東楠科技股份有限公司
Tungnan Technology Co., Ltd.

PIR CONTROLLER

M7612

PIR CONTROLLER

GENERAL DESCRIPTION

The M7612 is a PIR (passive infra-red) controller , using analog mixing digital design technique and manufactures by CMOS Process which can either drive TRIAC or RELAY depending on user's choice. With special noise immunity technique , M7612 is the most stable PIR controller you can find on the market. More than this , there are few components needed in its application circuit which can reduce material cost and increase competitive.

FEATURES

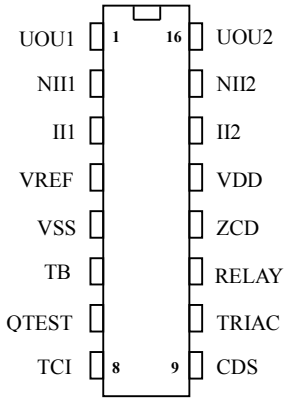
- High noise immunity.
- Drive either RELAY or TRIAC.
- Adjustable light on duration.
- TRIAC can be either shunt or serial connected.
- PIR input.
- CDS input.
- Auto change on / auto mode by bonding option.
- 16 pin DIP or SOP package.

APPLICATIONS

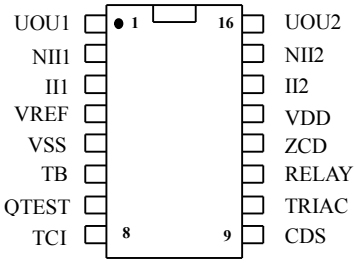
- PIR light controller, Motion Detector, Alarm system, Auto-door bell.

PIN ASSIGNMENT

M7612-L16



M7612-S16



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PIN DESCRIPTION

Pin No	Pin Name	Description
1	UOU1	First stage OP amp output.
2	NII1	First stage OP amp positive input.
3	II1	First stage OP amp negative input.
4	VREF	Stable reference voltage.
5	VSS	System ground.
6	TB	Time base for： The delay time of receiving PIR signal to sent a pulse to trigger TRIAC or a high signal to trigger relay. The delay time = R * C * 32. The PIR signal patented and accepted only if the signal cycle greater than R * C * 768. When state of RELAY or TRIAC is changing form active into inactive mode. It takes more than R * C * 4069 , then system is able to receive PIR signal again. 10K < R < 1MΩ 100pF ≦ C < 0.1uF (Reference Diagram 1)
7	QTEST	For testing only.
8	TCI	To set up the timing of how long TRIAC or RELAY is active. During the period , if the system receives the PIR signal , then it restarts counting the timing again. The flash cycle show the beginning of auto mode. Note：width of TRIAC pulse = R * C * 2 Flash cycle：R * C * 32768 The range for R：4.7K ≦ R < 1MΩ C：100pF < C < 0.1uF (Reference Diagram 2)
9	CDS	Connected to a CDS for inhibiting RELAY or TRIAC being triggered. If TRIAC or RELAY has already being triggered by PIR signal and turned into active mode , then CDS can not inhibit PIR again.
10	TRAIC	To trigger TRIAC , active low. Sink current：15 mA max.
11	RELAY	To drive relay , active high. Sink current：10 mA max. Source current：10 mA max.
12	ZCD	Detect zero cross of AC line under remote mode function.
13	VDD	Operation voltage：5V , stand by current：0.5 mA
14	II2	2 nd stage OP amp negative input.
15	NII2	2 nd stage OP amp positive input.
16	UOU2	2 nd stage OP amp output.

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DIAGRAM 1：

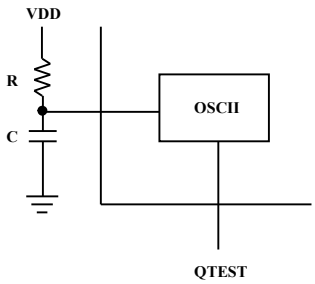
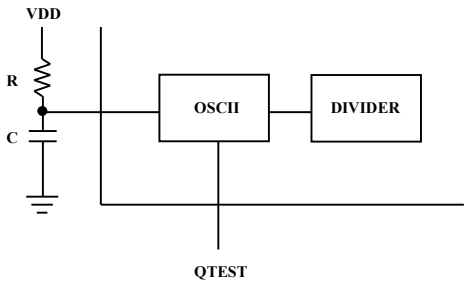
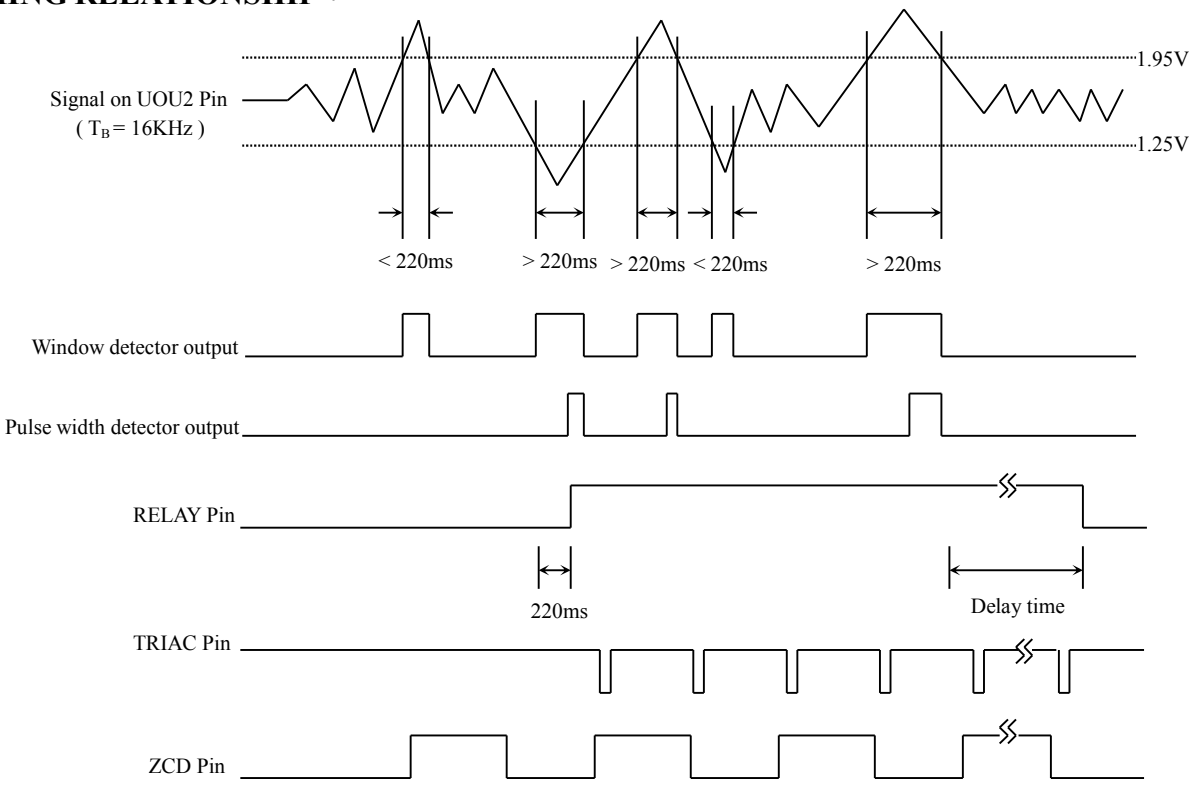


DIAGRAM 2：



TIMING RELATIONSHIP：



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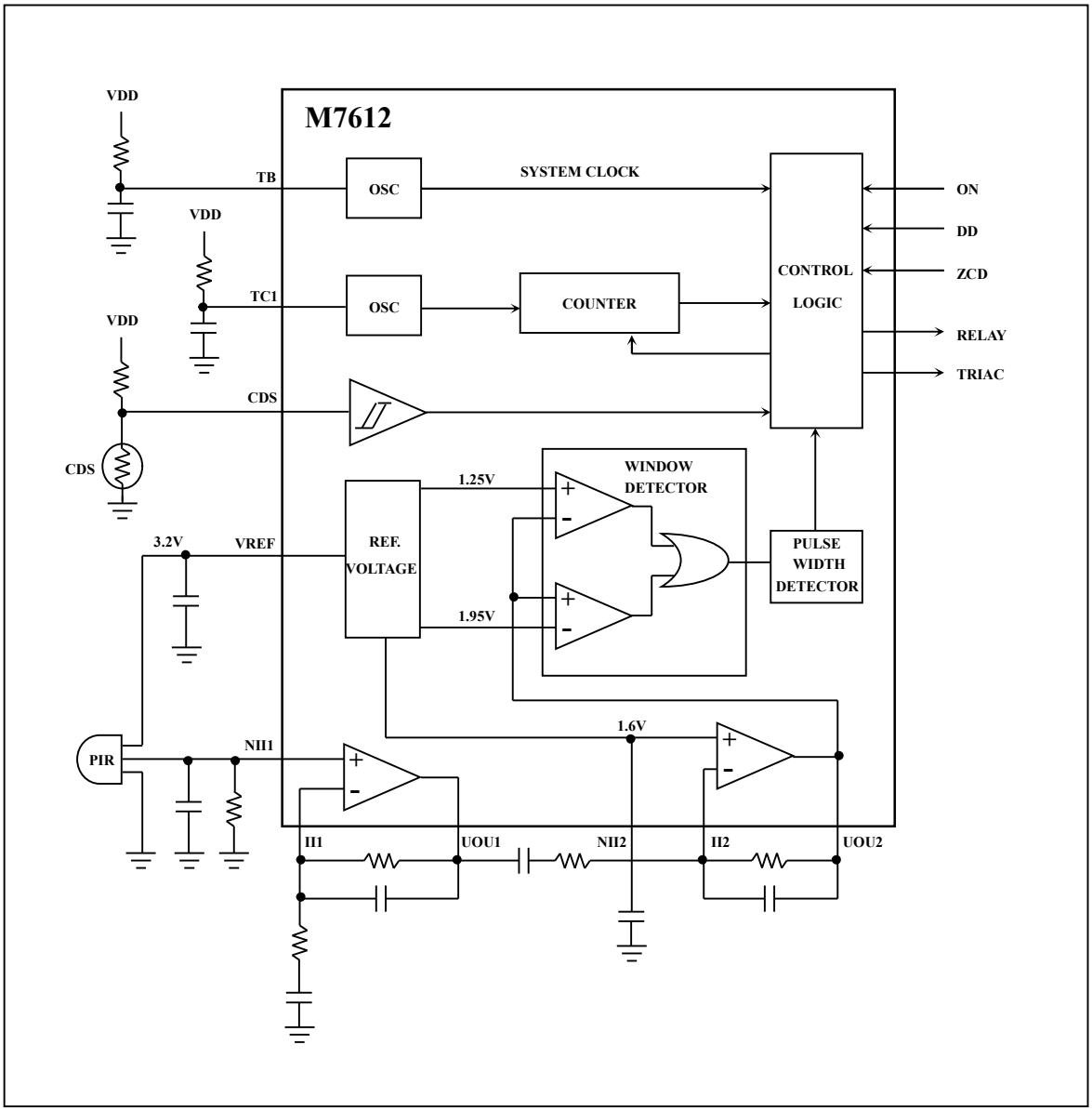
BLOCK DIAGRAM



PIR CONTROLLER

ABSOLUTE MAXIMUM RATING

(TA=25℃)

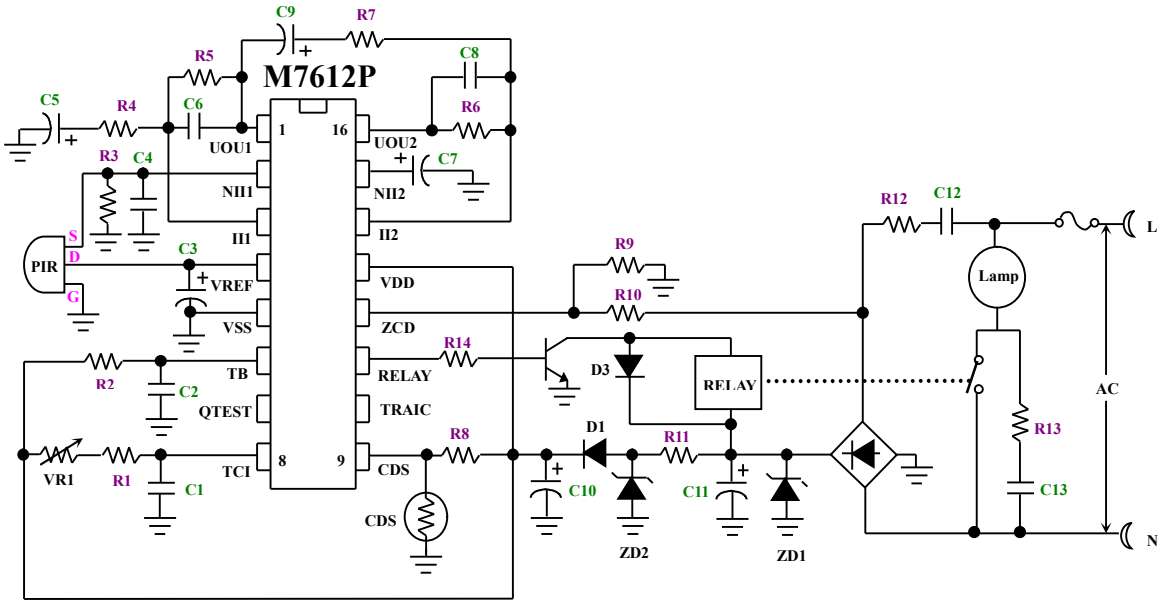
Parameter	Sym.	Rating	Unit
Power Supply V_{DD} With Respect to V_{SS}	V_{DD} - V_{SS}	5.6	V
Voltage On Any Pin		-0.3 to 5.6	V
Operating Temperature	Top	-20 to 70	℃
Storage Temperature		-65 to 150	℃

ELECTRICAL CHARACTERISTICS

Characteristics	Sym.	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	V_{DD}	4.2	5	5.5	V	
Stand by Current	I_{ST}	0.9	1.0	1.2	mA	
Operating Current	I_{DD}	1.8	—	2.5	mA	1.8mA ,TRIAC / 2.5mA , RELAY
Stable Voltage	V_{REF}	3.0	3.2	3.4	V	V_{DD} > 4.2V
Source Current of V_{REF}	I_{REF}	200	—	—	uA	
Ripple of V_{REF}		—	—	0.5	mV	
Input and Output Regulation of V_{REF}		—	—	0.3%		
Time Base Operating Frequency	F_{TB}	15	16	17	KHz	
CDS Operating Trigger	V_{T+}	1.3	1.7	2.1	V	
CDS Operating Trigger	V_{T-}	0.6	0.9	1.1	V	
CDS Output Sink Current	I_{SINK}	11.6	13	21	mA	
Timer Duration of Out 1	T_{OUT1}	10	—	1300	SEC	C=0.01uF , R=4.7K-1M
		0.1	—	13		C=100pF , R=4.7K-1M
Relay Source Current	I_{RS}	—	—	10	mA	
Relay Sink Current	I_{RSINK}	—	—	10	mA	
Relay Operating Voltage	V_{RO}	13.1	—	18.8	V	
TRIAC Sink Current	I_{TSINK}	—	—	15	mA	
TRIAC Source Current	$I_{TSOURCE}$	—	—	50	uA	

ELECTRICAL CHARACTERISTICS

一. RELAY APPLICATION



C1	0.01uF
C2	100pF
C3	100uF
C4	0.01uF
C5	33uF
C6	0.1uF
C7	47uF
C8	0.047uF
C9	47uF
C10	100uF/10V
C11	220uF/25V
C12	0.47uF/400~600V
C13	0.047uF/400~600V

VR1	1MΩ
R1	4.7KΩ
R2	620KΩ
R3	47KΩ
R4	15KΩ
R5	820KΩ
R6	560KΩ
R7	15KΩ
R8	51KΩ
R9	470KΩ
R10	1MΩ
R11	2.4KΩ
R12	47Ω/ 1/2W

R13	100Ω/ 1/2W
R14	5.6KΩ
D1	1N4001
D3	1N4148
ZD1	12V
ZD2	5.6V

TCI is connected to an external RC to set the delay time and frequency

Capacitor	Resistor	Frequency	Delay time(sec)
103	4.7K	40KHz	10
103	10K	20KHz	16
103	20K	10KHz	28
103	100K	2KHz	130
103	200K	0.8KHz	260
103	1M	0.2KHz	1300

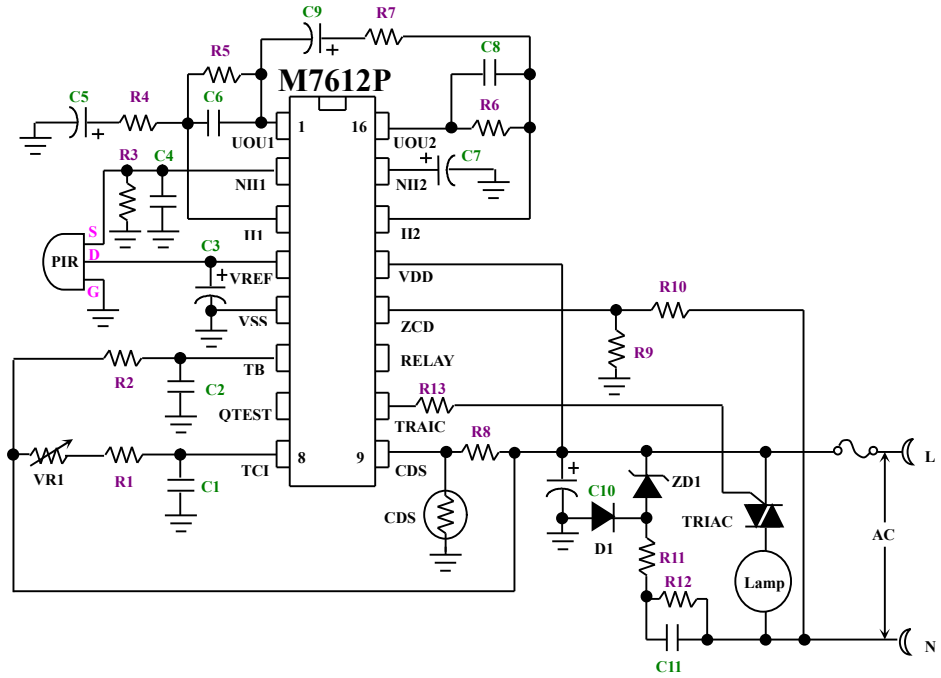
Note：

(1) To adjust delay time , change VR1 value. (VR1=1M , delay time is ≧ 10 sec)

(2) For different CDS , R8 value should be adjusted.

二. TRIAC APPLICATION

(A)



C1	0.01uF	R1	4.7KΩ
C2	100pF	R2	620KΩ
C3	100uF	R3	47KΩ
C4	0.01uF	R4	15KΩ
C5	33uF	R5	820KΩ
C6	0.1uF	R6	560KΩ
C7	47uF	R7	15KΩ
C8	0.047uF	R8	51KΩ
C9	47uF	R9	470KΩ
C10	100uF/10V	R10	1MΩ
C11	0.1uF/400~600V	R11	47Ω/ 1/2W
D1	1N4004	R12	100KΩ
ZD1	5.6V	R13	330Ω

TCI is connected to an external RC to set the delay time and frequency

Capacitor	Resistor	Frequency	Delay time(sec)
103	4.7K	40KHz	10
103	10K	20KHz	16
103	20K	10KHz	28
103	100K	2KHz	130
103	200K	0.8KHz	260
103	1M	0.2KHz	1300

Note：

(1) To adjust delay time , change R1 value. (Delay time is≧10 sec)

(2) For different CDS , R8 value should be adjusted.

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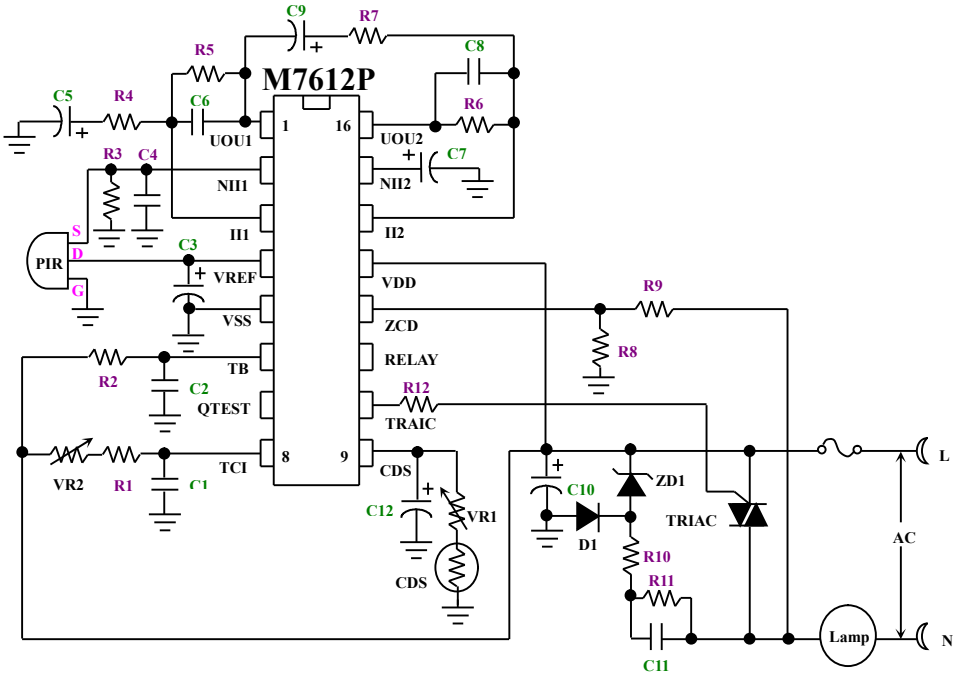
(B)



C1	0.01uF	VR1	1MΩ
C2	100pF	VR2	1MΩ
C3	100uF / 16V	R1	4.7KΩ
C4	0.01uF	R2	620KΩ
C5	220uF / 10V	R3	47KΩ
C6	0.1uF	R4	47KΩ
C7	22uF / 16V	R5	220KΩ
C8	683 pF	R6	470KΩ
C9	47uF / 16V	R7	56KΩ
C10	470uF / 16V	R8	800KΩ
C11	0.15uF / 400~600V	R9	720KΩ
C12	1uF / 50V	R10	47Ω/ 1/2W
D1	1N4007	R11	100KΩ
ZD1	6.2V	R12	100Ω

TCI is connected to an external RC to set the delay time and frequency

Capacitor	Resistor	Frequency	Delay time(sec)
103	4.7K	40KHz	10
103	10K	20KHz	16
103	20K	10KHz	28
103	100K	2KHz	130
103	200K	0.8KHz	260
103	1M	0.2KHz	1300

Note：

(1) To adjust delay time , change VR2 value. (VR2=1M , delay time is ≧10 sec)

(2) For different CDS , VR1 value should be adjusted.

(3) Distance = 4m.

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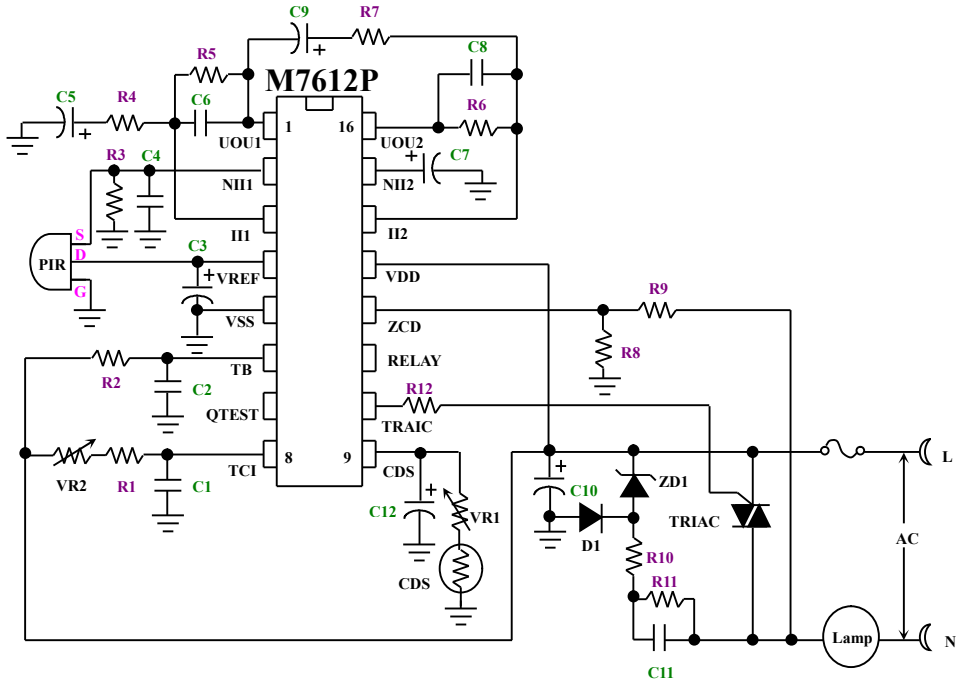
(C)



C1	0.01uF	VR1	1MΩ
C2	100pF	VR2	1MΩ
C3	100uF / 16V	R1	4.7KΩ
C4	0.01uF	R2	620KΩ
C5	33uF / 16V	R3	47KΩ
C6	0.033uF	R4	15KΩ
C7	22uF / 16V	R5	820KΩ
C8	0.033 uF	R6	820KΩ
C9	33uF / 16V	R7	15KΩ
C10	470uF / 16V	R8	800KΩ
C11	0.33uF / 400~600V	R9	720KΩ
C12	1uF / 50V	R10	47Ω/ 1/2W
D1	1N4007	R11	100KΩ
ZD1	6.2V	R12	100Ω

TCI is connected to an external RC to set the delay time and frequency

Capacitor	Resistor	Frequency	Delay time(sec)
103	4.7K	40KHz	10
103	10K	20KHz	16
103	20K	10KHz	28
103	100K	2KHz	130
103	200K	0.8KHz	260
103	1M	0.2KHz	1300

Note：

(1) To adjust delay time , change VR2 value. (VR2=1M , delay time is ≧10 sec)

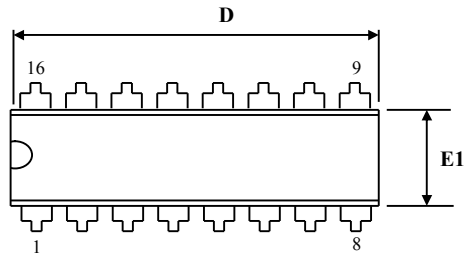
(2) For different CDS , VR1 value should be adjusted.

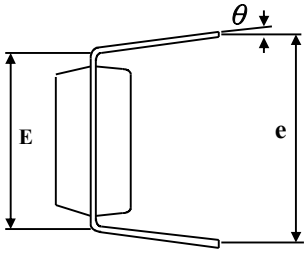
(3) Distance = 8m.

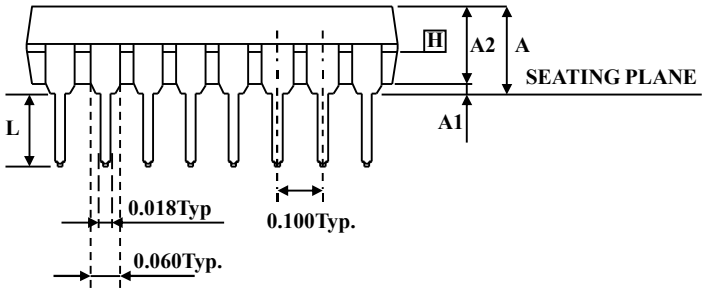
* All specs and applications shown above subject to change without prior notice.

PIR CONTROLLER

PACKAGE OUTLINE



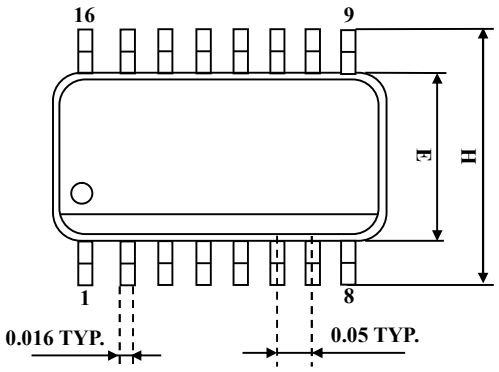


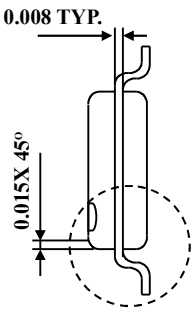


SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.210
A1	0.015	—	—
A2	0.125	0.130	0.135
D	0.735	0.755	0.775
E		0.300 BSC.	
E1	0.245	0.250	0.255
L	0.115	0.130	0.150
e	0.335	0.355	0.375
θ	0	7	15

UNIT：INCH

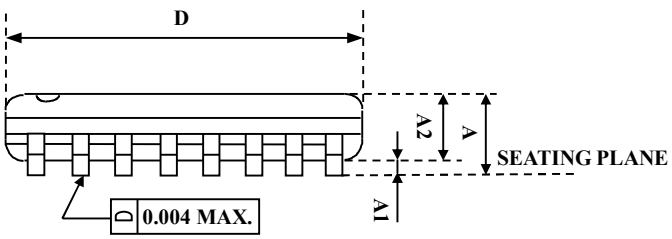
DIP-16
(300 mil)

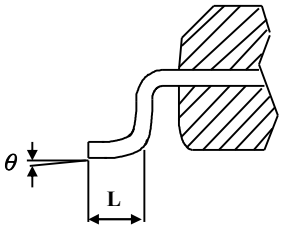




SYMBOLS	MIN.	MAX.
A	0.053	0.069
A1	0.004	0.010
D	0.386	0.394
E	0.150	0.157
H	0.228	0.244
L	0.016	0.050
θ	0	8

Unit：INCH





SOP-16
(150 mil)