GEC PLESSEY
SEMICONDUCTORS

ADVANCE INFORMATION

DS3848 -1.0

SL441C

ZERO VOLTAGE SWITCH

The SL441C is a symmetrical burst control integrated circuit in an 8 pin DIL package. When used with a triac, AC power may be regulated by varying the number of mains cycles applied to the load in a fixed timing period. The device is especially suited to room temperature control applications including panel heaters, fan heaters etc. Zero Voltage Switching has the advantage of minimising radio frequency interference.

FEATURES

- Balanced zero voltage point crossing detector, spike filter and pulse generator for reliable triggering of the triac.
- A period pulse generator and bistable which are arranged to provide symmetrical burst control and eliminate $^1/_2$ wave firing. (EN50.006 BS5406,1976)
- A ramp generator whose output is used to modify an internal reference voltage which is then compared with the voltage appearing on the thermistor to form a proportional control system. The period of the ramp generator is defined externally and may be chosen to limit 'lamp flicker' in accordance with EN50.006/BS5406, 1976.

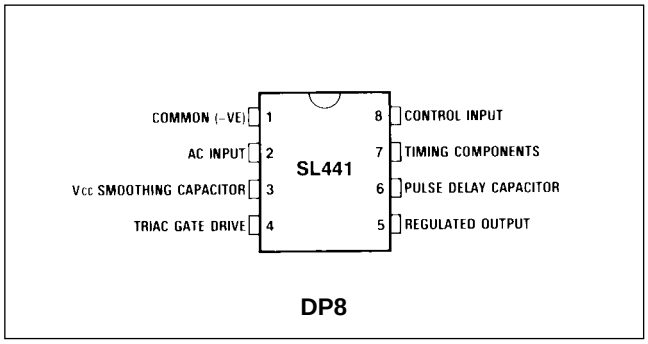

Fig.1 Pin Connections (top view)

- The comparison amplifier has inbuilt hysteresis to eliminate switching jitter and a spike filter/ sampling circuit to provide high immunity to both spikes and coherent 50Hz/60Hz.
- Thermistor malfunction may be sensed and power automatically removed.
- A supply voltage sensing circuit which inhibits firing pulses when the supply is inadequate to guarantee proper circuit operation. This eliminates stressing of the triac at switch-on.

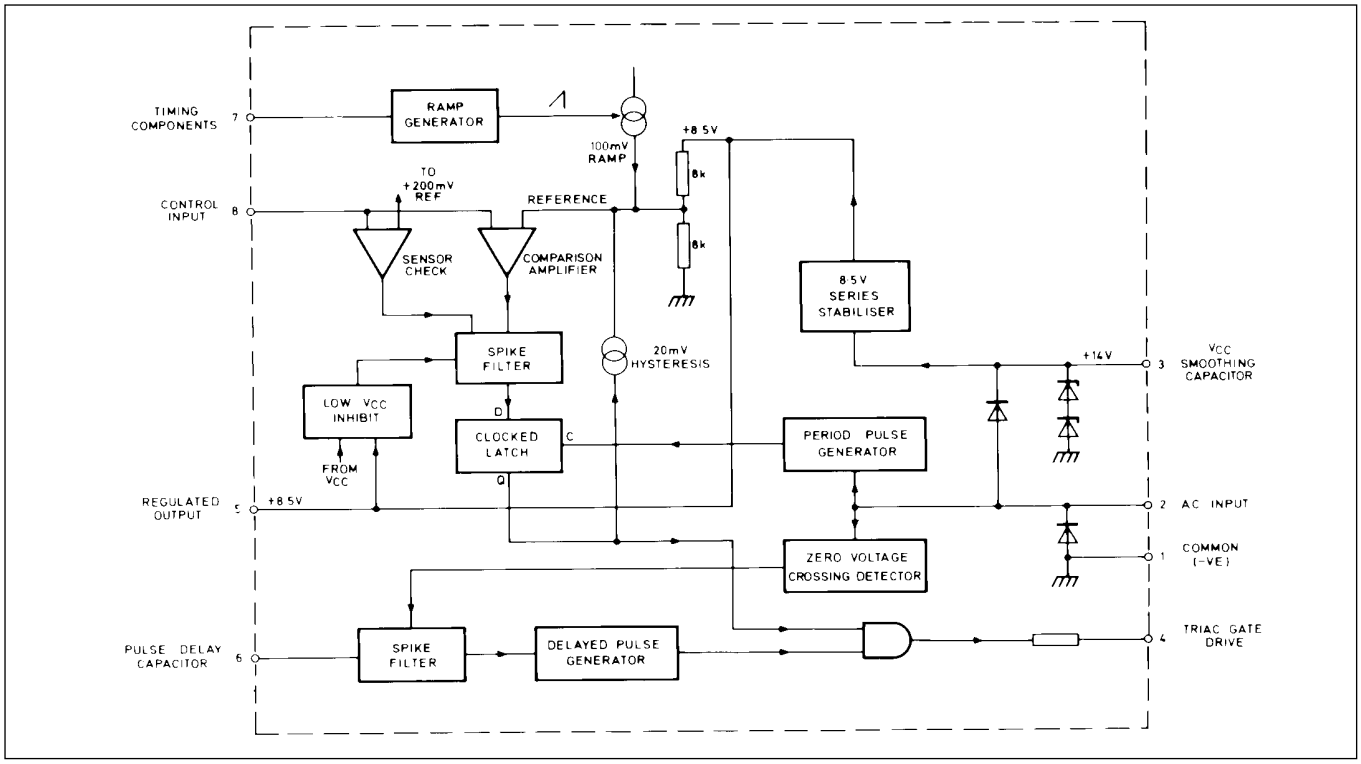

Fig. 2 Block Schematic of SL441C

ELECTRICAL CHARACTERISTICS

These Characteristics are guaranteed at the following temperatures (unless otherwise stated).
T_{amb} = +25°C
All voltages measured with respect to common (pin 1)

Characteristics	Min	Typ	Max	Units
Shunt regulating voltage pin 3 @ 16mA		14.7		V
Shunt regulating voltage pin 3 @ 16mA @ 75°C			16	V
Supply voltage trip level pin 3		12.2		V
Supply current (less I_4AV, I_5) (see Note 1)			7.5	mA
Regulated voltage pin 5	8.0	8.5	9.0	V
Regulated voltage temperature coefficient pin 5	-1		+1	mV/ °C
Triac gate drive pin 4 (see Note 2)				
Open circuit ON voltage		8.5		V
Open circuit OFF voltage			0.1	V
Output current into 2V drain	100	130		mA
Output current into 4V drain	65	80		mA
Output current into short circuit			200	mA
Internal drain resistance		800		Ω
Control input pin 8				
Bias current			1	µA
Hysteresis		20		mV
Sensor malfunction circuit operates at	150	200	250	mV
Input working voltage range	0		12	V
Internal reference voltage (Ramp start) (see Note 3)	4.0	4.25	4.5	V
Internal reference voltage (Ramp finish) (see Note 3)		4.35		V
Peak-to-peak amplitude of ramp	70	100	130	mV
Pin 6 output impedance (R6) (see Note 2)	21.5	27	32.5	kΩ
Maximum ripple voltage pin 3			1	V_{P-P}

NOTES
1. The supply current is 0.45 x (RMS current fed into pin 2). I_5 is the current drained from pin 5 externally. I_{4AV} is the average triac gate current supplied each mains cycle.
2. Triac firing pulse. t_p Pulse width = 0.69 $R6C_D$ microseconds typical
   t_f Pulse finish = 1.09 $R6C_D$ microseconds minimum after zero voltage point R6 in kohms. C_D in nF.
   See Application circuit
   t_p Nominal (C_D = 2.7nF) = 50 microseconds
   t_p Minimum (C_D = 2.7nF) = 63 microseconds
3. Ramp period = 0.85 ± 0.15 x R_TC_T sec. See Application circuit. The actual value of R_t must lie between 500kohms and 3Mohms.

ABSOLUTE MAXIMUM RATINGS

VOLTAGES
Voltage on pin V_8 - I Max. 12V
Voltage on pin V_4 - I Max. 10V

TEMPERATURE
Operating ambient temperature T_{AMB} -10°C to +75°C
Storage temperature T_{STG} -55°C to +150°C

CURRENTS
Supply current (pin 2) Peak value ± I_2M 50mA.
Non-repetitive peak current (tp ≤250µs) ±I_2SM 200mA.
Output current (pin 5) Max. 5mA Short circuit protected.
Output current (pin 4) average value I_4 (AV) Max 5mA Short circuit protected

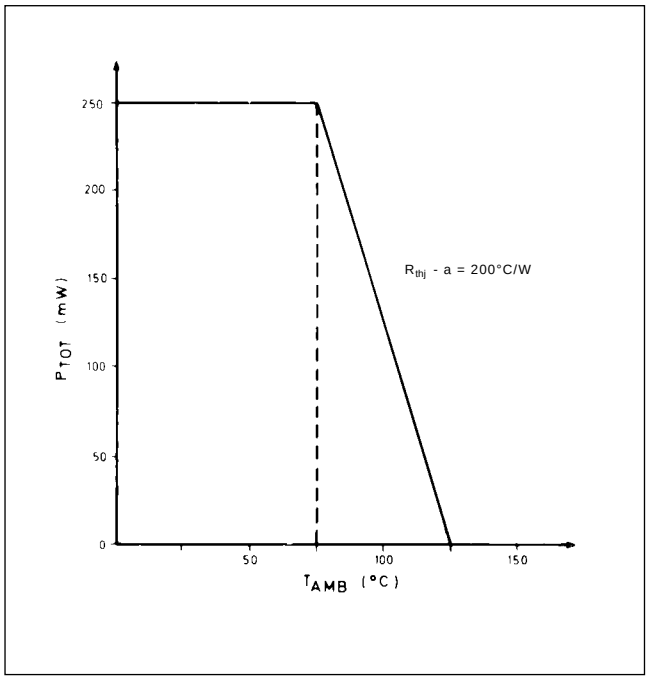

Fig. 3 Power Dissipation

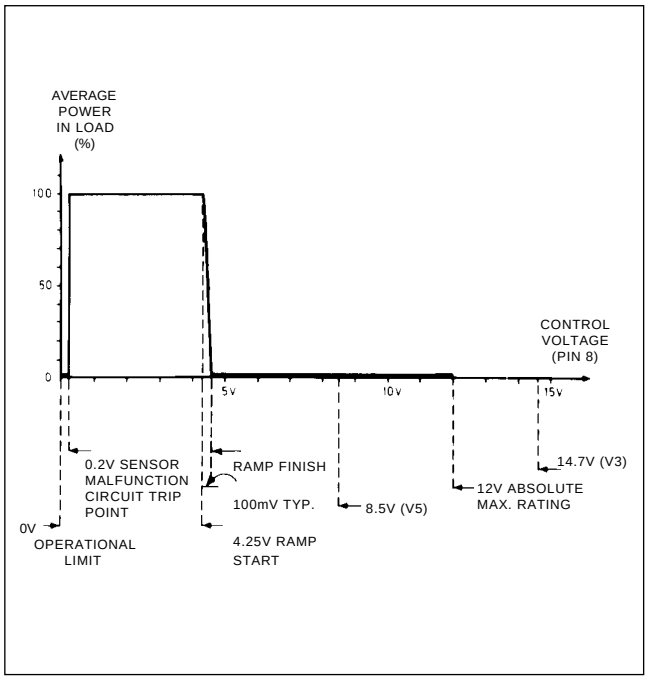

Fig. 4 Control Characteristic of Pin 8

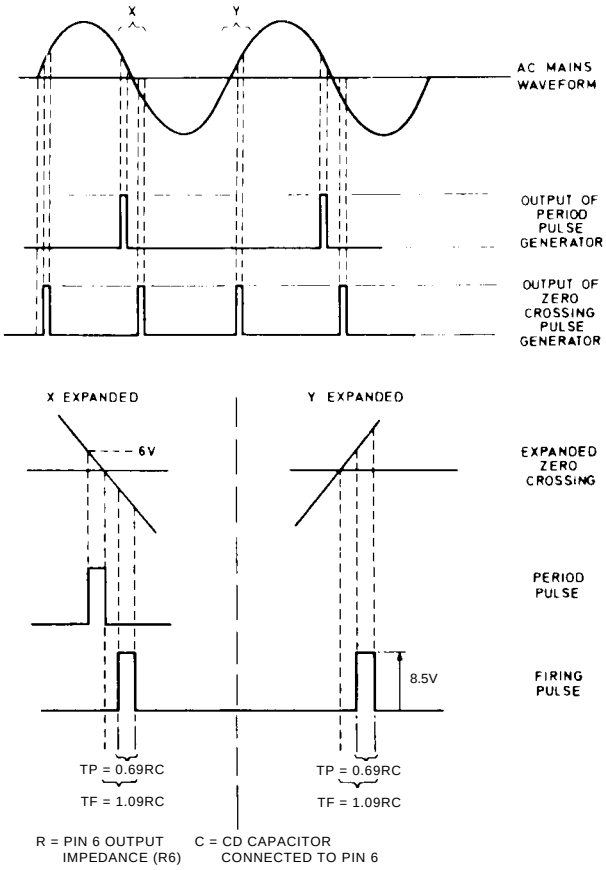

Fig. 5 Pulse Timing

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