Description

The ISL24010EVAL2 is the evaluation board for the ISL24010 Octal Level Shifter for TFT/LCD Panels. The part was designed to level shift a digital input signal to +22V and -5V for TFT-LCD displays. The device is capable of level shifting a CMOS logic signal between +40V and -20V.

The ISL24010 will level shift a digital input signal (V_{IH} = 1.8V, V_{IL} = 0.8V) to an output voltage nearly equal to its output supply voltages. The ISL24010 has 3 supplies. V_{ON1} and V_{ON2} are positive supplies with a voltage range between +10V and +40V (absolute maximum). V_{OFF} is the negative supply with a voltage range between -5V and -20V (absolute maximum). Outputs 1 through 6 are connected to V_{ON1} and V_{OFF}. Outputs 7 and 8 are connected to V_{ON2} and V_{OFF} (reference Figure 1). This configuration enables outputs 1 through 6 to provide slicing to the row drivers of a TFT/LCD panel to reduce flicker, and outputs 7 and 8 to control possible supply lines. V_{ON2} should remain constant.

It is possible to tie V_{ON1} and V_{ON2} supplies together, if independent control as described above is not desired. V_{ON2} is required to be greater than or equal to V_{ON1} at all times.

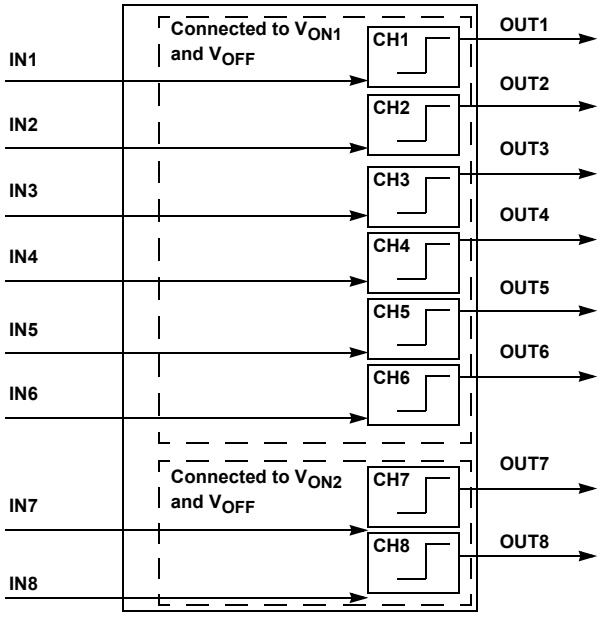


FIGURE 1. ISL24010 FUNCTIONAL BLOCK DIAGRAM

Using the ISL24010EVAL2 Board

Applying Power to the Board

If voltage supplies V_{ON1} and V_{ON2} are different supplies, then the supply sequence needs to be V_{ON2} then V_{ON1}. The reason for this requirement is shown in Circuit 4 in the Pin Description Table. The ESD protection diode between V_{ON2} and V_{ON1} will forward bias if V_{ON1} becomes a diode drop greater than V_{ON2}.

- Recommended power supply sequence: V_{ON2}, V_{ON1}, V_{OFF} then input logic signals.

Avoid hot plugging the supplies. The ESD protection scheme of the ISL24010 is based on diodes from the pins to the V_{ON2} supply and a dV/dt- triggered clamp. This dV/dt triggered clamp imposes a maximum supply turn-on slew rate of 10V/µs. This clamp will trigger if the supply powers up too fast, causing amps of current to flow. Capacitors C1 through C3 and C12 through C17 help to slow up the supply ramp to the part but may not be enough for hot plugging the supplies.

Operation of the Board

Operation of the board is simple. You provide a logic signal on the input (V_{IH} = 1.8V, V_{IL} = 0.8V) and monitor the output voltage which will swing nearly equal to the $V_{ON1/2}$ and V_{OFF} supplies.

The schematic of the board is shown in Figure 3. The output load provided is a parallel combination of 5kΩ and 100pF. The board has provisions for including a series resistor for analysis of various loads (R_9 through R_{16}). If different loads are evaluated, the user needs to limit the output load less than 10mA per channel because the ISL24010 has no output short circuit current limit.

ISL24010EVAL2 Picture

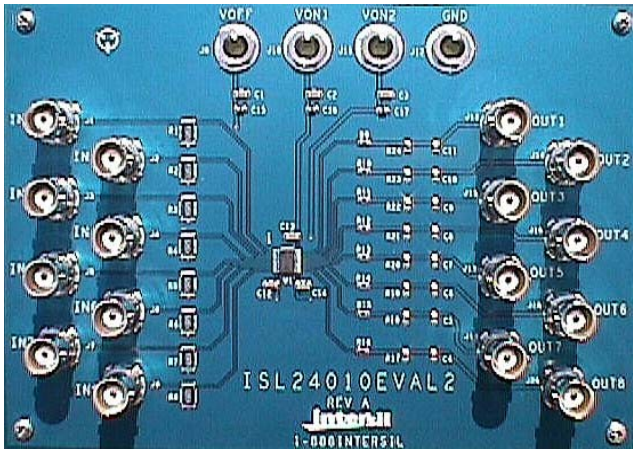
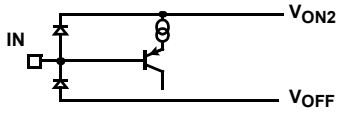


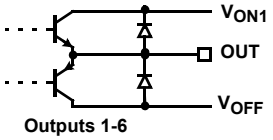
FIGURE 2. ISL24010 EVAL BOARD

Pin Descriptions

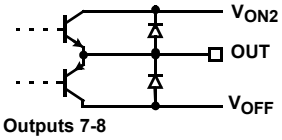
PIN NUMBER TSSOP-20	PIN NAME	EQUIVALENT CIRCUIT	DESCRIPTION
1	GND	4	Ground pin
2	IN1	1	Level shifter input 1
3	IN2	1	Level shifter input 2
4	IN3	1	Level shifter input 3
5	IN4	1	Level shifter input 4
6	IN5	1	Level shifter input 5
7	IN6	1	Level shifter input 6
8	IN7	1	Level shifter input 7
9	IN8	1	Level shifter input 8
10	VOFF	4	Negative output supply for all channels
11	VON2	4	Positive output supply for channels 7 and 8. V_{ON2} is required to be greater than or equal to V_{ON1}.
12	OUT8	3	Lever shifter output 8
13	OUT7	3	Lever shifter output 7
14	OUT6	2	Lever shifter output 6
15	OUT5	2	Lever shifter output 5
16	OUT4	2	Lever shifter output 4
17	OUT3	2	Lever shifter output 3
18	OUT2	2	Lever shifter output 2
19	OUT1	2	Lever shifter output 1
20	VON1	4	Positive output supply for channels 1 through 6. V_{ON1} is required to be less than or equal to V_{ON2}.



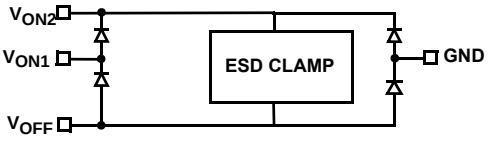
CIRCUIT 1.



CIRCUIT 2.



CIRCUIT 3.



CIRCUIT 4.

ISL24010EVAL2 Schematic

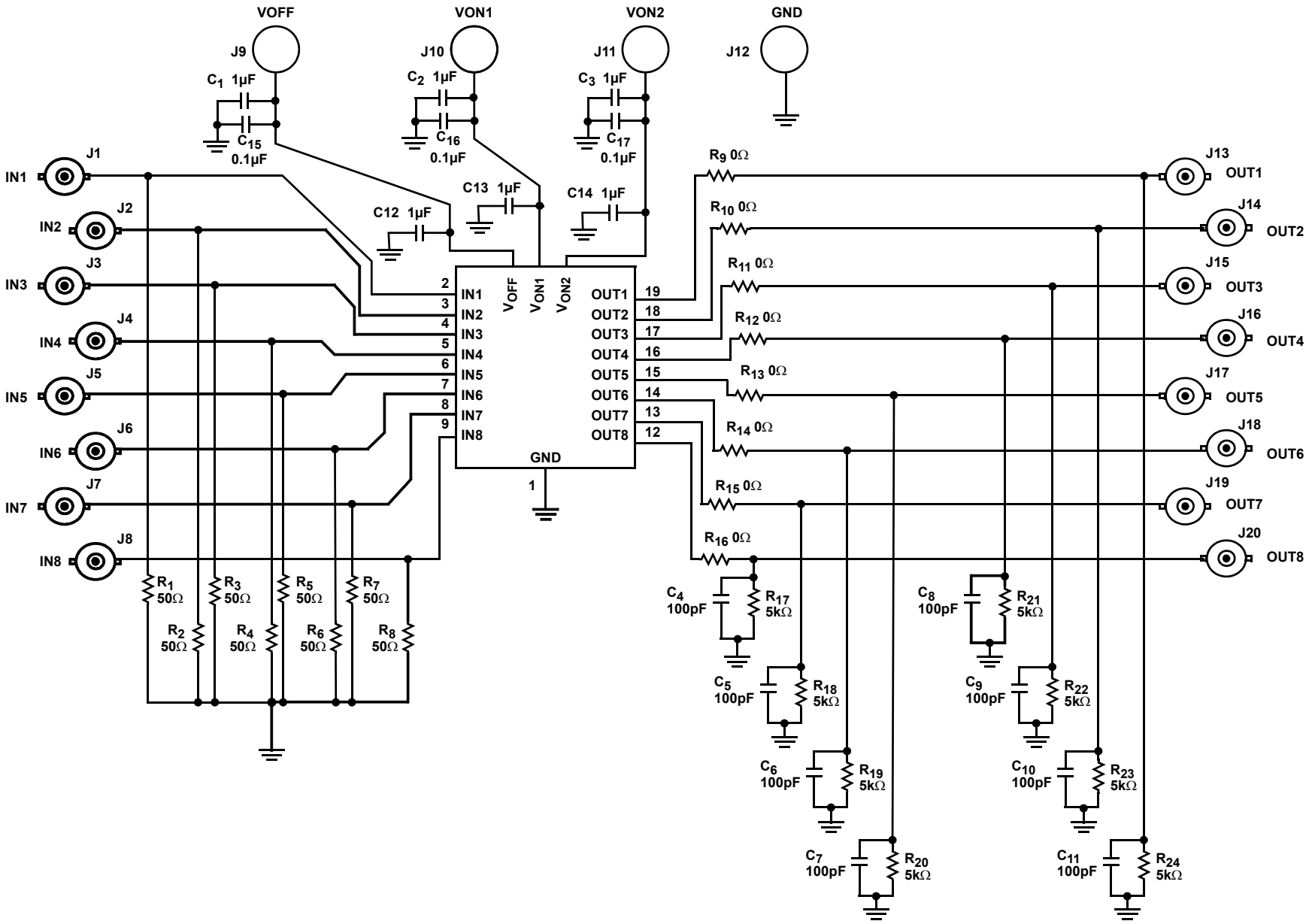


FIGURE 3. EVAL BOARD SCHEMATIC

ISL24010EVAL2 Bill of Materials

TABLE 1. ISL24010EVAL2 BOM

PART NUMBER	REF. DES.	QTY.	VALUE	TOL.	DESCRIPTION
ISL24010EVAL2REVAPCB	PCB	1			PWB-PCB, ISL24010EVAL2, REVA
H1046-00101-50V10-T	C4-C11	8	100pF, 50V	10%	Capacitor, SMD, 0805, NPO
H1046-00104-50V10-T	C15-C17	3	0.1µF, 50V	10%	Capacitor, SMD, 0805, X7R
H1065-00105-25V10-T	C1-C3, C12-C14	5	1.0µF	10%	Capacitor, SMD, 1206
108-0740-001	J9-J12	4			Conn-Jack, Bana-SS-Sdrless, Vertical
31-5329-52RFX	J1-J8, J13-J20	16			Conn-BNC, Female, 50Ω, 4 Post Vertical PC Mount
ISL24010IVZ	U1	1			IC-Octal Level Shifter, 20P, TSSOP, Pb-free
CRCW251249R9FKEG	R1-R8	8	49.9Ω, 1W,	1%	Resistor, SMD, 2512, TF, Pb-free
H2512-00R00-1/10W-T	R9-R16	8	0Ω, 1/10W,		Resistor, SMD, 0805, TF
H2512-04991-1/10W1-T	R17-R24	8	4.99kΩ, 1/10W	1%	Resistor, SMD, 0805, TF
4-40X1-STANDOFF-METAL	Four corners	4			Standoff, 4-40X1
4-40X1/2-SCREW-SS	Four corners	4			Screw, 4-40X1/2in, PAN, SS, Philip

NOTE: Decoupling capacitors C12 through C14 only need to be 0.1µF. The capacitors provided on the board are 1.0µF to insure robustness of the eval board.