FUJITSU

HIGH POWER COMPARATOR

MB4205

March 1988
Edition 1.0

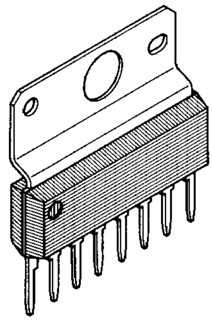
HIGH POWER COMPARATOR

The Fujitsu MB4205 is a comparator which is designed to operate from a single power supply voltage. It is capable of driving a load up to 0.5 A and have the current limiting circuitry, it enables a direct drive warning lamps.

As it is packaged in 8-pin plastic SIP package with heat sink, it enables easy mounting.

It is equipped with the function which turns the output "ON" by force, when the surge is inflicted in the application of automobile, and so on.

- PNP transistor input enables input control voltage from 0 V and a single power supply voltage operation
- High output drive capability : 0.5 A
- Resistance comparion is achieved due to on-chip switchable constant-current supply souce (Several hundred Ω to several kilo Ω)
- Hysteresis is set easily because V_{OH} level and V_R level is almost same
- On-chip current limiting circuitry
- Common pin for input control voltage pin V_{CS} and reference voltage output pin V_R



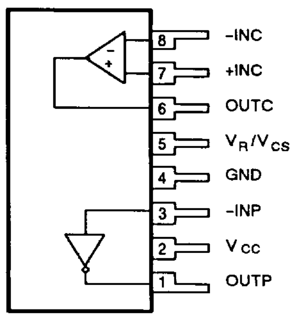
PLASTIC PACKAGE
SIP-08P-M01

ABSOLUTE MAXIMUM RATINGS (see NOTE) (T_A=25°C)

Rating	Symbol	Condition	Value	Unit
Power Supply Voltage	V_{CC}		18	V
Power Supply Current (Surge)	I_{CCS}	t≤50ms	100	mA
Load Current	I_{OL}		500	mA
Output Voltage	V_{OH}		40	V
Power Dissipation	P_D	T_A≤85°C	1	W
		T_C≤85°C	4	W
Operating Temperature	T_A		-30 to +85	°C
Storage Temperature	T_{STG}		-55 to +125	°C

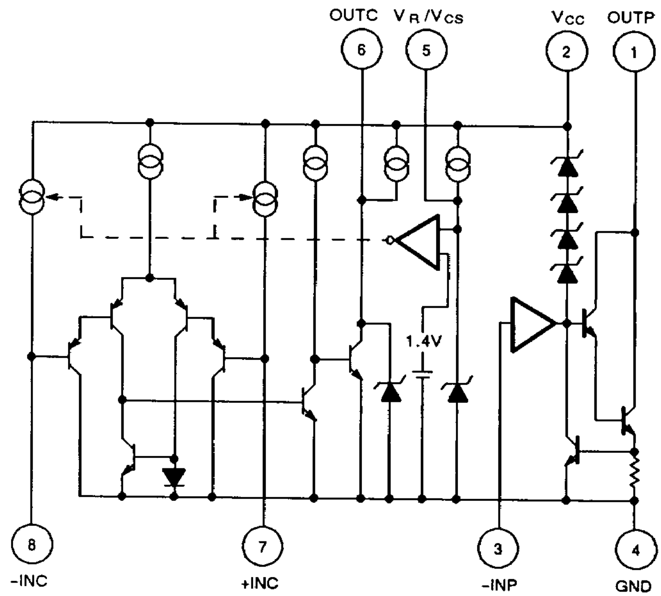
NOTE: Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

PIN ASSIGNMENT



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

Fig. 1 — MB4205 EQUIVALENT CIRCUIT



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ELECTRICAL CHARACTERISTICS (T_A=25°C, VCC=13.2V, RS=220Ω, RL=54Ω)

Parameter	Symbol	Condition	Value			Unit
			Min	Typ	Max	
Power Supply Voltage	V_{CC}	R_S=0	6.5		18	V
Power Supply Current	I_{CC}	V_{CC}=10V, R_S=0		9	13	mA
Zener Voltage	V_{CCZ}	I_{CC}=50mA	26	30	36	V
Comparator section						
Input Offset Voltage	V_{IO}	V_{CS}=2.0V		2	10	mV
		V_{CS}=0.8V		5	20	mV
Input Bias Current *	I_I	V_{CS}=2.0V		0.5	3	µA
	I_{IB}	V_{CS}=0.8V	0.6	1.0	1.5	mA
Input Bias Current Ratio	I_{I+}/I_{I-}	V_{CS}=0.8V	0.95	1.0	1.05	
Common-mode Input Voltage Range	V_{CM}		0		V_{CC}-2	V
Output Voltage	V_{OL}	I_{SINK}=3mA		0.1	0.2	V
	V_{OH}	I_R=0.5mA	5.0	5.4	5.8	V
Sink Current	I_{SINK}	$V_{OL} \leq 1V$	8	20		mA
Output section						
Reference Voltage	V_R	R_L=100kΩ	5.0	5.4	5.8	V
Input Control Current	I_{CS}	V_{CS}=0.8V	0.5	1.0	1.8	mA
Input Bias Current	I_I	V_I=0		3	20	µA
		V_I=5.0V			1	µA
Output Voltage	V_{OL}	V_{IH}=2.0V, I_{OL}=0.2A		0.85	1.0	V
Output Current	I_{OH}	V_{IL}=0.8V, V_{IH}=40V		2	5	mA

Note: Input bias current flows from the IC.

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ELECTRICAL CHARACTERISTICS CURVES

FIG. 2 — POWER SUPPLY CURRENT VS. POWER SUPPLY VOLTAGE

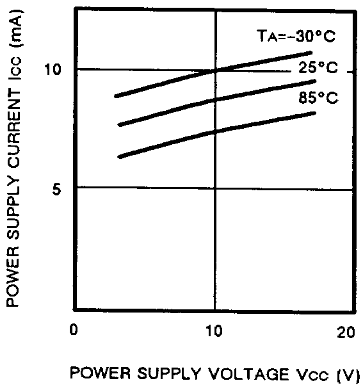


FIG. 3 — INPUT BIAS CURRENT VS. POWER SUPPLY VOLTAGE

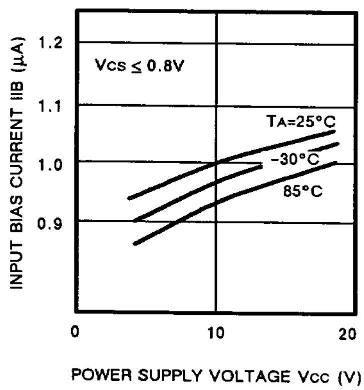


FIG. 4 — REFERENCE VOLTAGE/OUTPUT VOLTAGE VS.TEMPERATURE

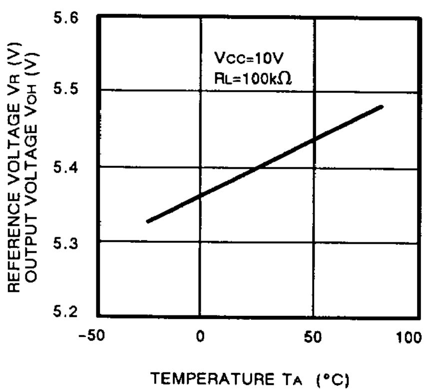
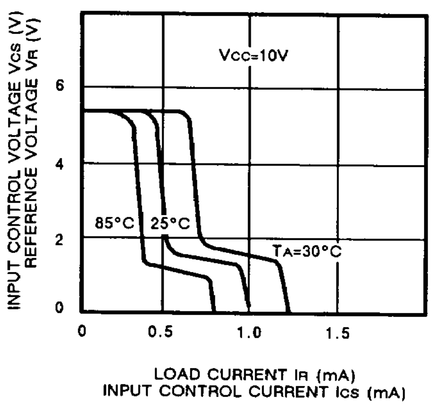


FIG. 5 — REFERENCE VOLTAGE VS. LOAD CURRENT INPUT CONTROL VOLTAGE VS. INPUT CONTROL CURRENT



ELECTRICAL CHARACTERISTICS CURVES (Continued)

FIG. 6 —OUTPUT VOLTAGE VS. INPUT VOLTAGE

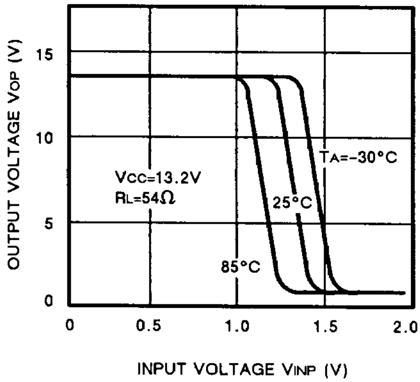
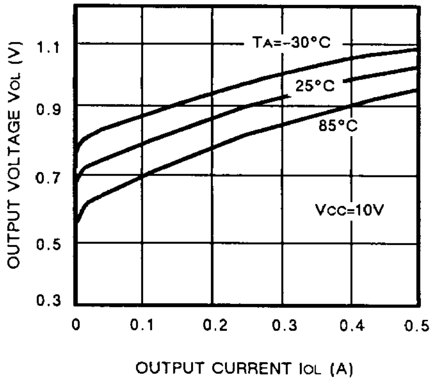
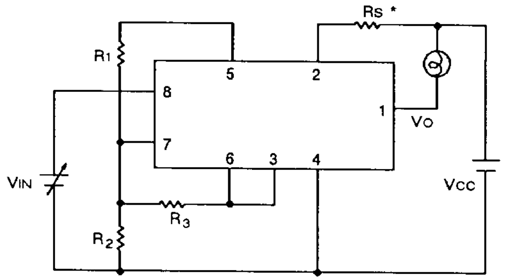


FIG. 7 —OUTPUT VOLTAGE VS. INPUT CURRENT

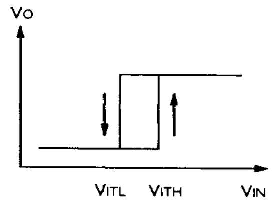


APPLICATION EXAMPLES

Fig. 8



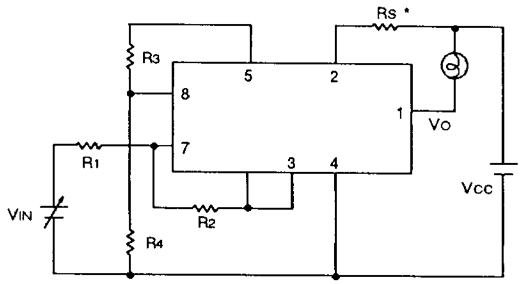
* Rs is not required if surge is not large.

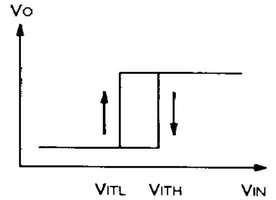


$$V_{ITH} \doteqdot \frac{R_2(R_1 + R_3)}{R_2(R_1 + R_3) + R_1R_3} V_R$$

$$V_{ITL} \doteqdot \frac{R_2R_3}{R_2(R_1 + R_3) + R_1R_3} V_R$$

Fig. 9

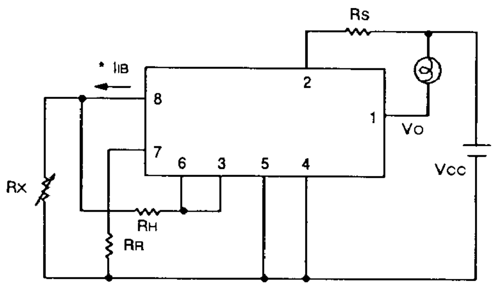




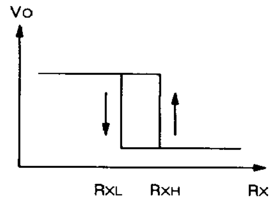
$$V_{ITH} = \left(1 + \frac{R_1}{R_2}\right)\left(\frac{R_4}{R_3 + R_4}\right)V_R$$

$$V_{ITL} = V_{ITH} - \frac{R_1}{R_2} V_R$$

Fig. 10



When 5 pin is connected to GND, constant current IIB is generated internally.

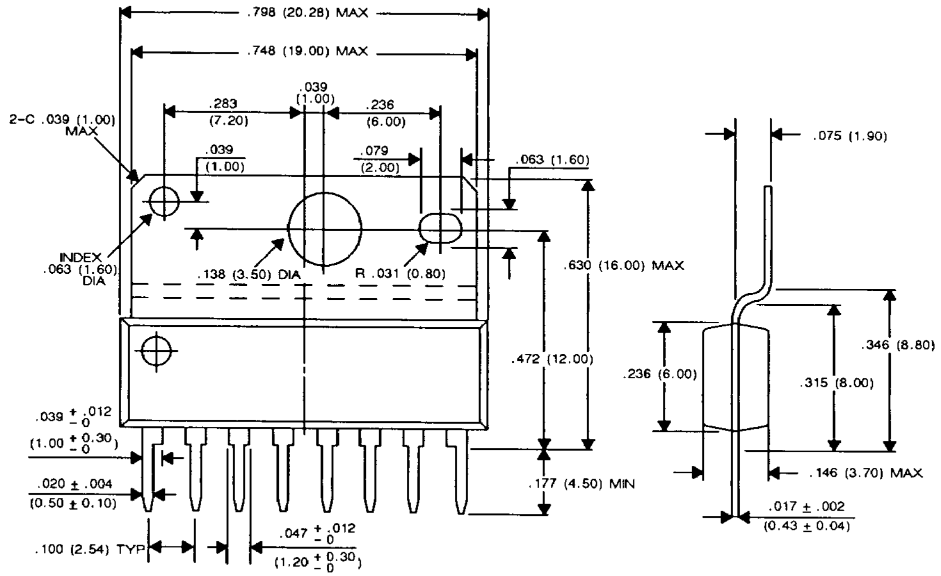


$$R_{XH} = \frac{R_R}{1 - \frac{R_R}{R_H}}$$

$$R_{XL} = \frac{R_R}{1 - \frac{R_R}{R_H} + \frac{V_R}{I_{IB}R_H}}$$

PACKAGE DIMENSIONS

8-LEAD PLASTIC SINGLE-IN-LINE PACKAGE
(CASE No.: SIP-08P-M01)



Dimensions in inches (millimeters)

S08004S-6C

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