

LINEAR IC**QUAD COMPARATOR****MB4204****LOW POWER QUAD COMPARATOR**

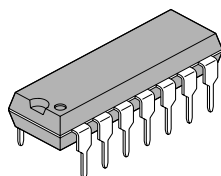
The Fujitsu MB4204 is a Quad Comparator which consists of four independent channels. The MB4204 is designed to operate from either a single power or dual power supplies over a wide range of voltages. The input characteristics is equivalent of current industry standard comparator. Even though operated 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.

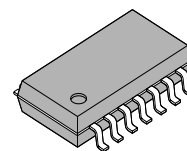
The MB4204 is pin compatible with LM339.

■ 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 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.

MB4204

■ 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

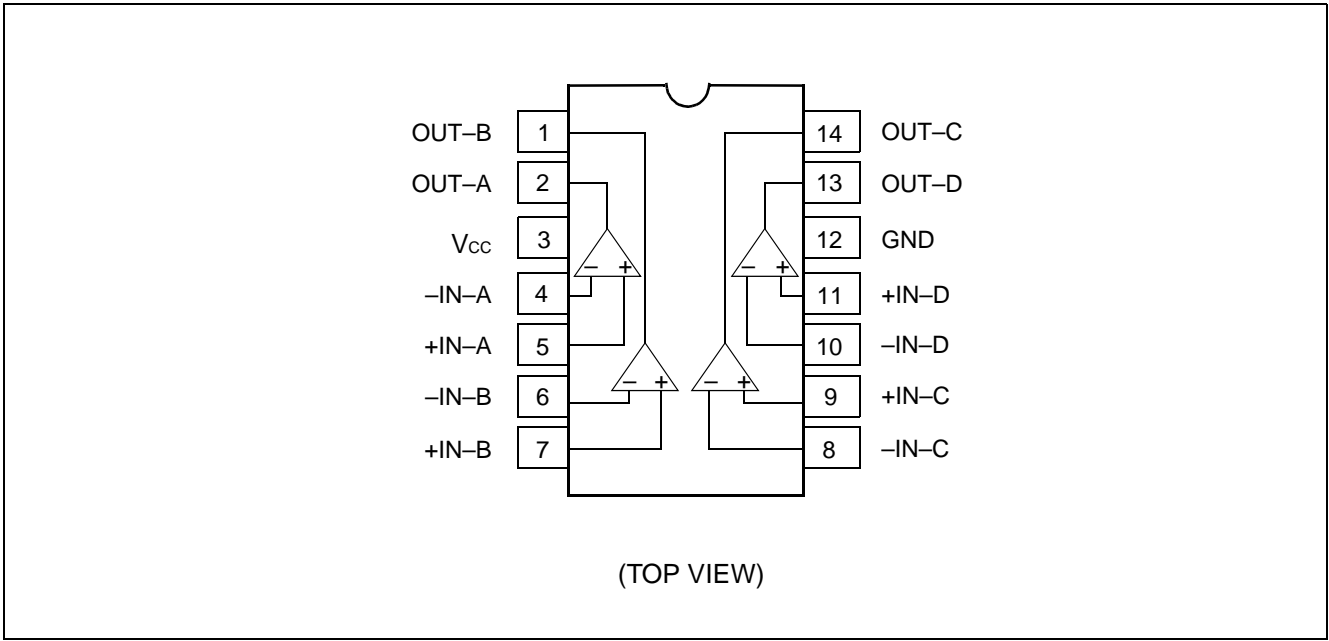
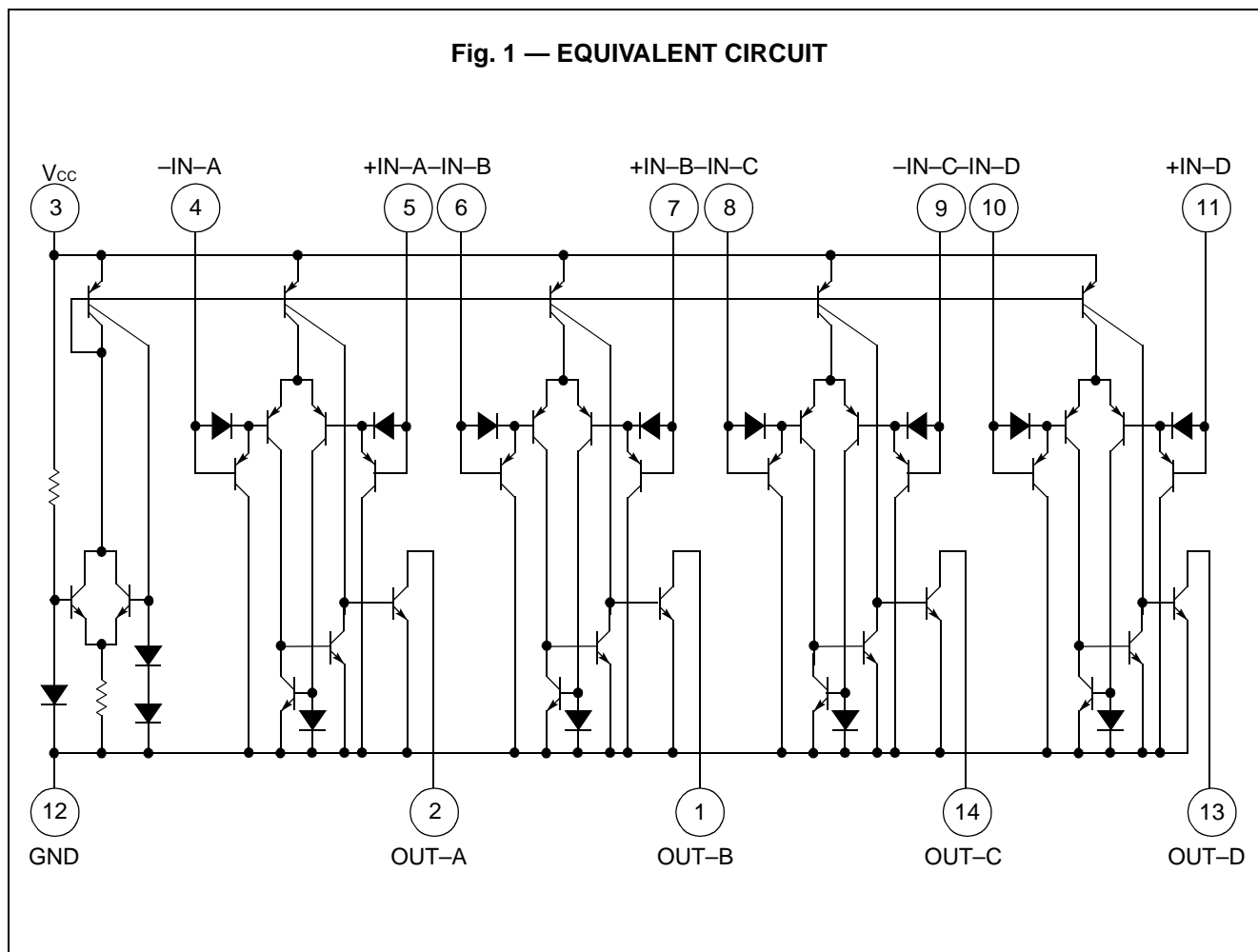


Fig. 1 — EQUIVALENT CIRCUIT



■ ELECTRICAL CHARACTERISTICS

($V_{CC} = +5\text{ V}$, $T_A = 25^\circ\text{C}$)

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

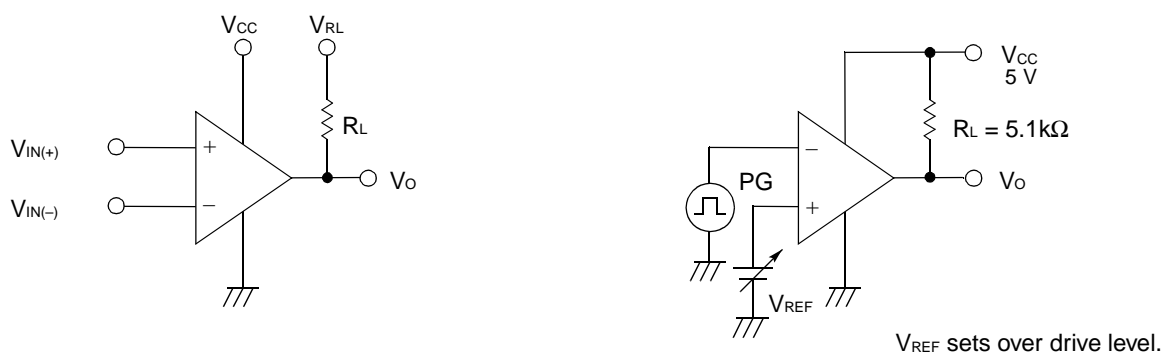
Notes:

*1: The direction of the input bias current flows from IC.

*2: $V_{IN} = \text{TTL Logic Swing}$, $V_{REF} = 1.4\text{ V}$

*3: $V_{IN} = 100\text{ mV}$, Overdrive = 5 mV

Fig. 2 — TEST CIRCUIT



TYPICAL CHARACTERISTICS CURVES

Fig. 3 — Power Supply Current vs.

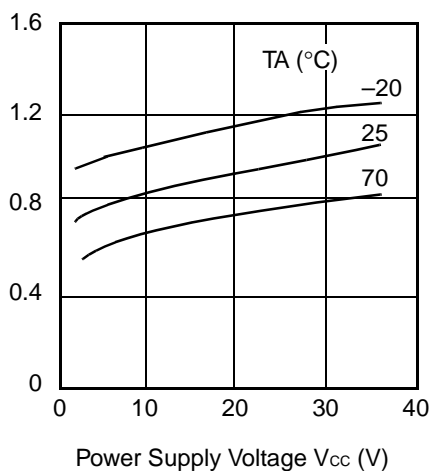


Fig. 4 — Output Saturation Voltage vs.

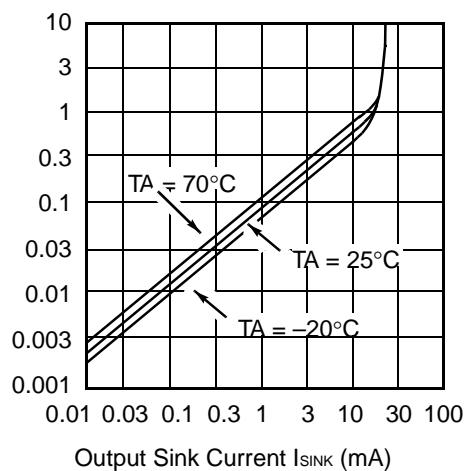


Fig. 5 — Input/Output Voltage vs.

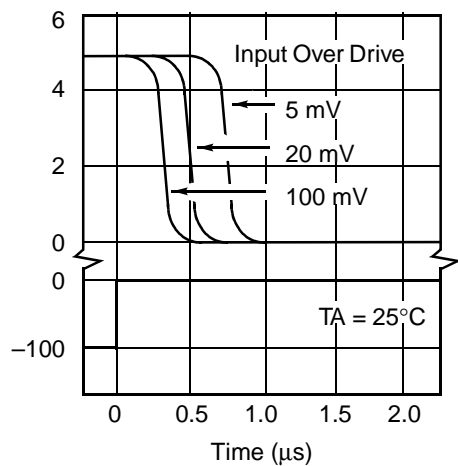
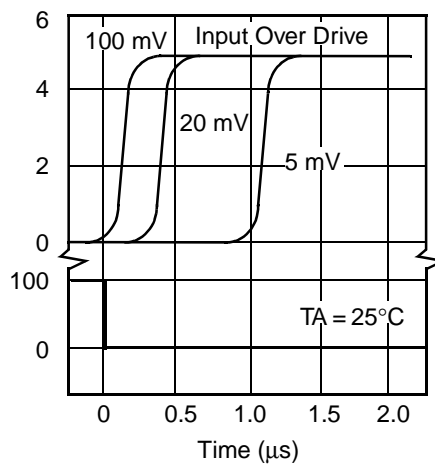


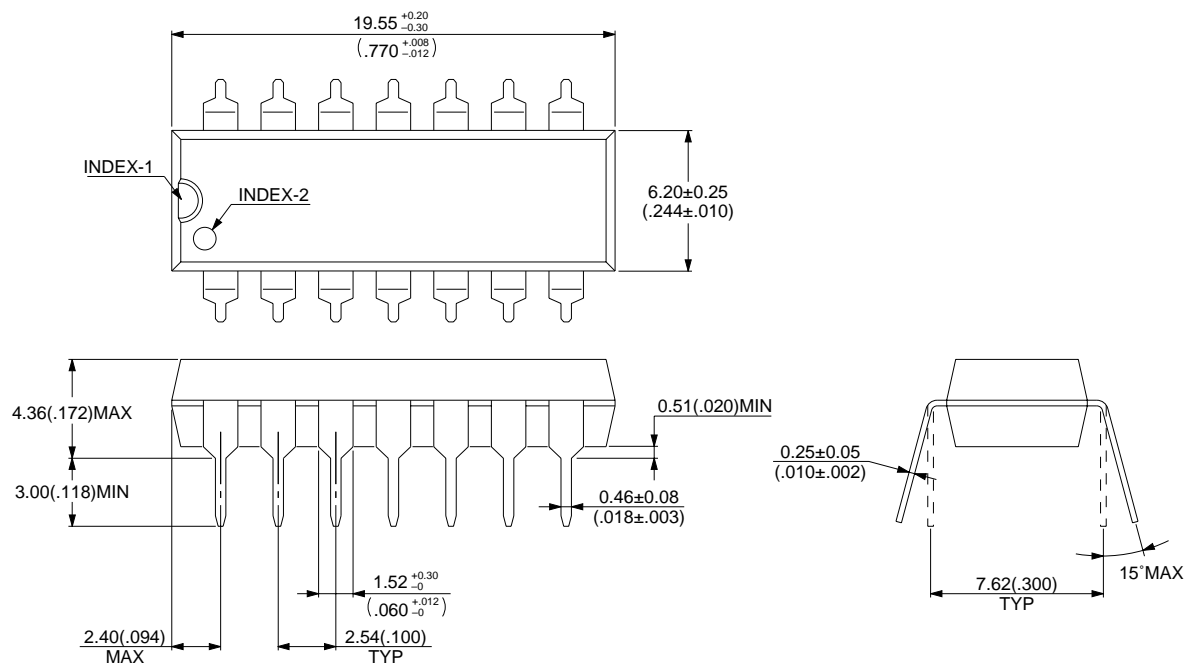
Fig. 6 — Input/Output Voltage vs.



MB4204

■ PACKAGE DIMENSIONS

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



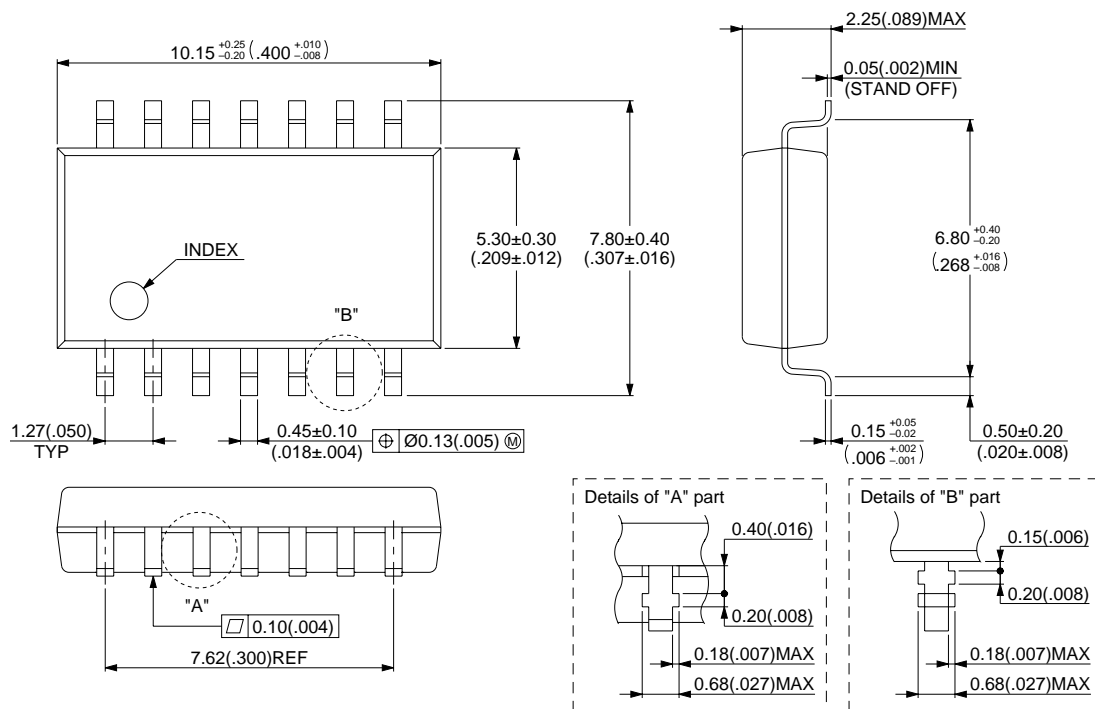
© 1994 FUJITSU LIMITED D14010S-4C-3

Dimensions in mm (inches).

(Continued)

(Continued)

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



© 1994 FUJITSU LIMITED F14010S-2C-4

Dimensions in mm (inches).

FUJITSU LIMITED

For further information please contact:

Japan

FUJITSU LIMITED
Corporate Global Business Support Division
Electronic Devices
KAWASAKI PLANT, 4-1-1, Kamikodanaka
Nakahara-ku, Kawasaki-shi
Kanagawa 211-8588, Japan
Tel: (044) 754-3763
Fax: (044) 754-3329

<http://www.fujitsu.co.jp/>

North and South America

FUJITSU MICROELECTRONICS, INC.
Semiconductor Division
3545 North First Street
San Jose, CA 95134-1804, USA
Tel: (408) 922-9000
Fax: (408) 922-9179

Customer Response Center
Mon. - Fri.: 7 am - 5 pm (PST)
Tel: (800) 866-8608
Fax: (408) 922-9179

<http://www.fujitsumicro.com/>

Europe

FUJITSU MIKROELEKTRONIK GmbH
Am Siebenstein 6-10
D-63303 Dreieich-Buchschlag
Germany
Tel: (06103) 690-0
Fax: (06103) 690-122

<http://www.fujitsu-edc.com/>

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE LTD
#05-08, 151 Lorong Chuan
New Tech Park
Singapore 556741
Tel: (65) 281-0770
Fax: (65) 281-0220

<http://www.fmap.com.sg/>

F9803

© FUJITSU LIMITED Printed in Japan

All Rights Reserved.

The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU sales representatives before ordering.

The information and circuit diagrams in this document presented as examples of semiconductor device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.

FUJITSU semiconductor devices are intended for use in standard applications (computers, office automation and other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.).

CAUTION:

Customers considering the use of our products in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage, or where extremely high levels of reliability are demanded (such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle operating controls, medical devices for life support, etc.) are requested to consult with FUJITSU sales representatives before such use. The company will not be responsible for damages arising from such use without prior approval.

Any semiconductor devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government should be required for export of those products from Japan.