



Digital Pyroelectric Infrared Sensor

(Model: RDA-226)

User's Manual

Version: 1.1

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Zhengzhou Winsen Electronics Technology Co., Ltd

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Please keep the manual properly, in order to get help if you have questions during the usage in the future.

Zhengzhou Winsen Electronics Technology CO., LTD.

RDA-226 Digital Pyroelectric Infrared Sensor

Digital PIR sensor RDA-226, is an integrated design of sensitive element and signal processing chip, packaged sensitive element and IC chip into sensor shield. Sensitive element transfer the human movement signal to high-precision digital chip for data processing. Then the sensor gives digital signal for easy using.

Features:

- * High-precision AD signal process
- * Differential signal input mode, anti-interference ability
- * Sensitivity, delay time, and light adjustment function
- * Enable pin controls the sensor output
- * Low working voltage and power consumption
- * Digital TTL signal output



Applications

Security product
 Human body induction toys
 Human body induction lamps, and switches
 Industrial automation control
 Smart home
 IOT terminals
 Intelligent appliance

Technical Parameter

Max Limit

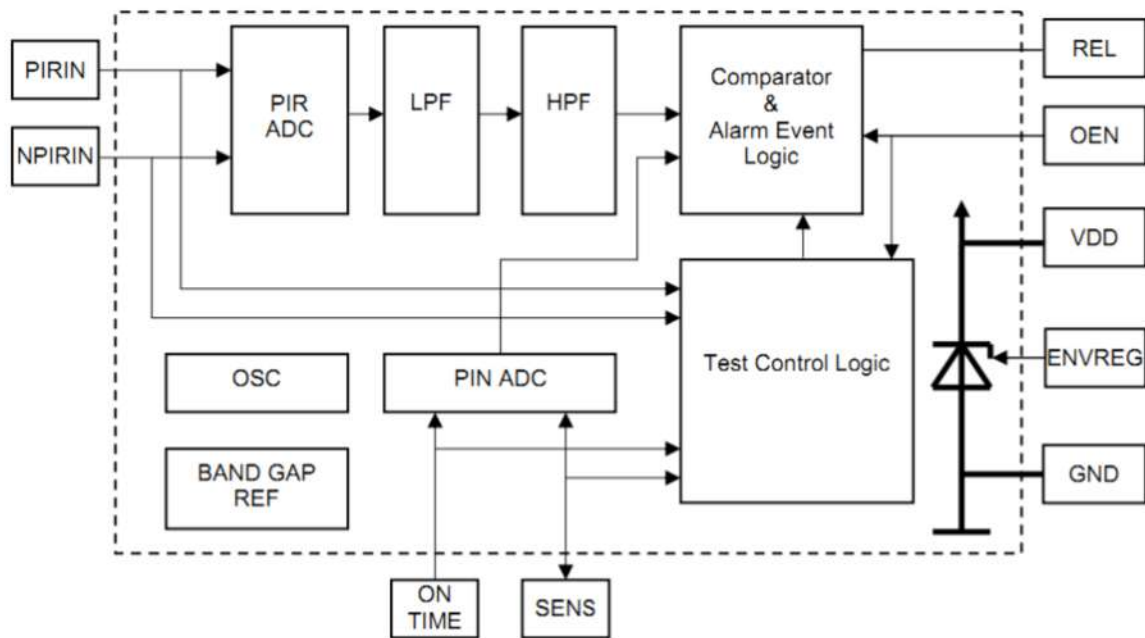
Parameter	Symbol	Min	Max	Unit	
Voltage	V_{DD}	-0.3	3.6	V	
Pin limit	I_{into}	-100	100	mA	
Storage temperature	T_{ST}	-40	125	°C	

Working condition

Parameter	Symbol	Min	Typical	Max	Unit	Note
Working condition						
Voltage	V_{DD}	2.7	3	3.6	V	
Current	I_{CC}	12	15	20	uA	
Sensitivity	V_{SENS}	110		530	uV	adjustable
Temperature	W_{ST}	-20		85	°C	
Input enable						
High voltage	V_{IH}	80			% V_{DD}	
Low voltage	V_{IL}			20	% V_{DD}	
Current	I_I	-1		1	uA	
Output						
Low current	I_{OL}	10			mA	
High current	I_{OH}			-10	mA	
Block time			2.3		S	
Delay time	ON_{TIME}	2		4194	S	adjustable

Input adjustment (sensitivity/delay time)						
Voltage input range		0		VDD	V	0V-1/4VDD
Input bias current		-1		1	uA	
Oscillators and filters						
Low filter cut-off frequency				7	Hz	
High filter cut-off frequency				0.44	Hz	
Chip oscillator frequency	F _{clk}			64	KHz	

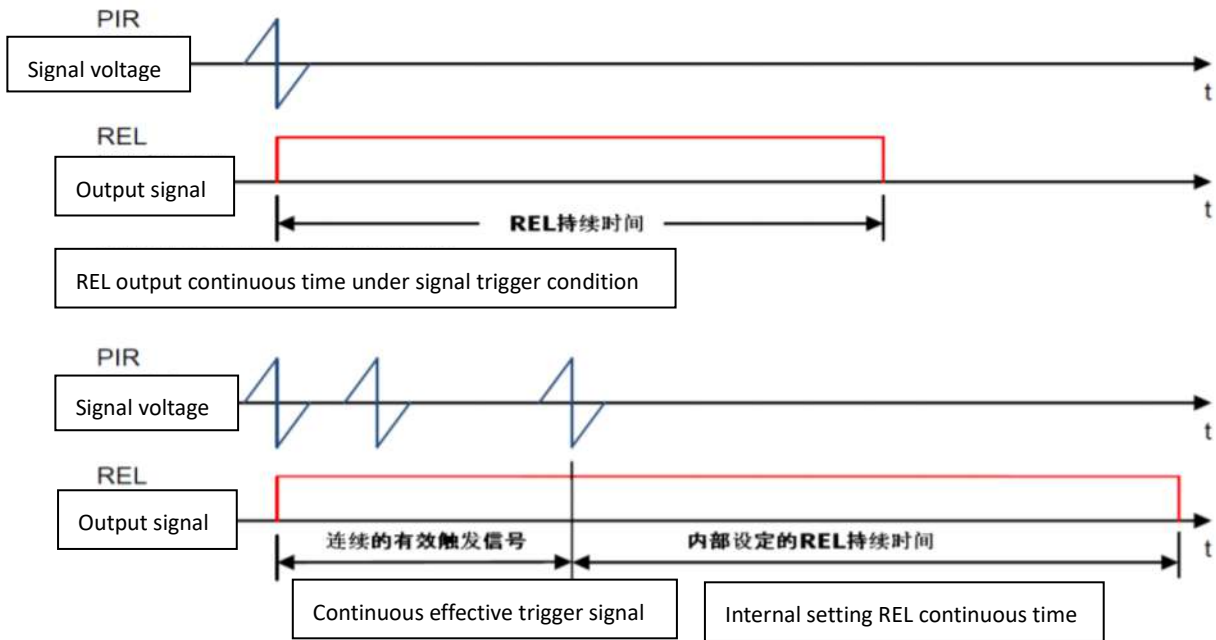
Internal frame



Trigger mode

When the sensor receives a signal that exceeds the set threshold, a count pulse is generated internally. When the sensor receives the signal again, it generates a second count pulse. When two counts are generated within 4 seconds, the sensor gives high-level TTL output on REL pin.

In addition, when the received signal is more than 5 times of the set threshold, only by a pulse, it gives high-level TTL output on REL pin. The output delay time is effective from the last pulse start time.

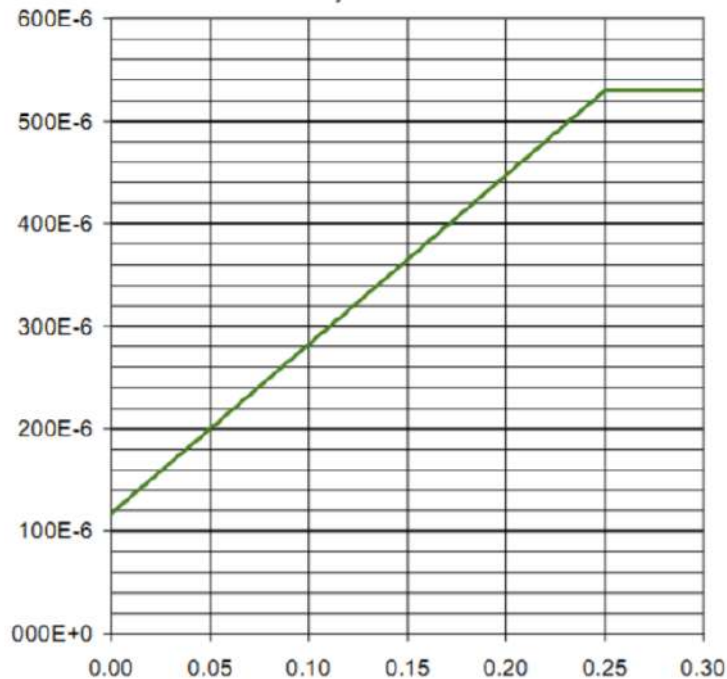


Sensitivity adjustment

The input voltage on SENS pin, determines the comparison threshold for the input signal. When connected to ground, the sensor comparison threshold is the lowest, sensitivity is highest, that is, detection distance is the farthest.

When the input voltage is over 1/4VDD, it would choose max threshold, sensitivity is the lowest, that is, the detection distance is minimal.

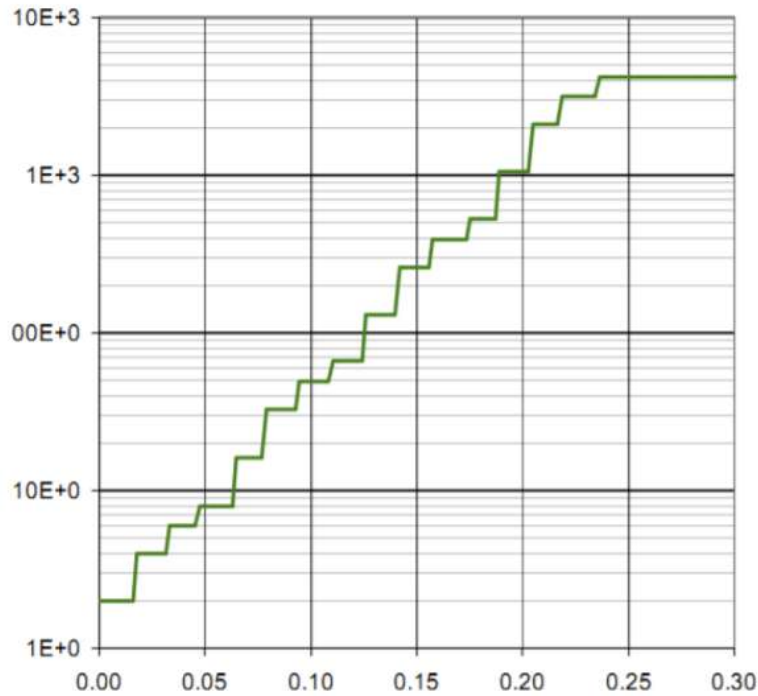
The sensing distance is not linear with the voltage on the SENS pin. With different Fresnel lenses, the sensitivity is different, and distance depends on actual measurement.



Comparison threshold with SENS input voltage

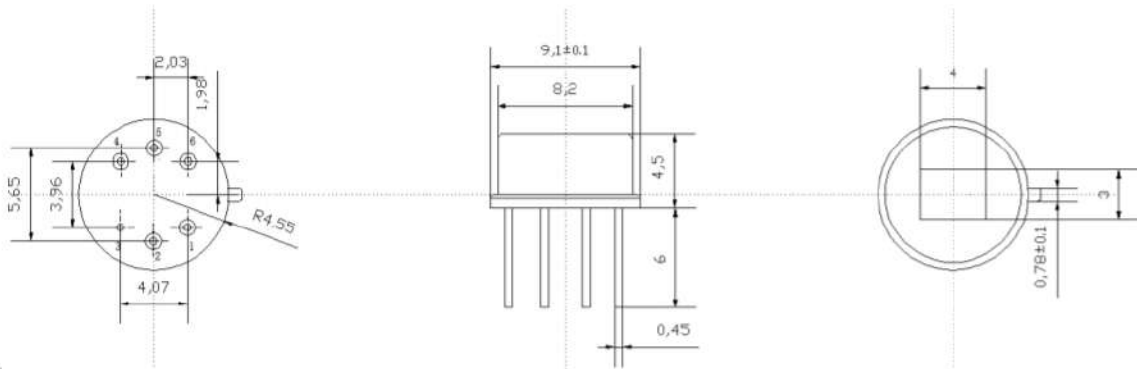
Delay time adjustment

The delay time is the high-level TTL output duration time when sensor reaches the comparison threshold. The input voltage of ONTIME pin, determines the duration of output signal. The relationship between output delay time and voltage, is as below for your reference. When the voltage value exceeds 1/4VDD, it would choose max delay time.



Pin voltage	PIN ADC count	ON Time in seconds	ON Time
$V_{DD} * 1/128$ or less	0	2	2 sec
$V_{DD} * 3/128$	1	4	4 sec
$V_{DD} * 5/128$	2	6	6 sec
$V_{DD} * 7/128$	3	8	8 sec
$V_{DD} * 9/128$	4	16	16 sec
$V_{DD} * 11/128$	5	33	32 sec
$V_{DD} * 13/128$	6	49	49 sec
$V_{DD} * 15/128$	7	66	1 min 5 sec
$V_{DD} * 17/128$	8	131	2 min 11 sec
$V_{DD} * 19/128$	9	262	4 min 22 sec
$V_{DD} * 21/128$	10	393	6 min 33 sec
$V_{DD} * 23/128$	11	524	8 min 44 sec
$V_{DD} * 25/128$	12	1049	17 min 28 sec
$V_{DD} * 27/128$	13	2097	34 min 57 sec
$V_{DD} * 29/128$	14	3146	52 min 25 sec

Component Structure (Unit: mm)

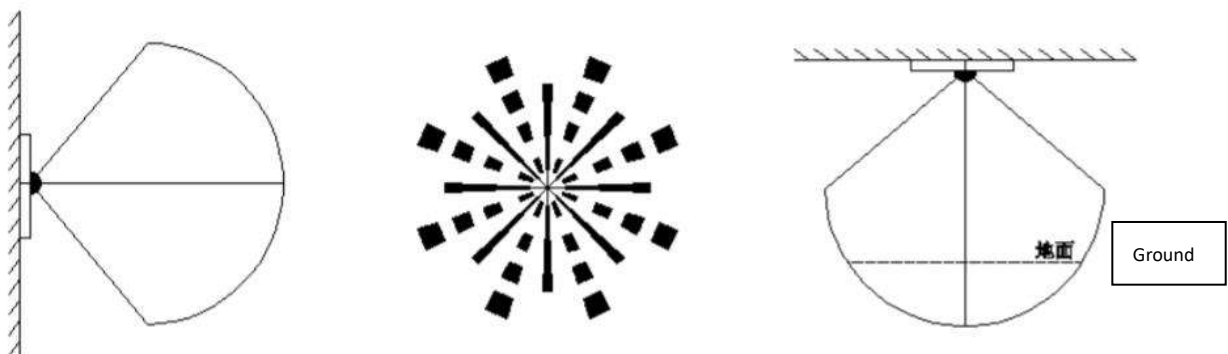


Pin Definition

Item	Name	Definition
1	SENS	Sensitivity pin (0-1/4V _{DD})
2	CDS	photo-cell adjustment pin, OEN PIN (20% V _{DD} ~80%V _{DD})
3	VSS	power ground
4	VDD	sensor power supply pin
5	REL	sensor output pin, TTL high/low level output
6	ONTime	delay time adjustment pin (0-1/4V _{DD})

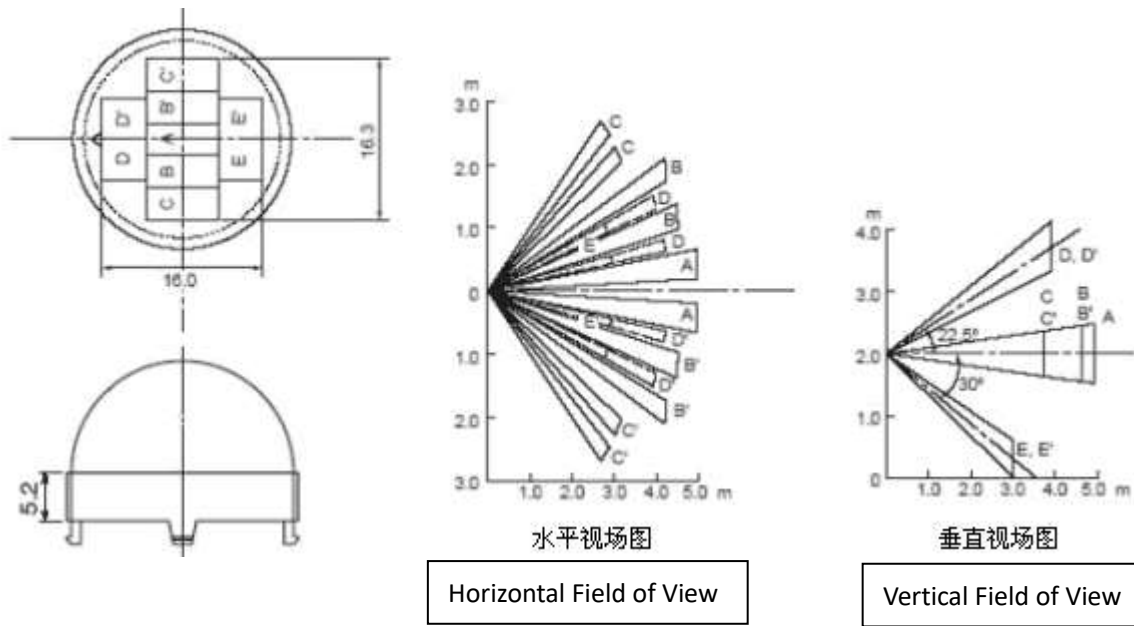
Detection Range:

The detection angle and distance is relevant to Fresnel lens and SENS pin voltage. Below picture is for reference only.

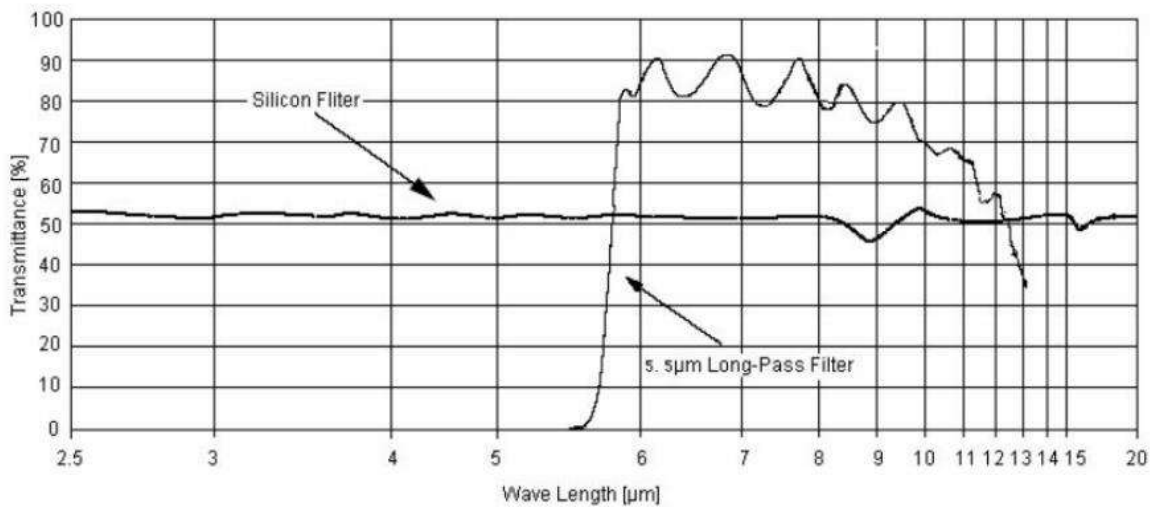


Fresnel Lens:

Fresnel Lens used, would determine the sensor's detection angle and distance, which can correspond to a variety of detection range and distance, according to customers' requirement.

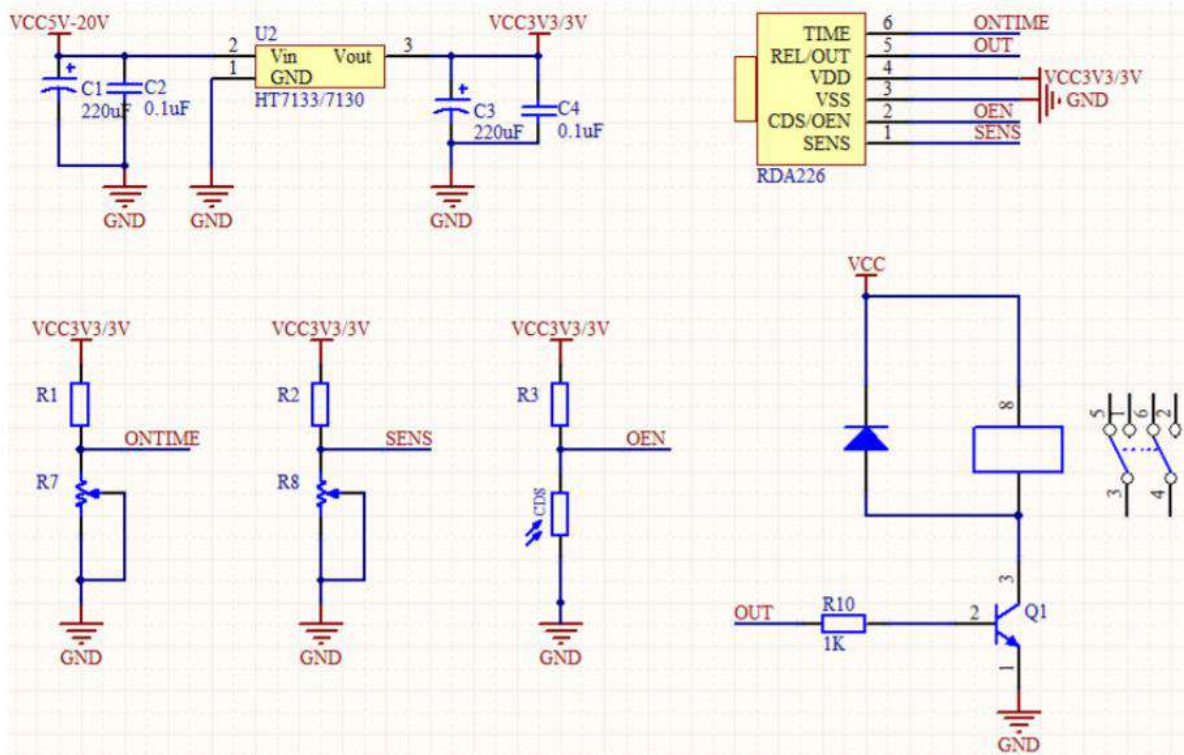


Wave Length



Note: The graph shows a typical 5 μm infrared filter reference, and the curve is the average of infrared pass rate. The window material is a special vacuum coating of semiconductor wafers.

Application



Cautions:

1. The sensor’s parameter is obtained by standard testing condition after 1 minute’s settling time.
2. Please pay attention on Sensor’s window direction, must combine with Fresnel lens to get a perfect detecting angle.
3. Sensors detecting distance is affected by ambient temperature, moving objects’ temperature, Fresnel lens, Amplifier amplification factor, the comparator threshold voltage setting...etc. please take a comprehensive consideration of various parameters when using the sensors.
4. Please do not touch the window area to avoid damaging to the optical filter.
5. Please handle the sensor with care when using it.
6. Please try to use hand soldering and make the soldering time as short as possible. Soldering temperature should be less than 350°C, and soldering time be less than 3 seconds.
7. Please get electrostatic protective measures when using this product.

Note: To keep continual product development, we reserve the right to change design features without prior notice.

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