

Mini SMD Digital Pyroelectric Infrared Sensors

Type: S16-L221D



The product is a digital intelligent PIR sensor. It interfaces directly with up to two conventional PIR sensors via a high impedance differential input. The PIR Signal is converted to a 15 bit digital value on chip. A LED output indicates whenever the PIR signal is above the selected threshold. The parameters for sensitivity and timing are set by connecting the corresponding inputs to DC voltages. The voltage levels on the inputs are converted to digital values with 7 bit resolution. All signal processing is performed digitally.

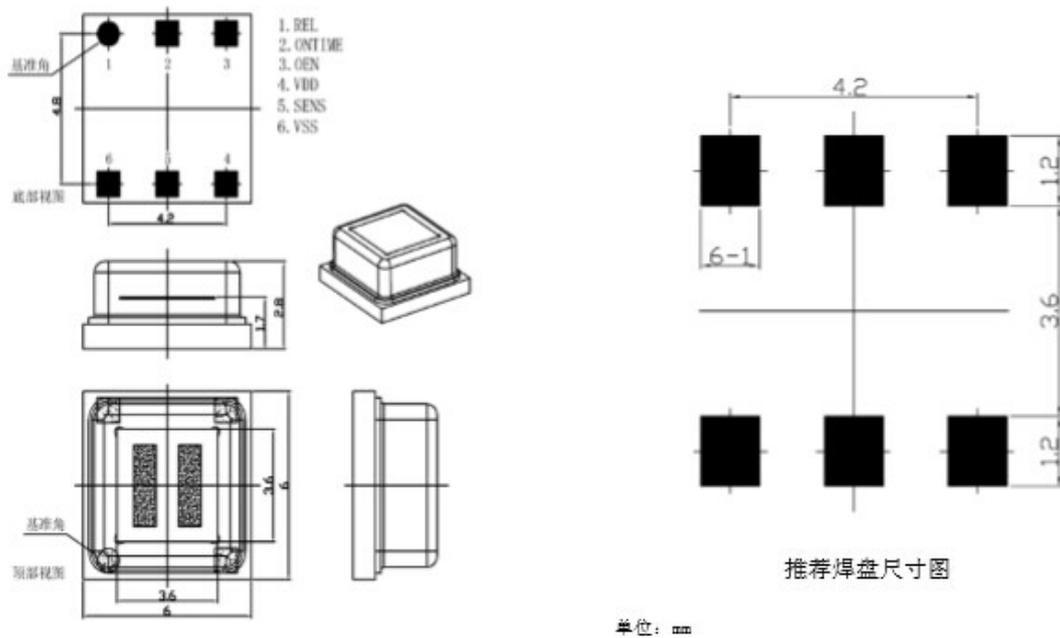
Features

- Mini SMD with reflowed SMT
- Digital signal processing (DSP)
- Power adjustable, save more energy
- Built-in filter, high immunity to RFI
- Output time, sensitivity and light control adjustable, Schmitt REL Output
- Low voltage, low power consumption

Applications

- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights
- Computer monitor
- Security system
- Automatic control, etc.

■ Dimension



Unit: mm

Right: The chart of recommended welding plate

■ Technical Parameter
Maximum Ratings

Characteristics	Symbol	Min.Vale	Max. Value	Unit	Remarks
Supply Voltage	VDD	-0.3	3.3	V	
Working Temperature	TOT	-30	70	°C	
Max.current for pin	INTO	-100	100	mA	
Viewing angle		X=110°	Y=90°	°	Theoretical value
Storage Temperature	TST	-40	80	°C	
Detection spectral response	λ	5	14	μm	
Interior Block Diagram					

**■ Working Conditions (T=25°C, Vdd=3V, Except other requirements)**

Characteristics	Symbol	Min.	Type	Max.	Unit	Remarks
Supply Voltage	V _{DD}	2.7	3	3.3	V	IR=0.5mA
Working Current	I _{DD}	12	15	20	μA	
Sensitivity	V _{SENS}	120		530	μV	Adjustable
Output REL						
Output Low Current	I _{OL}	10			mA	V _{OL} <1V
Output High Current	I _{OH}			-10	mA	V _{OH} >(V _{DD} -1V)
Lock time	T _{OL}		2.3		s	
On-time	T _{OH}	2.3		4793	s	
SENS/ONTIME						
Input voltage		0		V _{DD}	V	0V to ¼ V _{DD}
Input Bias Current		-1		1	μA	
OEN						
Input Low Voltage	V _{IL}			0.2	Vdd	
Input High Voltage	V _{IH}	0.4			Vdd	
Input Current	I _I	-1		1	μA	V _{SS} <V _{IN} <V _{DD}
Oscillator & Filter						
Low pass filter cut-off frequency				7	Hz	
High pass filter cut-off frequency				0.44	Hz	
Oscillator frequency on Chip	F _{CLK}			64	kHz	

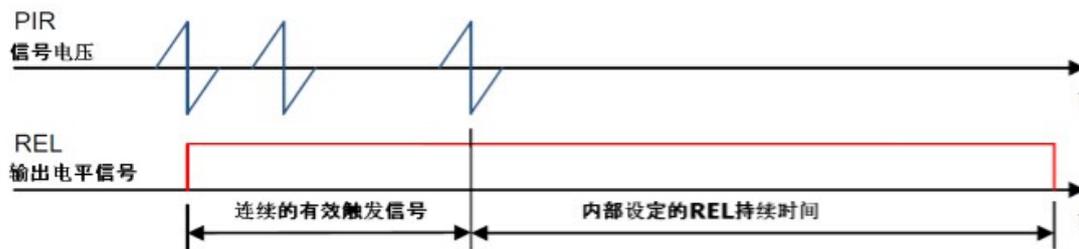
■ The output trigger mode

When PIR signal is above the triggered threshold inside the PIR sensor, there will be a count impulse inside. And when PIR sensor receives this impulse signal, it will think this signal as the second impulse. Once the second impulse was received within 4S, the PIR sensor will alarm, meanwhile, the REL pin will be triggered.

Besides, when the PIR signal is above 5 times of the triggered threshold, only one impulse is enough to trigger REL output as below. For multiple triggers, the delay time of REL output begins from the last valid trigger.



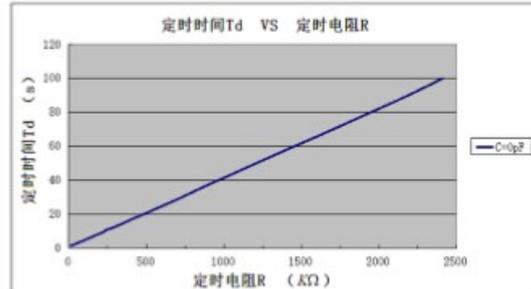
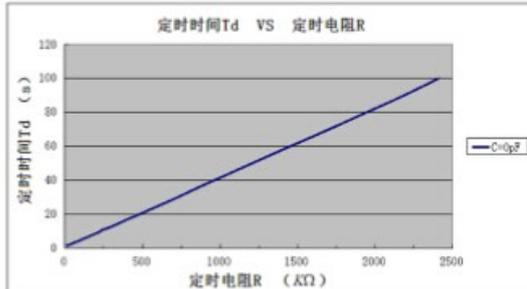
(REL delay time)



(multiple triggered signal) (interior set delay time of REL output.)

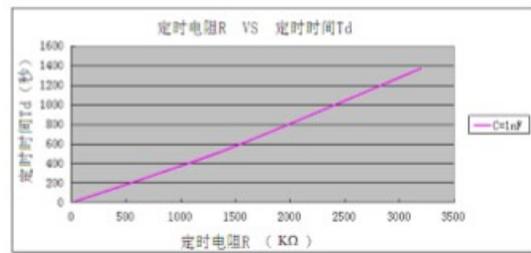
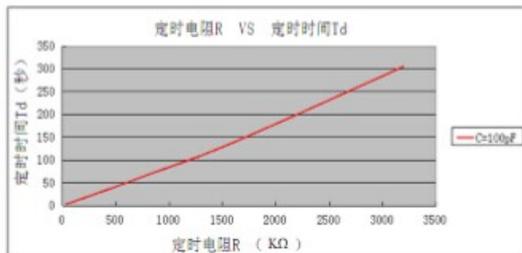
■ ONTIME Pin Setting

1. The Analog setting style for on-time



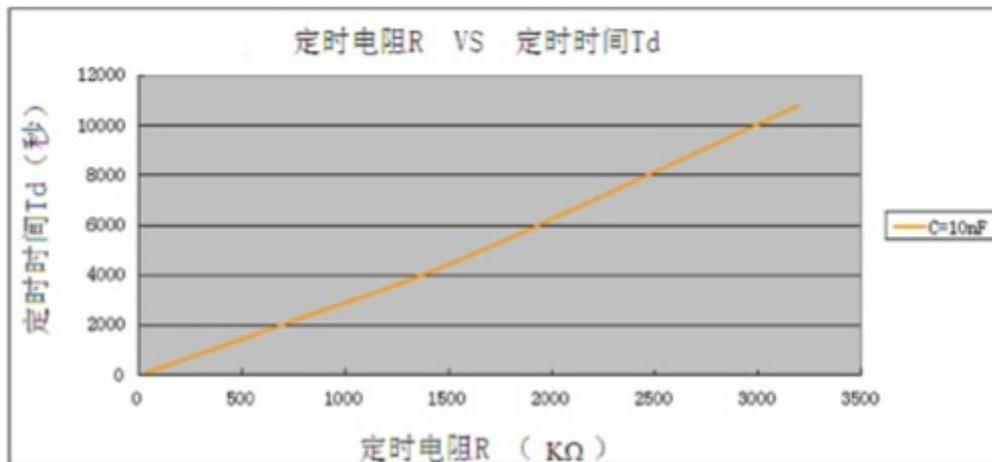
P1: ONTIME PIN non-contact Capacitor

P2: The Enlarged one



P3: 100pF

P4: 1nF



P5: 10nF

2. The Digital setting style for on-time

序号	ONTIME 脚电压范围 (VDD)	ONTIME 脚电压中心值(VDD)	Time Td
0	0~1/32	1/64	1.8sec
1	1/32~2/32	3/64	3.6sec
2	2/32~3/32	5/64	5.4sec
3	3/32~4/32	7/64	7.2sec
4	4/32~5/32	9/64	14.4sec
5	5/32~6/32	11/64	29sec
6	6/32~7/32	13/64	43sec
7	7/32~8/32	15/64	58sec
8	8/32~9/32	17/64	115sec
9	9/32~10/32	19/64	230sec
10	10/32~11/32	21/64	346sec
11	11/32~12/32	23/64	461sec
12	12/32~13/32	25/64	922sec
13	13/32~14/32	27/64	1843sec
14	14/32~15/32	29/64	2765sec
15	15/32~16/32	31/64	3686sec

■ Sensitivity Setting

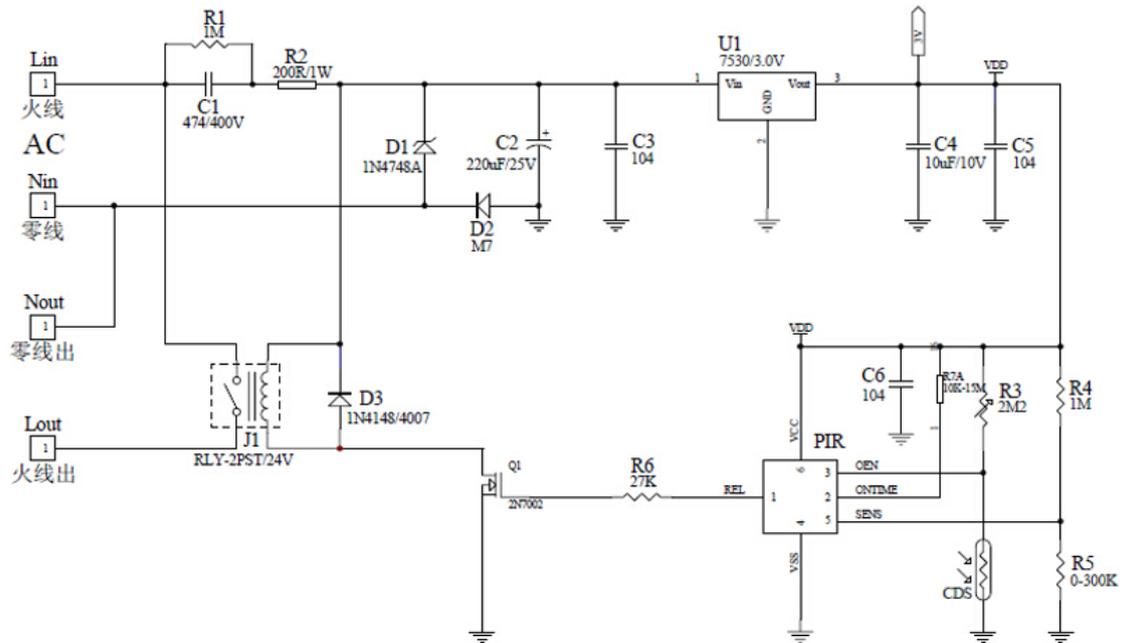
序号	SENS 脚电压		序号	SENS 脚电压	
	电压范围 (VDD)	中心电压 (VDD)		电压范围 (VDD)	中心电压 (VDD)
0	0~1/64	1/128	16	16/64~17/64	33/128
1	1/64~2/64	3/128	17	17/64~18/64	35/128
2	2/64~3/64	5/128	18	18/64~19/64	37/128
3	3/64~4/64	7/128	19	19/64~20/64	39/128
4	4/64~5/64	9/128	20	20/64~21/64	41/128
5	5/64~6/64	11/128	21	21/64~22/64	43/128
6	6/64~7/64	13/128	22	22/64~23/64	45/128
7	7/64~8/64	15/128	23	23/64~24/64	47/128
8	8/64~9/64	17/128	24	24/64~25/64	49/128
9	9/64~10/64	19/128	25	25/64~26/64	51/128
10	10/64~11/64	21/128	26	26/64~27/64	53/128
11	11/64~12/64	23/128	27	27/64~28/64	55/128
12	12/64~13/64	25/128	28	28/64~29/64	57/128
13	13/64~14/64	27/128	29	29/64~30/64	59/128
14	14/64~15/64	29/128	30	30/64~31/64	61/128

**■ Reliable Test**

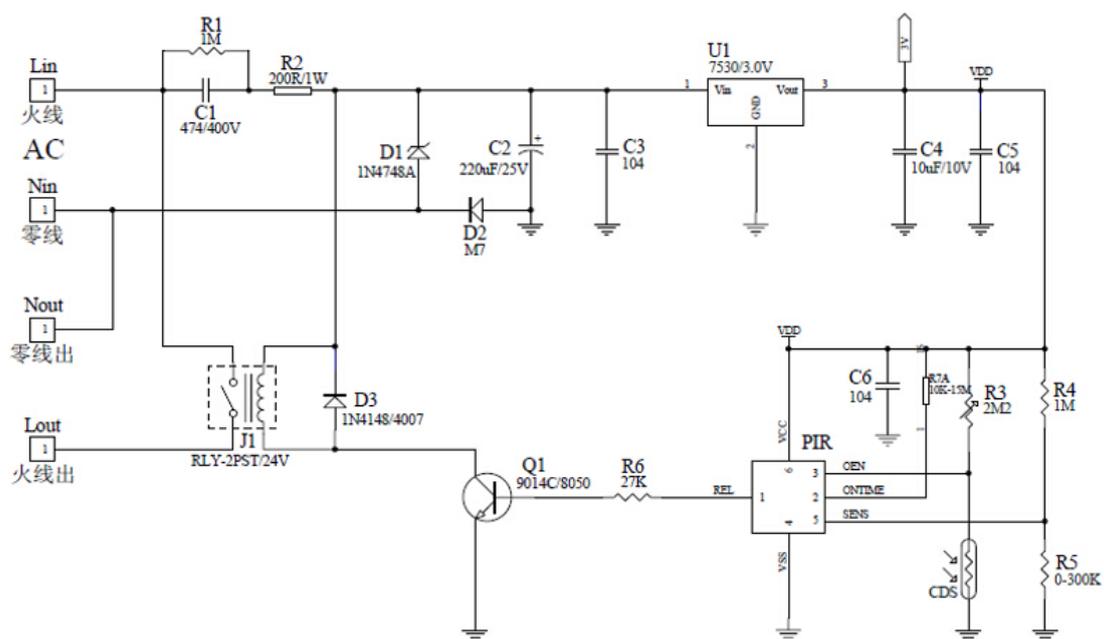
Type	Standard	OK
Salt spray test	GB/T 10125-2012	OK
High temperature test	100°C, 500 hours	OK
Low temperature test	-40°C, 500 hours	OK
Humidity	Relative humidity 95%, 500 hours	OK
Heat resistance	250°C, 10S	OK
Vibration	Frequency: 10Hz-55H, Time: 2 hours	OK
Fall	1m free fall	OK
Air tightness	Soaking in water of 21kpa, 1 hour	NO bubbles

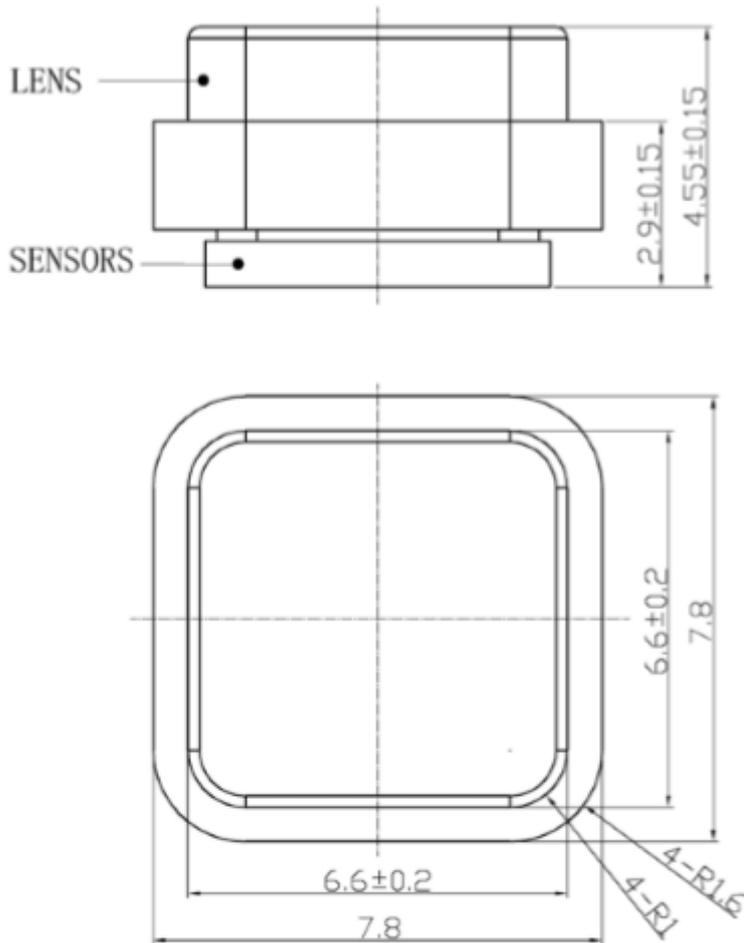
Typical Application Circuit—S16-L221D

MOS Tube application



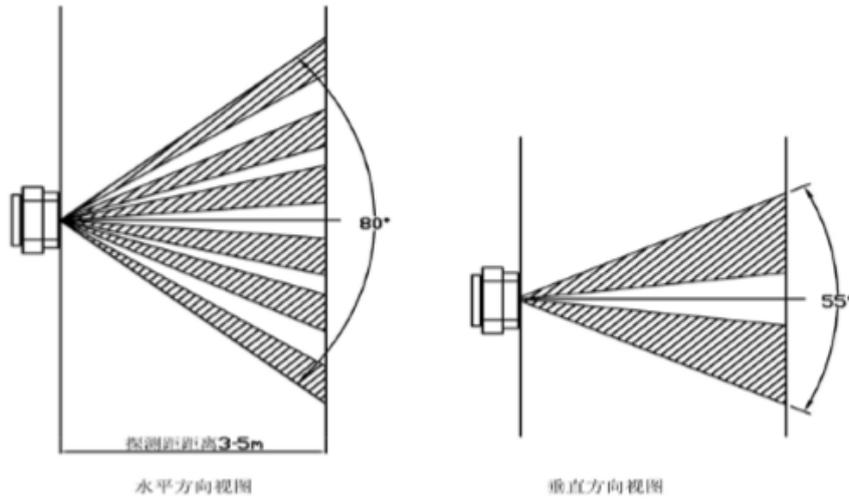
Triode application



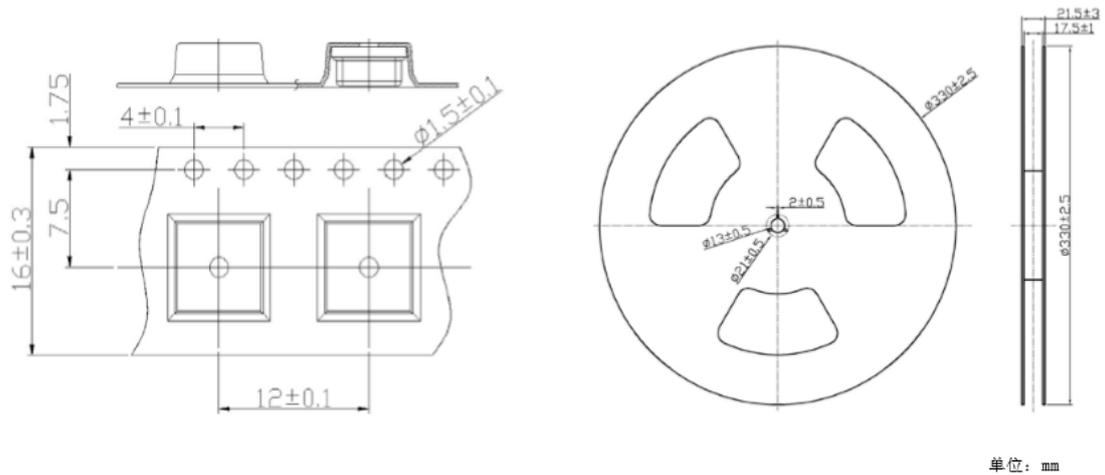
■ Fresnel lens for Mini SMD Digital Pyroelectric Infrared Sensors**SB-F-011**

单位: mm

■ Field of View (with SB-F-011)



■ Package



Standard package: 1500pcs



SENBA OPTOELECTRONIC Nanyang Senba Optical&Electronic Co., Ltd

Add: 2nd Floor, #D Building, HuaWan Industrial Zone,
GuShu, XiXiang Street, Bao'an Dist., ShenZhen City,
GuangDong Province, China (518102)

Tel: [+86-755-82591842](tel:+86-755-82591842)

Fax: [+86-755-82594762](tel:+86-755-82594762)

Mobile: [+86-13717032921](tel:+86-13717032921)

Skype: lily-zhong12

Email: lily@sbcde.com.cn

Website: <http://en.nysenba.com>