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 parameter：

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
Dual-element Match degree		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*	$4.7X10^{}$	$19X10^{}$		$cm·Hz^{1/2}·W^{-1}$	100℃, 1Hz
Supply voltage V_{DD}	2.7	3.0	3.3	Vdc	
Operating current I_{DD}	10	12	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
	148°				Shelter from level direction
GND	TO5 Metal Package Ground				V_{SS}
Operating Temperature	-20		85	℃	
Storage Temperature	-20		85	℃	

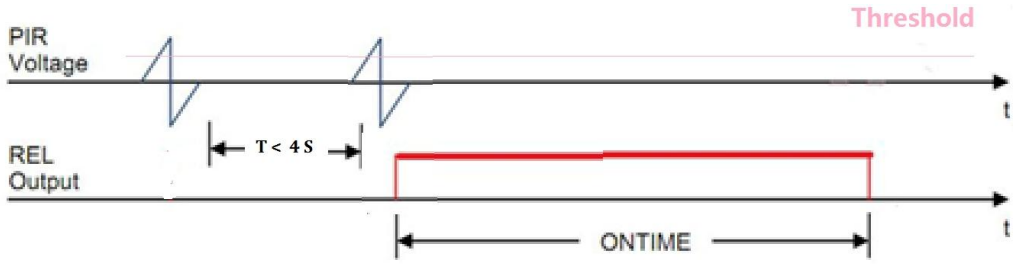
Blocking time

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.

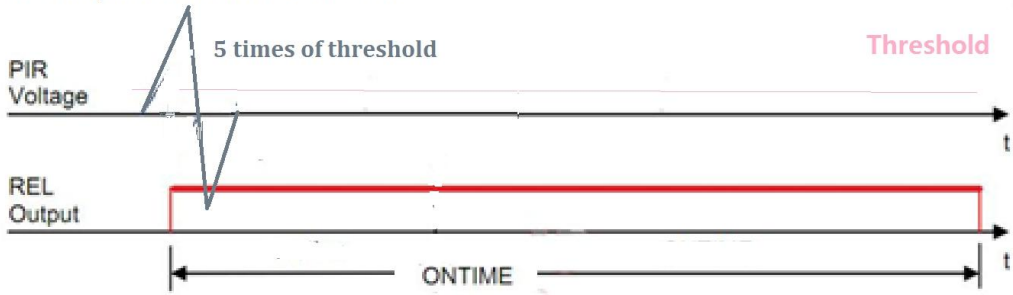
Response triggering mode

When the range of signal becomes bigger than the trigger threshold value, the inner chip will record this signal. If there is another signal with value larger than threshold value within 4 seconds, the sensor will immediately trigger response and output a 2-second high-level signal. If the range of the first signal is 5 times larger than the threshold value, it will directly trigger response and output a 2-second high-level signal. While the triggering continues, the response will keep outputting high-level signal.

See below figure with specific response：

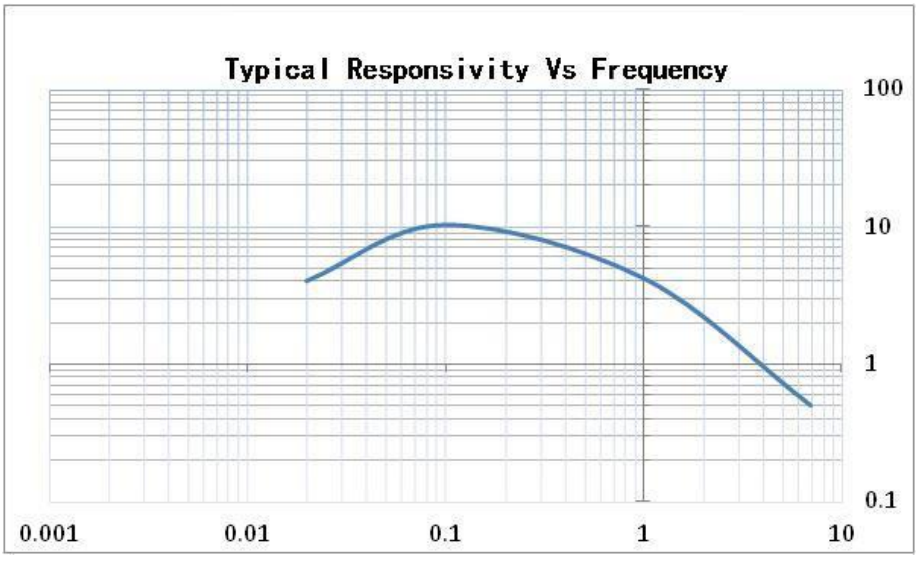


REL output aciitve due to tow events



REL out active timing due to 5 times PIR

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



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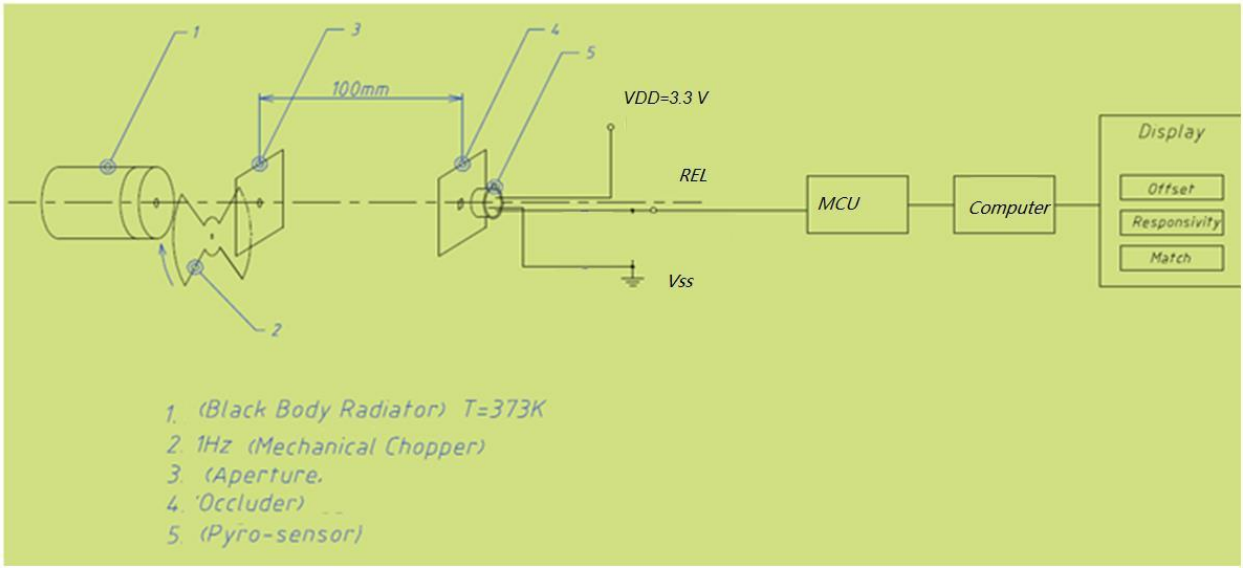
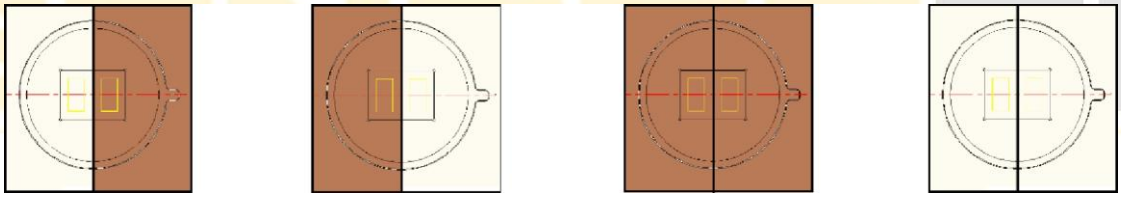
Schematic of Test Set Up



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



Dimensions and Equivalent Circuit

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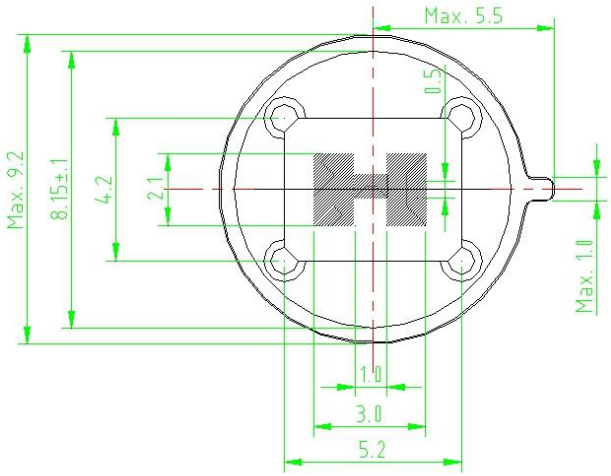
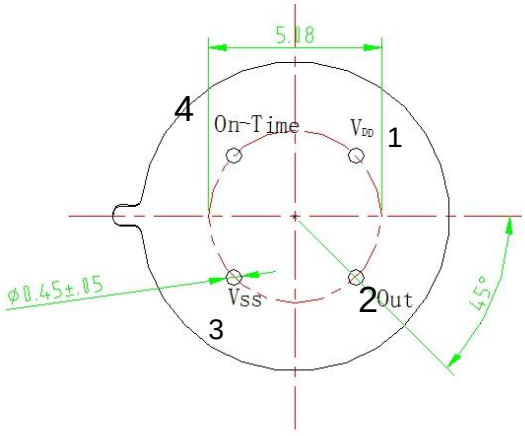
11





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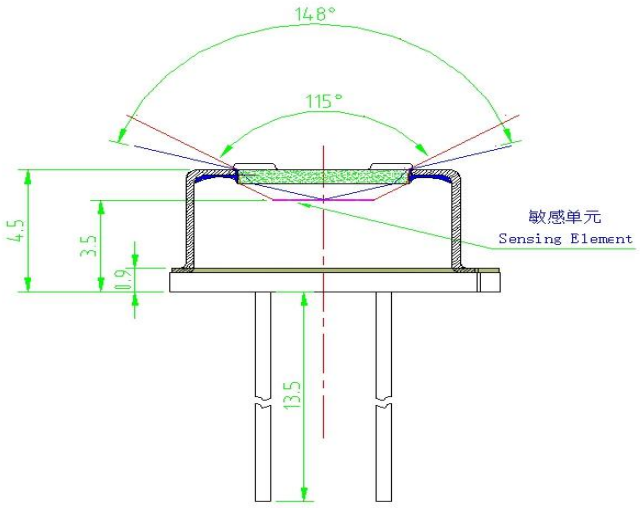
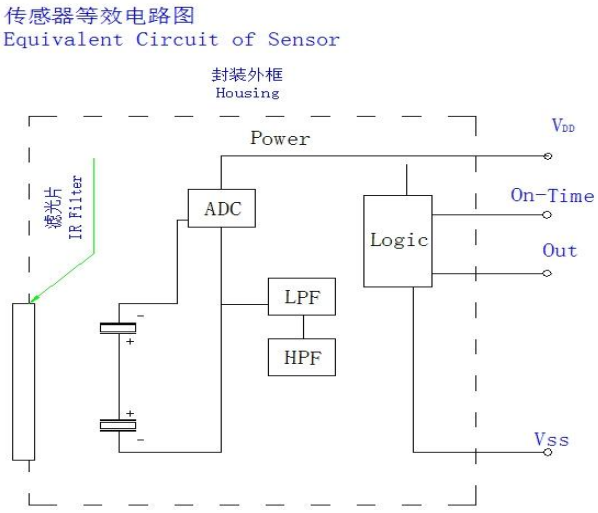
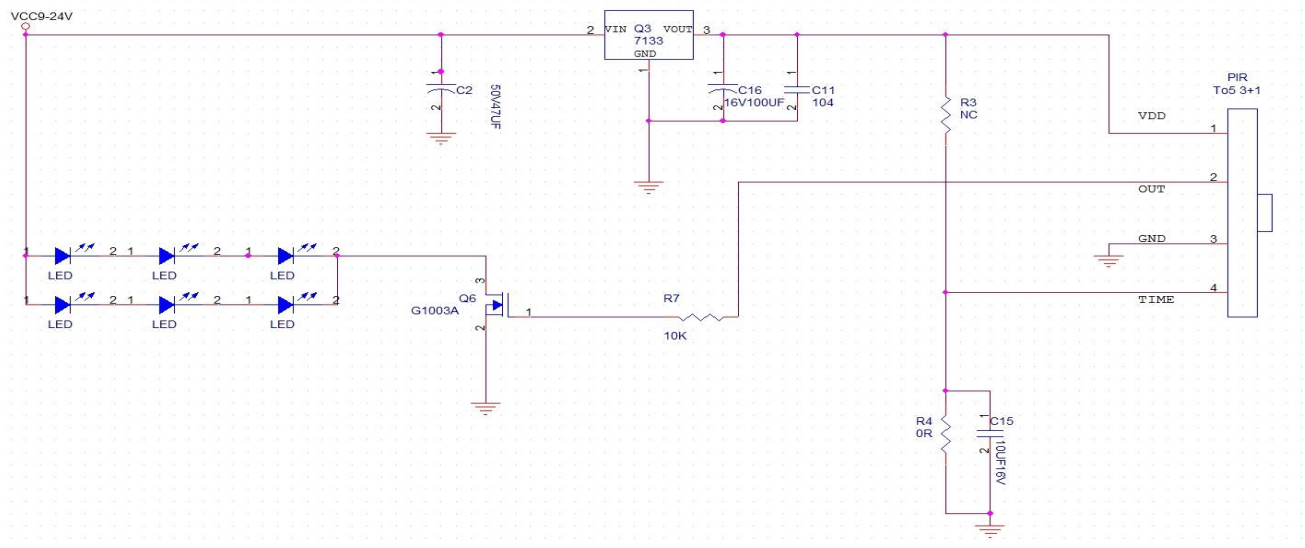




Pin Names:

Pin Name	Pin No.	Description
VDD	1	Regulator V_{DD} 2.7~3.3 V (Testing condition I_R = 0.5mA)
Out	2	I_{OH} Min. -10mA as V_{OH} >(V_{DD}-1.0) I_{OL} Min. 10mA as V_{OL}< 1.0
GND/Vss	3	Ground of TO 5 package
On-time	4	Adjustment between 0V~1/4V_{DD}

Reference application circuit



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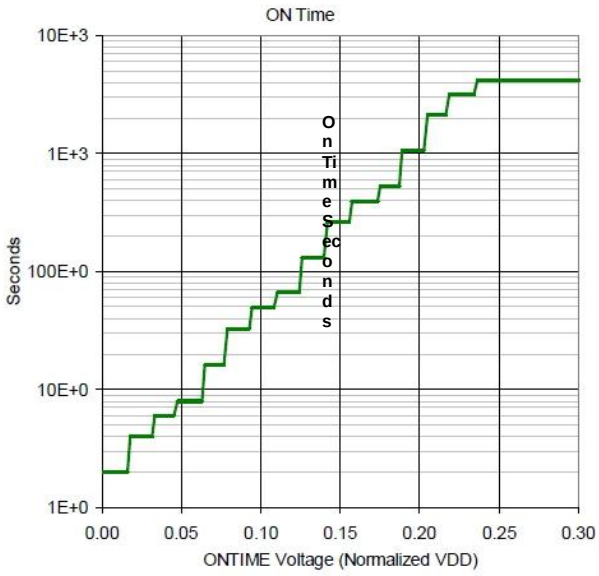
Time delay - ONTIME: By adjusting ONTIME Voltage, it controls the duration of the delay time. When the voltage is higher than 25% VDD, the duration comes to its upper limit.



Voltage	On-time count	On-time Recommend Res.(Kohm) 1%+/-accuracy		On-Time Voltage （3.3 V）	Time Typical Value
3/128～0VDD		NC	0R	0	≤ 4s
(VDD*2+3)/128	1	1M	24K	0.075	5s
(VDD*4+3)/128	2	1M	43K	0.127	7s
(VDD*6+3)/128	3	1M	62K	0.178	10s
(VDD*8+3)/128	4	1M	82K	0.230	18s
(VDD*10+3)/128	5	1M	100K	0.281	38s
(VDD*12+3)/128	6	1M	120K	0.333	56s
(VDD*14+3)/128	7	910K	130K	0.384	1m14s
(VDD*16+3)/128	8	1M	150K	0.436	2m29s
(VDD*18+3)/128	9	1M	190K	0.488	4m59s
(VDD*20+3)/128	10	1M	200K	0.539	7m29s
(VDD*22+3)/128	11	1M	220K	0.591	9m59s
(VDD*24+3)/128	12	820K	200K	0.642	20m
(VDD*26+3)/128	13	1M	270K	0.694	40m
(VDD*23+3)/128	14	1M	300K	0.745	60m
(VDD*30+3)/128～VDD	or	0R	NC	0.8~3	1h20m

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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.

Pick and place the sensor as carefully as anti-static sensitive equipment and set electrostatic protection working zone to protect the sensor safe from static damage. Staffs need to wear anti-static suit while pick and place it.