UMC

UM3711 Series

Touch-Controlled Dimmer (Continuous)

Features

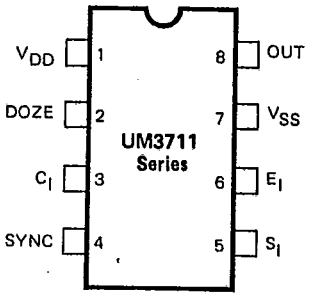
- 8V to 12V D.C. supply voltage and low power dissipation
- Operates on 50Hz/60Hz line frequency
- Sensor operation — no mechanically movable switch elements — provides ON/OFF bright-ness control of incandescent lamps
- Can control several extensions
- Clock input provides for automatic dimming (Slumber switch)
- Controls the brightness by controlling the A.C. "Duty Cycle", thus reducing power dissipation
- Controls the "Duty Cycle" from 19% to 92% on time angles for A.C. half cycles between 35° and 165°
- Minimum current is 25mA
- Three or four steps brightness can be selected by mask option — UM3711-1: NO MEMORY TYPE; UM3711-2: MEMORY TYPE

General Description

The UM3711 is a CMOS IC designed for ON/OFF and brightness control of incandescent lamps used on the A. C. line. The outputs of this chip control the brightness of a lamp by changing the firing angles of the TRIAC connecter in series with the lamp. The UM3711 can regulate the full brightness range (5%-99%) and is controlled by means of applying a low level at the sensor input or a high level at the external input. Touching the sensor plate causes the lamp brightness to change as follows:

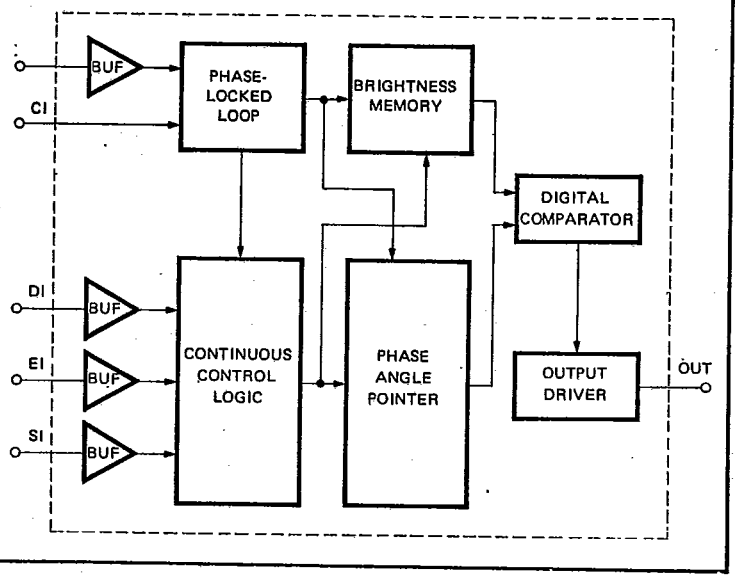
1. If the sensor is touched momentarily (less than 320ms), the lamp is:
   a. turned off if it is on.
   b. turned on if it is off.
2. If the sensor is touched for a prolonged time (more than 320ms) the light intensity changes slowly. As long as the touched is maintained. The change continues, the direction of change reverses whenever the maximum or minimum brightness is reached.

Pin Configuration



V_{DD} : Ground
DOZE : Doze clock input
C_I : Integration capacitor
SYNC : Synchronous input
S_I : Sensor input
E_I : Extension input
V_{SS} : Negative D.C. Supply
OUT : Output for Tnac driving

Block Diagram



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Absolute Maximum Ratings*

DC Supply Voltage V_{SS} . . . . −15V (With respect to V_{DD})

Operating Temperature . . . . . 0 ~ 80°C

Storage Temperature . . . . . −65 ~ 150°C

*Comments

Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Characteristics

(All voltages with reference to V_{DD})

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	V_{SS}	−8	−10	−1.2	V	
Supply Current	I_{SS}		3.0		mA	
Input Voltage						
Doze Lo	V_{IZL}	0		V_{DD}-7	V	V_{DD} = 0V
Doze Hi	V_{IZH}	V_{DD}-3		V_{DD}	V	
Sync Lo	V_{IYL}			V_{DD}-7	V	V_{DD} = 0V
Sync Hi	V_{IYH}	V_{DD}-3			V	
Sensor Lo	V_{ISL}		V_{DD}-5		V	V_{DD} = 0V
Sensor Hi	V_{ISH}			V_{DD}-2	V	
Extension Lo	V_{IEL}		V_{DD}-7		V	V_{DD} = 0V
Extension Hi	V_{IEH}	V_{DD}-3			V	
Output Sink Current	I_O	25			mA	V_{DD} = 0V
Control Cycle Time	T_O		5.1		Sec	

Pin Description

Pin No.	Designation	Description
1	V_{DD}	Ground.
2	Doze	A clock applied to this input causes the brightness to decrease in equal increments with each negative transition of the clock. For transition from maximum brightness to off, a total of 92 clock pulses are needed at the DOZE input. When either the SENSOR or the Extension input is active, the DOZE input is disabled.
3	C_I	The capacitor input is for external component connection.
4	SYNC	The AC line frequency (50Hz/60Hz), when applied to this input, synchronizes all internal timing through a phase locked loop.

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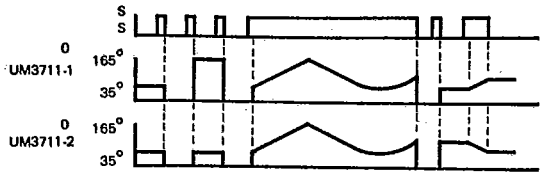
Pin Description (Continued)

Pin No.	Designation	Description
5	S_I	A low level applied to the sensor input controls the turning on or turning off of the output as well as its phase angle with respect to the sync input.
6	E_I	The extension input, logical high level active, is used instead of the SENSOR input when long extension wires are used between the sensing plates (or switches) and the dimmer chips.
7	V_{SS}	Supply voltage negative terminal.
8	OUT	The output is a low level pulse occurring once every half cycle of the SYNC signal. The phase angle of the output in relation to the SYNC signal controls the lamp brightness.

Control Behavior

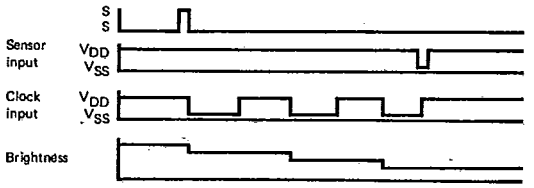
These two versions UM3711-1 & UM3711-2 differ in their control behaviors as indicated in the following.



0: Conduction angle
S: Sensor touched
S: Sensor not touched

: Sensor duration less than 0.32S
: Sensor duration larger than 0.32S
0.32S

Doze Clock Input Circuit Control Behavior



S: Sensor plate touched
S: Sensor plate not touched

Frequency Characteristics

(All timing based on 60Hz or 50Hz line frequency)

Parameter		Symbol	Min.	Typ.	Max.	Unit
SYNC FREQ.		f_Y	–	60/50	–	Hz
SENSOR Duration	(ON/OFF Operation)	T_{S1}	–	–	320	ms
	(Dimming Operation)	T_{S2}	320	–	Infinite	ms
Doze Freq.		f_z	–	–	500	Hz
Output phase angle		0	35	–	165	degrees

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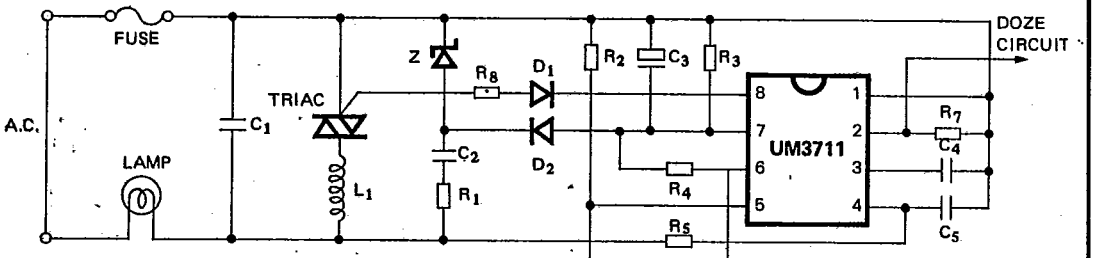
Typical Application Circuit

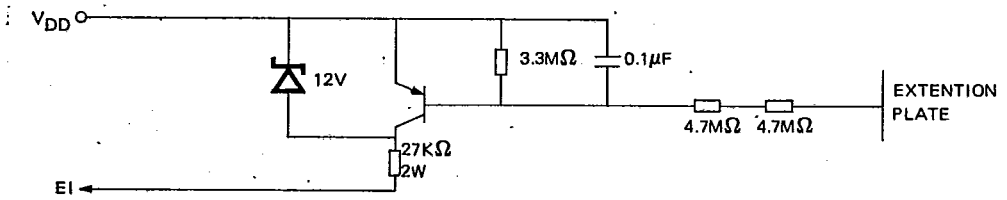


C_1: 0.15μF/AC 250V
C_2: 0.47μF/AC 250V
C_3: 47μF/16V
C_4: 0.047μF/16V
C_5: 470pF/50V

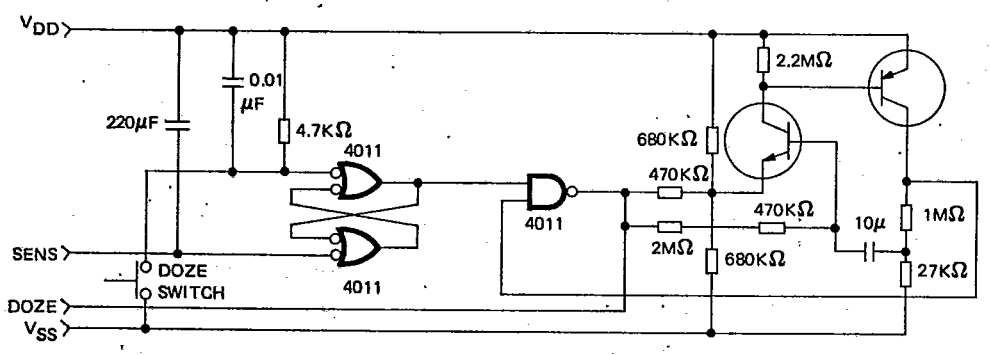
D_1, D_2: 1N4148
Z: 12V/1W (ZENER)
R_1: 1KΩ/1W for AC: 100-120V
1KΩ/2W for AC: 210-230V
R_2, R_4 R_6: 10MΩ

R_3: 10KΩ
R_7: 1MΩ
R_5: 1.5MΩ
L_1: 200μH
R_8: 100Ω

1. EXTENSION CIRCUIT



2. DOZE CIRCUIT



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