SENSORCN TECH LIMITED

Dual-element Pyroelectric Sensor SN924

IR Detector

Main Characteristic：

Specified Design

1. A sensor structure design with Hi-REL
2. Single chip digital signal processing
3. All signal processing are integrated in TO5 packaging
4. 16 bits analog-digital conversion and digital signal processing
5. Excellent capacity of anti-jamming

Key Application

1.Passive infrared sensor light switches
2.Intrusion alarms
3.Human body sensor toys
4.Intelligence household appliances
5.Monitor and security product

Specification

Parameters	Min	Typical	Max	Unit	Condition
Sensing Element Size		2X 1		mm^2	Dual-element sense unit
Responsivity	3.3	4.5		kV/W	100℃, 1Hz
Match		5%	15%		100℃， 1Hz
Noise	30		80	μVp-p	25℃ 0.3～3Hz
NEP		$7.5X10^{-10}$	$30X10^{-10}$	$W·Hz^{-1/2}$	100℃, 1Hz
Detectivity D*	$4.7X10^{7}$	$19X10^{7}$		$cm·Hz^{1/2}·W^{-1}$	100℃, 1Hz
Supply voltage V_{DD}	2.7	3.0	3.3	Vdc	
Operating current I_{DD}	10	15	20	μA	
Output I_{OL}			-10	mA	V_{OL} > 1
Output I_{OH}	10			mA	V_{OH} > (V_{DD}-1)
Brand Filter	0.4		7.0	Hz	Frequency 64kHz
Field of View		115°			No shelter from level direction
Field of View		148°			Shelter from level direction
GND		TO5 Metal Package Ground			V_{SS}
Operating Temperature	-20		85	℃	
Storage Temperature	-20		85	℃	

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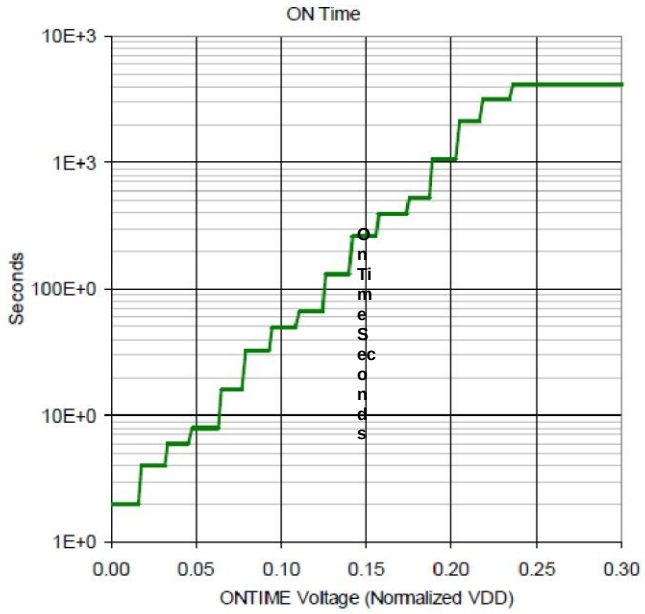
Delay - ONTIME: Input voltage controls the delay time by adjusting. While ONTIME pin grounding and the voltage more than 25% of VDD, the time comes to the longest.



Voltage	On-Time counting	On-Time Commended Matching Res		On-Time (3.3V) Reference Voltage	Typical Time
VDD*3/128～0	0	NC	0R	0	<4s
VDD*3/128	1	1M	24k	>0.077	5s
VDD*5/128	2	1M	39k	>0.129	7s
VDD*7/128	3	1M	56k	>0.180	10s
VDD*9/128	4	1M	75k	>0.232	18s
VDD*11/128	5	1M	91k	>0.284	38s
VDD*13/128	6	1M	110k	>0.335	56s
VDD*15/128	7	1M	130k	>0.387	1m14s
VDD*17/128	8	1M	150k	0.438	2m29s
VDD*19/128	9	1M	174k	>0.490	4m59s
VDD*21/128	10	1M	200k	>0.541	7m29s
VDD*23/128	11	1M	220k	>0.593	9m59s
VDD*25/128	12	1M	240k	>0.645	19m58s
VDD*27/128	13	1M	270k	>0.696	39m56s
VDD*29/128	14	1M	294k	>0.748	59m55s
VDD*31/128	or	0R	NC	>0.8	1 h 20 s

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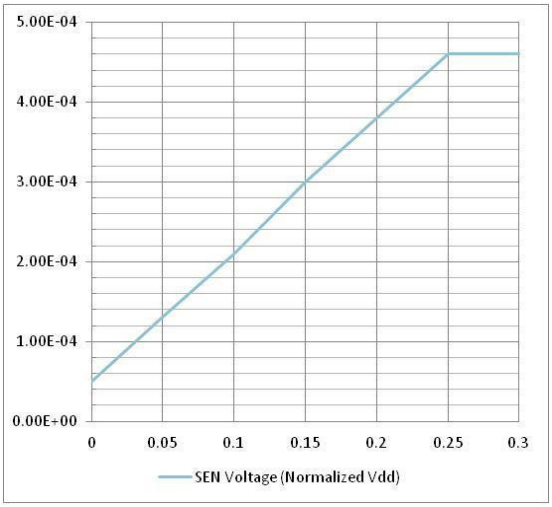
Sensitivity:

Adjust the triggering threshold value of sensing signal via voltage of the SEN input end. The threshold value comes to the minimum and sensitivity comes to the maximum when SEN=V_{SS}. On the other hand, the threshold values comes to the maximum and sensitivity comes to the minimum when the voltage is higher than 25% of V_{DD}. Below shows the comparison chart of threshold value.

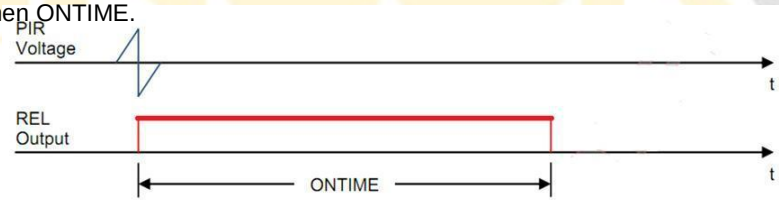


Blocking time

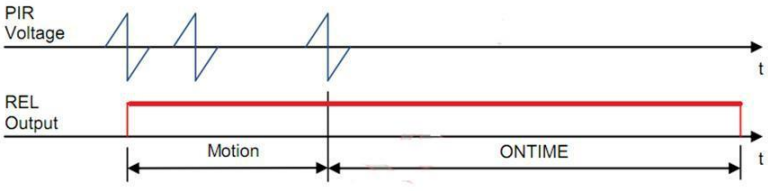
After triggering off there is a 2-second blocking time, which is set to avoid the pulse interference caused by circuit shutting down that will affect the sensor self-triggering.

Response triggering mode

When the range of signal becomes bigger than the trigger threshold value, the inner chip will record this signal. Any triggering during working time will lengthen ONTIME.

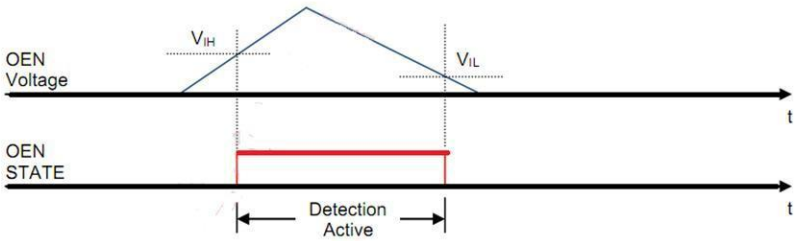


REL output active due to single event



REL output active timing due to multiple events

OEN –The switch to effectively avoid the frequency in hysteresis voltage range (Photocell or Photo Diode）



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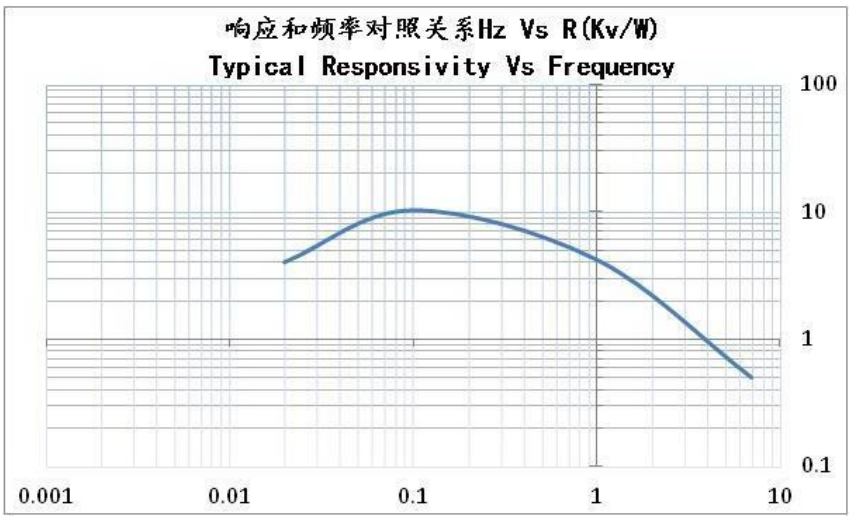
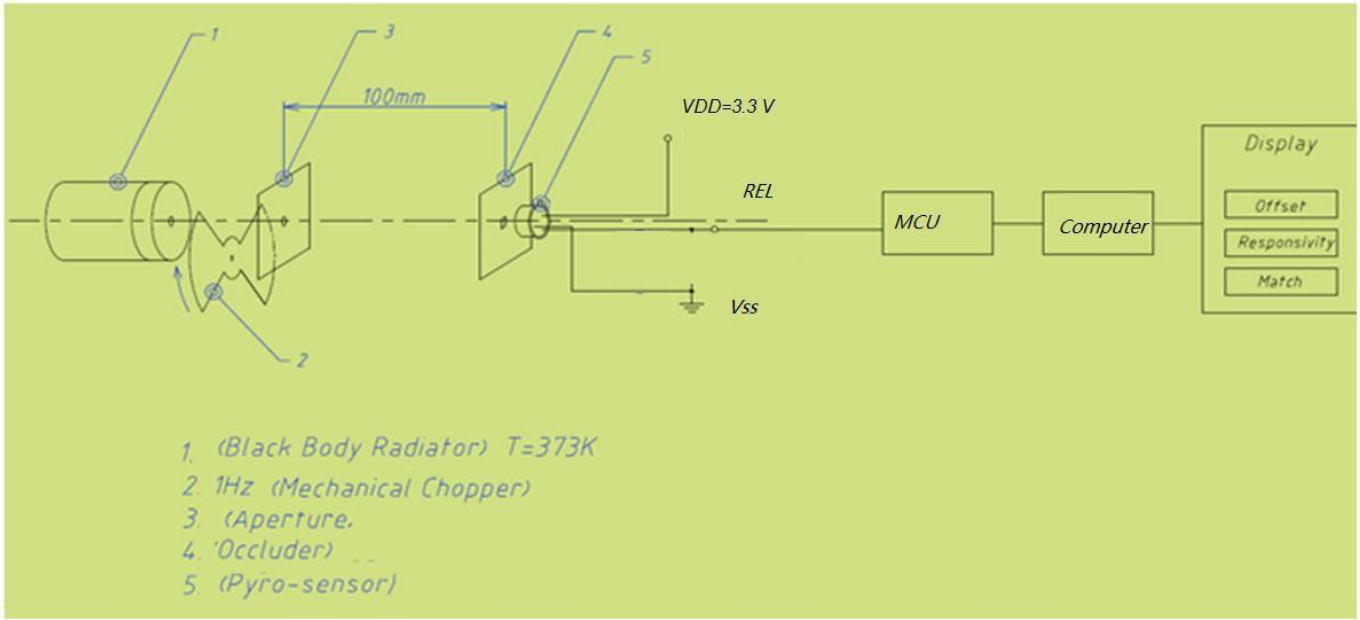
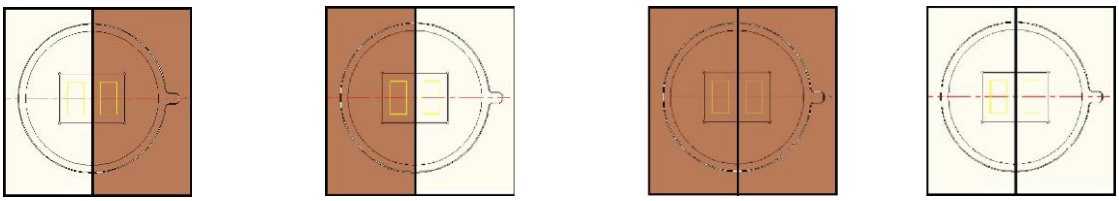
Typical Responsivity Vs. Frequency（Frequency response is remarkable between 0.4Hz & 7.0Hz）



Schematic of Test Set Up



Element A **Element B** **Dark Noise** **Match**



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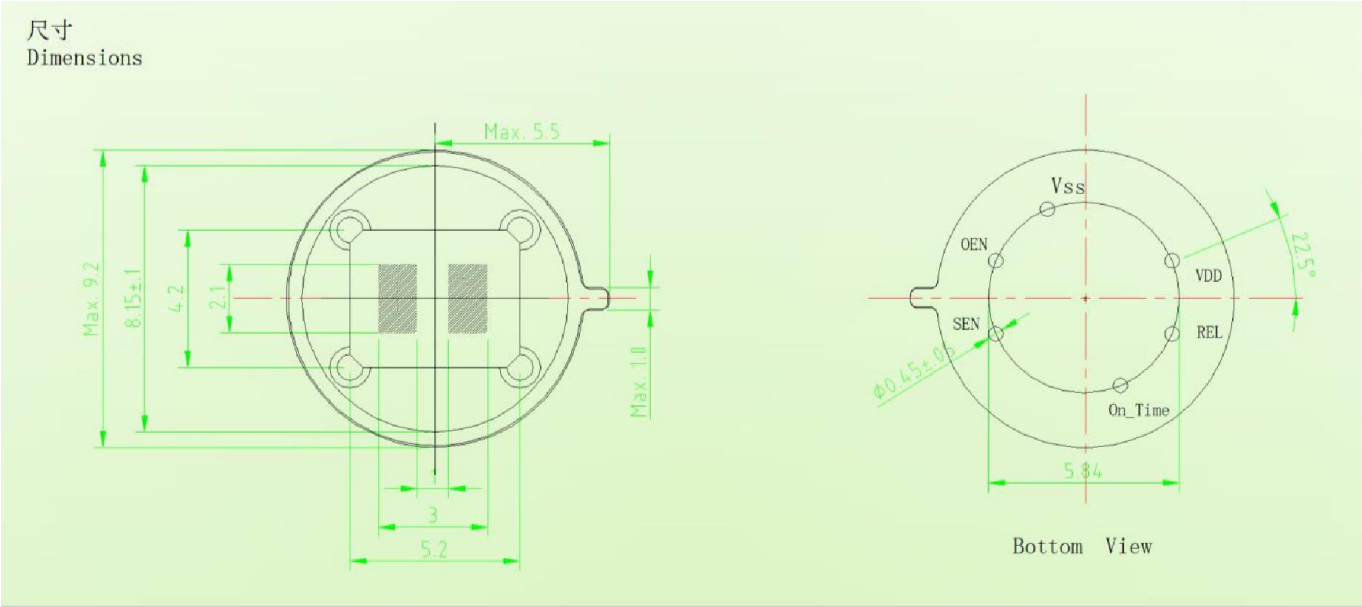
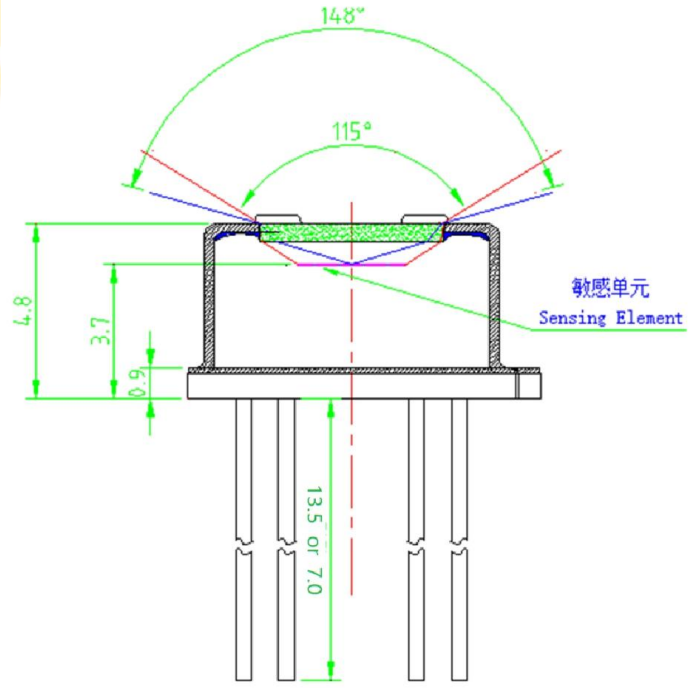
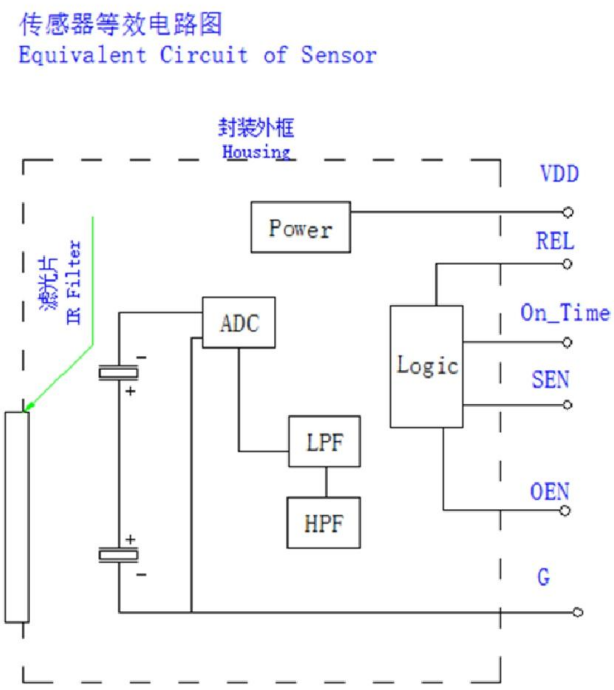
Dimensions and Equivalent Circuit (Top View)







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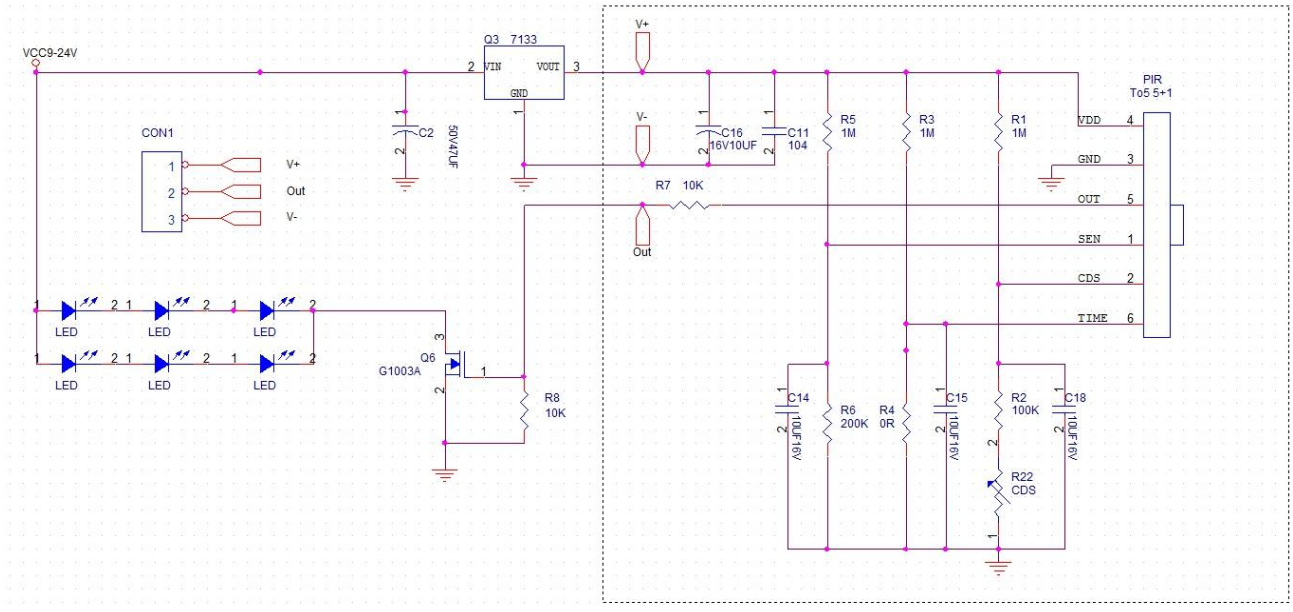
Pin Names:

名称	Pin No.	描述
SEN	**1**	Sensitivity selection input end
OEN	**2**	Function input end V_{IL} MAX 0.8V (input low voltage) V_{IH} min 0.9V (input high voltage)
VSS	**3**	Cathode & GND Ground of TO 5 package & Negative supply voltage
VDD	**4**	Supply voltage range V_{DD} 2.7~3.3 V (Testing condition I_R = 0.5mA)
REL/Output	**5**	Signal output end I_{OH} Max. -10mA as V_{OL} >(V_{DD}-1.0) I_{OL} Min. 10mA as V_{OL}< 1.0
On-Time	**6**	Delay input Adjustment between 0V~1/4V_{DD}

Referential Application Circuit

Induction Control Circuit



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Attention:

Inappropriate application method may cause irreversible and permanent damage to the sensor. Below methods will help to protect the high performance of the equipment.

For the high sensitivity of the sensor，the sensing material of the sensor is normally sensitive to heat, which means the material is most likely to lose it functionality in high temperature. While wave soldering, we recommend the temperature to be 285℃,duration less than 5 seconds. And if a pre-heater is used, please take proper measures to avoid the sensor from grilling. Besides the weld of the lead, the sensor must not stand a temperature higher than 100℃.

While soldering manually, please set the temperature between 240℃ and 280℃, duration between 2 & 4 seconds.

Please keep the distance between weld and base no less than 3 or 4mm under any circumstance.

The sensor is seal welded by housing with superb hermeticity, filled with dry nitrogen. In order to maintain the hermeticity, we do not suggest to bend the lead, which may damage the glass-metal sealed point, causing air leakage. If a buckling is needed, please use assistive tools to ensure no stress on the root of the lead. Maintain the distance between buckling and base of the sensor no less than 3mm. No twisting the lead axially at any time.

Optical filter in the window of sensor is equipped with high precision. Window filter of the sensor is plated with precise antireflection film in order to improve the transmittance of infrared ray. Do not touch the window directly with bare hand. During the operational process, in order to avoid scratch on the filter, do not make window contact or rub with other object. If the filter has been smudged on the surface, scrub with absolute ethyl alcohol.