FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-12104-2E

LINEAR IC

QUAD COMPARATOR

MB4204

LOW POWER QUAD COMPARATOR

The Fujitsu MB4204 is a Quad Comparator which consists of four independent channels. The MB4204 is designed to operate form either a single power or dual power supplies over a wide range of voltages. The input characteristics is equivalent of current industry standard comparator. Even though operated from a single power supply, the MB4204 is suitably designed to compare multiple signals in parallel and to be operated with battery because its input common mode voltage range includes ground potential and it requires low power supply current.

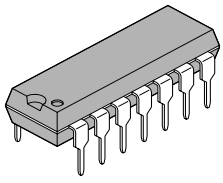
The MB4204 can be high density mounted because it integrates 4 circuits on a chip in DIP/FPT-14-pin package.

The MB4204 is pin compatible with LM339.

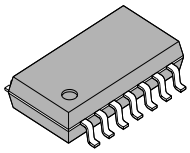
■ FEATURES

- Wide power supply voltage range: +2 to +36V
- Wide input common mode range: 0 to (V_{CC} – 1.5) V
- Low power supply current: 0.8 mA typ.
- Low input offset voltage: 2 mV typ.
- Low input bias current: 25 nA typ.
- Open Collectors Output allow to wired-OR Connection
- Package
  —14-pin Plastic DIP Package (Suffix: –P)
  —14-pin Plastic FPT Package (Suffix: –PF)

■ PACKAGES



PLASTIC PACKAGE
DIP-14P-M02



PLASTIC PACKAGE
FPT-14P-M04

This device contains cirduitry 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.

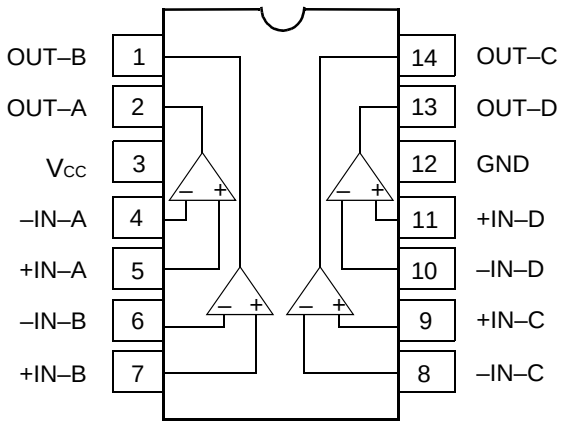
■ ABSOLUTE MAXIMUM RATINGS (see NOTE)

(T_A = 25°C)

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	36	V
Power Dissipation	P_D	500	mW
Differential Input Voltage	V_{ID}	36	V
Common Mode Input Voltage	V_I	–0.3 to +36	V
Output Short Circuit Duration	—	Infinite	—
Operating Temperature	T_A	–20 to +75	°C
Storage Temperature	T_{STG}	–55 to +125	°C

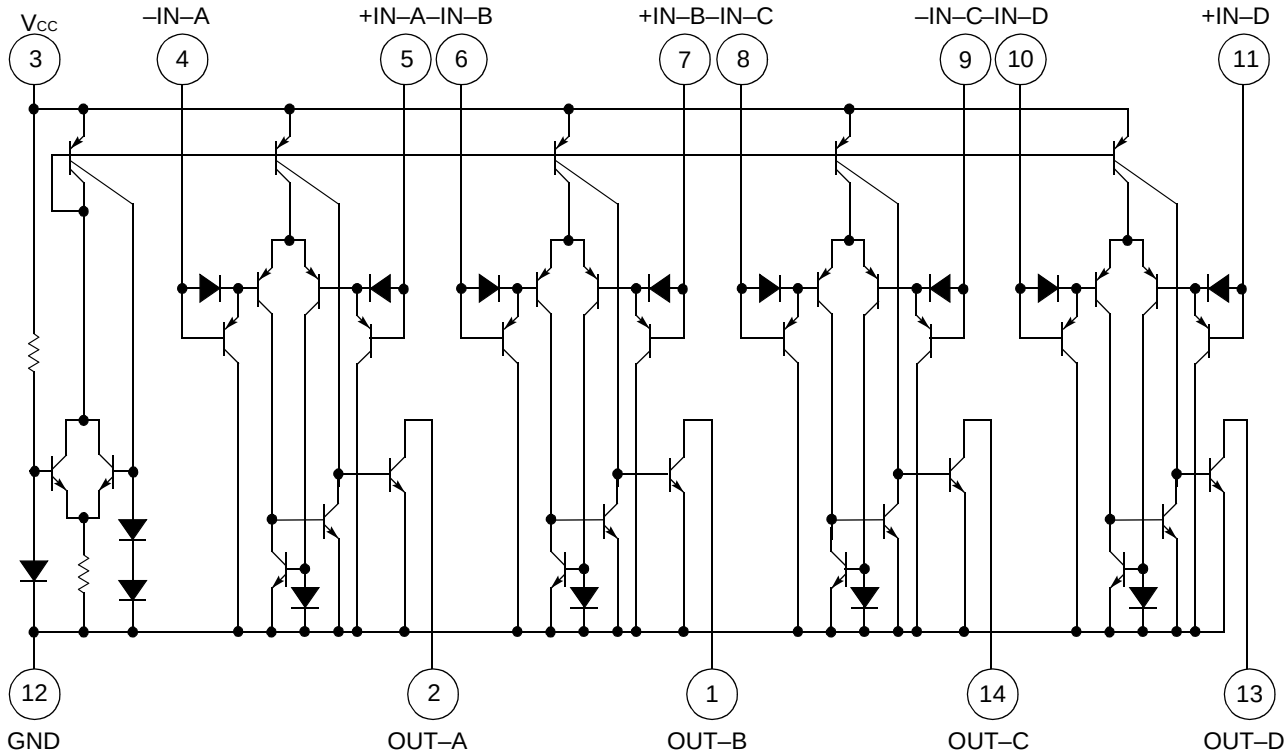
NOTE: Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

■ PIN ASSIGNMENT



(TOP VIEW)

Fig. 1 — EQUIVALENT CIRCUIT



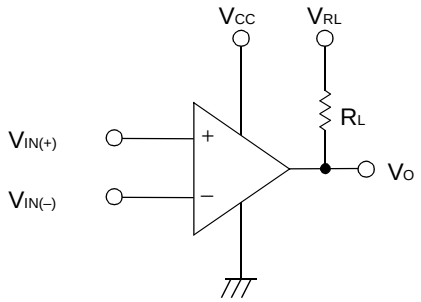
■ ELECTRICAL CHARACTERISTICS

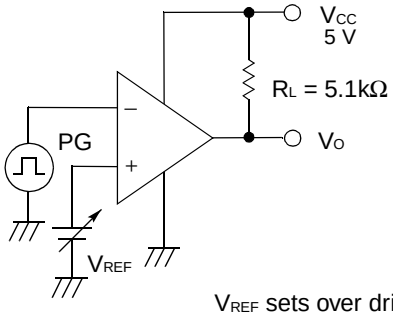
(V_{CC} = +5 V, T_A = 25°C)

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Input Offset Voltage	V_{IO}	V_O = V_{REF} = 1.4 V	—	2	5	mV
Input Offset Current	I_{IO}	—	—	5	50	nA
Input Bias Current	I_I*1	—	—	25	250	nA
Input Common Mode Voltage	V_{CM}	—	0	—	V_{CC} – 1.5	V
Voltage Gain	A_V	R_L = 15 kΩ	—	200	—	V/mV
Transconductance	—	—	—	13	—	mhos
Large Signal Response Time	*2	R_L = 5.1 kΩ, V_{RL} = 5 V	—	300	—	ns
Response Time	*3	R_L = 5.1 kΩ, V_{RL} = 5 V	—	1.3	—	µs
Output Saturation Voltage	V_{OL}	$V_{IN(-)}$ = 1 V, $V_{IN(+)}$ = 0 V, I_{SINK} = 3 mA	—	250	400	mV
Output Sink Current	I_{SINK}	$V_{IN(-)}$ = 1 V, $V_{IN(+)}$ = 0 V, $V_O \leq$ 1.5 V	6	16	—	mA
Output Leakage Current	I_{LEAK}	$V_{IN(+)}$ = 1 V, $V_{IN(-)}$ = 0 V, V_O = 5 V	—	0.1	—	nA
Output Leakage Current	I_{LEAK}	$V_{IN(+)}$ = 1 V, $V_{IN(-)}$ = 0 V, V_O = 30 V	—	—	1	µA
Power Supply Current	I_{CC}	R_L = ∞	—	0.8	2	mA

Notes:
*1: The direction of the input bias current flows from IC.
*2: V_{IN} = TTL Logic Swing, V_{REF} = 1.4 V
*3: V_{IN} = 100 mV, Overdrive = 5 mV

Fig. 2 — TEST CIRCUIT





V_{REF} sets over drive level.

■ TYPICAL CHARACTERISTICS CURVES

Fig. 3 — Power Supply Current vs.

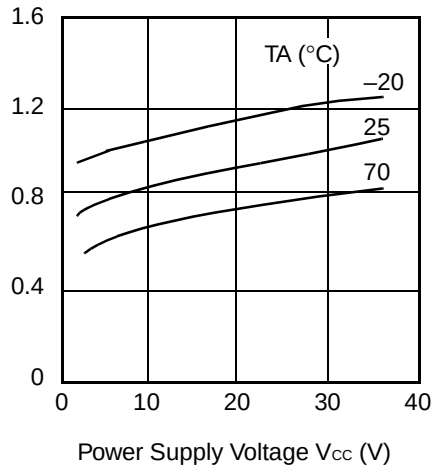


Fig. 4 — Output Saturation Voltage vs.

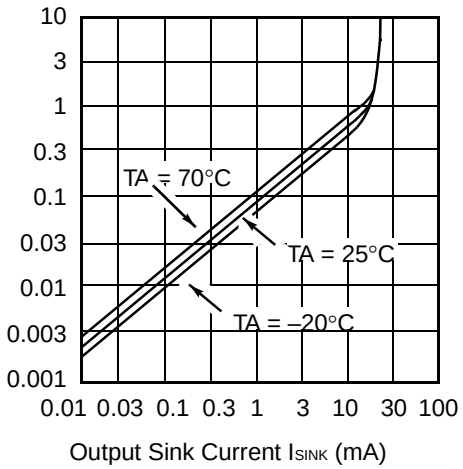


Fig. 5 — Input/Output Voltage vs.

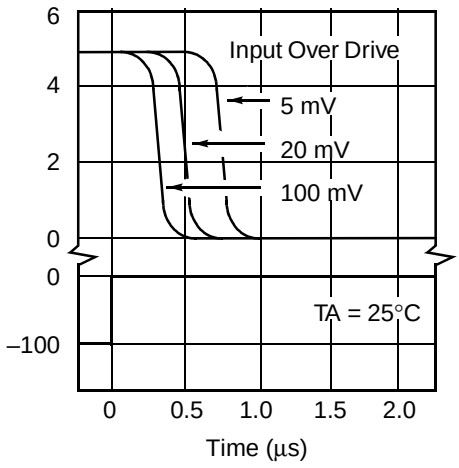
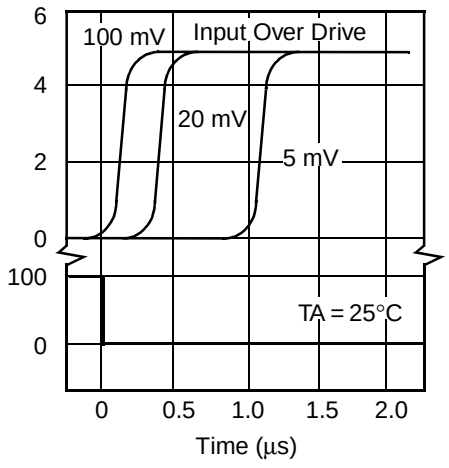
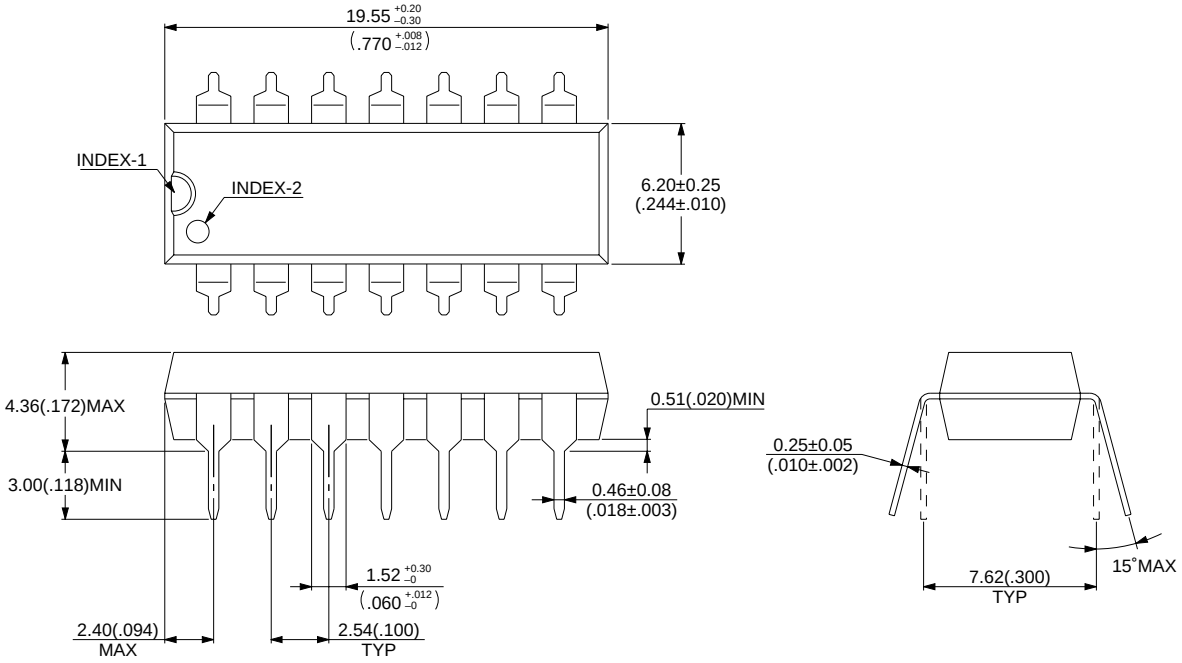


Fig. 6 — Input/Output Voltage vs.



■ PACKAGE DIMENSIONS

14 pin, Plastic DIP
(DIP-14P-M02)



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Dimensions in mm (inches).

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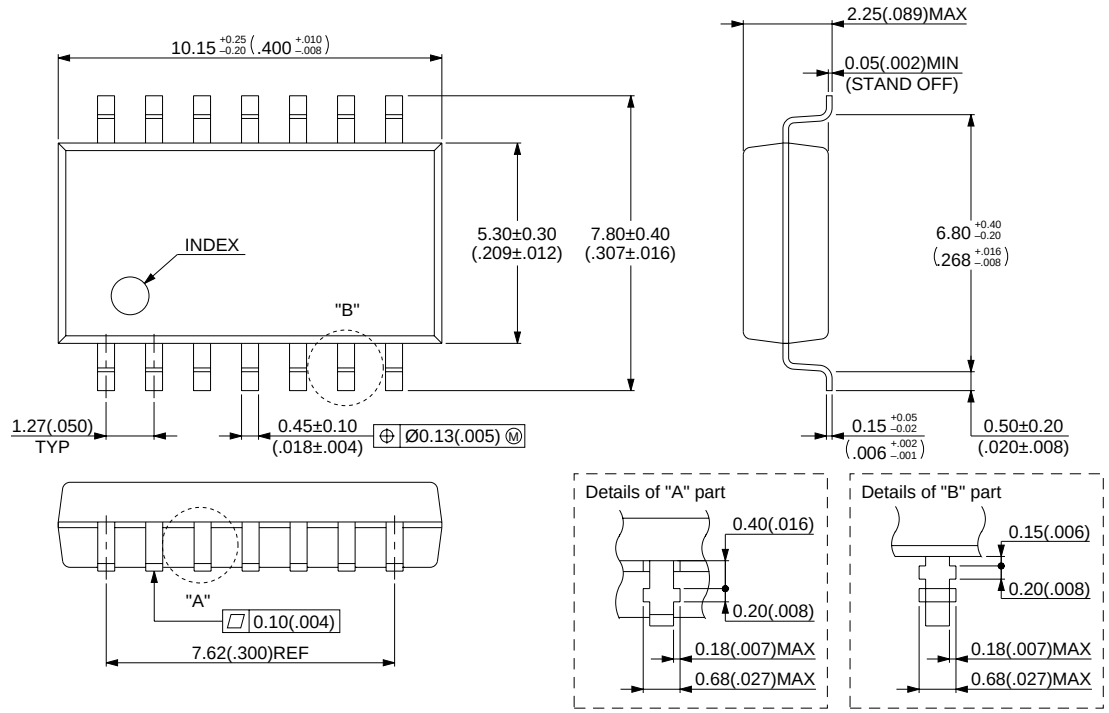
14 pin, Plastic SOP
(FPT-14P-M04)



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Dimensions in mm (inches).

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