



PIR CONTROLLER  
FOR DC/AC APPLICATIONS

## DESCRIPTION

The M7625 integrated circuit combines all required functions for a single chip Passive Infra-Red (PIR) motion detector. Suitable for AC and DC systems. The M7625 integrates the internal pull-down resistor and the DC decoupling circuit PIR signal.

The M7625 can be operated directly from batteries or regulated supply voltages ranging from 2.7V to 3.6V. In applications with higher voltages, the user would activate the on-chip shunt regulator, which generates a stable supply voltage of 3V for the M7625 and the PIR detector. The VDD pin requires a bypass capacitor to VSS.

The external potentiometer or resistor sets the sensitivity, lamp on-time, CDS (photoresist) parameters, the corresponding potential is converted to a 15-bit resolution digital value, all processed by digital signals. The application circuit is simple, and the consistency of mass production products is good.

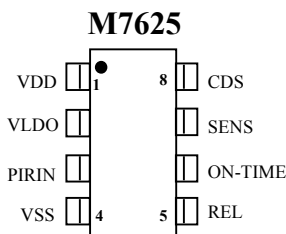
## FEATURES

- power supply 3.1~12V
- Digital signal processing
- Adjustable PIR sensitivity
- Adjustable output turn-on time
- Integrated shunt voltage regulator
- RELAY output
- SOP-8 package

## APPLICATIONS

- PIR light controller, Motion Detector, Alarm system, Auto-door bell

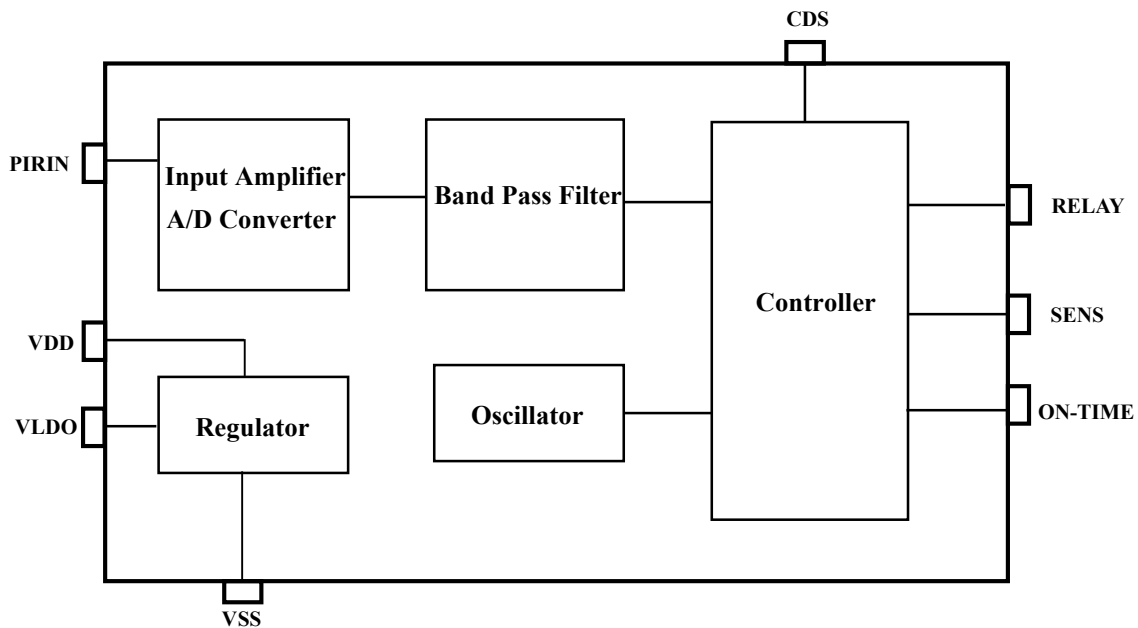
## PIN ASSIGNMENT





PIR CONTROLLER  
FOR DC/AC APPLICATIONS

BLOCK DIAGRAM



PIN DESCRIPTION

Pin No.	Name	I/O	Description
1	VDD	—	Positive power supply
2	VLDO	I	Regulated supply voltages ranging from 2.7V to 3.6V
3	PIRIN	I	PIR sensor input
4	VSS		Ground
5	RELAY	O	Relay output pin
6	ON-TIME	I	Light on-time adjustment. Refer to <a href="#">Table1</a> (internal pull-low resistance)
7	SENS	I	Sensitivity threshold adjustment Sets the sensitivity threshold required to generate a trigger condition. Refer to <a href="#">Table2</a>
8	CDS	I	Connect to the CDS voltage divider for daytime/night auto detecting (internal pull-low resistance) VDD : Enable switching of the light VSS : Disable switching of the light



PIR CONTROLLER  
FOR DC/AC APPLICATIONS

**FUNCTION DESCRIPTION**

**Power-up Mode**

After the device powers on it first enters a warm-up period. The light is switched on for the selected on-time duration.

**Conditions for Switching the Light ON**

The lights and relays will remain on for the duration set by the ON-TIME input.

**Table 1 :** Output turn-on time

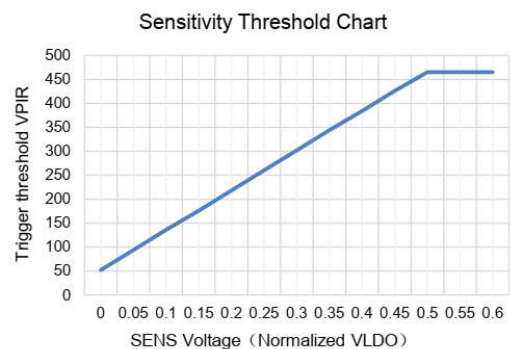
	Pin Voltage	On time (second)	Pull-up resistor ( $\Omega$ )	Pull-down resistor ( $\Omega$ )
0	0 ~VLDO*16/256	1	1M	Ground
1	VLDO*9/256~VLDO*16/256	5	1M	47k
2	VLDO*17/256~VLDO*24/256	10	1M	82k
3	VLDO*25/256~VLDO*32/256	15	1M	120k
4	VLDO*33/256~VLDO*40/256	20	1M	160k
5	VLDO*41/256~VLDO*48/256	30	1M	205k
6	VLDO*49/256~VLDO*56/256	45	1M	261k
7	VLDO*57/256~VLDO*64/256	60	1M	300k
8	VLDO*65/256~VLDO*72/256	90	1M	360k
9	VLDO*73/256~VLDO*80/256	120	1M	430k
10	VLDO*81/256~VLDO*88/256	180	1M	487k
11	VLDO*89/256~VLDO*96/256	300	1M	560k
12	VLDO*97/256~VLDO*104/256	60	1M	620k
13	VLDO*105/256~VLDO*112/256	900	1M	750k
14	VLDO*113/256~VLDO*120/256	1800	1M	820k
15	VLDO*121/256~VLDO*128/256	3600	1M	1M

**Threshold resistance setting**

Sensitivity setting input. Input voltage range from 0 to VDD/4, internally converted to 7-bit digital code, 0 to 127, corresponding to a threshold range of 50 $\mu$ V to 460 $\mu$ V, the minimum threshold is 50uV.

**Table 2 :** Sensitivity threshold adjustment

Sensitivity	Pull-up resistor ( $\Omega$ )	Pull-down resistor ( $\Omega$ )	Distance	
50 $\mu$ v	1M	Ground	long distance	
89 $\mu$ v	1M	47K		
134 $\mu$ v	1M	110K		
178 $\mu$ v	1M	180K		
212 $\mu$ v	1M	240K		
257 $\mu$ v	1M	330K		
300 $\mu$ v	1M	430K		
349 $\mu$ v	1M	560K		
386 $\mu$ v	1M	680K		
465 $\mu$ v	1M	1M		short distance





PIR CONTROLLER  
FOR DC/AC APPLICATIONS

**ABSOLUTE MAXIMUM RATING**

( TA=25°C )

Parameter	Sym.	Min.	Max.	Unit	Remarks
Operating Voltage	VDD	-0.3	12	V	
Voltage on Any Pin		-100	100	mA	
Operating Temperature		-25	70	°C	
Storage temperature	Tst	-45	125	°C	

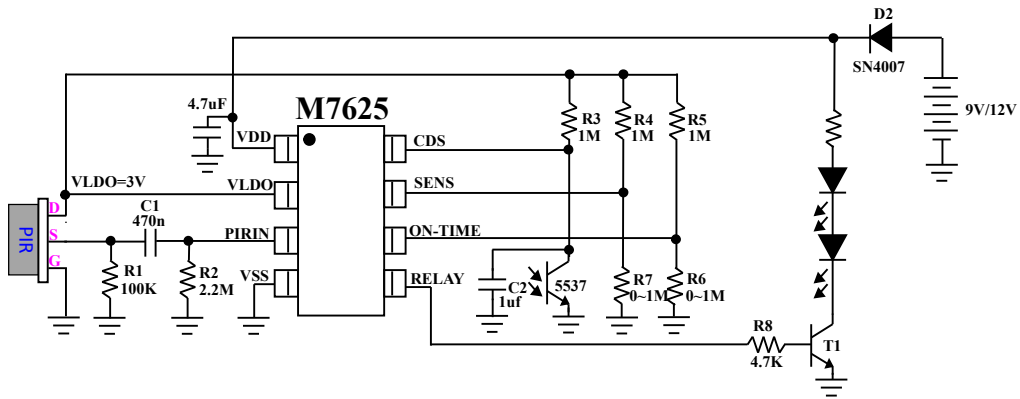
**ELECTRICAL CHARACTERISTICS**

( TA=25°C , VDD=3.0V )

Characteristics	Sym.	Min.	Typ.	Max.	Unit	Conditions
<b>Operating Voltage</b>						
Supply voltage	VDD	3.1		12	V	
Supply current	IDD		13		μA	VDD=3.3V@25°C
Regulator voltage	VLDO	2.7	3	3.3	V	I <sub>R</sub> = 0.5mA
<b>Oscillator and Filter</b>						
LPF cutoff frequency		—	7	—	Hz	
HPF cutoff frequency		—	0.4	—	Hz	
Clock frequency	F <sub>CLK</sub>	—	32	—	KHz	
<b>Analog Inputs</b>						
Input leakage current ( ON-TIME 、 SENS )		—	—	20	μA	
PIRIN resistance to VSS		30	—	60	GΩ	
PIRIN input AC voltage		-53	—	53	mV	Peak-to-Peak
PIRIN input DC voltage	V <sub>n</sub>	0.2	—	1.5	V	
<b>Digital Inputs, Schmitt Triggers (CDS)</b>						
Input low voltage	V <sub>IL</sub>	—	—	0.6	V	
Input high voltage	V <sub>IH</sub>	1.2	—	—	V	
Leakage current on CDS		—	—	±1	μA	input to VSS or VDD
<b>Digital Outputs</b>						
Relay Source Current	I <sub>RS</sub>	-5	—	5	mA	



APPLICATION CIRCUIT



\* All specs and applications shown above subject to change without prior notice.



PIR CONTROLLER  
FOR DC/AC APPLICATIONS

PACKAGE OUTLINE

SYMBOLS	MIN	MAX
A	0.053	0.069
A1	0.004	0.010
A2		0.059
D	0.189	0.196
E	0.150	0.157
H	0.228	0.244
L	0.016	0.050
$\theta$	0	8

Unit : INCH

**SOP-8**