M51200P

DUAL COMPARATOR

DESCRIPTION

The M51200P is a monolithic integrated circuit encapsulated in a 10-leads flat plastic package, intended for use as a dual (two independent) comparator. One of the comparators has dual input and single output, the other has single input and dual output. Both of them operate in the range of 1.4 to 6V.

FEATURES

- Low input current ..... 3 nA (typ.), 10nA (max.)
- High output current capability ..... 40mA (max.)
- Wide supply voltage range ..... 1.4~ 6 V
- Including surge absorbing zener diodes.

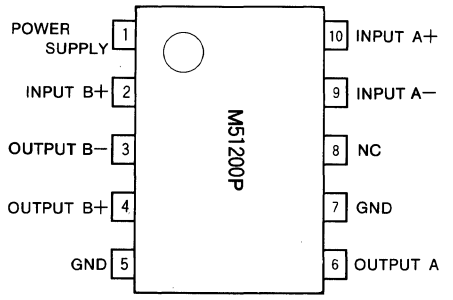
APPLICATIONS

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

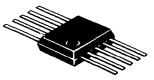
RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... 1.4~6.0V
Rated supply voltage ..... 3V±10%

PIN CONFIGURATION (TOP VIEW)

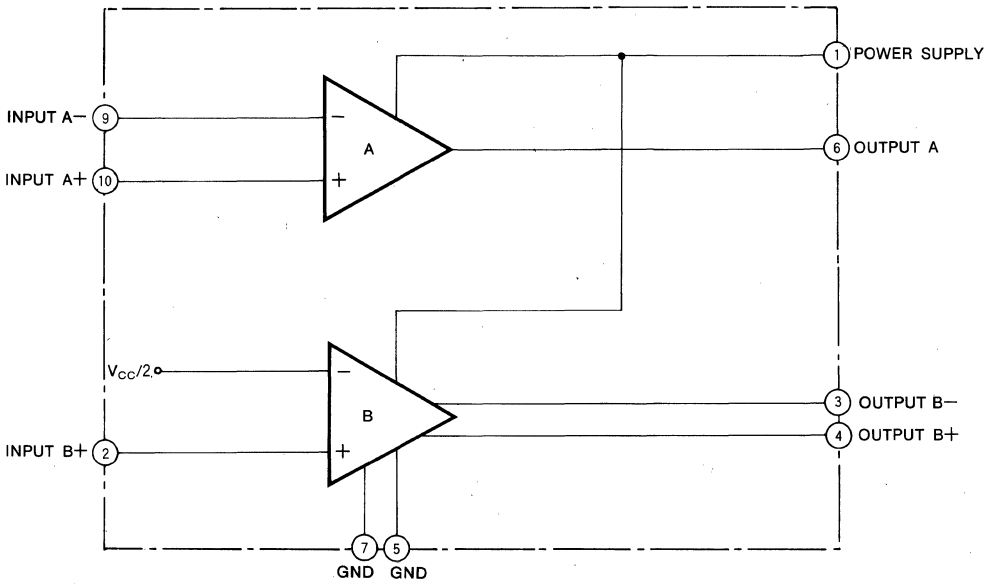


Outline 10P2 NC : NO CONNECTION



10-pin molded plastic FLAT

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

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

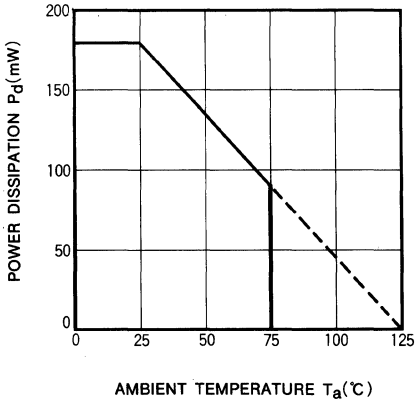
Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		6	V
V_{IN}	Input voltage		V_{CC}	V
$I_{⑥}$	Output drive current	Output saturated	40	mA
$I_{③}$			2	mA
$I_{④}$			25	mA
$V_{⑥}$	Output drive voltage		18	V
$V_{③}$			10	V
$V_{④}$			18	V
P_d	Power dissipation		180	mW
T_{opr}	Operating temperature range		−20～+75	℃
T_{stg}	Storage temperature		−40～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=3.0V, unless otherwise noted)

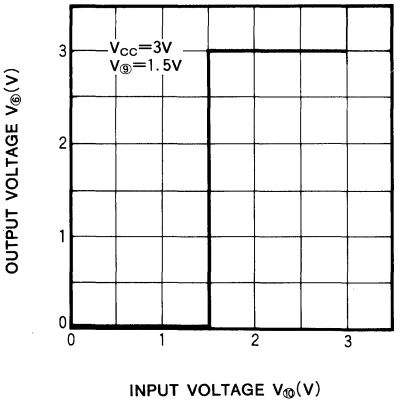
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage range		1.4		6.0	V
I_{CC}	Circuit current	V_{CC}=3V		1.8	2.8	mA
		V_{CC}=6V		3.4	4.9	
$I_{IN⑩}$	Input current	V_{CC}=3V		3	10	nA
$I_{IN⑨}$				3	10	nA
$I_{IN②}$				8	100	nA
V_{REF}	Reference voltage for #B		1.35	1.5	1.65	V
$V_{S⑥}$	Output saturation voltage	$I_{⑥}$=20mA		0.18	0.3	V
$V_{S③}$		$I_{③}$=10μA		38	60	mV
$V_{S④}$		$I_{④}$=25mA		0.2	0.5	V
$V_{Z⑥}$	Output zener voltage	$I_{⑥}$=5mA	18	21	26	V
$V_{Z④}$		$I_{④}$=5mA	18	21	26	V
V_{IN}	Input voltage range	V_{CC}=3V	0.8		V_{CC}−0.2	V
t_{PLH}	Output "L→H" propagation delay time	V_{CC}=3V		20		μs
t_{PHL}	Output "H→L" propagation delay time			20		μs

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

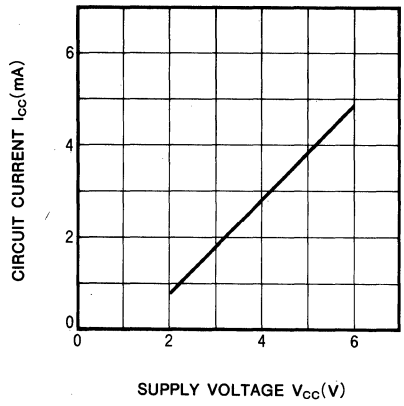
THERMAL DERATING (MAXIMUM RATING)



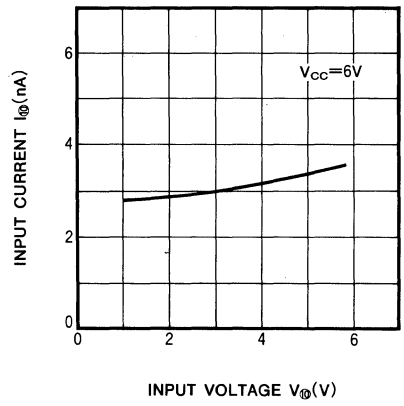
OUTPUT VOLTAGE VS INPUT VOLTAGE (COMPARATOR A)



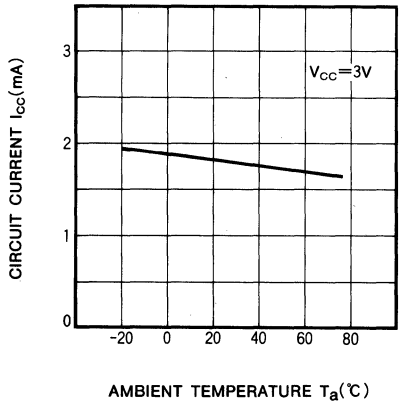
CIRCUIT CURRENT VS SUPPLY VOLTAGE



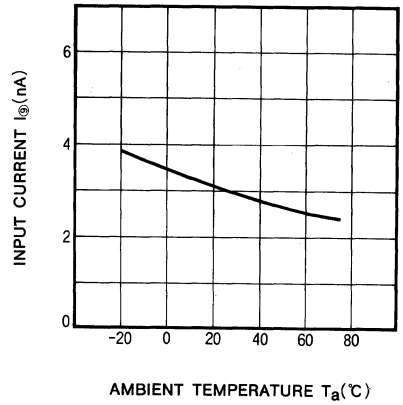
INPUT CURRENT VS INPUT VOLTAGE $V_{I⊕}$



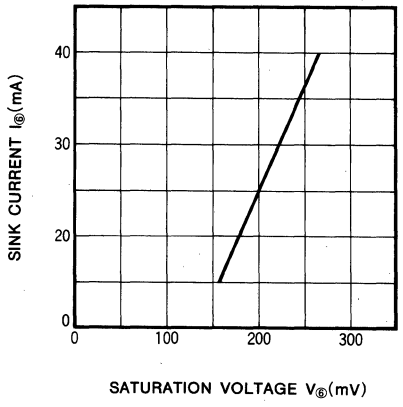
CIRCUIT CURRENT VS AMBIENT TEMPERATURE



INPUT CURRENT VS AMBIENT TEMPERATURE

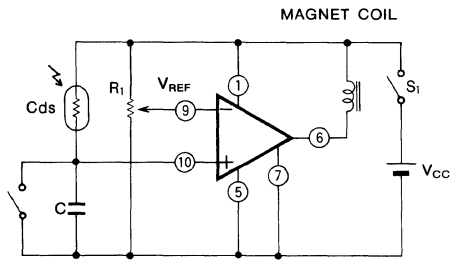


SINK CURRENT VS SATURATION VOLTAGE



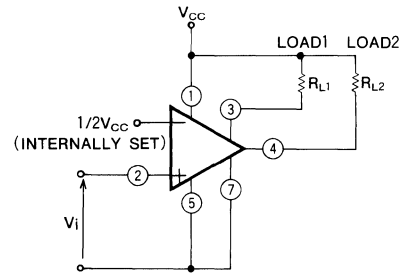
APPLICATION EXAMPLES

(1) Electric shutter



$$t = CR_{cds}\ell n\frac{V_{CC}}{V_{CC}-V_{REF}}$$

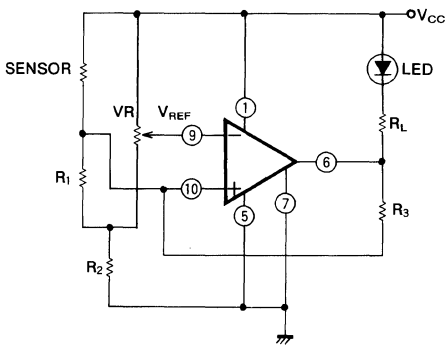
(2) Voltage comparator



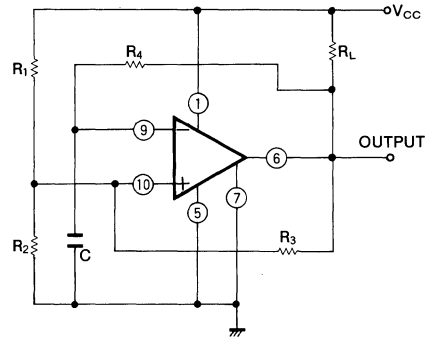
$V_i < \frac{1}{2}V_{CC}$: $V_④$=Low, $V_③$=High

$V_i > \frac{1}{2}V_{CC}$: $V_④$=High, $V_③$=Low

(3) Detector



(4) Oscillator



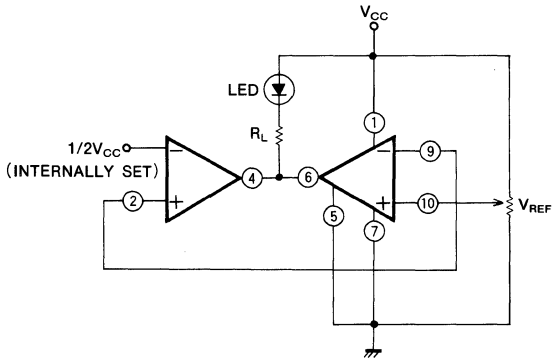
$R_L < R_3, R_4$

$$f = \frac{1}{CR_4\ell n\frac{R\ell}{Rh}\cdot\frac{1-R\ell}{1-Rh}}\ [Hz]$$

$$Rh = \frac{R_2}{R_2 + \frac{R_1R_3}{R_1+R_3}}$$

$$R\ell = \frac{\frac{R_2R_3}{R_2+R_3}}{R_1 + \frac{R_2R_3}{R_2+R_3}}$$

(5) Window comparator



PRECAUTIONS FOR USE

1. Paying much attention is necessary for fear that the M51200P may flow large current and reach to destroy because of the structure when the terminals of V_{CC} and GND of the M51200P 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.