



The OS-PIR233C-S0 digital pyroelectric infrared sensor is an integrated design of the sensitive element and signal processing chip of traditional pyroelectric infrared sensor, and the sensitive element and IC chip are integrated and packaged into the sensor shield

The infrared signal generated by the movement is transmitted to the high-precision digital intelligent processing chip for processing by means of differential input, and the 16-bit digital signal is output through acquisition, filtering, etc., without configuring the device, the data can be read through the serial bus Signal analysis.

Feature

- High precision AD signal processing
- Serial communication
- Strong anti-electromagnetic interference ability
- Very low power consumption

Application

- Long distance motion detection
- Applicable to all kinds of intrusion detectors for burglar alarms
- Energy saving applications
- Applicable to all kinds of smart household appliances

Advantages

- Strict quality assurance system
- Provide a full range of technical support

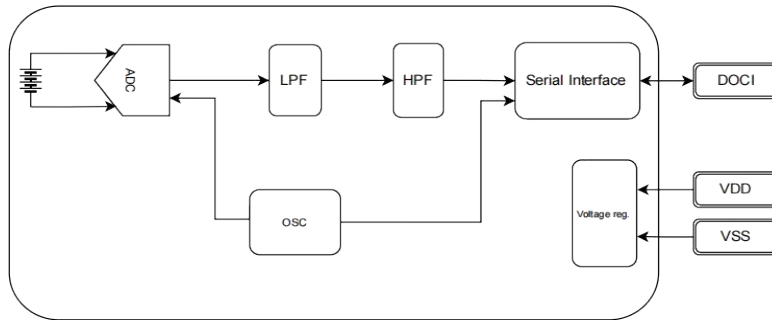
Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Input Voltage	V _{DD}	-0.3	5.5	V	-
Storage Temperature	T _{st}	-40	125	°C	-
Operating Temperature	T _{op}	-40	70	°C	-

Working Condition (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Voltage	V _{DD}	2.7	3.0	5.0	V	-
Supply Current	I _{DD}	-	18	20	μA	V _{DD} = 3 V, no load
Detect Wavelength	λ	5	-	14	μm	-
HPF Cutoff Frequency	-	-	-	0.44	Hz	-
LPF Cutoff Frequency	-	-	-	7	Hz	-
ADC						
Start Time	t _s	40	60	100	μS	-
CLK Low Time	t _{CL}	-	1	2	μS	-
CLK High Time	t _{CH}	-	1	2	μS	-
Bit Time	t _{BIT}	-	10	20	μS	-
ADC Resolution	-	-	16	-	Bits	-

Internal Block Diagram

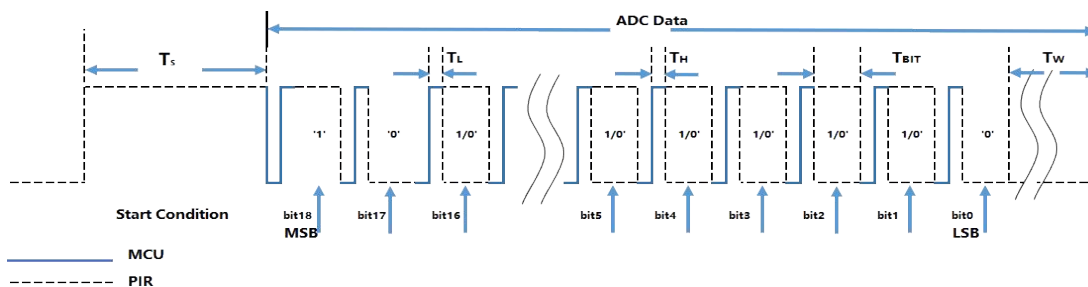


Principle

The PIR signal is first converted by an ADC and then filtered by a second-order Butterworth low-pass filter to filter out unwanted high-frequency signal components. The signal after LPF is then input to the programmable second-order high-pass filter HPF, where the data after the band-pass filter can be read by the user using the serial bus.

■ PIR timing interrupt read

After PIR is powered on, the data can be read directly without parameter configuration. PIR updates data every 16mS, each frame consists of 19 bits of data, DOCI is pulled high by PIR to maintain 2 system clock cycles. After waiting for TL, the MCU generates a rising edge TH on the DOCI line and starts reading data. The first readout data is the highest bit. Repeat the process until all 16 bits of data are read. After the last bit of data is readout, the MCU must force low and release DOCI immediately. The DOCI timing diagram is shown in the figure below. The blue line indicates the MCU drive and the dotted line indicates the PIR drive.



■ Data format

The DOCI interface outputs the value of the high-pass filter. The DOCI output data is shown in the figure below, the first 2 bits and the last bits of the total 19 bits of data are flag bits, which are fixed values, if they do not match the default values, it means that the data is wrong, please discard the set of data.

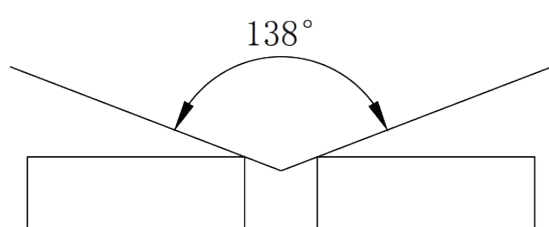
19 Bits Data																		
BIT18	BIT17	BIT16	BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
1	0	ADC VAL																0

■ Data description

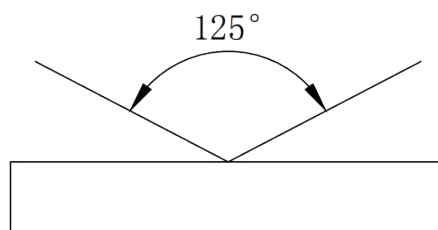
Value	Header		16Bits Data																Tail
(Dec)	B18	B17	B16	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
32767	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
32766	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
32765	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
⋮																			
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
-2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
-3	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
⋮																			
-32765	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
-32766	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
-32767	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

When Bit16 is "1", Bit15~Bit1 takes the reverse code and adds 1 to Bit1 for processing. The resulting data bit16 is the sign bit, "0" represents positive, "1" represents negative; Bit15~Bit1 is a regular binary code. When Bit16 is "0", the data remains the same

Detection Angle

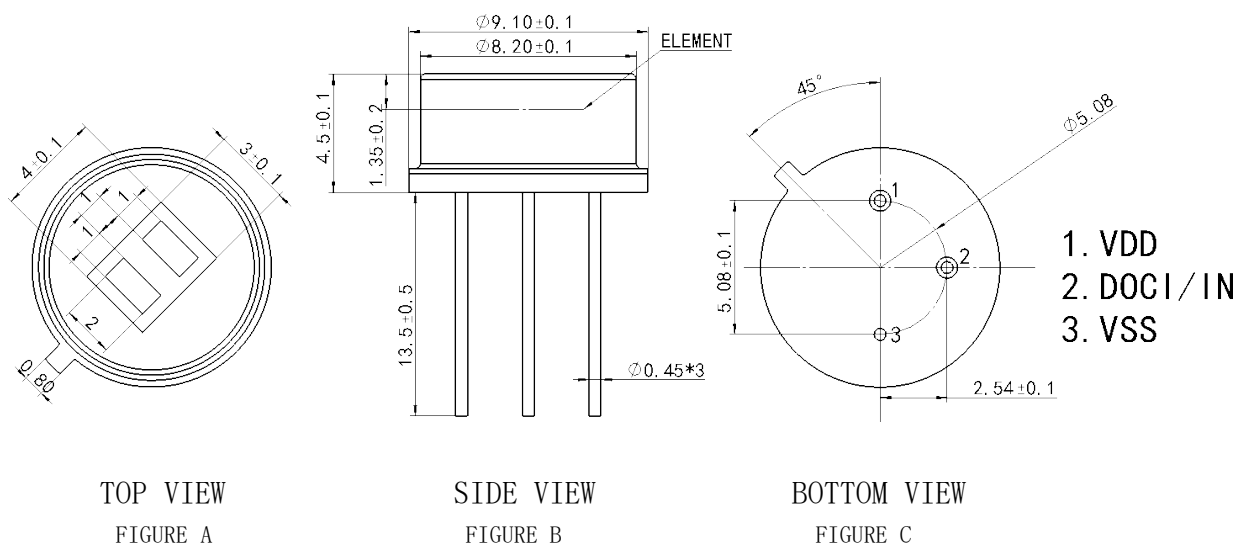


X-X



Y-Y

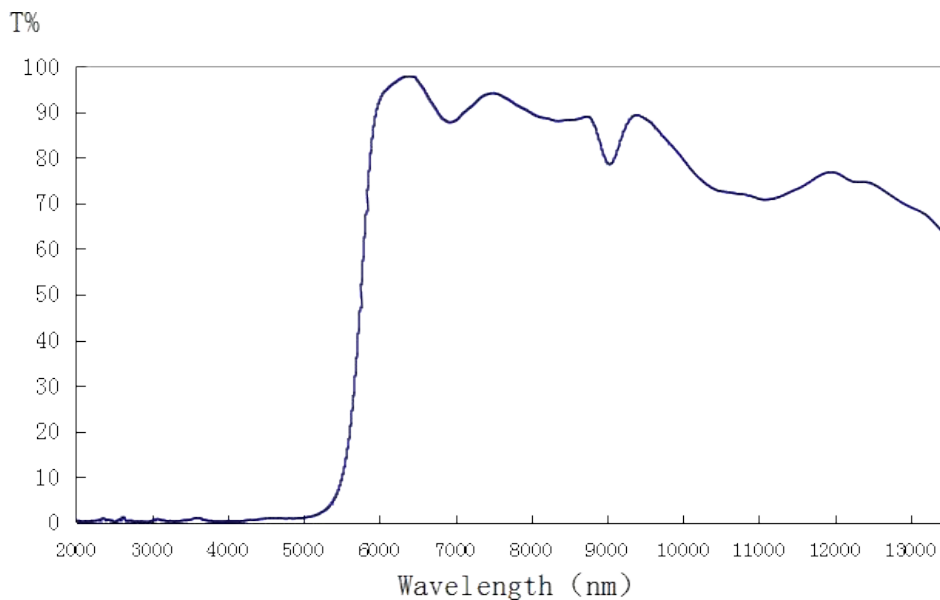
Product Dimension (mm)



Pin Description:

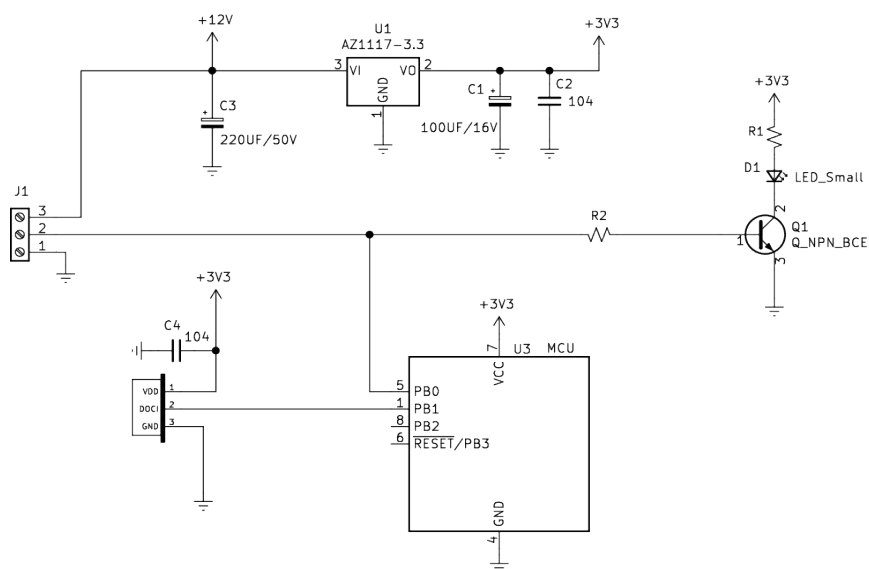
1	VDD	VDD Power supply pin
2	DOCI	DOCI Sensor data output pin
3	VSS	VSS Power ground GND

Window Material Receiving Wavelength Range



Note: the chart shows a typical 5.5um infrared filter reference chart. The curve is the average of the infrared pass rate.

Typical Application Circuit



Soldering

Careless operation during soldering will cause damage to the product, please be careful. Please avoid put pressure on the product bracket or package part during soldering. When soldering, please ensure that the soldering position has a certain distance from the bottom of the sensor. This distance varies with different welding methods. Please refer to the recommended welding conditions below.

Recommended Soldering Conditions

Soldering Mode		Fixed Form
Manual soldering	Soldering iron temperature	<350℃
	Soldering time	<5 seconds
	Soldering position	More than 1.5mm (from PCB to base)
Tin stove welding	Preheat	Max 100℃, no more than 60 seconds
	Dip soldering temperature	Max 280 ℃
	Dip soldering time	<5 seconds
	Soldering position	More than 1.5mm (from PCB to base)

Caution

Thanks for using our company's PIR series products. In order to enhance your understanding of our products characteristics and avoid unnecessary damage due to manmade factors, we provide corresponding operation standard instruction. At the same time, even if you are using the same specification PIR, its reliability is related to overall system design level, operation mode and use condition. This instruction couldn't cover all questions customers may meet during using. We apologize for any inconvenience caused sincerely.

■ Product Declaration

- The factory parameters of the sensor are tested after one minute stabilization time under standard blackbody

and related parameter test conditions.

- In order to confirm the product is right for using purpose, pretest is necessary before use. We don't guarantee the product application introduction don't contravene any patent. The corresponding import and export legal responsibility should be taken by customers. Please verify relevant provision in each country and district beforehand. We may change specifications from time to time in the interest of product development, without prior notification or public announcement. We require formal product specifications to be signed before mass production.

■ **Storage**

- Under the storage conditions of 30℃ or less and humidity less than 60%RH, the storage period is 6months. Store the products in sealed container with moisture absorbent could prolong the storage time to a certain extent. Bad storage conditions may cause the product pin corrode or characteristics change.

■ **Static**

- Static and electric surge would change the product features, such as decreasing forward voltage or damage the products. Please make sure adopt effective anti-static measures. All the relative devices and machinery must be properly grounded. And please use anti-static wristbands, anti-electrostatic gloves, anti-electrostatic containers at the same time to prevent static and electric surge.

■ **Design Suggestion**

- Please pay attention to the window direction of the sensor when designing the product, and combine the Fresnel lens to achieve a better detection angle.
- The sensor detection distance is related to the background temperature, the moving target temperature, the Fresnel lens, the ambient temperature, and the amplifier magnification setting. It is necessary to consider all parameters when using.

■ **Others**

- The sensor is sealed by a metal casing. In order to ensure the airtightness of the device, it is not recommended to bend the lead during use. Bending the lead may damage the airtightness of the glass and metal sealing parts, cause air leakage. If you need to bend, please use tool assist and ensure that the root of the lead is not stressed during the bending process. Please ensure the distance between the bending point and sensor base is more than 3mm. Do not twist the leads axially during use.
- The sensor window lens is a semiconductor wafers filter vacuum coated by special materials. Please don't touch the window with your hands or hard objects when using. If the filter is dirty, please wipe it with absolute ethanol by lint-free cloth.
- Please avoid mechanical shock for the sensor. Frequent or excessive vibration will cause the sensitive element break.