LT8201A

DATA SHEET

SPEC. NO. : SZ22011901
DATE : 2022/01/19
REV. : A/0

Approved By: Checked By: Prepared By:

1. Description

LT8201A is an ultra-low power and high performance optical sensor for In-Ear and proximity detection for wearable devices with I2C Interface. LT8201A include both transmitter and receiver. The Receiver has proximity detection photodiode, high resolution ADC, programmable pulse LD driver circuit. The ADC code can be read out by using an I2C interface. LT8201A supports an interrupt feature that removes the need to poll the sensor for a reading which improves system efficiency.

2. Features

- Wide operating voltage range: 2.2 to 5.5V
- Low operating current
- Low power standby
- Long detection distance
- High induction sensitivity
- Few peripheral components
- Good anti-interference performance
- The operating temperature range is -30 °C to +70 °C
- I2C interface communication: I2C clock up to 400kbit/s
- Built in transmitter and detector
- Built in programmable LED drive current configuration
- Small package size: 2.0x1.6x0.8mm

3. Applications

- TWS In-Ear
- Optical Switch
- Smart Wearable
- Smart Home
- Lamp control

4. Functional Block Diagram

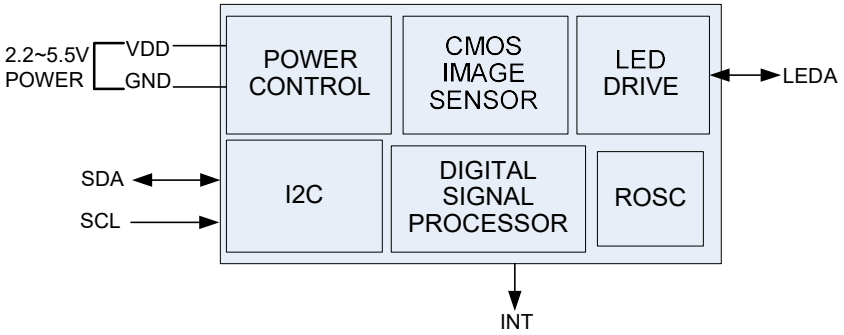


Figure 1. Functional Block

5. Pin Description

Figure 2. Pin Assignment

Pin Number	Pin Name	Type	Description
1	VDD	POWER	Supply voltage
2	INT	OUT	Interrupt output
3	SDA	I/O	I2C serial Data
4	SCL	IN	I2C serial clock
5	GND	GND	Ground
6	LEDA	IN	LED driver

6. Electrical Specifications

PARAMETER	DESCRIPTION	CONDITION	MIN	TYP	MAX	UNIT
V_{DD}	Power Supply Range		2.2	3.3	5.5	V
I_{WC}	Normal Work Current			5		uA
I_{PD}	Power Down Current	Software or auto power down			1	uA
T_S	Storage Temperature range		-40	25	85	℃
ADC	ADC Resolution		--	11	--	bits
DATA_FS	Full Scale ADC Data		--	2047	--	
I_{IRDR}	IR LED Driver Current			10		mA
I^2C Clock	I^2C Clock Rate Range		1		400	KHz
IR LED	IR VCESEL Peak Wave length			940		nm
D	Detection distance		0	50	100	mm

7. I2C Protocol

LT8201A supports standard I2C writing and reading protocol. The device address of LT8201A is 0x48 (1001000). The interface and control are realized through an I2C serial compatible interface, which is connected with a set of registers to provide access to chip control functions and output data.

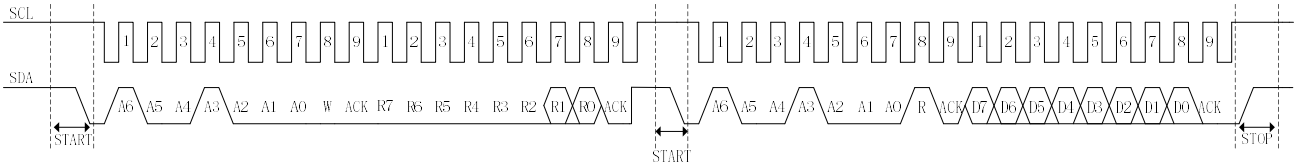


Figure 3. I²C Read Timing Diagram Sample

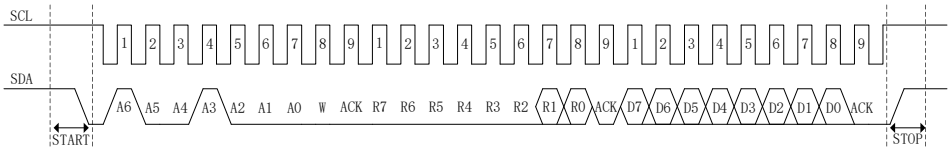


Figure 4. I²C Write Timing Diagram Sample

LT8201A has three registers to store ADC conversion results. External MCU can read ADC data through I2C interface. MCU calculates and processes the difference between non exposure average value and exposure average value. MCU judges the proximity sensing state according to the difference. Refer to the following table for detailed functions.

ADDR	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	POR
0X01	image_avg [7:0]								8'h00
0X02	image_avg [10:8]				image_dark [10:8]				8'h00
0X03	image_dark [7:0]								8'h00
Description	image_avg：Exposure image average； image_dark：unexposed image average								

8. Typical Application Circuit

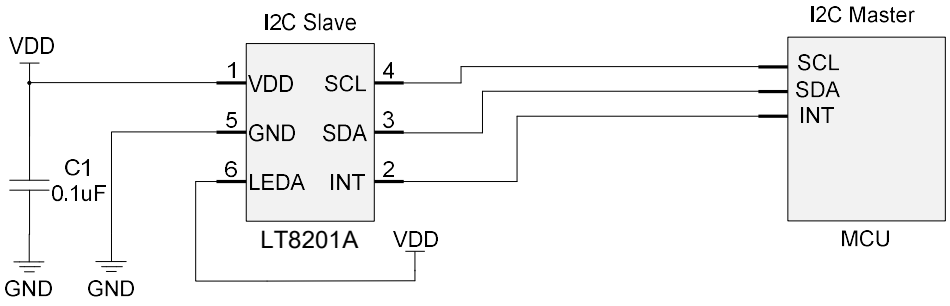


Figure 5. LT8201A Typical Circuit

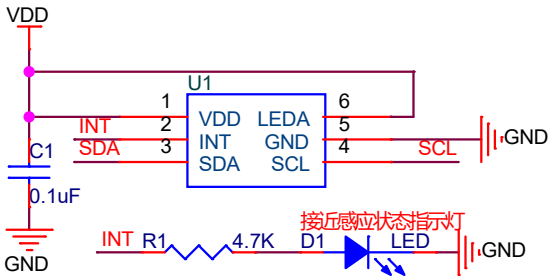
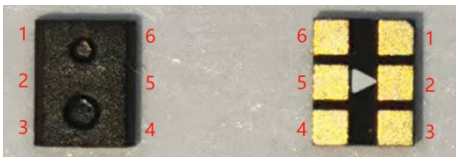


Figure 6. LT8201A Application Circuit

Test circuit function description:

1) When the hand or object approaches the top of the sensor, the D1 switch state is reversed.

9. Package Information



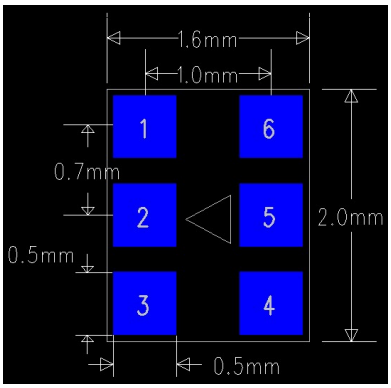


FIGURE 7. LT8201A Package Layout

10. Notes

1) It is suggested that the infrared transmittance of the shell filter should not be less than 90%.
2) The gap distance between the shell and the sensor should be less than 0.2mm as far as possible.
3) It is required that the minimum diameter of the Infrared light guide hole opening of the shell is 2mm.