

# IS31SE5000 IR SENSOR FOR TOUCHLESS MOTION AND PROXIMITY

## DESCRIPTION

The IS31SE5000 is a low-power, reflectance-based infrared light sensor with advanced signal processing and a digital output. The sensor can detect the movement of nearby objects, making touchless motion possible.

The IS31SE5000 uses one infrared LED to transmit and 2-channel receivers which pick up the reflectance signal from the 2 photodiodes to perform touchless motion detection. When a horizontal motion or an object approaches, the flag bits in the IS31SE5000 status register will be triggered and an interrupt signal is generated to inform the master to read the flag bit through I2C interface.

## FEATURES

- Supply voltage from 2.7V~5.5V
- 400kHz I2C compatible interface
- 1μA shutdown current
- 0.6mA low supply current
- Detection range can be adjusted
- Motion Mode and Proximity Mode
- Integrated signal processing and digital output
- Auto interrupt clear
- Package in UTQFN-12 (2mm × 2mm)

## QUICK START



Figure 1: Photo of IS31SE5000 Evaluation Board

## RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply

## ABSOLUTE MAXIMUM RATINGS

- ≤ 5.5V power supply

**Caution:** Do not exceed the conditions listed above, otherwise the board will be damaged.

## PROCEDURE

The IS31SE5000 evaluation board is fully assembled and tested. Follow the steps listed below to verify board operation.

**Caution:** Do not turn on the power supply until all connections are completed.

- 1) Connect the ground terminal of the power supply to the GND and the positive terminal to the VCC. Or connect the DC power to the connector (DC IN).
- 2) Turn on the power supply and pay attention to the supply current. If the current exceeds 800mA, please check for circuit fault.

## EVALUATION BOARD OPERATION

The evaluation board is controlled by an LPC922.

IS31SE5000 evaluation board supports both Motion and Proximity Modes. Pressing a button switch will select between 4 operating modes.

- 1) Mode 1(Default): Motion Mode (The emitting current is 400mA and detect distance is 9cm). The Right LED will light when an object moves from left to right directly above the IRLED and Photo diode. The Left LED will light when an object moves from right to left directly above the IRLED and Photo diode.
- 2) Mode 2: Motion Mode (The emitting current is 210mA and detect distance is 7.5cm). The Right LED will light when an object moves from left to right directly above the IRLED and Photo diode. The Left LED will light when an object moves from right to left directly above the IRLED and Photo diode.
- 3) Mode 3: Proximity Mode (The emitting current is 400mA and detect distance is 15cm). Both the Left and Right LEDs will light when an object is close to the IRLED and Photo diode.
- 4) Mode 4: Proximity Mode (The emitting current is 210mA and detect distance is 12cm). Both the Left and Right LEDs will light when an object is close to the IRLED and Photo diode.

## SOFTWARE SUPPORT

Please refer to the integrated program.

The jumper JP1 is closed by default. If you want to use an external MCU to control IS31SE5000, JP1 should be opened, the on board MCU will stop working and its I2C ports will be high impedance. Connect the external MCU to the I2C connector TP3 to control the IC.

**Please refer to the datasheet to get more information about IS31SE5000.**

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## ORDERING INFORMATION

Part No.	Temperature Range	Package
IS31SE5000-UTLS2-EB	-40°C ~ +85°C (Industrial)	UTQFN-12, Lead-free

Table 1: Ordering Information

For pricing, delivery, and ordering information, please contact Lumissil's analog marketing team at [analog@lumissil.com](mailto:analog@lumissil.com) or (408) 969-6600.

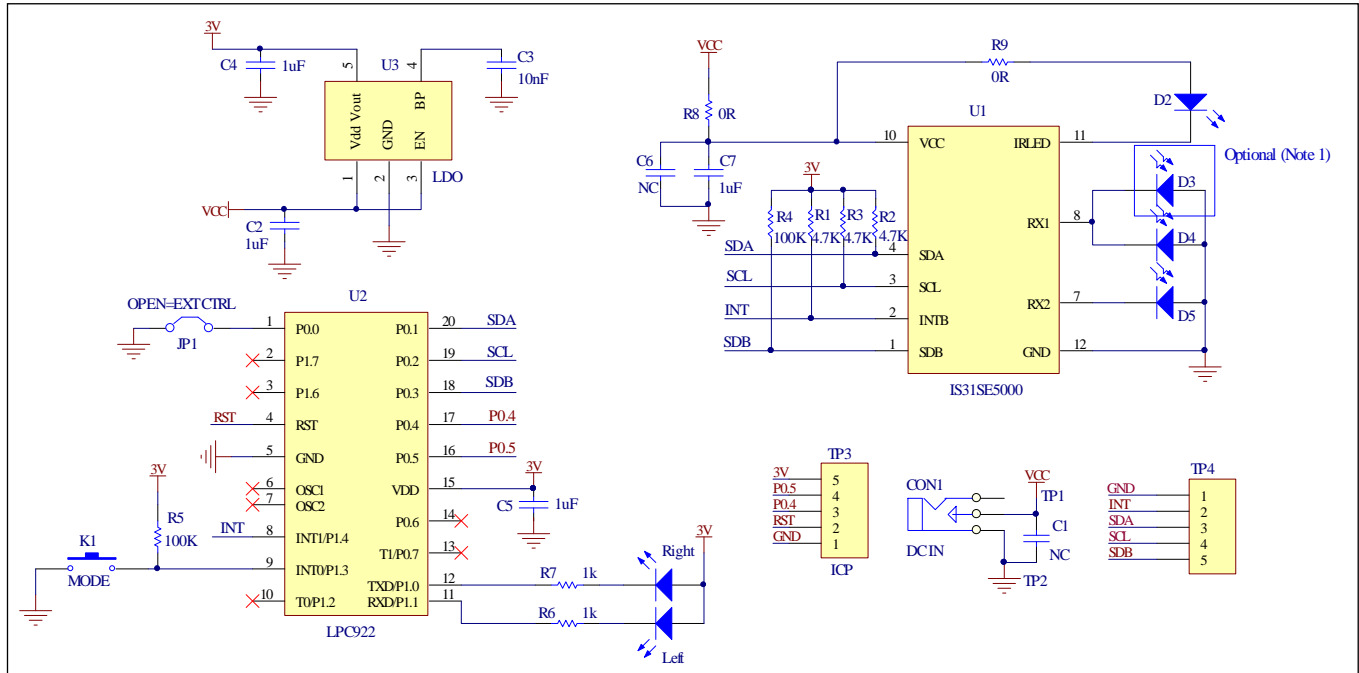


Figure 2: IS31SE5000 Application Schematic

## IS31SE5000 IR SENSOR FOR TOUCHLESS MOTION AND PROXIMITY

### BILL OF MATERIALS

Name	Symbol	Description	Qty	Supplier	Part No.
Sensor IC	U1	IR sensor for touch less motion and proximity	1	Lumissil	IS31SE5000
MCU	U2	Microcontroller	1	NXP	LPC922
LDO	U3	Low-dropout regulator	1	PAM	PAM3101
LED Blue	Left, Right	Diode, LED Blue, SMD	2	Everlight	19-217/BHC-ZL1M2RY/3T
Resistor	R1~R3	RES,4.7k,1/16W,±5%,SMD	3	Yageo	RC0603JR-074K7L
Resistor	R4, R5	RES,100k,1/16W,±5%,SMD	2	Yageo	RC0603JR-07100KL
Resistor	R6, R7	RES,1k,1/16W,±5%,SMD	2	Yageo	RC0603JR-071KL
Resistor	R8	RES,0Ω,1/10W,±5%,SMD	1	Yageo	RL0805JR-070RL
Resistor	R9	RES,0Ω,1/16W,±5%,SMD	1	Yageo	RL0603JR-070RL
Capacitor	C1, C6	Not connect	2		
Capacitor	C2,C4	CAP,1μF,25V,±10%,SMD	2	Yageo	CC0805KKX7R8BB105
Capacitor	C5,C7	CAP,1μF,50V,±10%,SMD	2	Yageo	CC0603KKX7R9BB105
Capacitor	C3	CAP,10nF,50V,±10%,SMD	1	Yageo	CC0603KKX7R9BB103
IRLED	D2	IRLED	1	Everlight	IR11-21C/TR8
PD	D4,D5	Photodiodes	2	Everlight	PD15-22C-R/TR8
PD	D3	Not connect (Note 1)			

**Note 1:** There is only one photodiode can be put in D4 or D3 locations. Two locations make more choice for customers to select distance between photodiode and IRLED.

Bill of Materials, refer to Figure 2 above.

**IS31SE5000 IR SENSOR FOR TOUCHLESS MOTION AND PROXIMITY**

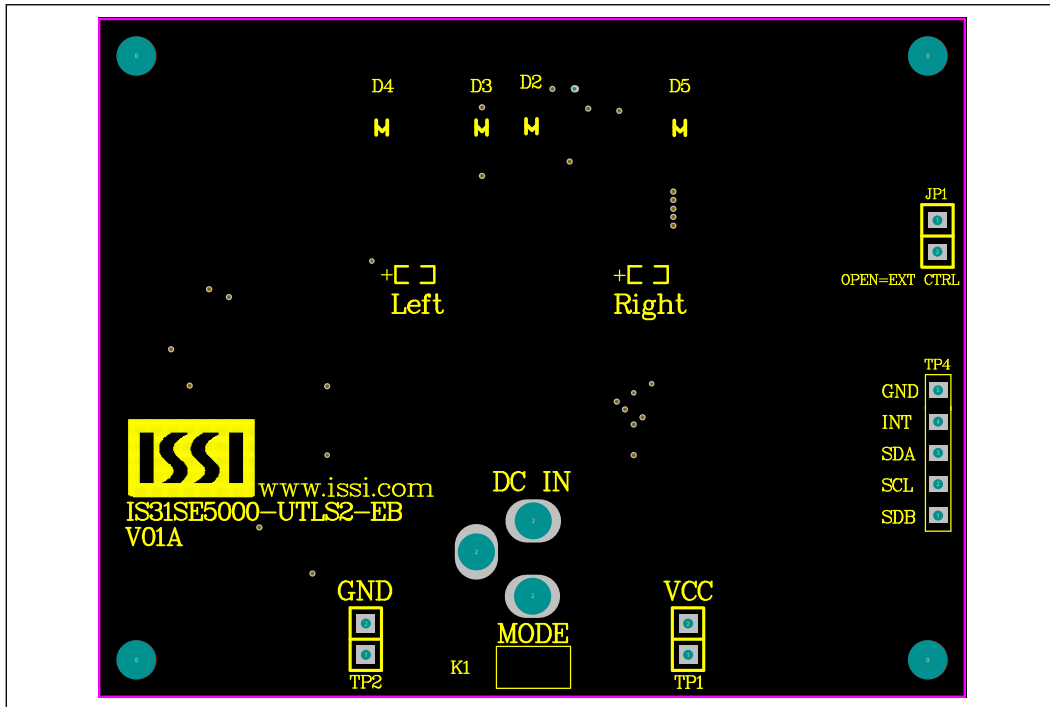


Figure 3: Board Component Placement Guide - Top Layer

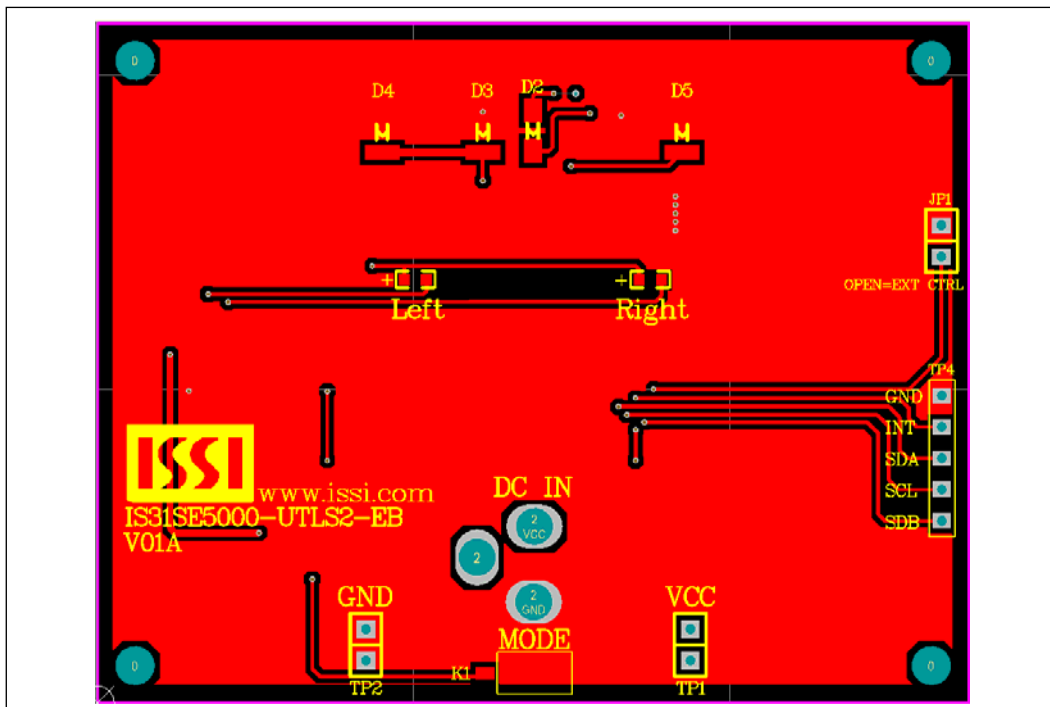
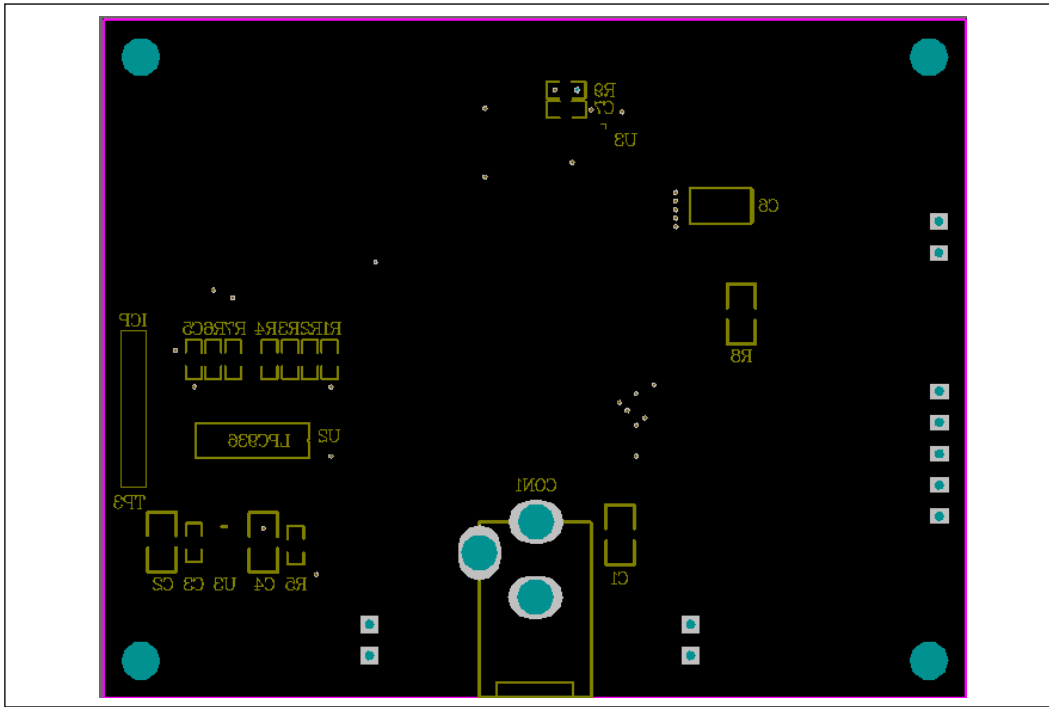
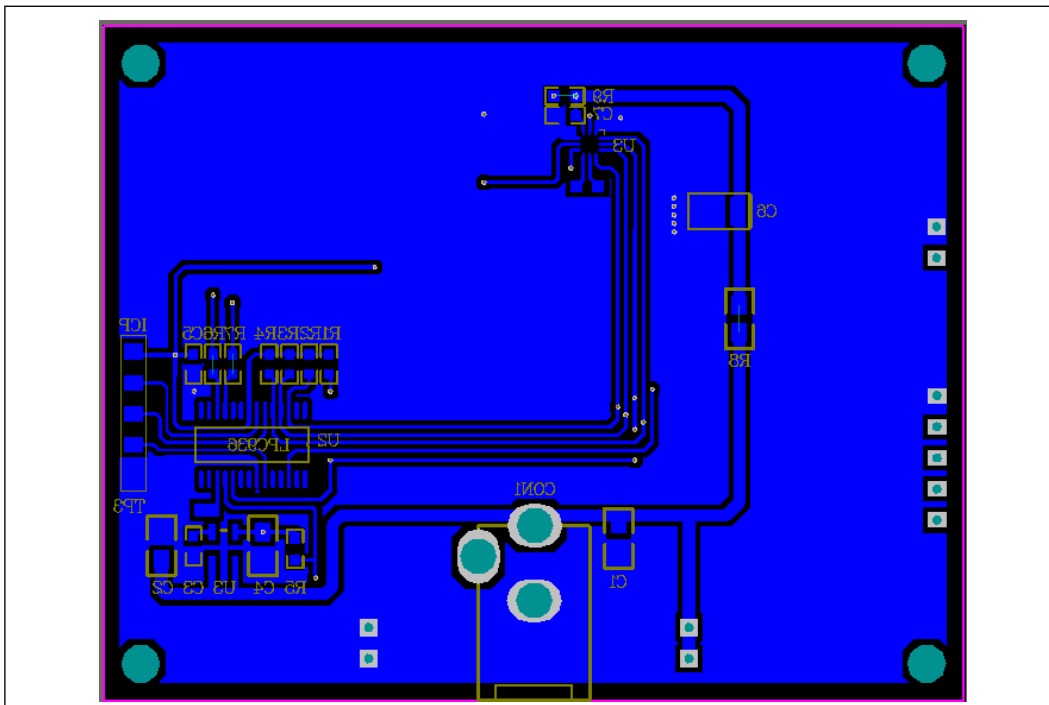


Figure 4: Board PCB Layout - Top Layer

# IS31SE5000 IR SENSOR FOR TOUCHLESS MOTION AND PROXIMITY



**Figure 5: Board Component Placement Guide - Bottom Layer**



**Figure 6: Board PCB Layout - Bottom Layer**

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