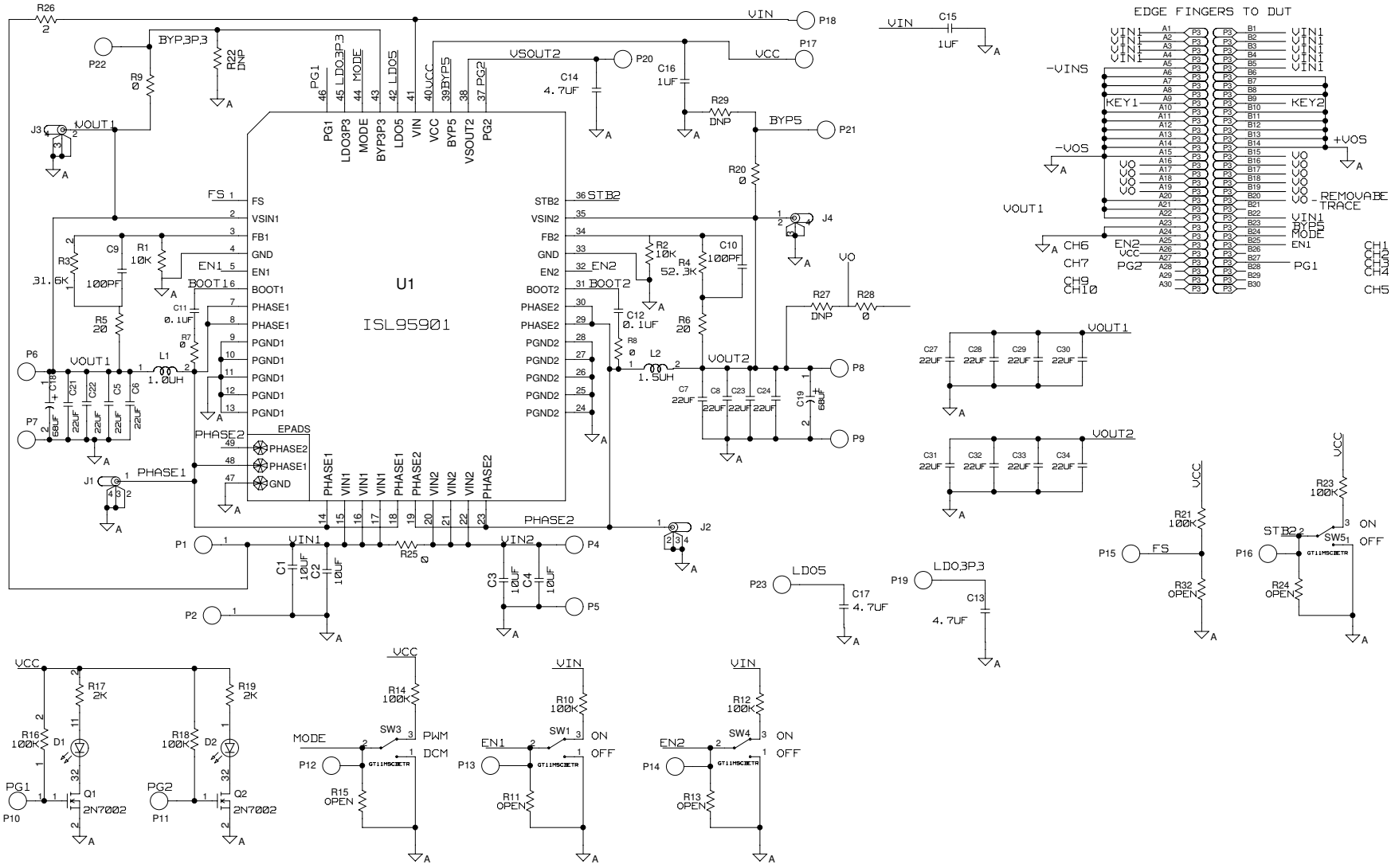
Switches Control

The ISL95901 evaluation board contains switches SW1, SW3 and SW4 for various controls of the ISL95901 circuitries. Table 1 details this function.

TABLE 1. SWITCH SETTINGS

SW1	ENABLE	FUNCTION
1	OFF	DISABLE VOUT1
3	ON	ENABLE VOUT1
SW3	MODE	FUNCTION
1	PWM	Fixed PWM frequency at light load
3	DCM	Force continuous mode
SW4	ENABLE	FUNCTION
1	OFF	DISABLE VOUT2
3	ON	ENABLE VOUT2

ISL95901EVAL1Z Schematic



Application Note 1743

ISL95901EVAL1Z Bill of Materials

PART NUMBER	QTY	UNITS	REFERENCE DESIGNATOR	DESCRIPTION	MANUFACTURER	MANUFACTURER PART
ISL95901EVAL1ZREVDPCB	1	ea		PWB-PCB, ISL95901EVAL1Z, REVD, ROHS	IMAGINEERING INC	ISL95901EVAL1ZREVDPCB
H1044-00104-16V10-T	2	ea	C11, C12	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
H1045-00101-50V5-T	2	ea	C9, C10	CAP, SMD, 0603, 100pF, 50V, 5%, COG, ROHS	PANASONIC	ECJ-1VC1H101J
H1045-00106-16V20-T	2	ea	C15, C16	CAP, SMD, 0603, 10µF, 16V, 20%, X5R, ROHS	TAIYO YUDEN	EMK107BBJ106MA-T
H1046-00106-25V10-T	4	ea	C1-C4	CAP, SMD, 0805, 10µF, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
H1046-00226-6R3V10-T	8	ea	C5-C8, C21-C24	CAP, SMD, 0805, 22µF, 6.3V, 10%, X5R, ROHS	JOHANSON DIELECTRICS INC	6R3R15X226KV4E
H1046-00475-10V10-T	3	ea	C13, C14,C17	CAP, SMD, 0805, 4.7µF, 10V, 10%, X5R, ROHS	AVX	0805ZD475KAT2A
H1046-DNP	0	ea	C27-C34	CAP, SMD, 0805, DNP-PLACE HOLDER, ROHS		
131-4353-00	4	ea	J1-J4	CONN-SCOPE PROBE TEST PT, COMPACT, PCB MNT, ROHS	TEKTRONIX	131-4353-00
1514-2	8	ea	P1, P2, P4-P9	CONN-TURRET, TERMINAL POST, TH, ROHS	KEYSTONE	1514-2
5000	14	ea	P10-P23	CONN-MINI TEST PT, VERTICAL, RED, ROHS	KEYSTONE	5000
LTST-C190KGKT-T	2	ea	D1, D2	LED, SMD, 0603, GREEN CLEAR, 2V, 20mA, 571nm, 35mcd, ROHS	LITEON/VISHAY	LTST-C190KGKT
ETQ-P3W1R0WFN	1	ea	L1	COIL-PWR CHOKE, SMD, 7.3x6.6, 1.0µH, 20%, 8.1A, 6.9mΩ, ROHS	PANASONIC	ETQ-P3W1R0WFN
ETQ-P3W1R5WFN	1	ea	L2	COIL-PWR CHOKE, SMD, 7.3x6.6, 1.5µH, 20%, 6.6A, 9.8mΩ, ROHS	PANASONIC	ETQ-P3W1R5WFN
ISL95901IRZ	1	ea	U1	IC-PMIC SOLUTION, 46P, QFN, 5x5, ROHS	INTERSIL	ISL95901IRZ
2N7002-7-F-T	2	ea	Q1, Q2	TRANSISTOR, N-CHANNEL, 3 LD, SOT-23, 60V, 115mA, ROHS	DIODES, INC.	2N7002-7-F
H2505-DNP	0	ea	R22, R29	RESISTOR, SMD, 0603, 0.1%, MF, DNP-PLACE HOLDER		
H2510-00R00-1/16W-T	2	ea	R7, R8	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
H2511-00020-1/10W1-T	1	ea	R26	RES, SMD, 0603, 2Ω, 1/10W, 1%, TF, ROHS	YAGEO	9C06031A2R00FGHFT

ISL95901EVAL1Z Bill of Materials (Continued)

PART NUMBER	QTY	UNITS	REFERENCE DESIGNATOR	DESCRIPTION	MANUFACTURER	MANUFACTURER PART
H2511-00200-1/10W1-T	2	ea	R5, R6	RES, SMD, 0603, 20Ω, 1/10W, 1%, TF, ROHS	PANASONIC	ERJ-3EKF20ROV
H2511-00R00-1/10W-T	2	ea	R9, R20	RES, SMD, 0603, 0Ω, 1/10W, TF, ROHS	VENKEL	CR0603-10W-000T
H2511-01002-1/10W1-T	2	ea	R1, R2	RES, SMD, 0603, 10k, 1/10W, 1%, TF, ROHS	KOA	RK73H1JT1002F
H2511-01003-1/10W1-T	7	ea	R10, R12, R14, R16, R18, R21, R23	RES, SMD, 0603, 100k, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-1003FT
H2511-02001-1/10W1-T	2	ea	R17, R19	RES, SMD, 0603, 2k, 1/10W, 1%, TF, ROHS	KOA	RK73H1JT2001F
H2511-03162-1/10W1-T	1	ea	R3	RES, SMD, 0603, 31.6k, 1/10W, 1%, TF, ROHS	VISHAY	CRCW06033162F
H2511-05232-1/10W1-T	1	ea	R4	RES, SMD, 0603, 52.3k, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-5232FT
H2511-DNP	0	ea	R11, R13, R15, R24, R32	RES, SMD, 0603, DNP-PLACE HOLDER, ROHS		
H2514-00R00-1/4W-T	2	ea	R25, R28	RES, SMD, 1210, 0Ω, 1/4W, TF, ROHS	VENKEL	CR1210-4W-000
H2514-DNP	0	ea	R27	RES, SMD, 1210, DNP, DNP, DNP, TF, ROHS		
GT11MSCBE-T	4	ea	SW1, SW3-SW5	SWITCH-TOGGLE, SMD, 6PIN, SPDT, 2POS, ON-ON, ROHS	ITT INDUSTRIES/C&K DIVISION	GT11MSCBE
4X6-STATIC-BAG	1	ea	PLACE ASSY IN BAG	BAG,STATIC, 4x6, ZIPLOC,ROHS	ULINE	S-2261
DNP	0	ea	C18,C19 (16TQC68M)	DO NOT POPULATE OR PURCHASE		
DNP	0	ea	P3 (3VH30/1JN5)	DO NOT POPULATE OR PURCHASE		
LABEL-DATE CODE	1	ea	AFFIX TO BACK OF PCB	LABEL-DATE CODE_BOM REV#_SERIAL# LABEL ON ZIL & QUEL	INTERSIL	LABEL-DATE CODE

ISL95901EVAL1Z Board Layout

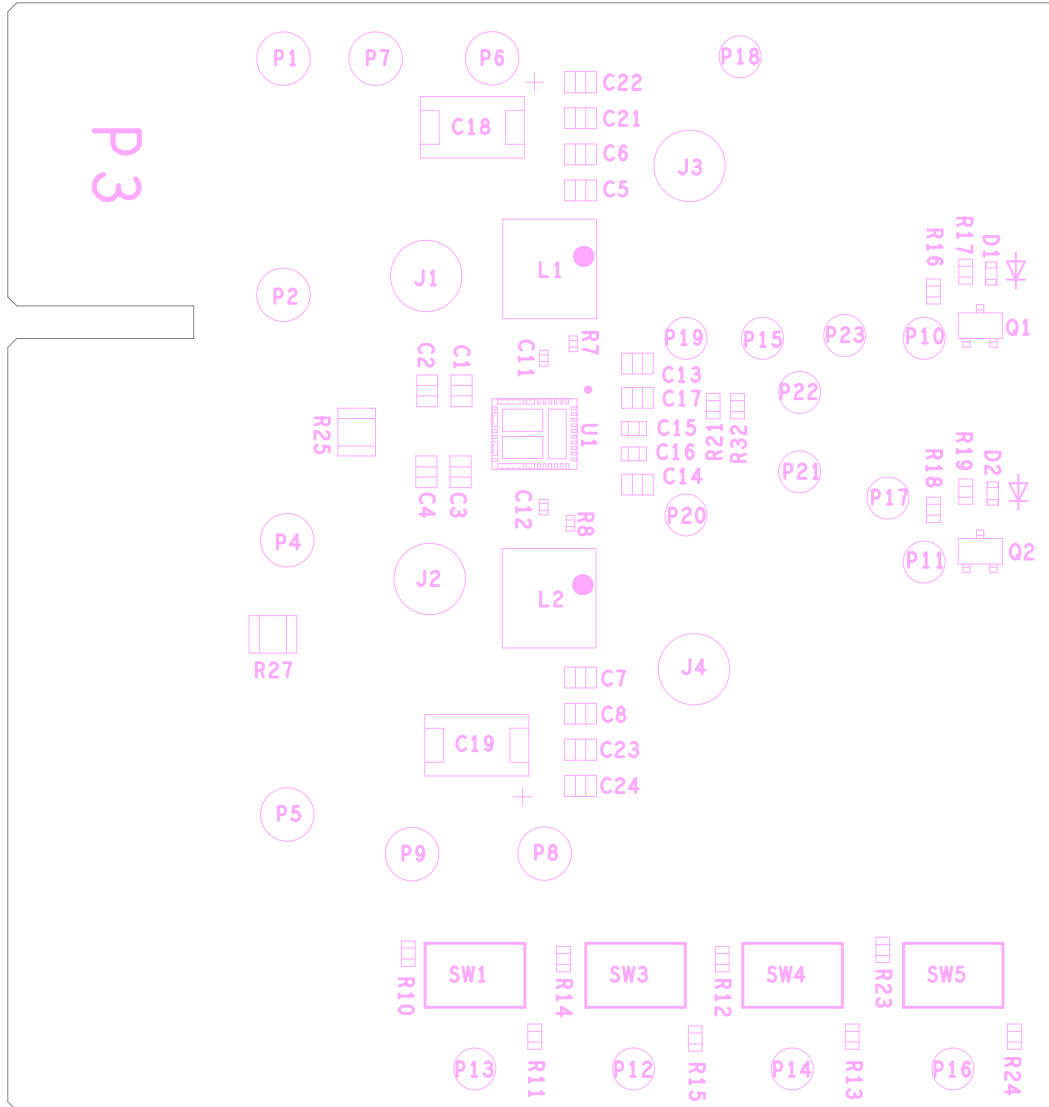


FIGURE 1. ASSEMBLY TOP

ISL95901EVAL1Z Board Layout (Continued)

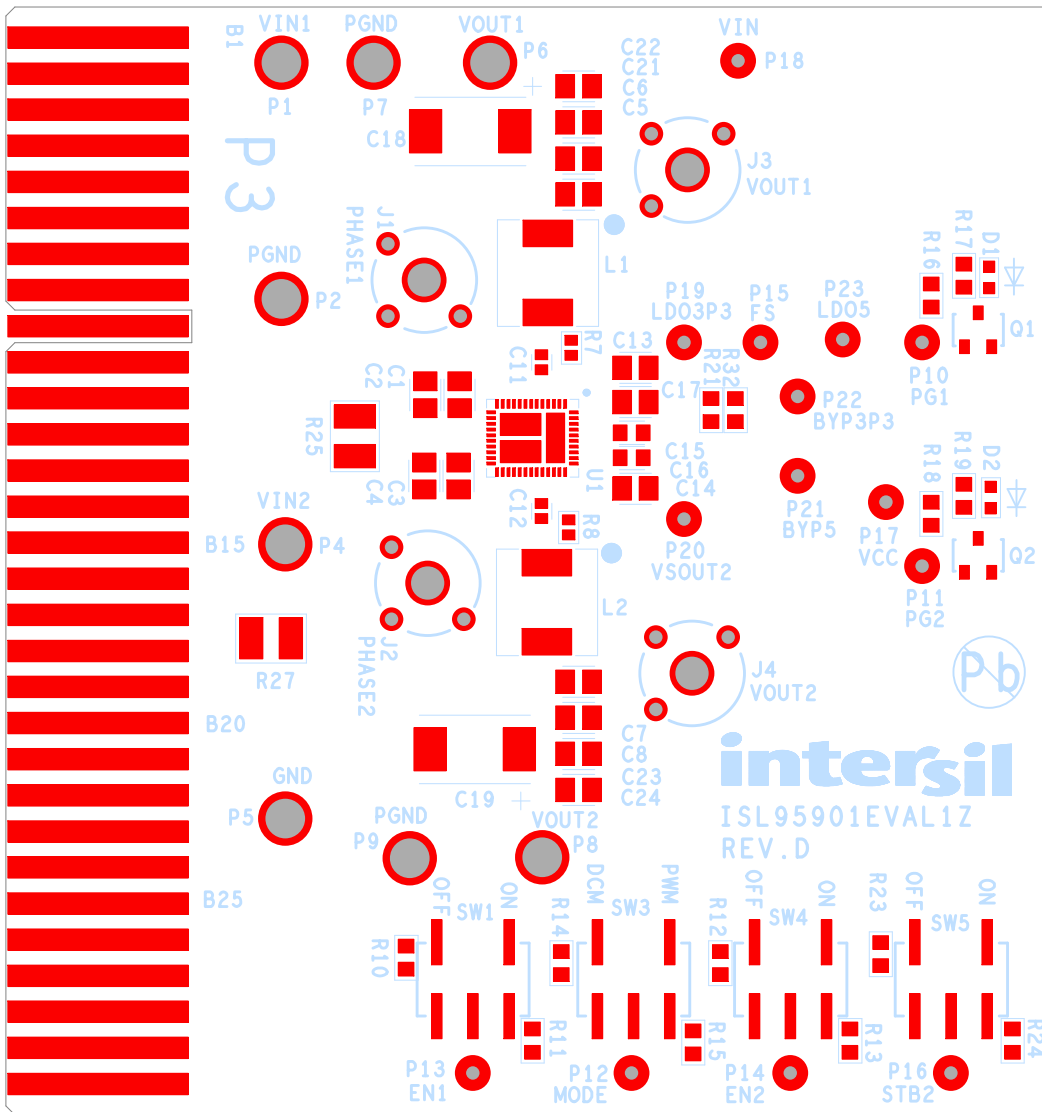


FIGURE 2. SILKSCREEN TOP

ISL95901EVAL1Z Board Layout (Continued)

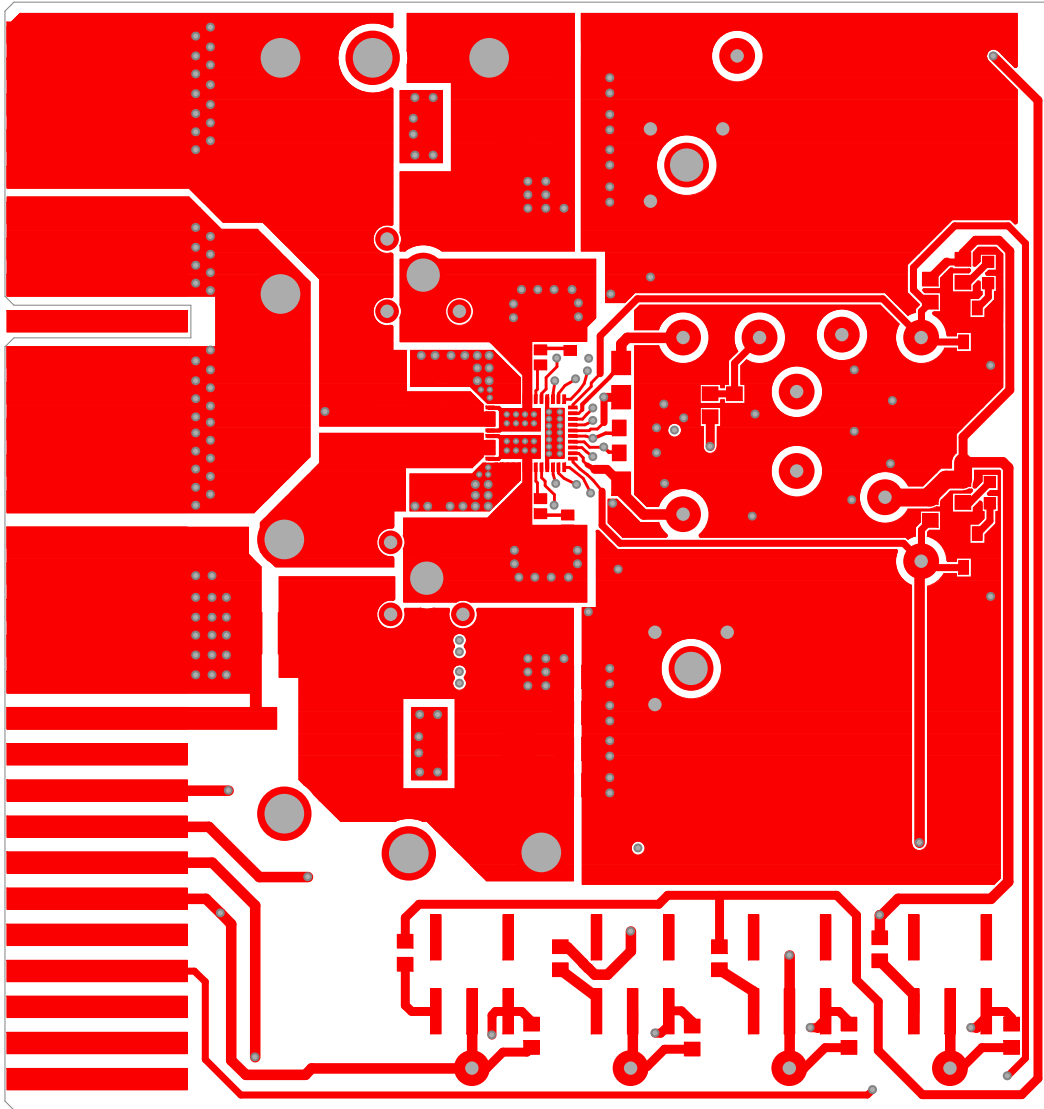


FIGURE 3. LAYER 1 (PRIMARY SIDE)

ISL95901EVAL1Z Board Layout (Continued)

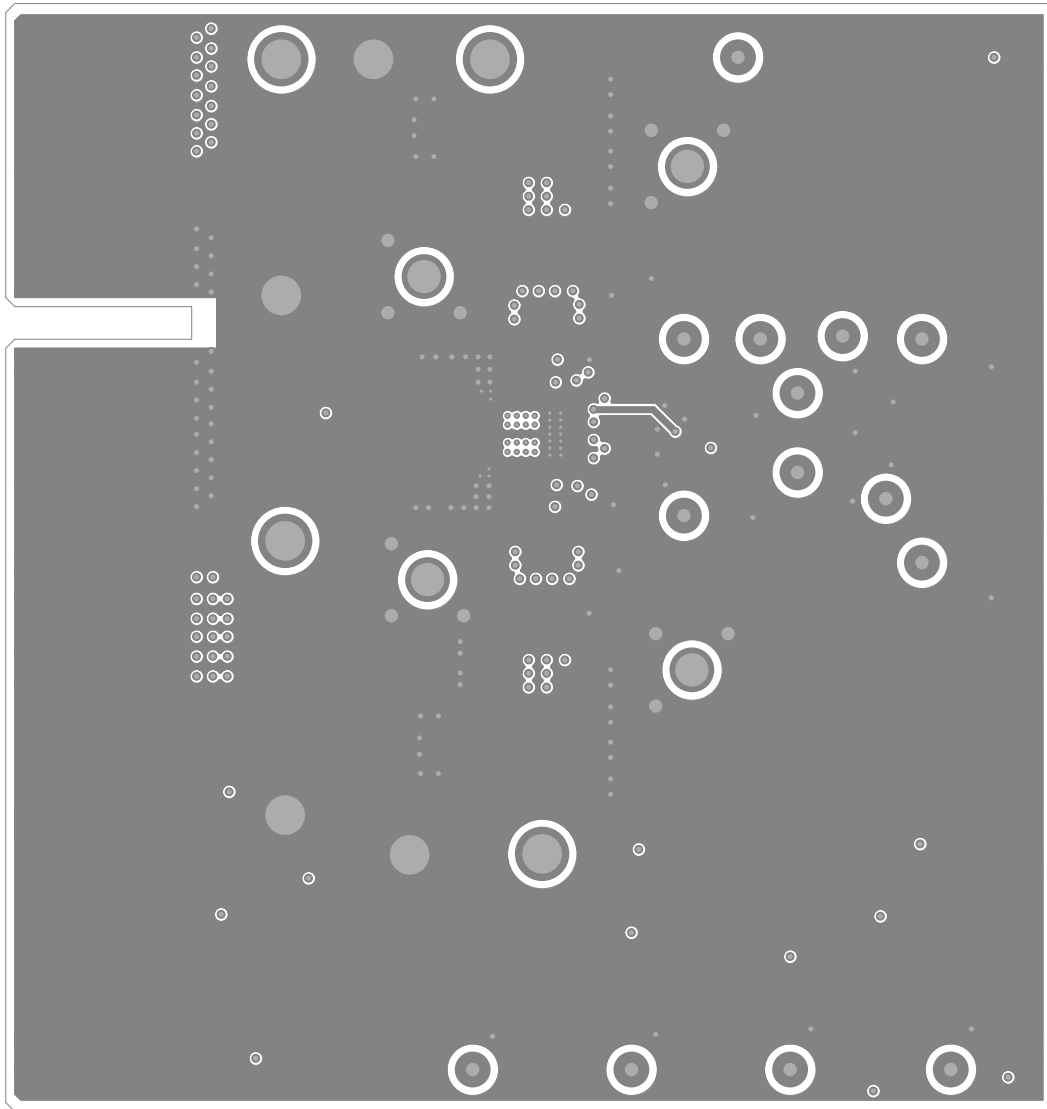


FIGURE 4. LAYER 2

ISL95901EVAL1Z Board Layout (Continued)

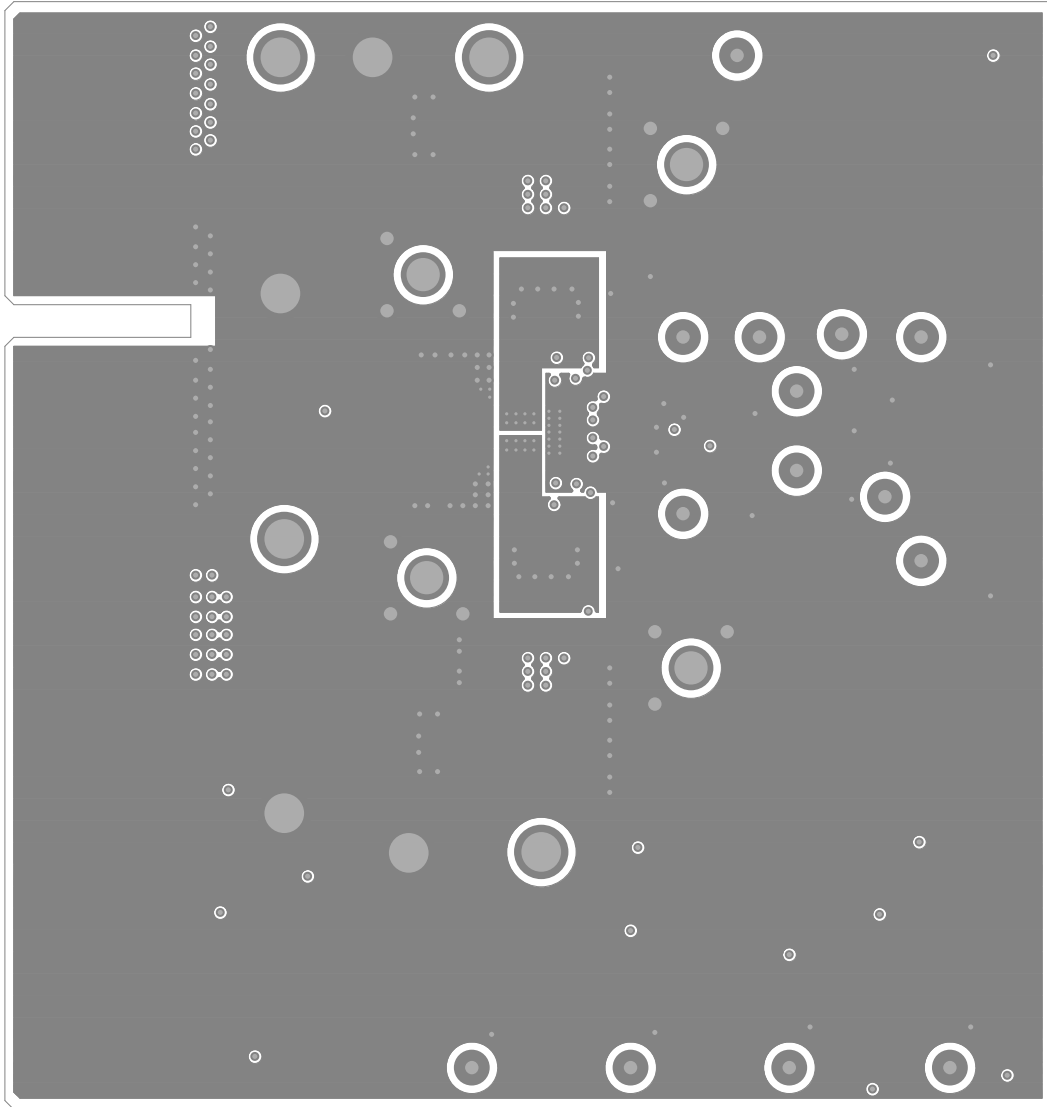


FIGURE 5. LAYER 3

ISL95901EVAL1Z Board Layout (Continued)

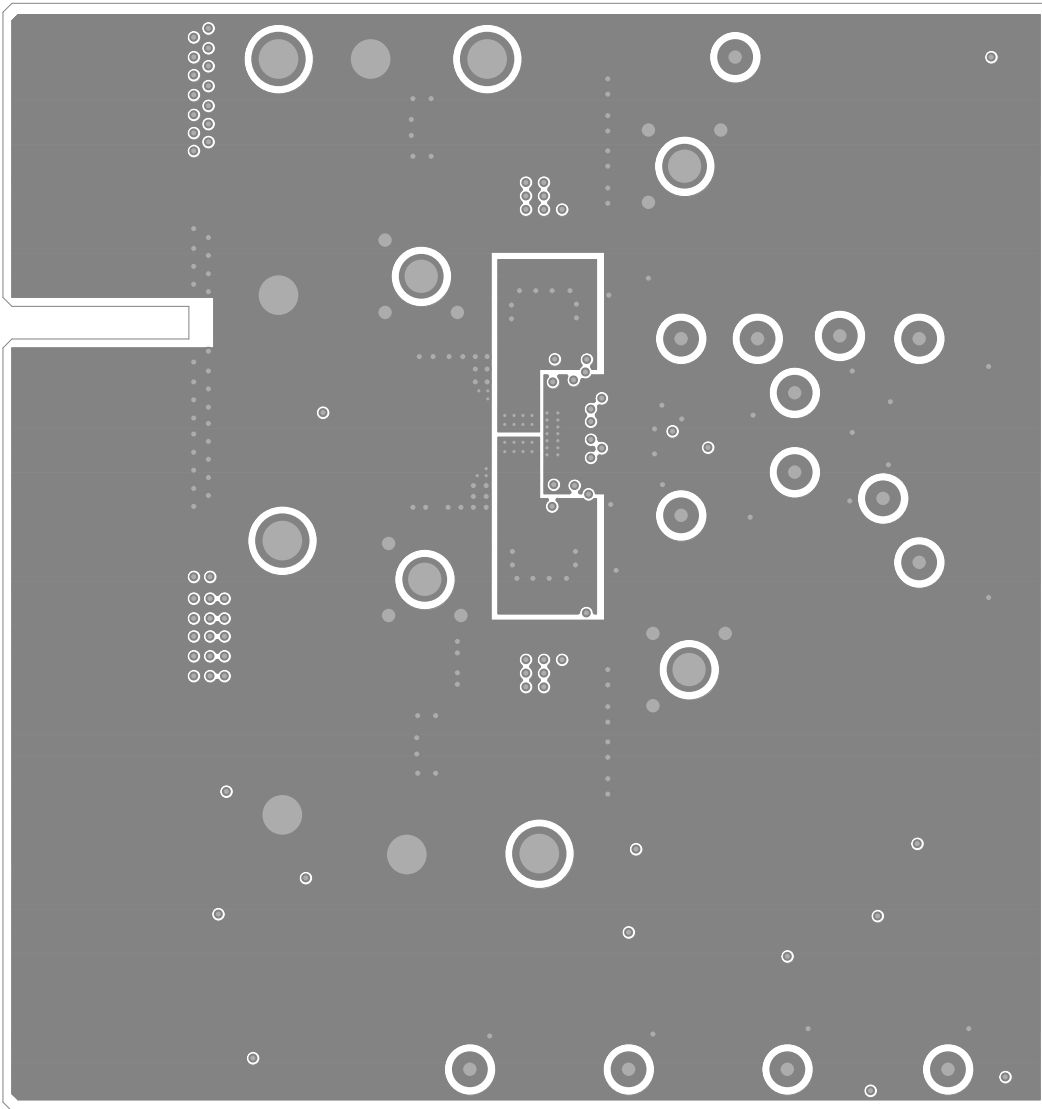


FIGURE 6. LAYER 4

ISL95901EVAL1Z Board Layout (Continued)

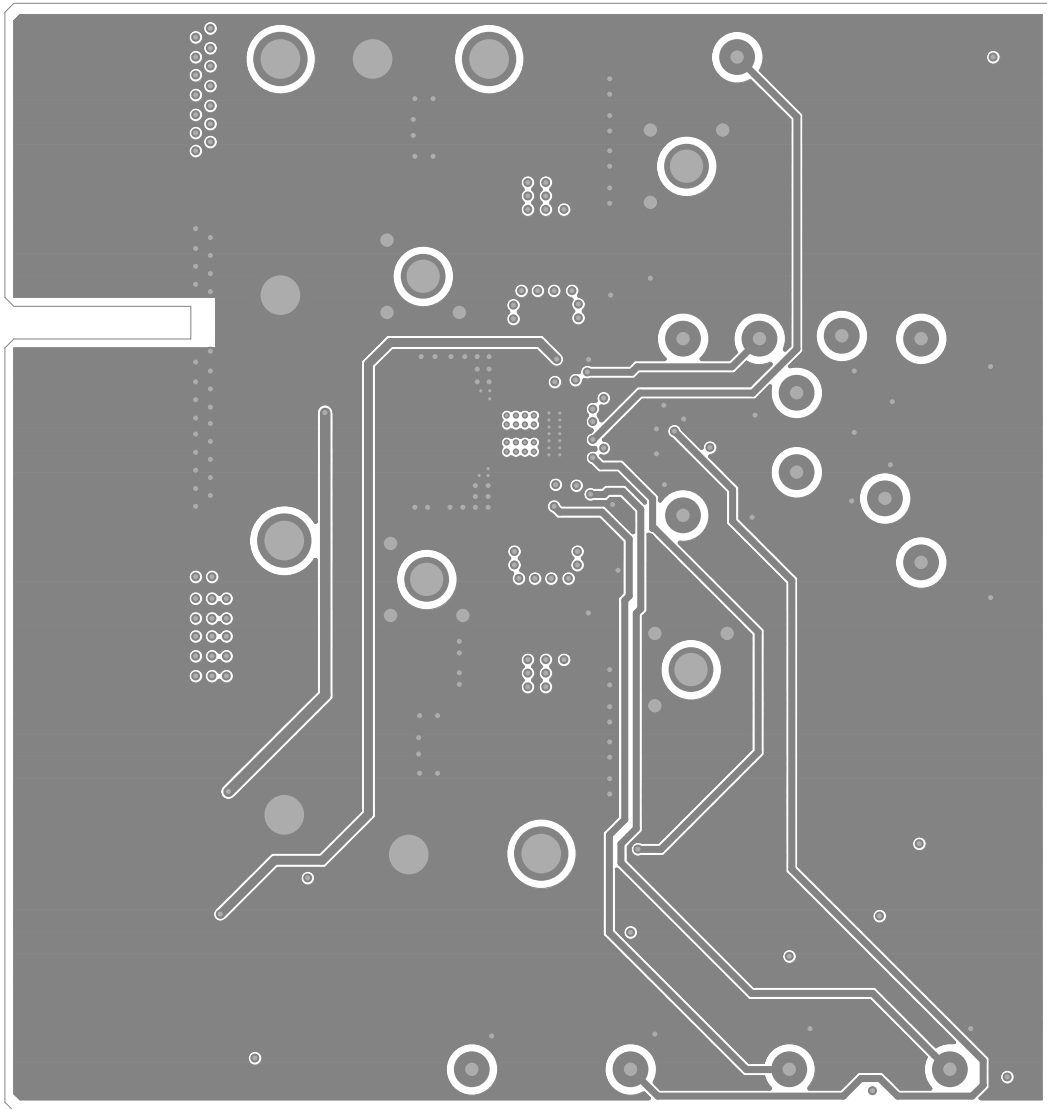


FIGURE 7. LAYER 5

ISL95901EVAL1Z Board Layout (Continued)

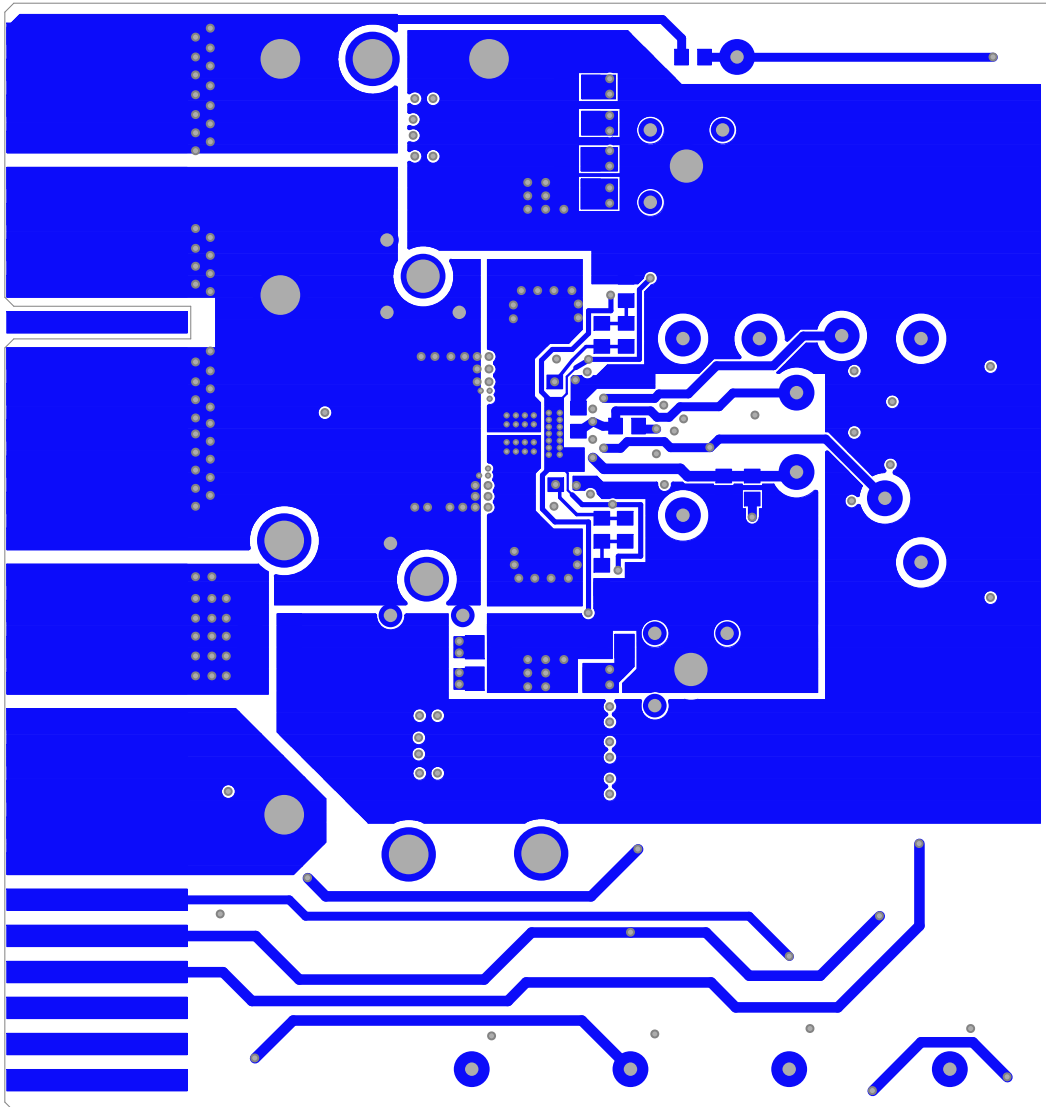


FIGURE 8. BOTTOM LAYER

ISL95901EVAL1Z Board Layout (Continued)

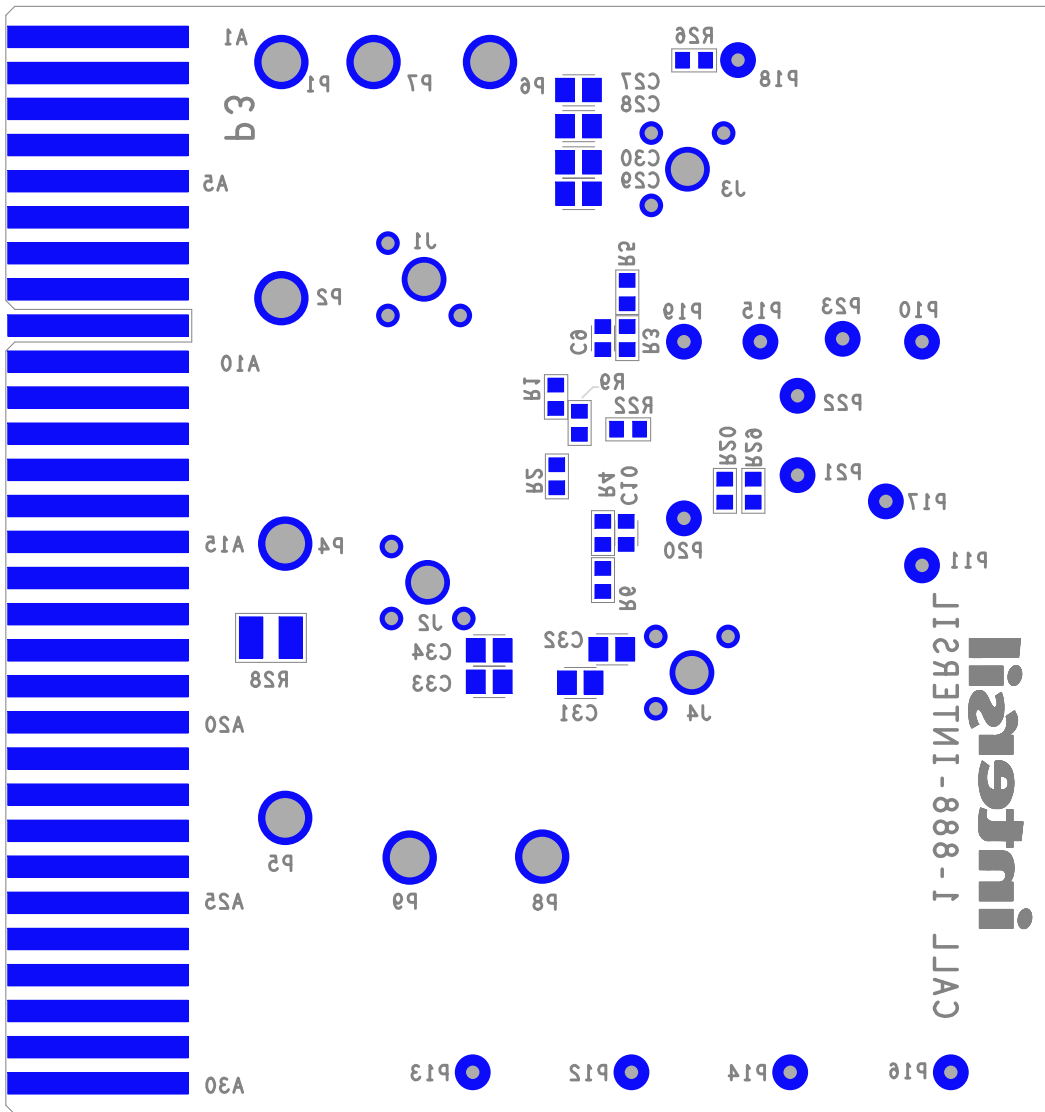


FIGURE 9. SILKSCREEN BOTTOM

ISL95901EVAL1Z Board Layout (Continued)

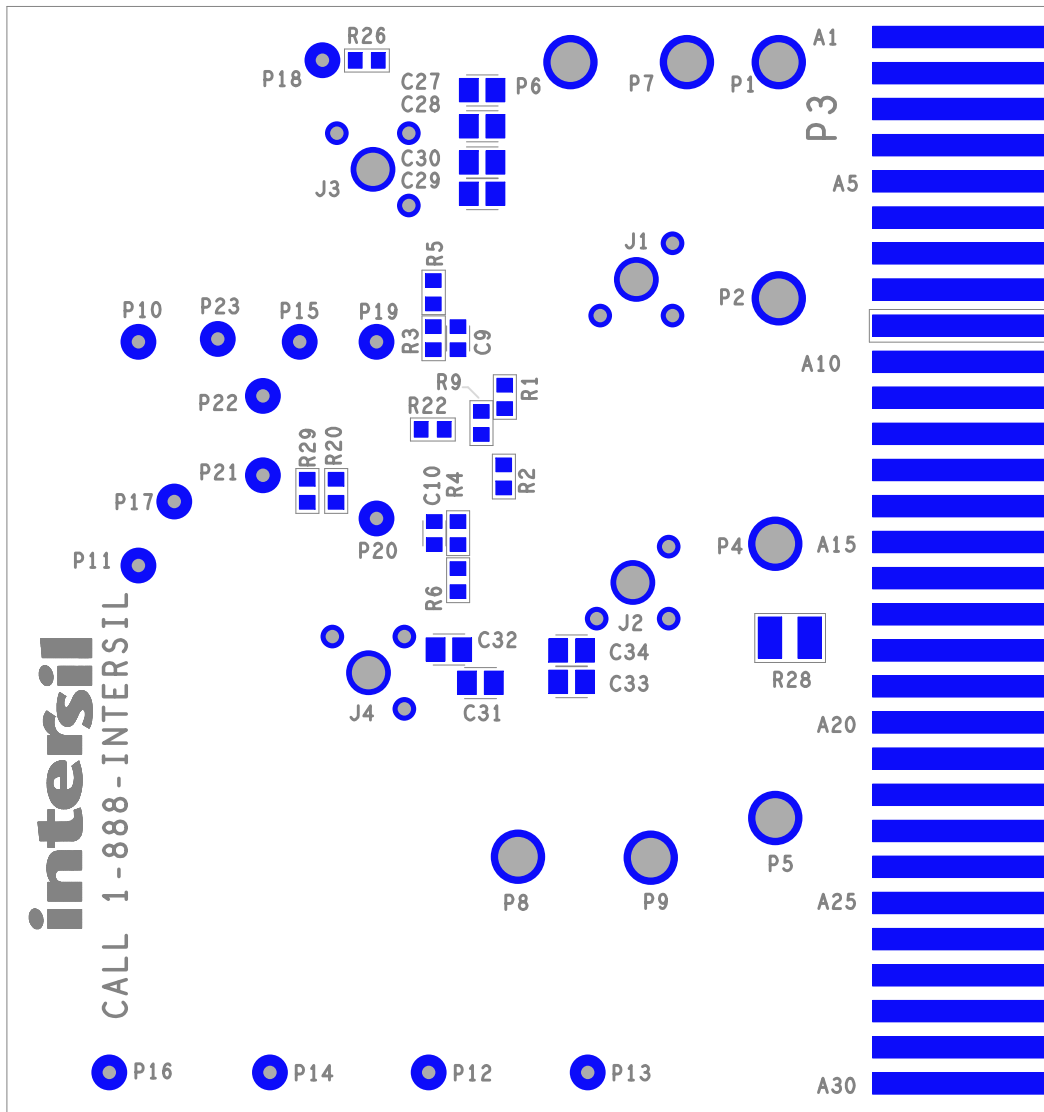


FIGURE 10. SILKSCREEN BOTTOM

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