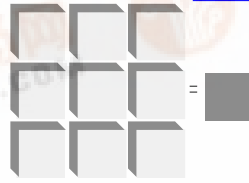


LSI/CSI



LS7538-LS7539



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TOUCH CONTROL STEP DIMMER LIGHT SWITCH WITH AUTOMATIC GAIN CONTROL (AGC)

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FEATURES:

- Touch Sensitivity guaranteed to 600pF Touch Plate Capacitance.
- Touch Operation independent of line plug polarity.
- Pin selection of three available Brightness Step Sequences.
- Minimal external components.
- AGC Loop stabilizes immediately after Power-Up.
- Brightness state is Off after AC power applied.
- Brightness state is unchanged if AC power interrupted for < 0.5 sec.
- Advanced CMOS design for reliable operating characteristics and low power.
- 50/60 Hz Line Frequency.
- +6V to +9.5V Operation ($V_{DD}-V_{SS}$).
- LS7538, LS7539 (DIP); LS7538-S, LS7539-S (SOIC) - See Figure 1

APPLICATIONS:

- Screw-in and built-in adapter modules for converting table and floor lamps to touch control for step dimming.
- On-Off touch control of under-cabinet fluorescent lamps (LS7539 only).

DESCRIPTION:

The LS7538 and LS7539 are CMOS integrated circuits which provide trigger pulses for triac phase control of incandescent lamps. The circuits are designed to operate with a wide variety of lamp sizes ranging from small table lamps to large floor lamps. The AGC Loop automatically adjusts Touch Sensitivity to be independent of lamp size.

There are 3 different Brightness Step Sequences for each version of the IC which can be selected by the Three-State MODE pin as shown in Table 1.

TABLE 1. BRIGHTNESS STEP MODES

MODE PIN	BRIGHTNESS STEP SEQUENCE
FLOAT	OFF-NIGHT LIGHT-MEDIUM-MAXIMUM-OFF
V_{DD}	OFF-NIGHT LIGHT- LOW MEDIUM-HIGH MEDIUM-MAXIMUM-OFF
V_{SS} (LS7538) (LS7539)	OFF-MAXIMUM-MEDIUM-NIGHT LIGHT-OFF OFF-MAXIMUM-OFF

The lamp brightness is made to vary by changing the delay of the TRIG pulse to the triac from the zero-crossing of the SYNC input. The delays are shown in Table 2 for 50Hz and 60Hz operation along with Delivered Power as a percentage of Full Power. Figure 2 illustrates the delay.

TABLE 2. BRIGHTNESS POWER LEVELS

Brightness	60Hz Delay (1)	50Hz Delay (2)	% PWR (3)
Night Light	6.0 ms	7.2 ms	12
Low Medium	4.8 ms	5.7 ms	35
Medium	4.0 ms	4.8 ms	53
High Medium	3.2 ms	3.8 ms	72
Maximum	0.85 ms	1.0 ms	99

(1) With 300k connected between Pin 1 and V_{DD} .(2) With 360k connected between Pin 1 and V_{DD} .

(3) Percentage of Full Power delivered to a resistive load by the Triac Switch.

PIN ASSIGNMENT TOP VIEW

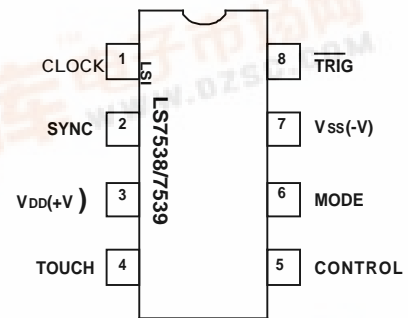
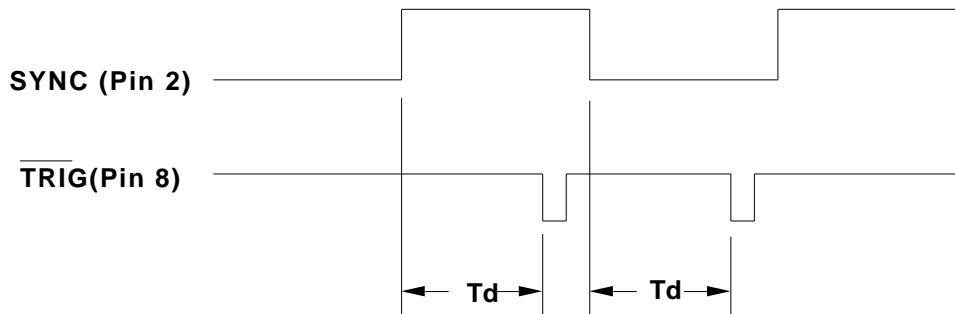


FIGURE 1

FIGURE 2. OUTPUT DELAY (Td)



INPUT/OUTPUT DESCRIPTION:

CLOCK Input (Pin 1)

An external resistor connected between this input and V_{DD} , along with an internal capacitor and oscillator stage, generates a clock which is used for all timing functions. The recommended value of this resistor for 50Hz and 60Hz operation is specified in the ELECTRICAL CHARACTERISTICS. The resistor value determines the Brightness Levels produced. (See Table 2)

SYNC Input (Pin 2)

50 or 60Hz AC input for zero crossing detection.

V_{DD} (Pin 3)

Supply voltage positive terminal.

TOUCH Input (Pin 4)

Input for sensing that a touch has been made on a lamp surface or other touch plate.

CONTROL I/O (Pin 5)

An external R-C network connected between this pin and V_{DD} establishes the controlling feedback for the AGC Loop.

MODE Input (Pin 6)

A three-state input used to select the desired Brightness Step Sequence (See Table 1). The MODE Input may be changed during operation.

V_{SS} (Pin 7)

Supply voltage negative terminal.

TRIG (Pin 8)

The TRIG output produces a negative going pulse every half-cycle of the SYNC input to trigger the triac. The delay, T_d , of the pulse with respect to the SYNC signal determines the Brightness Level produced. (See Table 2 & Figure 2)

ABSOLUTE MAXIMUM RATINGS:

PARAMETER	SYMBOL	VALUE	UNIT
DC supply voltage	$V_{DD} - V_{SS}$	+11	V
Any input voltage	V_{IN}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
Operating temperature	T_A	-20 to +85	°C
Storage temperature	T_{STG}	-65 to +150	°C

The information included herein is believed to be accurate and reliable. However, LSI Computer Systems, Inc. assumes no responsibilities for inaccuracies, nor for any infringements of patent rights of others which may result from its use.

ELECTRICAL CHARACTERISTICS:

(All voltages referenced to Vss. TA = +25°C unless otherwise specified.)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	CONDITIONS
Supply Voltage	VDD	+6	-	+9.5	V	-
Supply Current	IDD	-	-	1.5	mA	Output off, VDD = +8.0V
TRIG Sink Current Vo = VDD - V	Io	-50	-	-	mA	VDD = +8.0V
TRIG Source Current Vo = VDD - 0.2V	Io	+0.1	-	-	mA	VDD = +8.0V
TRIG Pulse Width	Tw	-	90	-	μs	Rc = 300k , 60Hz
	-	-	110	-	μs	Rc = 360k , 50Hz
TRIG Pulse Delay (Medium Brightness)	Td	-	4.0	-	ms	Rc = 300k , 60Hz
		-	4.8	-	ms	Rc = 360k , 50Hz
CLOCK Resistor	Rc	-	300	-	k	60Hz
	-	-	360	-	k	50Hz
CONTROL Resistor	-	-	10	-	M	-
Capacitor	-	-	1	-	μF	-
Touch Plate Capacitance	CL	-	-	600	pF	-

