M51205L

VOLTAGE COMPARATOR

DESCRIPTION

The M51205L is a semiconductor integrated circuit consisting of precision voltage comparator. It is designed specifically to operate from a high voltage because of built-in zener diode for stabilization. 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. M51205L's package is a mini SIL package, therefore can use very easily.

FEATURES

- Low input current ..... 20nA(typ.)
- Built-in zener diode for stabilization of power supply voltage.
- 60mA output current capability can drive a relay or a lamp
- High output break down voltage ..... 30V(max.)
- Including both reference voltage circuit and hysteresis for switching

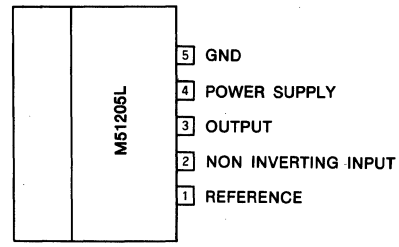
APPLICATIONS

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

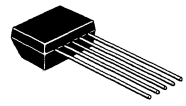
RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... Over 2.5V
Rated supply voltage ..... 12V (with dropper resistor)

PIN CONFIGURATION (TOP VIEW)

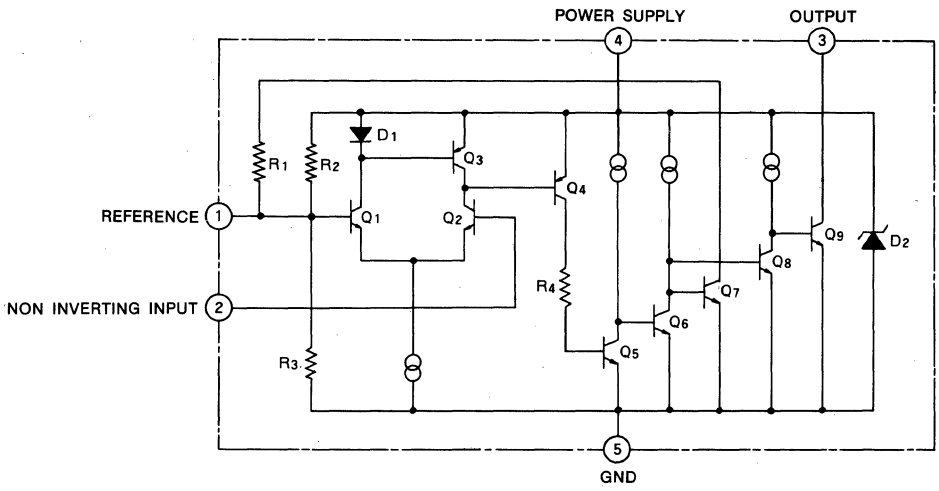


Outline 5P5



5-pin molded plastic SIL

EQUIVALENT CIRCUIT



MITSUBISHI ELECTRIC

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

Symbol	Parameter	Conditions	Limits	Unit
I_{CC}	Circuit current		20	mA
V_{IN}	Input voltage		V④※	V
I_{OL}	Output drive current	Output saturated	60	mA
V_{OH}	Output drive voltage		30	V
P_d	Power dissipation		180	mW
K_θ	Thermal derating	T_a≧25℃	1.8	mW/℃
T_{opr}	Operating temperature		−20～+75	℃
T_{stg}	Storage temperature		−40～+125	℃

※ : Voltage at Pin④

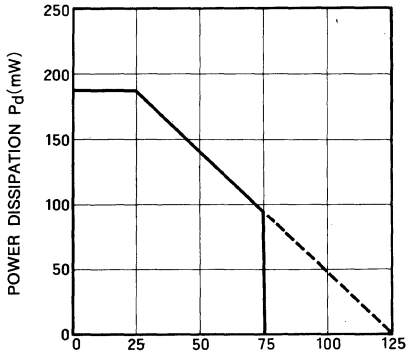
ELECTRICAL CHARACTERISTICS (T_a=25℃, R_d : dropper resistor)

Symbol	Parameter	Test conditions		Limits			Unit
		V_{CC}(V)		Min	Typ	Max	
V④	Zener voltage	12.0	R_d=1kΩ	5.0	5.6	7.0	V
V_{IN}	Input voltage range	12.0	Rd=1kΩ	0.8		V④−0.2	V
I_{IN}	Input current	12.0	R_d=1kΩ		20	75	nA
V_{REF}	Reference voltage	5.00	R_d=0Ω, V_{IN}=0V	2.25	2.50	2.75	V
ΔV_{hys}	Hysteresis for switching	5.00	R_d=0Ω, V_{IN}=3V	0.80	1	1.20	V
V_{OL}	Output saturation voltage	12.0	R_d=1kΩ, R_L=200Ω		0.3	0.6	V
t_{PLH}	Output "L-H" propagation delay time	12.0	R_d=1kΩ		1		μs
t_{PHL}	Output "H-L" propagation delay time				10		μs
I_{CC}※	Circuit current (V_{CC}≦V④)	5.00	R_d=0Ω		1.9	2.4	mA

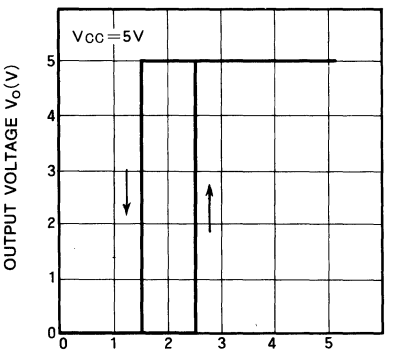
※ : Excluding zener current of zener diode connected to Pin④

TYPICAL CHARACTERISTICS (T_a=25℃, unless otherwise noted)

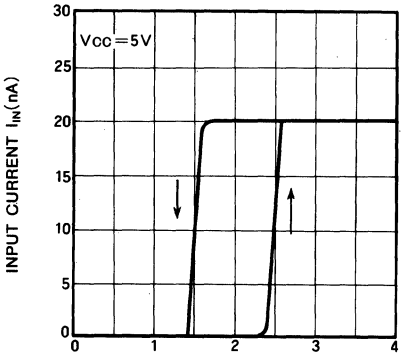
THERMAL DERATING (MAXIMUM RATING)



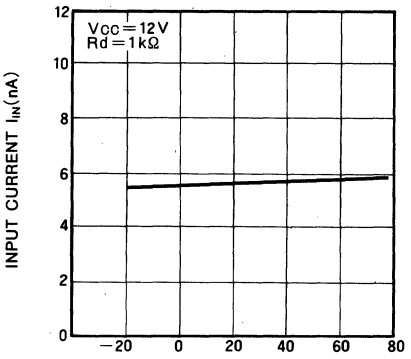
OUTPUT VOLTAGE VS INPUT VOLTAGE AT PIN②



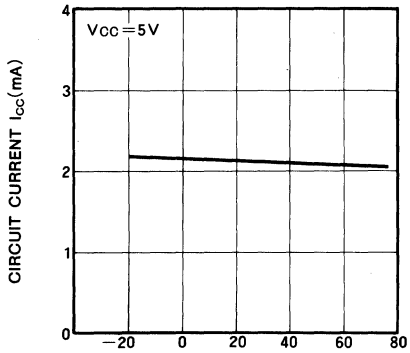
INPUT CURRENT VS
INPUT VOLTAGE AT PIN②



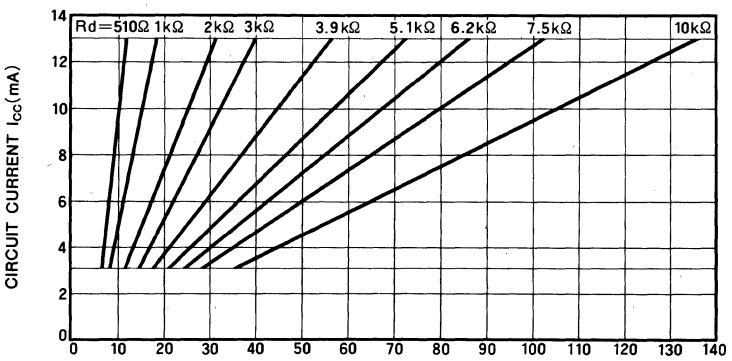
INPUT CURRENT VS
AMBIENT TEMPERATURE



CIRCUIT CURRENT VS
AMBIENT TEMPERATURE

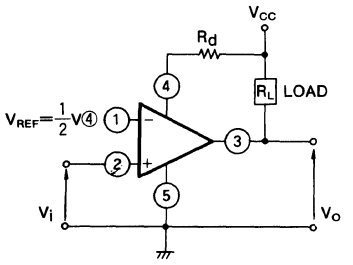


DROPPER RESISTOR(Rd) SELECTION GRAPH

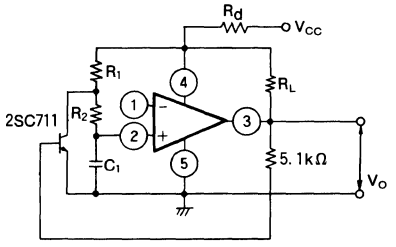


APPLICATION EXAMPLES

Voltage comparator



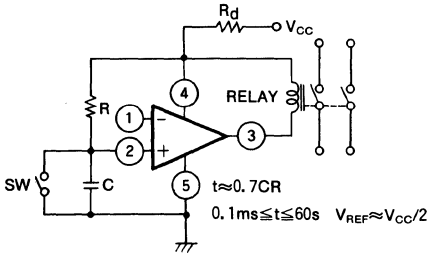
Oscillator



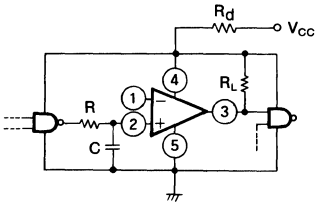
f_0 : Oscillation frequency

$$f=\frac{1}{C_1(0.337R_1+0.847R_2)}\text{(Hz)}$$

CR Timer



Time delay circuit



$t_{delay}\approx 0.7CR$

PRECAUTIONS FOR USE

1. Paying much attention is necessary for fear that the M51205L may flow large current and reach to destroy because of the structure when the terminals of V_{CC} and GND of the M51205L 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. Care should be taken not to apply over 5(V) directly to the terminals between Pin④ and Pin⑤. Connect a dropper resistor(Rd) in series to Pin④, in case of applying over 5(V) between Pin④ and Pin⑤.