

# IS31SE5104 4-CH CAPACITIVE TOUCH SENSOR

## DESCRIPTION

The IS31SE5104 is an ultra low power, fully integrated solution for capacitive touch applications with up to 4 surfaces. The chip allows electrodes to project sense fields through any dielectric such as glass or plastic. On-chip calibration logic continuously monitors the environment and automatically adjusts on-and-off threshold levels to prevent false sensor activation.

The IS31SE5104 is fully programmable via a 400kHz I2C serial bus protocol.

## FEATURES

- Supply voltage from 2.7V to 5.5V
- I2C interface, 1.8V/2.8V is allowed
- Auto offset compensation
- Fully integrated sense controller with 4 capacitive touch inputs
- Interrupt driven output
- Adjustable sensitivity with external capacitor or by internal register
- Low power consumption
- ESD HBM 8kV
- IC controller in QFN-16 (3mm × 3mm)

## QUICK START



Figure 1: Photo of IS31SE5104 Evaluation Board

## RECOMMENDED EQUIPMENT

- 5.0V, 500mA 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 IS31SE5104 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 lead of the power supply to the EVB GND terminal and the positive lead to the EVB VCC terminal. Or use the connector (DC IN) with a power adaptor: jack size 3.5mm x 1.35mm.
- 2) Turn on the power supply and pay attention to the supply current. If the current exceeds 100mA, please check for a circuit fault.

## EVALUATION BOARD OPERATION

This evaluation board is controlled by a pre-programmed P89LPC922 (80C51 core).

IS31SE5104 evaluation board has 4 touch surfaces designed on a 2mm thick acrylic board to induce a dielectric. Each touch surface has an associated LED that will light when the corresponding surface area is touched.

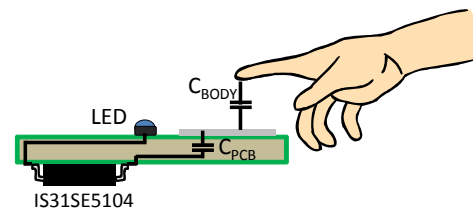


Figure 2: Capacitance Detection

The capacitance ( $C_{\text{BODY}}$ ) of an approaching finger increases as it approaches the sense area. The IS31SE5104 detects this increase in capacitance and turns on the associated LED.

## SOFTWARE SUPPORT

Please refer to the integrated program.

**Please refer to the datasheet for more information.**

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## ORDERING INFORMATION

Part No.	Temperature Range	Package
IS31SE5104-QFLS2-EB	-40°C ~ +85°C (Industrial)	QFN-16, 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.

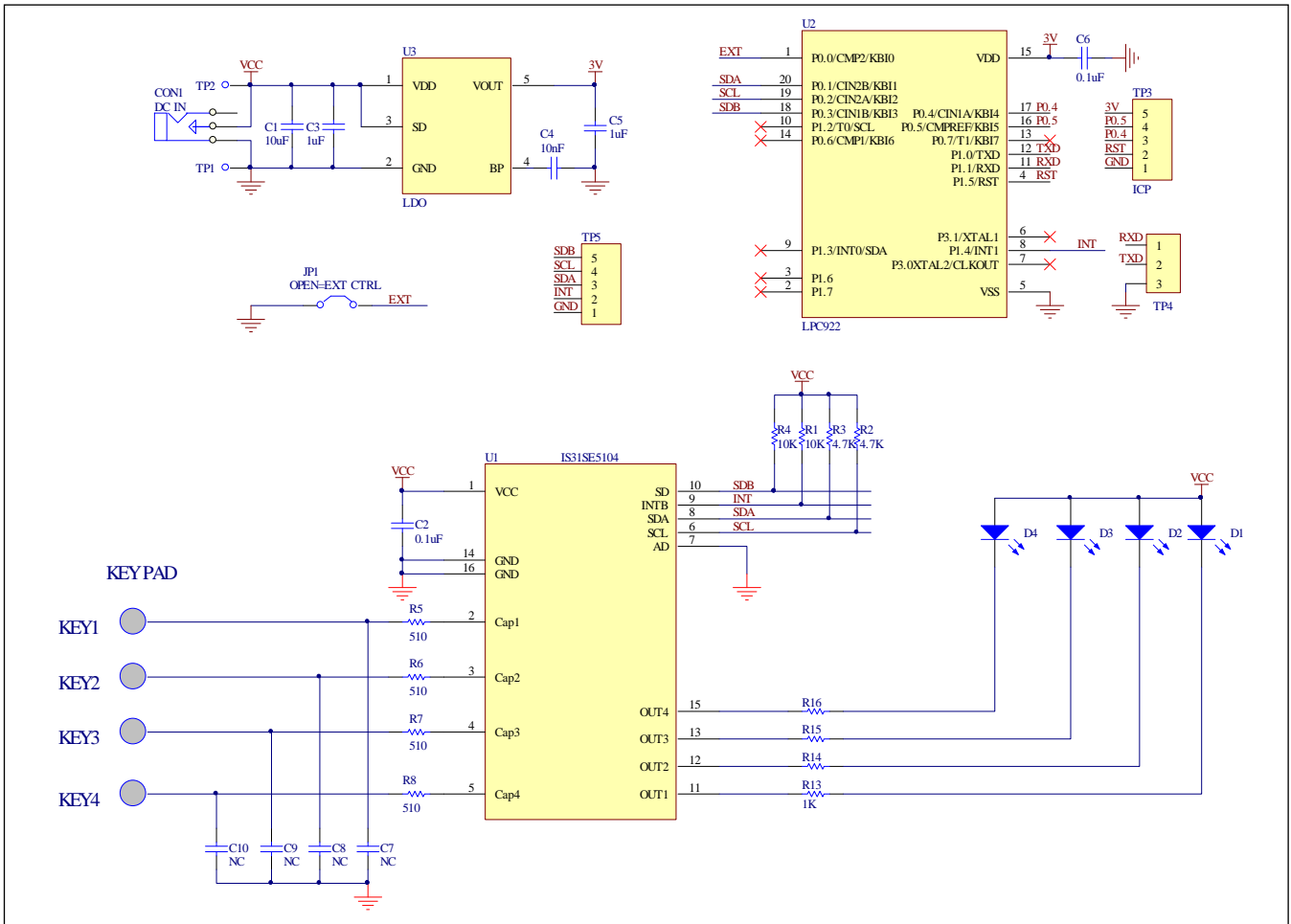


Figure 3: IS31SE5104 Application Schematic

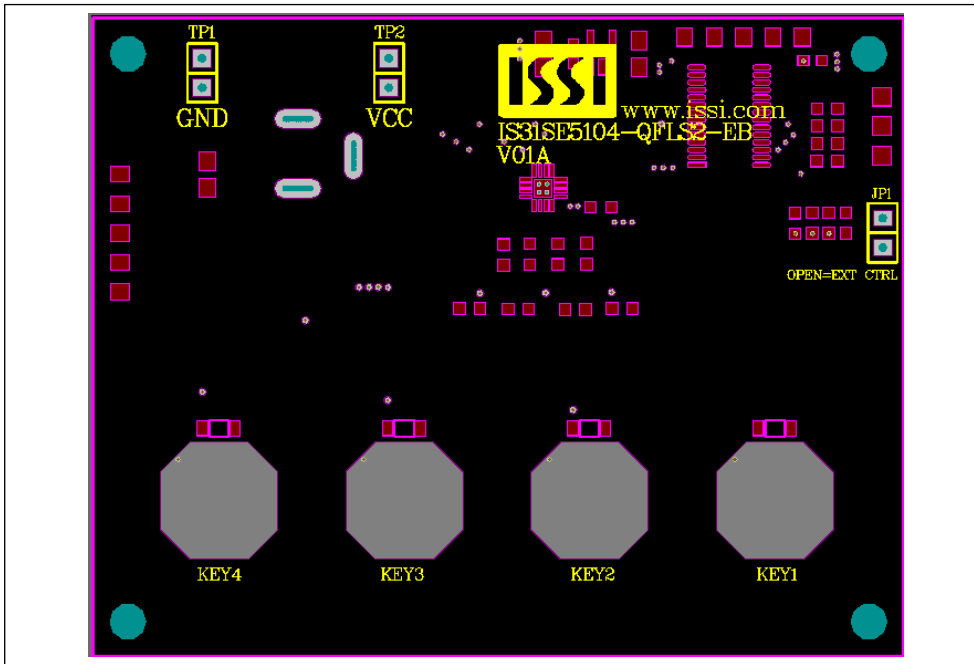
## IS31SE5104 4-CH CAPACITIVE TOUCH SENSOR

### BILL OF MATERIALS

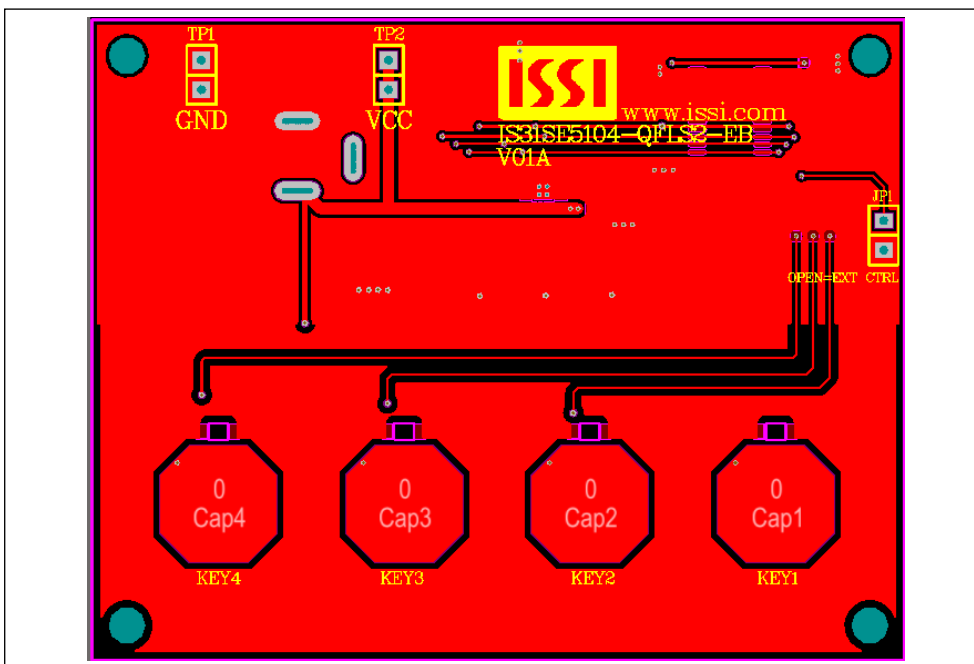
Name	Symbol	Description	Qty.	Supplier	Part No.
Touch Sensor	U1	Capacitive touch sensor	1	Lumissil	IS31SE5104
MCU	U2	Microcontroller	1	NXP	LPC922
LDO	U3	Low-dropout regulator	1	PAM	PAM3101
LED	D1~D4	Diode, LED blue, SMD	4	Everlight	19-217/BHC-ZL1M2RY/3 T
Resistor	R1,R4	RES,10k,1/16W,±5%,SMD	2	YAGEO	RC0603JR-0710KL
Resistor	R2,R3	RES,4.7k,1/16W,±5%,SMD	2	YAGEO	RC0603JR-074K7L
Resistor	R5~R8	RES,510,1/16W,±5%,SMD	4	YAGEO	RC0603JR-07510RL
Resistor	R13~R16	RES,1k,1/16W,±5%,SMD	4	YAGEO	RC0603FR-071KL
Capacitor	C1	CAP,10µF,10V,±10%,SMD	1	YAGEO	CC0805KKX7R6BB106
Capacitor	C2, C6	CAP, 0.1µF,16V,±10%,SMD	2	YAGEO	CC0603KKX7R7BB104
Capacitor	C3, C5	CAP, 1µF,16V,±10%,SMD	2	YAGEO	CC0805KKX7R7BB105
Capacitor	C4	CAP,10nF,16V,±10%,SMD	1	YAGEO	CC0603KKX7R7BB103
Capacitor	C7~C10	Not Connect	4		

*Bill of Materials, refer to Figure 3 above.*

**IS31SE5104 4-CH CAPACITIVE TOUCH SENSOR**

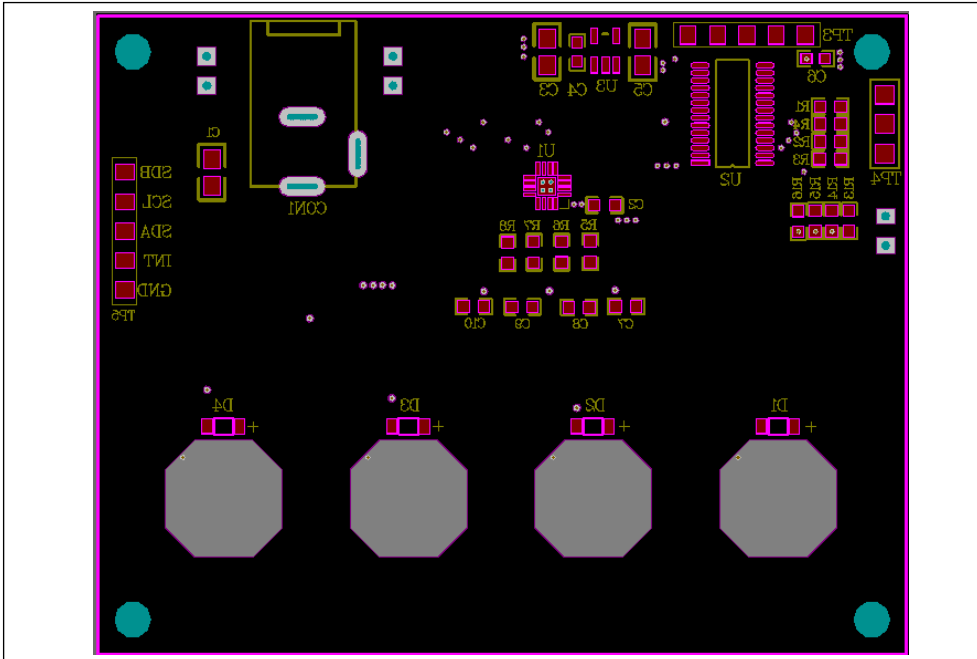


*Figure 4: Board Component Placement Guide - Top Layer*

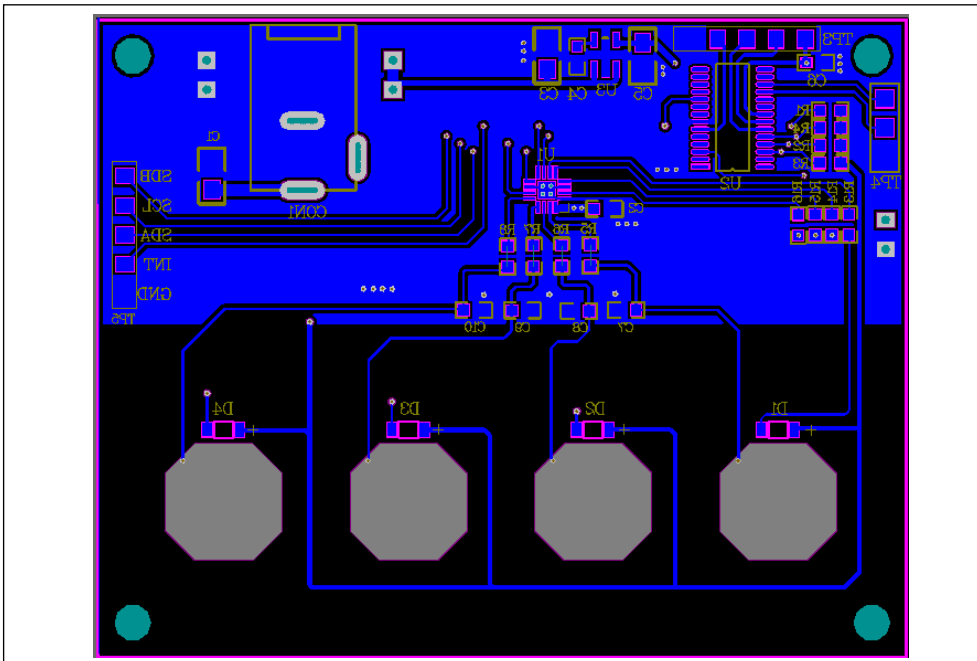


*Figure 5: Board PCB Layout - Top Layer*

# IS31SE5104 4-CH CAPACITIVE TOUCH SENSOR



**Figure 6: Board Component Placement Guide - Bottom Layer**



**Figure 7: Board PCB Layout - Bottom Layer**

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