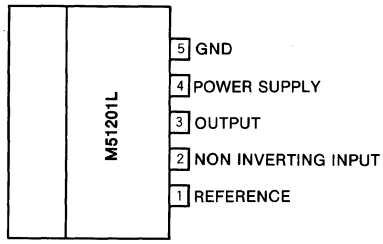
M51201L

VOLTAGE COMPARATOR

DESCRIPTION

The M51201L is a semiconductor integrated circuit consisting of precision voltage comparator. It is designed specifically to operate from a single power supply of low voltage. One of the input stages has a characteristic of low bias current and the other has built-in reference voltage with hysteresis. Output stage is capable of sinking high current. So, it is intended for a wide range of applications, ex. CR Timer, relays or lamps driver. M51201L's package is a mini SIL package, therefore can use very easily.

PIN CONFIGURATION (TOP VIEW)



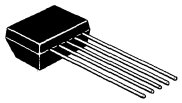
Outline 5P5

FEATURES

- Low input current ..... 8nA(typ.)
- 60mA output current capability can drive a relay or a lamp
- Built-in protection zener diodes for reverse E.M.F. at the output terminal
- Wide supply voltage range ..... 1.7~6.5V
- Including both reference voltage circuit and hysteresis for switching
- High output break down voltage ..... 18V(max.)

APPLICATIONS

- Electric shutter
- Comparator
- Level detector
- CR Timer
- Time delay circuit

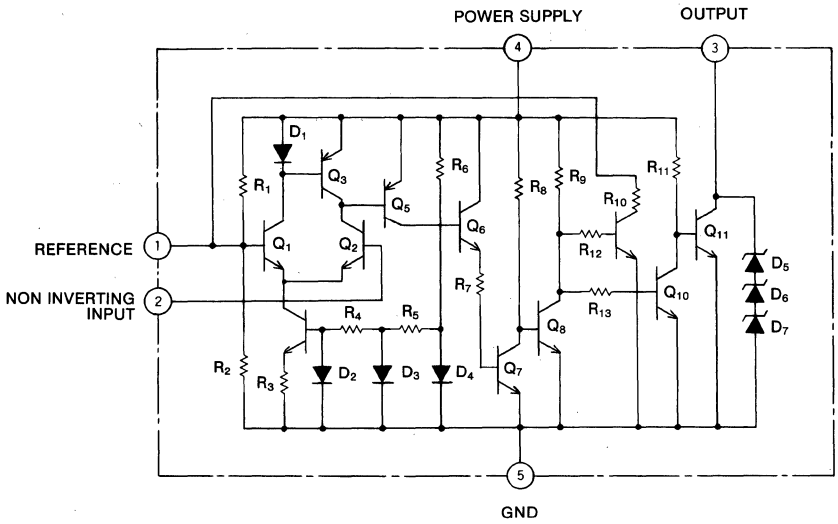


5-pin molded plastic SIL

RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... 1.7~6.5V
Rated supply voltage ..... 3V±10%

EQUIVALENT CIRCUIT



MITSUBISHI ELECTRIC

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

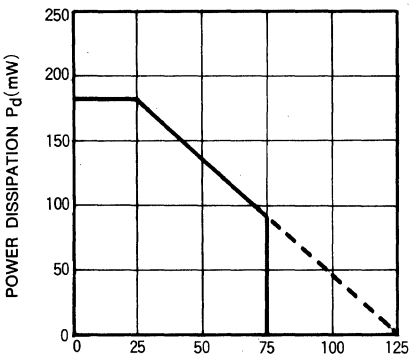
Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		6.5	V
I_{OL}	Output drive current	Output saturated	60	mA
V_{IN}	Input voltage		V_{CC}	V
P_d	Power dissipation		180	mW
K_θ	Thermal derating	$T_a \geqq 25$℃	1.8	mW/℃
T_{opr}	Operating temperature		−20～+75	℃
T_{stg}	Storage temperature		−40～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃)

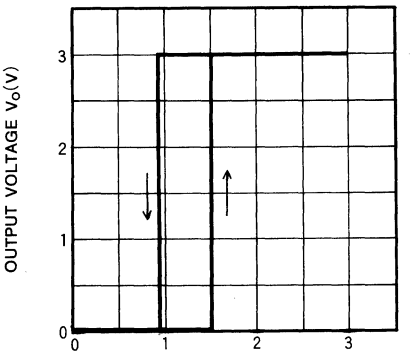
Symbol	Parameter	V_{CC}(V)	Test conditions	Limits			Unit
				Min	Typ	Max	
V_{CC}	Supply voltage range			1.7		6.5	V
I_{CC}	Circuit current	2.65			2.0	3.5	mA
		6.0			5.0	8.8	
I_{IN}	Input current	2.65			8	100	nA
V_{REF}	Reference voltage	6.0		2.55	3.0	3.45	V
V_{OL}	Output saturation voltage	6.0	I_{OL}=60mA		0.2	0.6	V
V_Z	Output zener voltage		I_Z=5mA	18	22	26	V
t_{PLH}	Output "L-H" propagation delay time	6.0			0.2		μs
t_{PHL}	Output "H-L" propagation delay time	6.0			50		μs
V_{IN}	Input voltage range			0.8		V_{CC}−0.2	V

TYPICAL CHARACTERISTICS (T_a=25℃, V_{CC}=3V, unless otherwise noted)

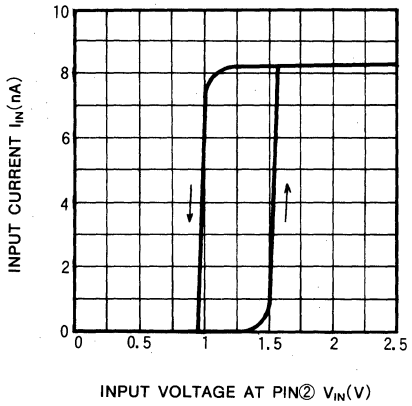
THERMAL DERATING (MAXIMUM RATING)



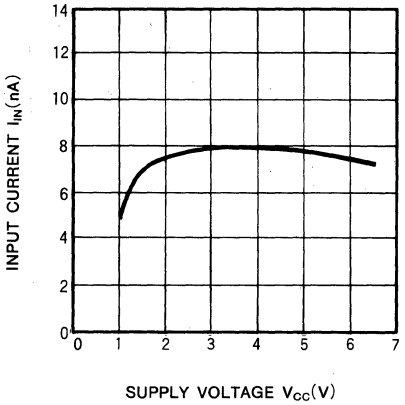
OUTPUT VOLTAGE VS INPUT VOLTAGE AT PIN②



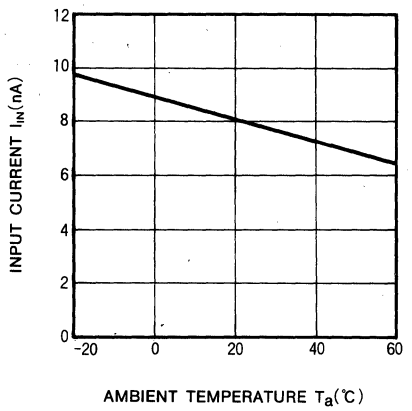
INPUT CURRENT VS INPUT VOLTAGE AT PIN②



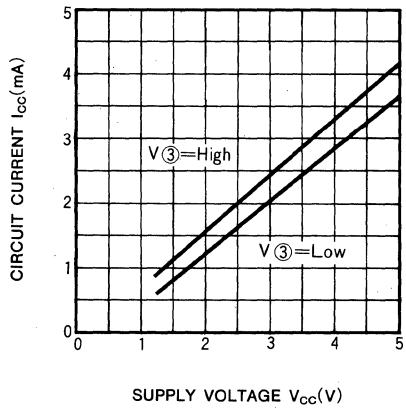
INPUT CURRENT VS SUPPLY VOLTAGE



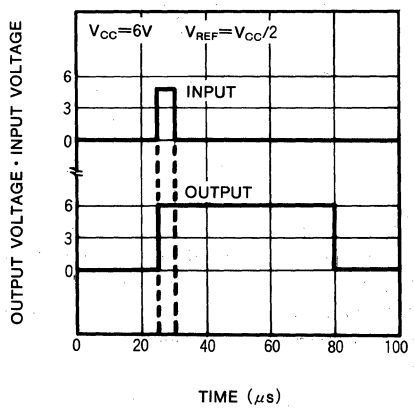
INPUT CURRENT VS AMBIENT TEMPERATURE



CIRCUIT CURRENT VS SUPPLY VOLTAGE

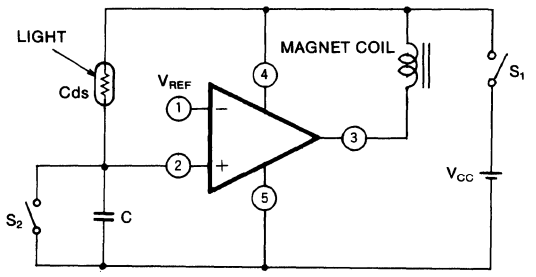


PULSE RESPONSE CHARACTERISTICS



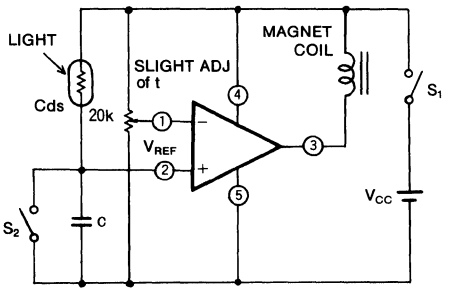
APPLICATION EXAMPLES

Electric shutter (1)



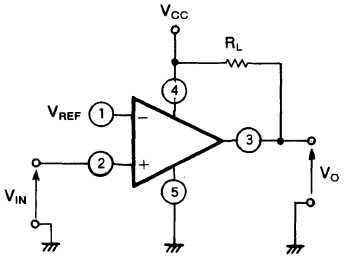
$t \approx 0.7CRcds$ [s]

Electric shutter (2)

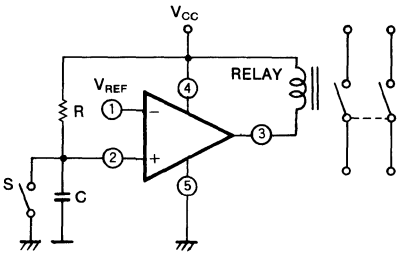


$t \approx 0.7CRcds \cdot \ln \frac{V_{CC}}{V_{CC}-V_{REF}}$

Voltage comparator



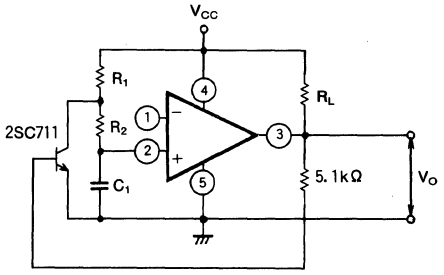
CR Timer



$t \approx 0.7CR$ [s]

$0.1ms \leqq t \leqq 180s < V_{REF} \approx V_{CC}/2$

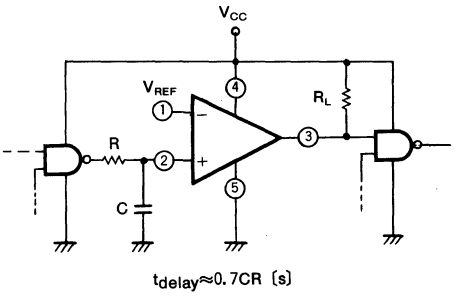
Oscillator



f_0 : Oscillation frequency

$f_0 = \frac{1}{C_1(0.337R_1+0.847R_2)}$ [Hz]

Time delay circuit



$t_{delay} \approx 0.7CR$ [s]

PRECAUTIONS FOR USE

1. Paying much attention is necessary for fear that the M51201L may flow large current and reach to destroy because of the structure when the terminals of V_{CC} and GND of the M51201L is connected wrong position each other.
2. Output is "open collector" and a loading resistor is not included. Connect a loading resistor to stabilize operation, in case of driving a next stage.
3. Reference voltage (V_{REF}) is adjustable for connecting external resistor, but adjustable voltage range is 0.8 to $V_{CC}-0.2$(V).