DESCRIPTION

The M5172L is a semiconductor integrated circuit designed for use in zero-point ignition temperature control circuits. It consists of a rectifier circuit, zero-point synchronous pulse generator circuit, temperature adjustment circuit using a differential amplifier, and a pulse generator circuit that is used in safety circuit.

The built-in zero-point ignition circuit and differential amplifier can operate directly from commercial power supply voltage through a resistor of 10k (at 100Vrms AC), permitting the M5172L to be widely applied in temperature control circuits using thyristors.

FEATURES

- Can be driven directly from commercial power supply voltage (100Vrms AC)
- Built-in zero-point ignition control circuit
- Can compensate for line voltage and line freguency fluctuations
- Includes a pulse generator circuit for a safety circuit

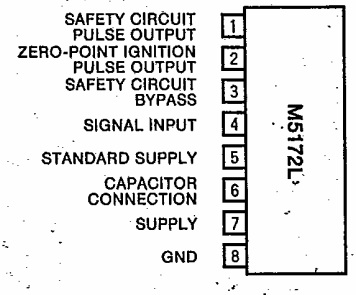
APPLICATION

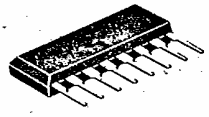
Temperature control circuit for electric blankets, zero-point ignition circuit for thyristors, and all kinds of temperature control ciocuits.

RECOMMENDED OPERATING CONDITIONS

AC supply voltage range ..... 90~110Vrms(50~60Hz)
Rated AC supply voltage ..... 100Vrms(50~60Hz)
(Note that a resistor of 10k or greater (≧2W) should be connected between pin ⑦ and the AC supply voltage.

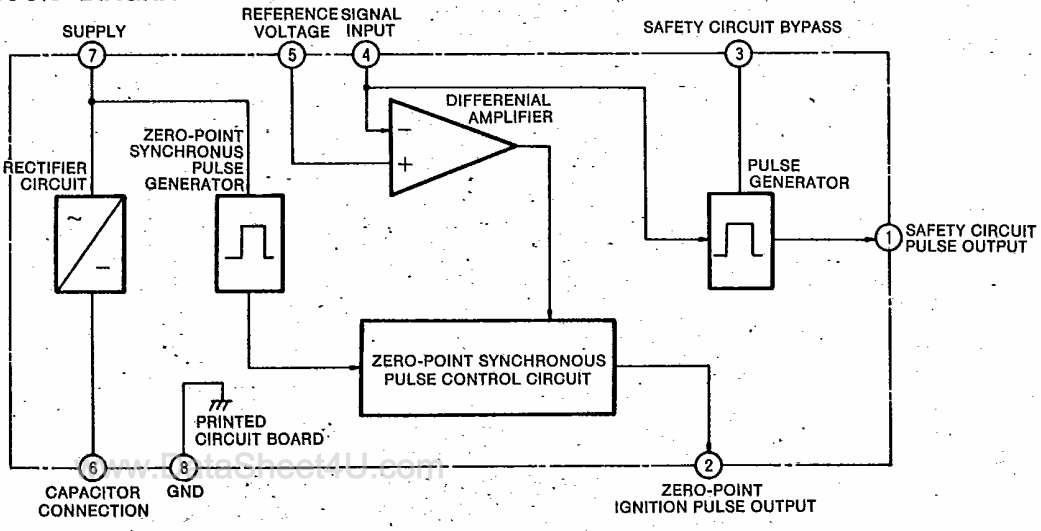
PIN CONFIGURATION (TOP VIEW)





8-pin molded plastic SIP

BLOCK DIAGRAM



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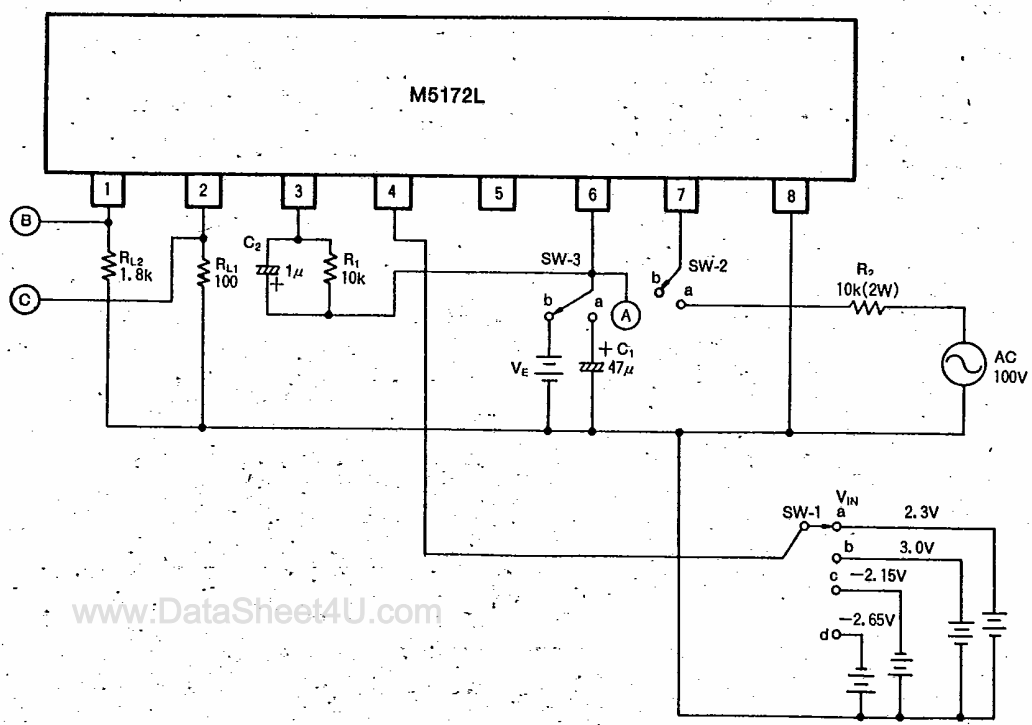
ABSOLUTE MAXIMUM RATINGS (T_a=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage (between pins ⑦ and ⑧)		10	V
$I_⑦$	Pin ⑦ sink current		10	mA
P_d	Power dissipation		360	mW
K_θ	Thermal derating	T_a≧25℃	3.5	mW/℃
Topg	Operating temperature range		−20～+60	℃
Tstg	Storage temperature range		−20～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{DC}	Rectification current (between pins ⑥ and ⑧)	C_1=47μF, R_2=10kΩ	5.85		6.9	V
V_{TH-T}	Differential amplifier ON level	V_E=5.9V	2.3	2.7	3.0	V
V_{TH-S}	Safety circuit ON level	V_E=5.9V	−2.65	−2.4	−2.15	V
$V_{OH(T)}$	Zero-point synchronous pulse peak value	R_{L1}=100Ω, V_E=5.9V	0.65			V
$V_{OH(S)}$	Safety circuit output pin "H" level	R_{L2}=1.8kΩ, V_E=5.9V	0.59			V

TEST CIRCUIT



Unit

Resistance : Ω

Capacitance : F

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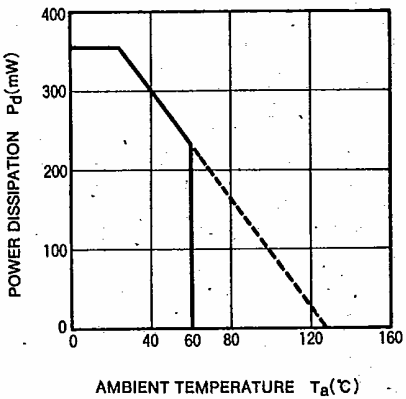
TEST METHODS

Symbol	SW-1	SW-2	SW-3	Measurement point
V_{DD}	a	a	a	A
V_{TH-T}	a b	b	b	C
V_{TH-T}	c d	b	b	B
$V_{OH(T)}$	a	b	b	C
$V_{OH(S)}$	d	b	b	B

TYPICAL CHARACTERISTICS

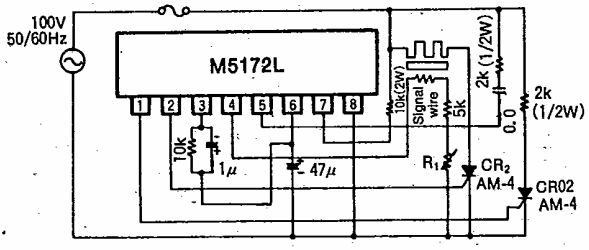
(T_a=25℃, unless otherwise noted)

THERMAL DERATING
(MAXIMUM RATING)



APPLICATION EXAMPLES

(1) Electric Blanket Temperature Control Circuit

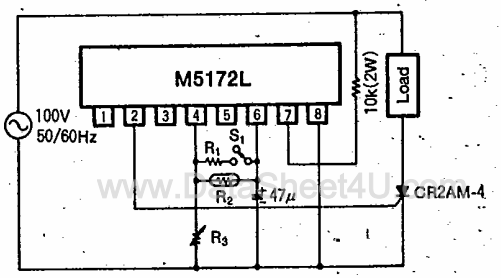


Unit

Resistance : Ω

Capacitance : F

(2) Thyristor Zero-Point Ignition Circuit



R_2 : NTC thermistor 10k

S_1 : OFF Only when thermistor used

S_1 : ON Linear compensation of thermistor

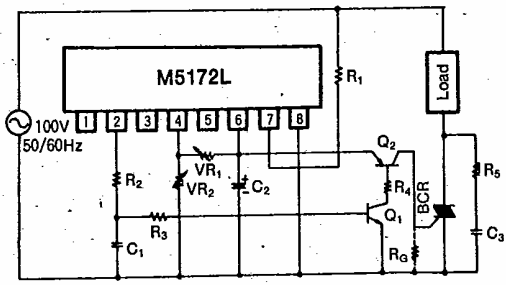
R_1 : 10kΩ

Unit

Resistance : Ω

Capacitance : F

(3) BCR Zero-Point Ignition Circuit



R_1 : 10kΩ(2W) R_2 : 1kΩ(1/4W) R_3 : 10kΩ(1/4W)

R_4 : 1kΩ(1/4W) R_5 : 100Ω(1/2W) C_1 : 0.068μF(50WV)

C_2 : 220μF(25WV) C_3 : 0.1μF(400WV) Q_1 : 2SC712-D

Q_2 : 2SA696-D BCR : BCR3AM~BCR25A