

ISL55112 High Speed Dual Precision CCD Driver Evaluation Board User Guide

Background

Before getting started, the user should obtain a copy of the ISL55112 Data Sheet “High-Speed Dual Precision CCD Driver” (FN6649) from the Intersil Web site. Please refer to that document for the latest in recommended operating voltages and conditions.

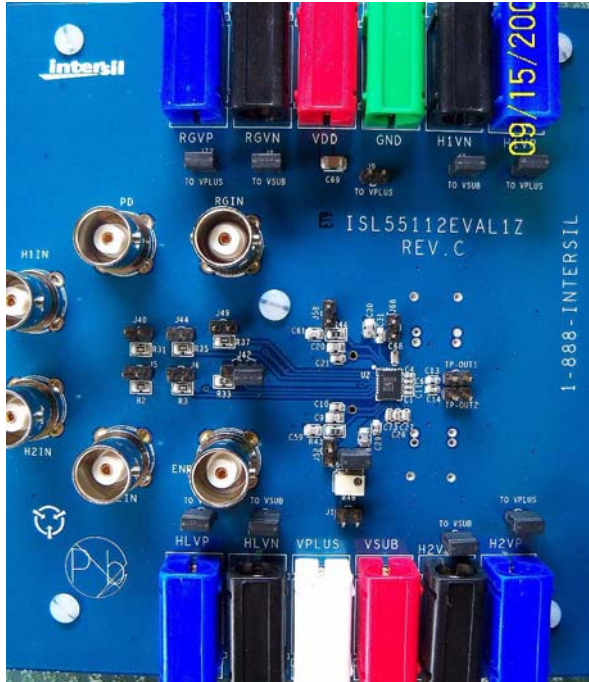


FIGURE 1. ISL55112EVAL1Z EVALUATION BOARD

Getting Started (Voltage Connection)

Driver Rails

The board is shipped with all driver rails connected in parallel via jumpers (H1VP, H2VP, HLVP and RGVP = VPLUS, H1VN, H2VN, HLVN and RGVN = VSUB). This simplifies getting started as only three supplies need be connected to the banana jacks. (A) VDD supply across VDD (Top Red) and GND (Top Green). B) VPLUS supply across VPLUS (Bottom White) and GND (Top Green). C) VSUB supply across VSUB (Bottom Red) and GND (Top Green).

(SEE BANANA POWER CONNECTIONS)

The user can connect to additional supplies by removing the jumpers and connecting a different voltage source. However, H1VP and H2VP and H1VN and H2VN need to be connected to the same potential. HLVP and HLVN can operate off a different supply if desired. Also RGVP and RGVN can also run at different voltage levels.

When using different driver rails, VPLUS needs to be connected to the most positive and VSUB the most negative. If your most positive Driver Rail is below VDD then VPLUS needs to be connected to VDD via J9.

When using multiple driver rail values, remember to disconnect the associated jumper located by each banana jack.

Power Inputs

When getting started, it is recommended that H1VP, H2VP, HLVP and RGVP be connected to a +4V supply and H1VN, H2VN, HLVN and RGVN be connected to a -4V supply. If no negative supply is intended, then connect H1VP, H2VP, HLVP and RGVP to +8V and H1VN, H2VN, HLVN, RGVN and VSUB to Ground.

The user should ensure that VPLUS is always connected to the most positive voltage required for the application. VSUB is always connected to the most negative driver voltage. In applications where the most negative VN voltage is 0, VSUB should also be connected to ground.

As previously stated, the boards ship with jumpers that enable the simplest power connections:

1. VSUB = -4.0V (Default Jumper configuration connects H1VN, H2VN, RGVN and HLVN to VSUB)
2. VDD = 3.3V
3. VPLUS = +4.0V (Default Jumper configuration connects H1VP, H2VP, RGVP and HLVP to VPLUS) See ISL55112 Evaluation Board Test for detailed information.

Once power is applied:

- VDD Current ~1.0mA
- VPLUS, VSUB Current ~6mA.

Power Mode Pins (Default conditions)

The board is shipped to have the part come up in Standby Mode. EN is pulled high via J42 (Position 2-3) and PD is pulled low via R35 (50Ω to ground)

Digital Inputs

Inputs H1, H2, RG, HL, PD and EN all have 50Ω resistors to ground for working with typical laboratory signal generators. The user may wish to remove these resistors if Logic Signal Sources are used.

(Note, PD should never be toggled above 1Hz. The PD pin should not be considered a high speed toggling input. It should only be used as a static input where the device is turned off and on infrequently. See the “Power Saving Mode Control” section in the ISL55112 Data Sheet “High-Speed Dual Precision CCD Driver” (FN6649) for more details).

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Probe Connections

All inputs and driver outputs have a lead-less scope probe connection. This accommodates Active Probes and reduces measurement errors due to scope lead inductance.

Driver Outputs during Power-Up

Driver outputs will remain in a HiZ condition until a pulse is applied to the respective input. Driver outputs will follow the input level unless EN is brought to a low condition. A high to low transition on the EN pin will cause the drivers to retain (freeze) in their last state. When EN is brought high again and an additional transition occurs on the input, the drivers will follow their respective inputs.

DRIVER LOADS

H1/H2

The board ships with a 300pF capacitor to ground on each of H1 and H2 Outputs. C13 and C14 are located adjacent to the TP_OUT1 and TP_OUT2 probe connections.

RG/HL

The board ships with 22pF Capacitor to ground on the RG and HL Outputs. C61 (RG) and C59 (HL) are located adjacent to the probe connections.

ROIC Adjustment

A unique feature of the ISL55112 is the adjustable impedance of the H1 and H2 High Current Drivers. A potentiometer is connected to the ROIC pin of the device. The default value is 68k when measured with respect to VSUB.

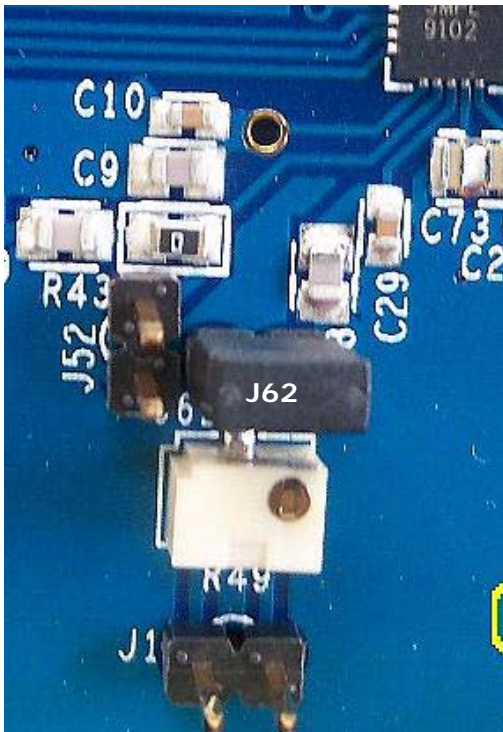


FIGURE 2.

The suggested range of R49 is 40kΩ to 120kΩ, with 68kΩ considered nominal. J62 is a series jumper that can be removed to enable easy measurement of the ROIC value. J1 provides a physical means of measuring across R49, ROIC to VSUB.

Changing the ROIC value will change the Rise/Fall characteristics of the H1 and H2 outputs. (See "Output Impedance Control (OIC)" section in the ISL55112, data sheet (FN6649)).

ISL55112 Evaluation Board Test

1. Optional Factory Setting verification: Remove J62, connect ohmmeter across J1, adjust R49 for a reading of 68kΩ. Reconnect J62.
2. Verify/Install Jumpers in default configuration.

TABLE 1. POWER SUPPLY DEFAULT JUMPER CONNECTIONS

RGVP	Blue	J72	VPLUS	Installed
RGVN	Black	J8	VSUB	Installed
VDD	Red	J9	VPLUS	Not Installed
GND	Green			
H1VN	Black	J3	VSUB	Installed
H1VP	Blue	J69	VPLUS	Installed
HLVP	Blue	J2	VPLUS	Installed
HLVN	Black	J7	VSUB	Installed
VPLUS	White			
VSUB	Red			
H2VN	Black	J4	VSUB	Installed
H2VP	Blue	J71	VPLUS	Installed
ENB		J42(2-3)		Installed Position 2-3
ROIC		J62		Installed
ROIC Probe		J1		Probe Connection
Probe Connections: Driver Outputs				Load
RGOUT		J58		C61-22pF
H1OUT		TPOUT1		C13-300pF
H2OUT		TPOUT2		C14-300pF
HLOUT		J52		C59-22pF
Probe Input Connections				
RGIN		J49		
PD		J44		
H1IN		J40		
H2IN		J5		
HLIN		J6		
ENB		J42(1-2)		

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3. Banana Power Connections:

- VDD supply across VDD (Top Red) and GND (Top Green)
- VPLUS supply across VPLUS (Bottom White) and GND (Top Green)
- VSUB supply across VSUB (Bottom Red) and GND (Top Green).

4. Power-up Sequence

- Set VDD supply to 3.3 voltages and turn on.
- Set VSUB supply to -4.0V and turn on.
- Set VPLUS supply to +4.0V and turn on.

5. Driver Verification

(Note all drivers will now output +4.0V for a high and -4.0V for a low.)

Set-up a 10MHz square wave (3.3V, 0V amplitude) and connect to each driver input as follows:

- RGIN: connect signal source to RGIN BNC, observe square wave across J58.

- H1IN: connect signal source to H1IN BNC, observe square wave across TPOUT1.
- H2IN: connect signal source to H2IN BNC, observe square wave across TPOUT2.
- HLIN: connect signal source to HLIN BNC, observe square wave across J52.

5. Mode Control Verification

- With HLIN still running, move J42 from Pos2-3 to Pos1-2. Verify that the HLIN output stops moving and stays at either +4.0 or -4.0V.
- Apply 3.3V to the PD Input and verify VDD current goes to <1mA. (Note: do not apply a square wave to the PD input. PD should not be cycled at frequencies above 1Hz).

7. Power-down Sequence

- Remove Input square wave.
- Remove VPLUS, VSUB
- Remove VDD.

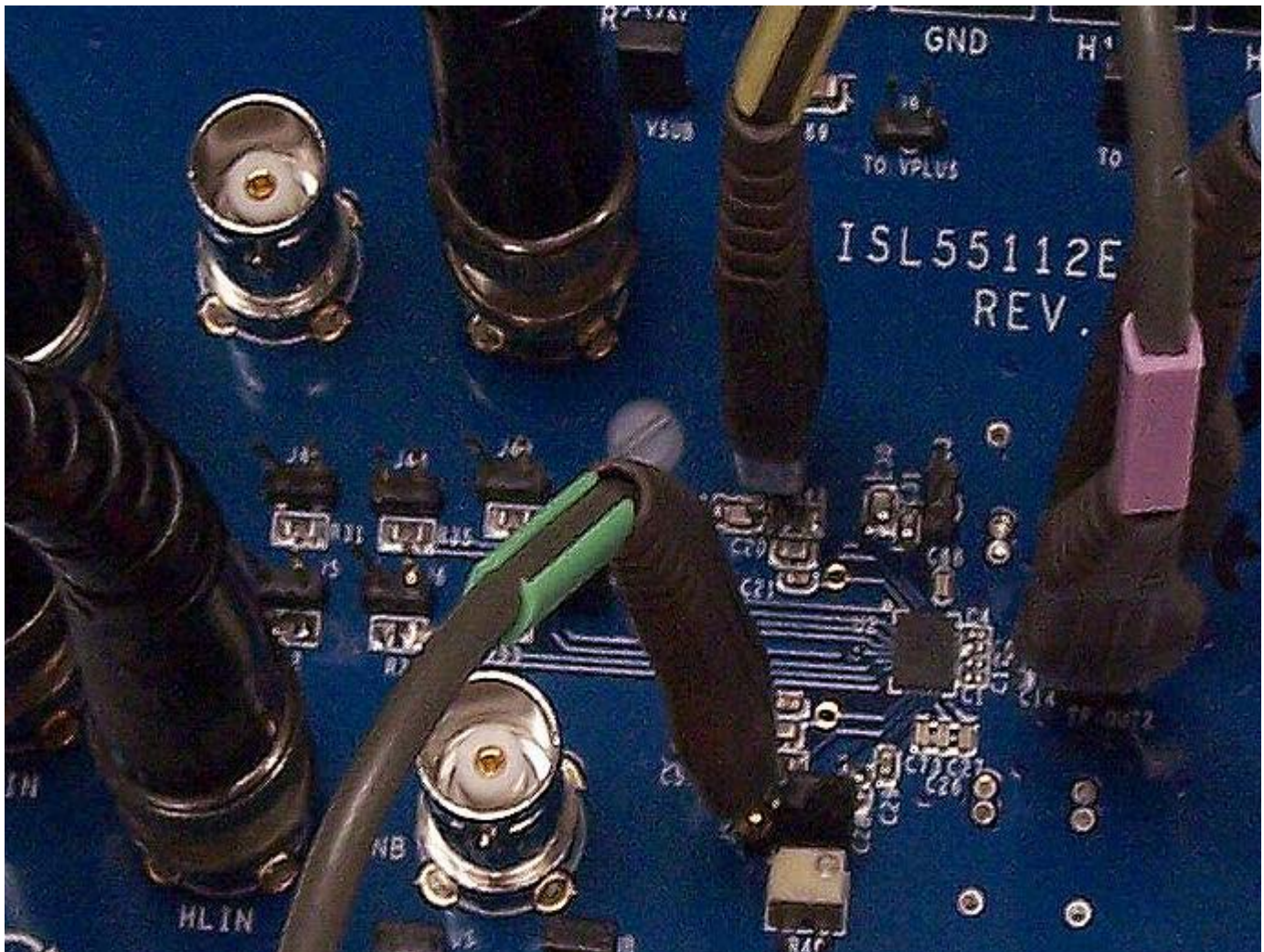


FIGURE 3. ISL55112 EVALUATION BOARD ACCOMMODATES LEAD-LESS SCOPE PROBE CONNECTIONS.

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Evaluation Board Notes

1. Do not exceed recommended Power Dissipation as detailed in the ISL55112 Data Sheet.
2. User may wish to reduce power supply requirements by running VSUB and all VN drivers at GND. When operating VSUB at GND, raise the VPLUS voltage to a minimum of 5.5V.
3. PD and Enable operation is also covered in detail in the ISL55112 Data Sheet (FN6649).
4. When operating the Driver High Rails below VDD, connect install J9 to bias VPLUS at the VDD voltage. Remove default VPLUS jumpers.
5. H1VN and H2VN should always be operated the same voltage.

TABLE 2. BILL OF MATERIALS

PART NUMBER	QTY	UNITS	REFERENCE DESIGNATOR	DESCRIPTION	MANUFACTURER	MANUFACTURER PART
ISL55112EVAL1ZREVCPCB	1	ea		PWB-PCB, ISL55112EVAL1Z, REVC, ROHS	IMAGINEERING INC	ISL55112EVAL1ZREVC PCB
0306YD104KAT2A-T	4	ea	C26, C27, C68, C73	CAP, LO INDUCTANCE, SMD, 0306, 0.1µF, 16V, 10%, X5R, ROHS	AVX	0306YD104KAT2A
H1044-00104-16V10-T	4	ea	C1, C4, C6, C11	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	MURATA	GRM36X7R104K016AD
H1045-00104-25V10-T	4	ea	C2, C5, C7, C12	CAP, SMD, 0603, .auf, 25V, 10%, X7R, ROHS	MURATA	GRM39X7R104K025AD
H1045-00104-50V10-T	4	ea	C10, C21, C29, C31	CAP, SMD, 0603, 0.1µF, 50V, 10%, X7R, ROHS	TDK	C1608X7R1H104K
H1045-00301-50V5-T	2	ea	C13, C14	CAP, SMD, 0603, 300pF, 50V, 5%, COG, ROHS	MURATA	GRM1885C1H301JA01D
H1046-00102-50V5-T	4	ea	C9, C20, C28, C30	CAP, SMD, 0805, 1000pF, 50V, 5%, NPO, ROHS	PANASONIC	ECU-V1H102JCX
H1046-00220-50V5-T	2	ea	C59, C61	CAP, SMD, 0805, 22pF, 50V, 5%, NPO, ROHS	PANASONIC	ECU-V1H220JCN
H1065-00475-16V10-T	1	ea	C69	CAP, SMD, 1206, 4.7µF, 16V, 10%, X7R, ROHS	KEMET	C1206C475K4RACTU
H1121-00226-25V10-D-T	4	ea	C3, C8, C15, C19	CAP TANT, LOW ESR, SMD, D, 22µF, 25V, 10% , ROHS	AVX	TPSD226K025R0200
31-5329-52RFX	6	ea	PD, ENB, H11N, H21N, HL1N, RG1N	CONN-BNC, RECEPTACLE, TH, 4 POST, 50Ω, GOLDCONTACT, ROHS	AMPHENOL	31-5329-52RFX
571-0100	4	ea	H1VN, H2VN, H1VN, H2VN, H1VN, H2VN, H1VN, H2VN	CONN-PLUG, BANA-INSUL-SDRLESS, BLACK, 4mm, RA	DELTRON	571-0100
571-0200	4	ea	H1VP, H2VP, H1VP, H2VP, H1VP, H2VP, H1VP, H2VP	CONN-PLUG, BANA-INSUL-SDRLESS, BLUE, 4mm, ROHS, RA	DELTRON	571-0200
571-0400	1	ea	GND	CONN-PLUG, BANA-INSUL-SDRLESS, GREEN, 4mm, ROHS, RA	DELTRON	571-0400
571-0500	2	ea	VDD, VSUB	CONN-PLUG, BANA-INSUL-SDRLESS, RED, 4mm, RA	DELTRON	571-0500

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TABLE 2. BILL OF MATERIALS (Continued)

PART NUMBER	QTY	UNITS	REFERENCE DESIGNATOR	DESCRIPTION	MANUFACTURER	MANUFACTURER PART
571-0600	1	ea	VPLUS	CONN-PLUG, BANA-INSUL-SDRLESS, WHITE, 4mm, ROHS, RA	DELTRON	571-0600
68000-236HLF-1X3	1	ea	J42	CONN-HEADER, 1x3, BREAKAWY 1X36, 2.54mm, ROHS	BERG/FCI	68000-236HLF
69190-202HLF	21	ea	a) J1-J9, J40, J44, J49, J52, J58, J62, J68, J69	CONN-HEADER, 1x2, RETENTIVE, 2.54mm, ST, ROHS	BERG/FCI	69190-202HLF
69190-202HLF	0	ea	b) J71, J72, TP-OUT1, TP-OUT2	CONN-HEADER, 1x2, RETENTIVE, 2.54mm, ST, ROHS	BERG/FCI	69190-202HLF
SPC02SYAN	10	ea	J2, J3, J4, J7, J8, J62, J69, J71, J72, J42-Pins 2 and 3	CONN-JUMPER, SHORTING, 2PIN, BLACK, GOLD, ROHS	SULLINS	SPC02SYAN
ISL55112IRTZ	1	ea	U2	IC-DUAL HIGH SPEED CCD DRIVER, 24P, TQFN, 4X5, ROHS	INTERSIL	ISL55112IRTZ
PVG5A204C01R00	1	ea	R49	POT-TRIM, SMD, 5mm, 200K, 1/4W, 10%, 11TURN, TOP ADJ, ROHS	MURATA	PVG5A204C01R00
H2512-00R00-1/8W-T	2	ea	R43, R44	RES, SMD, 0805, 0Ω, 1/8W, TF, ROHS	YAGEO	RC0805JR-07ORL
H2512-049R9-1/8W1-T	6	ea	R2, R3, R31, R33, R35, R37	RES, SMD, 0805, 49.9Ω, 1/8W, 1%, TF, ROHS	ROHM	MCR10EZH49R9
4-40X1/2-SCREW	5	ea	Four corners and Center	SCREW, 4-40X1/2in, PAN, NYLON, PHILLIPS, ROHS		
4-40X3/4-STANDOFF	5	ea	Four corners and Center	STANDOFF, 4-40X3/4in, F/F, HEX, NYLON	KEYSTONE	1902D
8X12-STATIC-BAG	1	ea	Place assy in bag	BAG, STATIC, 8X12, ZIP LOC	INTERSIL COMMON STOCK	D812(212403-014)
LABEL-SERIAL NUMBER	1	ea		LABEL, FOR SERIAL NUMBER AND BOM REV #		

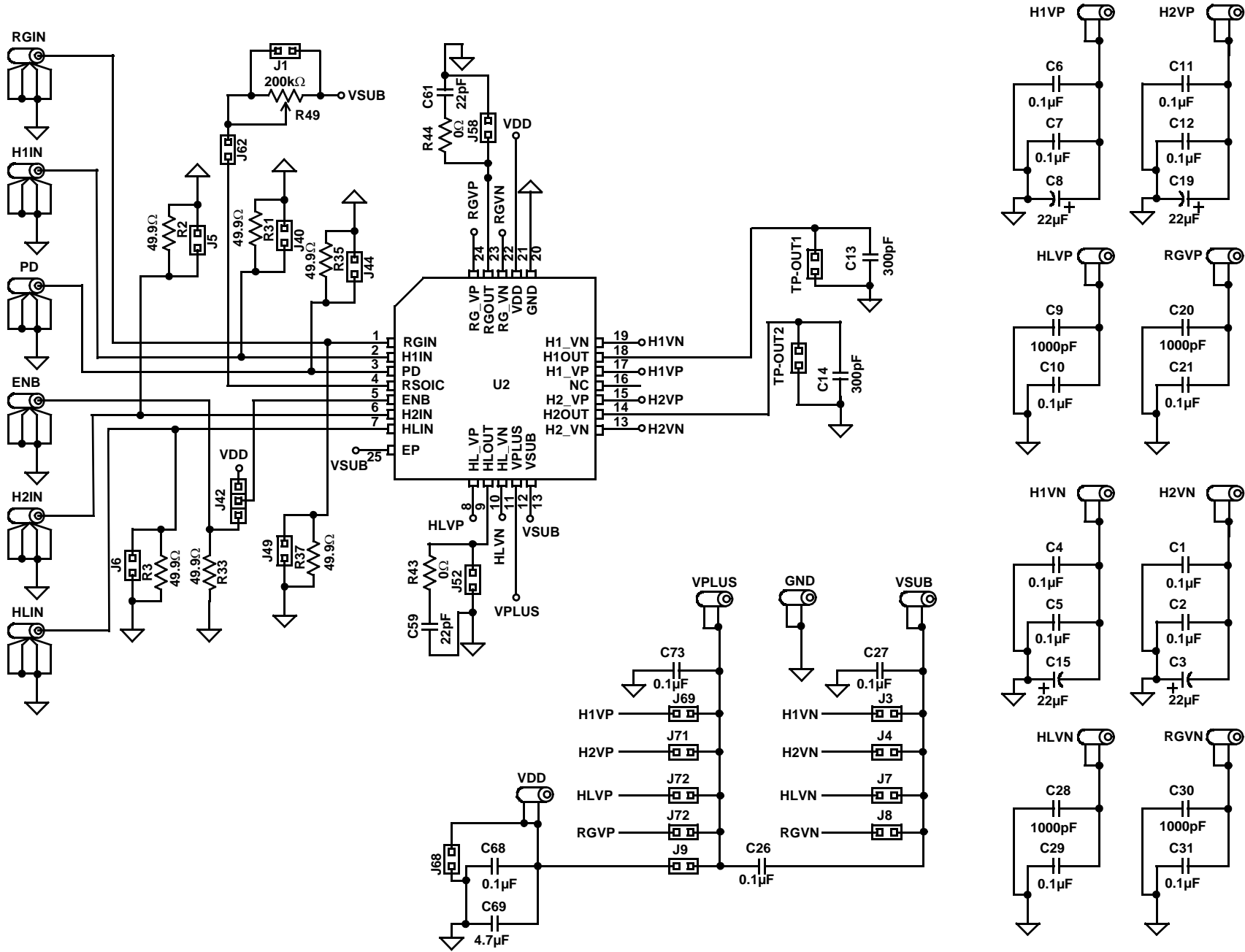


FIGURE 5. ISL55112EVAL1Z SCHEMATIC

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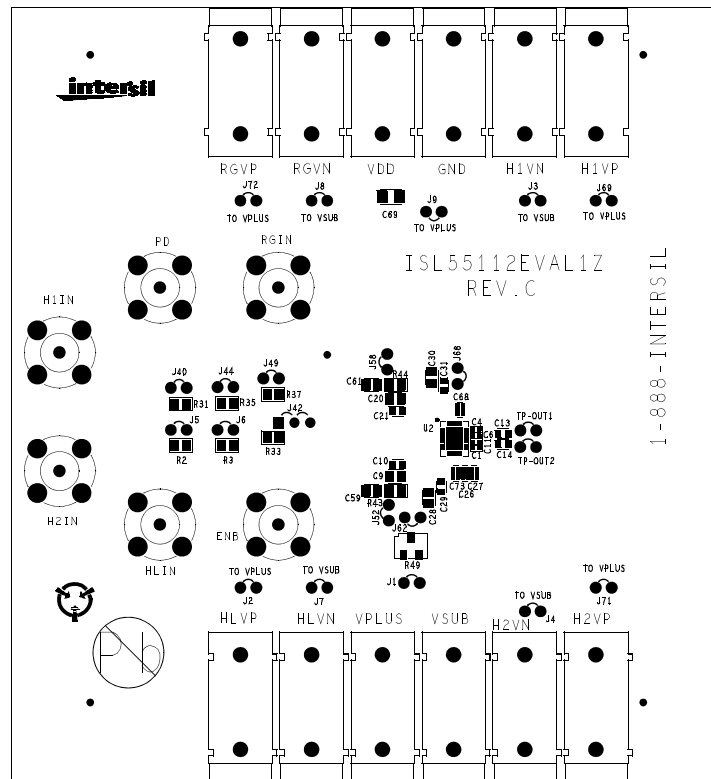


FIGURE 4. BOARD LAYOUT - TOP VIEW

Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that the Application Note or Technical Brief is current before proceeding.

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