

ASSP

Bidirectional Motor Driver

MB3763

■ DESCRIPTION

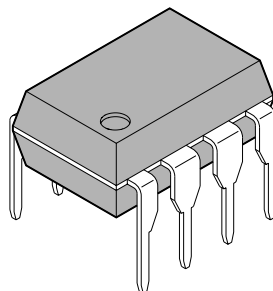
Fujitsu Microelectronics's MB3763 Motor Driver with forward/reverse control capability, is used in applications such as the front-loading mechanism in video tape, or the auto-reverse tape deck, driven by a TTL signal. The MB3763 has 150 mA drive units and braking capability with TTL control.

■ FEATURES

- Motor Drive Current: 150 mA maximum (DC)
300 mA maximum ($t_{ON} = 1$ s, Duty = 50 %)
- Wide Power Supply Voltage Range: 4V to 18V
- TTL-control capability
- Standby capability when input is off.
- Brake capability at motor stop mode.
- Built-in diode for surge absorption
- Package: 8-pin plastic DIP package (Suffix: -P)
8-pin plastic SOP package (Suffix: -PF)

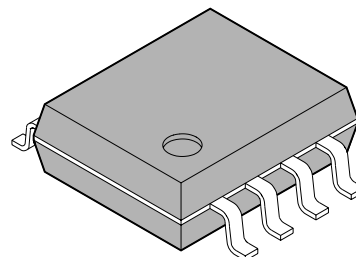
■ PACKAGE

8-pin plastic DIP



(DIP-8P-M01)

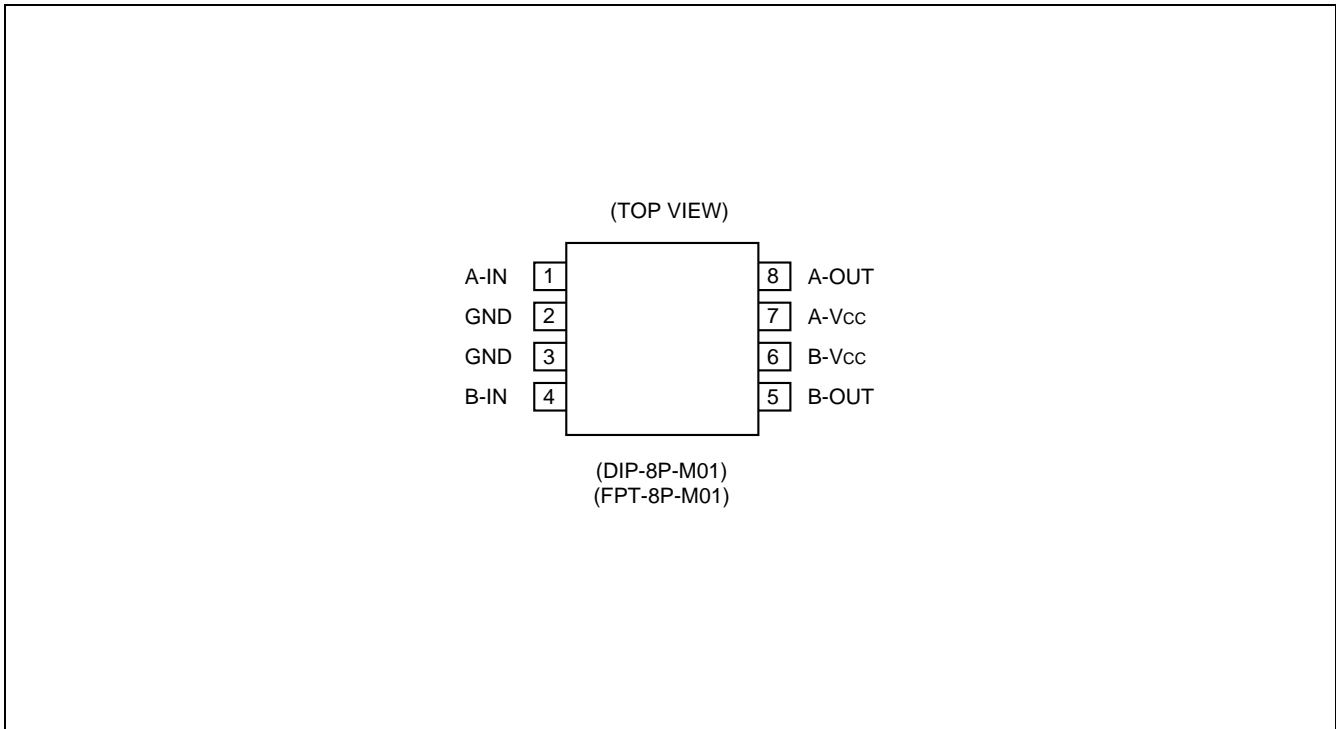
8-pin plastic SOP



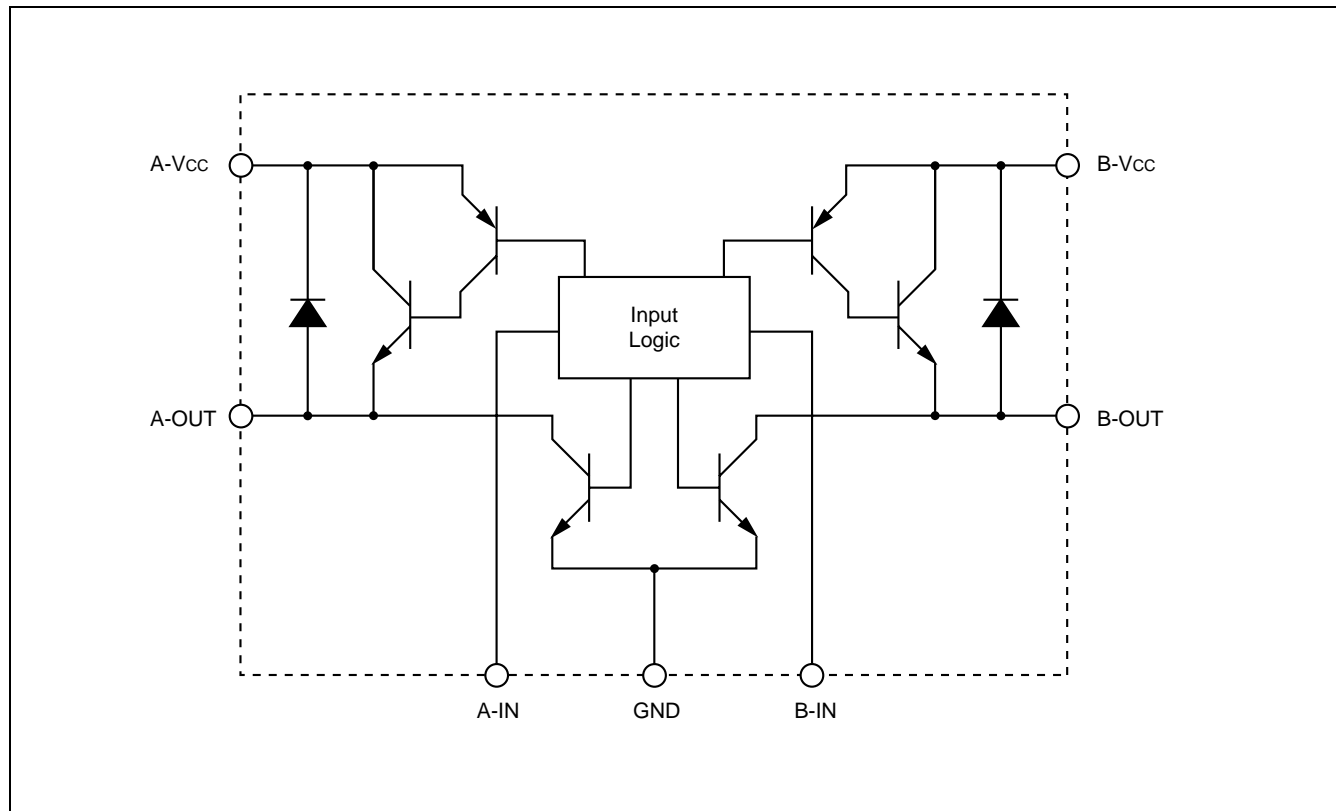
(FPT-8P-M01)

MB3763

■ PIN ASSIGNMENT



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

(Ta = +25°C)

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Power supply voltage	V _{CC}	—	20	V
Output current	I _O	—	180 (330* ¹)	mA
Maximum output current	I _{OMAX} * ³	—	1.2	A
Power Dissipation	P _D	—	560* ²	mW
Operating temperature	T _C	-20	+75	°C
Storage temperature	T _{stg}	-55	+125	°C

*1: t_{ON} ≤ 1 s, Duty = 50%

*2: Ta ≤ 60°C

*3: t ≤ 5 ms

WARNING: Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value		Unit
		Min.	Max.	
Power supply voltage	V _{CC}	4	18	V
Output current	I _O	0	150 (300* ¹)	mA
Input high voltage	V _{IH} * ²	2.4	V _{CC} + 0.3	V
Input low voltage	V _{IL}	0	0.4	V

*1: t_{ON} ≤ 1 s, Duty = 50%

*2: When V_{IH} ≥ V_{CC}, I_{IH} ≤ V_{CC} × 0.2 mA

WARNING: The recommended operating conditions are required in order to ensure the normal operation of the semiconductor device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.

Always use semiconductor devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their representatives beforehand.

■ ELECTRICAL CHARACTERISTICS

(V_{CC} = 12 V, T_a = +25°C)

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Standby supply current	I _{CC0}	V _{CC} = 18 V, V _{IA} = V _{IB} = 0 V	—	—	1.0	mA
Power supply current	I _{CC1}	I _o = 0 mA	—	10	20	mA
	I _{CC2}	I _o = 150 mA	—	10	—	mA
		I _o = 300 mA	—	15	—	mA
I _{CC3}	I _o = 0 mA, V _{IA} = V _{IB} = 2.4 V	—	15	—	mA	
Output high voltage	V _{OH}	I _o = 150 mA	11.0	11.2	—	V
		I _o = 300 mA	10.8	11.1	—	V
Output low voltage	V _{OL}	I _o = 150 mA	—	0.1	0.2	V
		I _o = 300 mA	—	0.2	0.5	V
Output saturation voltage	V _{SAT}	I _o = 150 mA	—	0.9	1.2	V
		I _o = 300 mA	—	1.1	1.7	V
Input current	I _{IH}	V _{IN} = 2.4 V	—	250	400	μA
Input switching prohibition time	T _{OFF}	—	10	—	—	μs

FUNCTIONAL DESCRIPTIONS

FORWARD/REVERSE MODE (MODE B & C)

In this mode, the transistor pairs Q2-Q3 and Q1-Q4 work alternatively, changing the output current direction. When the mode B is selected, Q2 and Q3 are active and Q1 and Q4 are inactive. Therefore A-OUT is at low level and B-OUT is at high level, with the current flowing from B-OUT to A-OUT through the motor. On the other hand, when the mode C is selected, the current flows in the reverse direction.

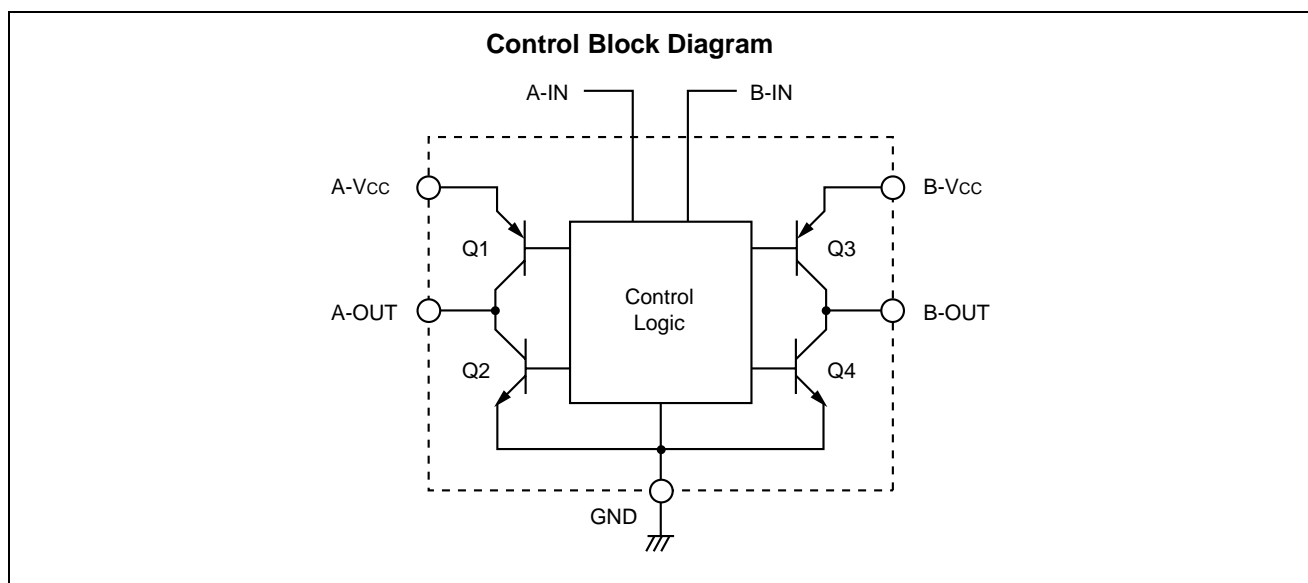
BRAKE/STOP MODE (MODE A)

When the mode A is selected, Q1 and Q3 are inactive and Q2 and Q4 are active. A-OUT and B-OUT are stuck at low-level; terminals of motor are shorted and the motor is forced to stop.

STANDBY MODE (MODE D)

In this mode, all transistors are inactive and the current through the motor does not flow. When the power supply voltage is applied to A-Vcc and B-Vcc, the supply current is still less than or equal to 1 mA.

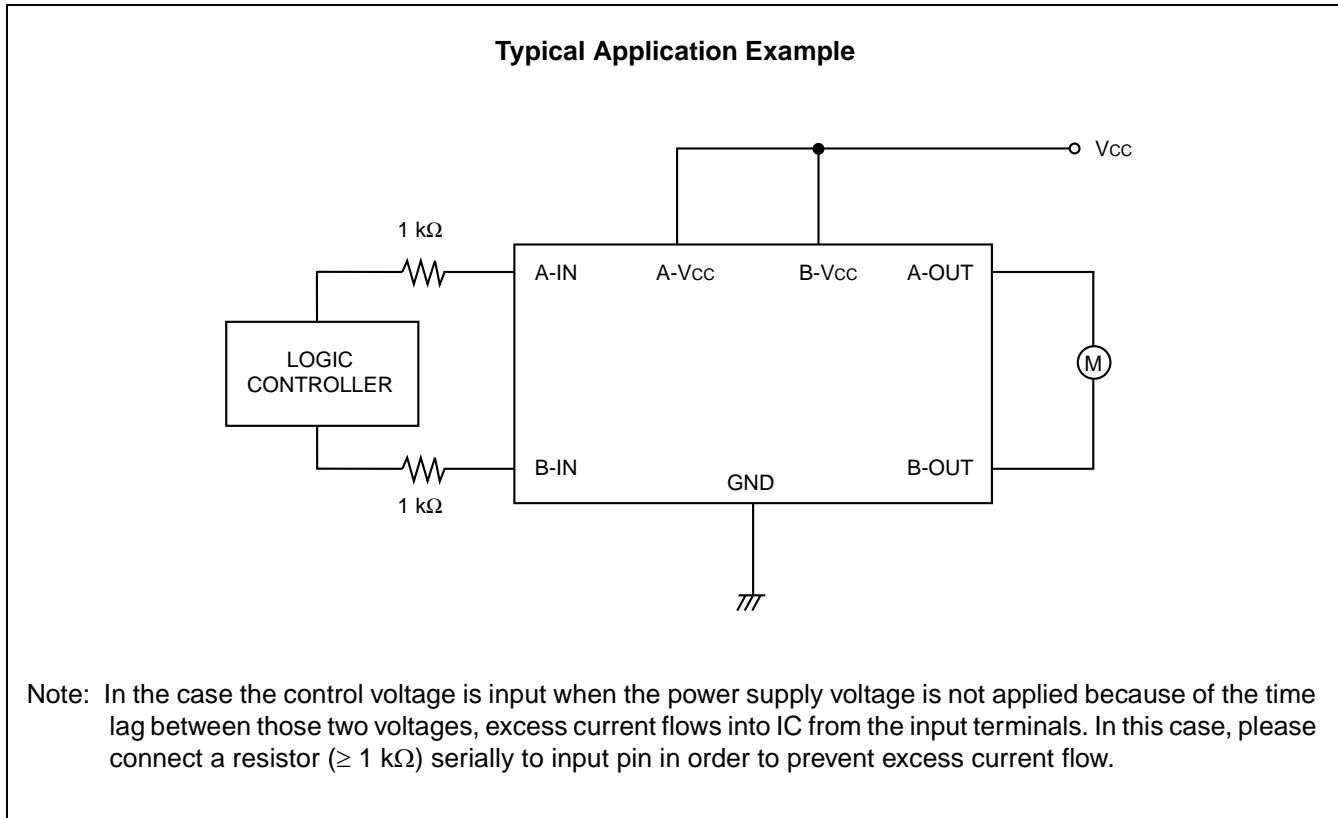
CONTROL MODE



Mode	Input mode		Output mode		Operation
	A-IN	B-IN	A-OUT	B-OUT	
A	1	1	L	L	short (Brake)
B	1	0	L	H	Forward
C	0	1	H	L	Reverse
D	0	0	—	—	Open (Standby)

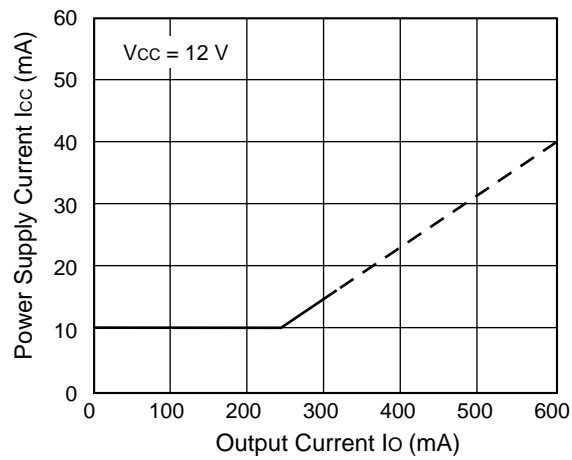
Notes: 1: $\geq 2.4V$
0: $\leq 0.4V$

■ TYPICAL APPLICATION

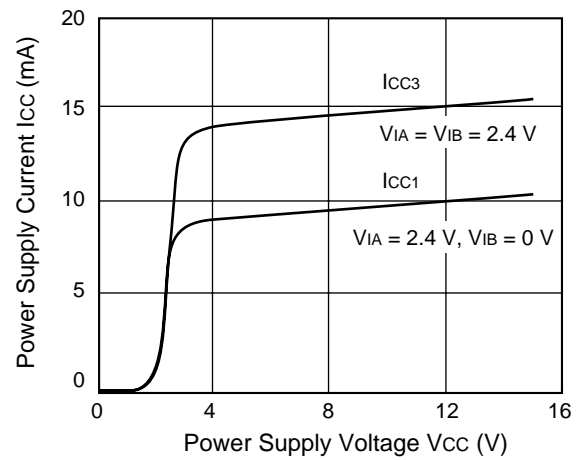


■ TYPICAL PERFORMANCE CHARACTERISTICS

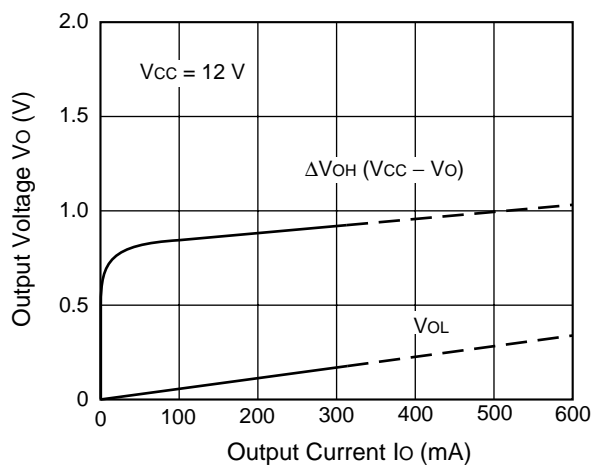
Output Current vs. Power Supply Current



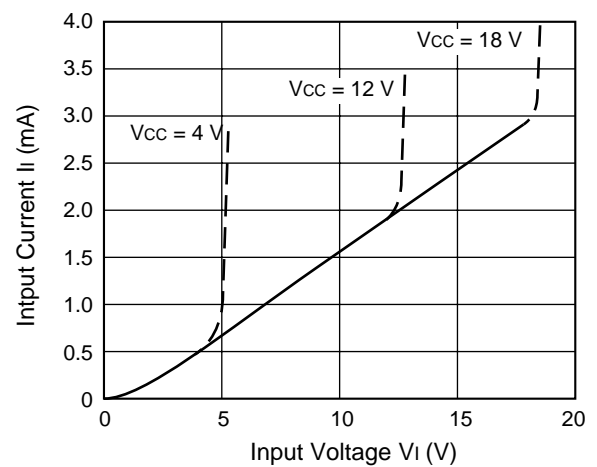
Power Supply Voltage vs. Power Supply Current



Output Current vs. Output Voltage



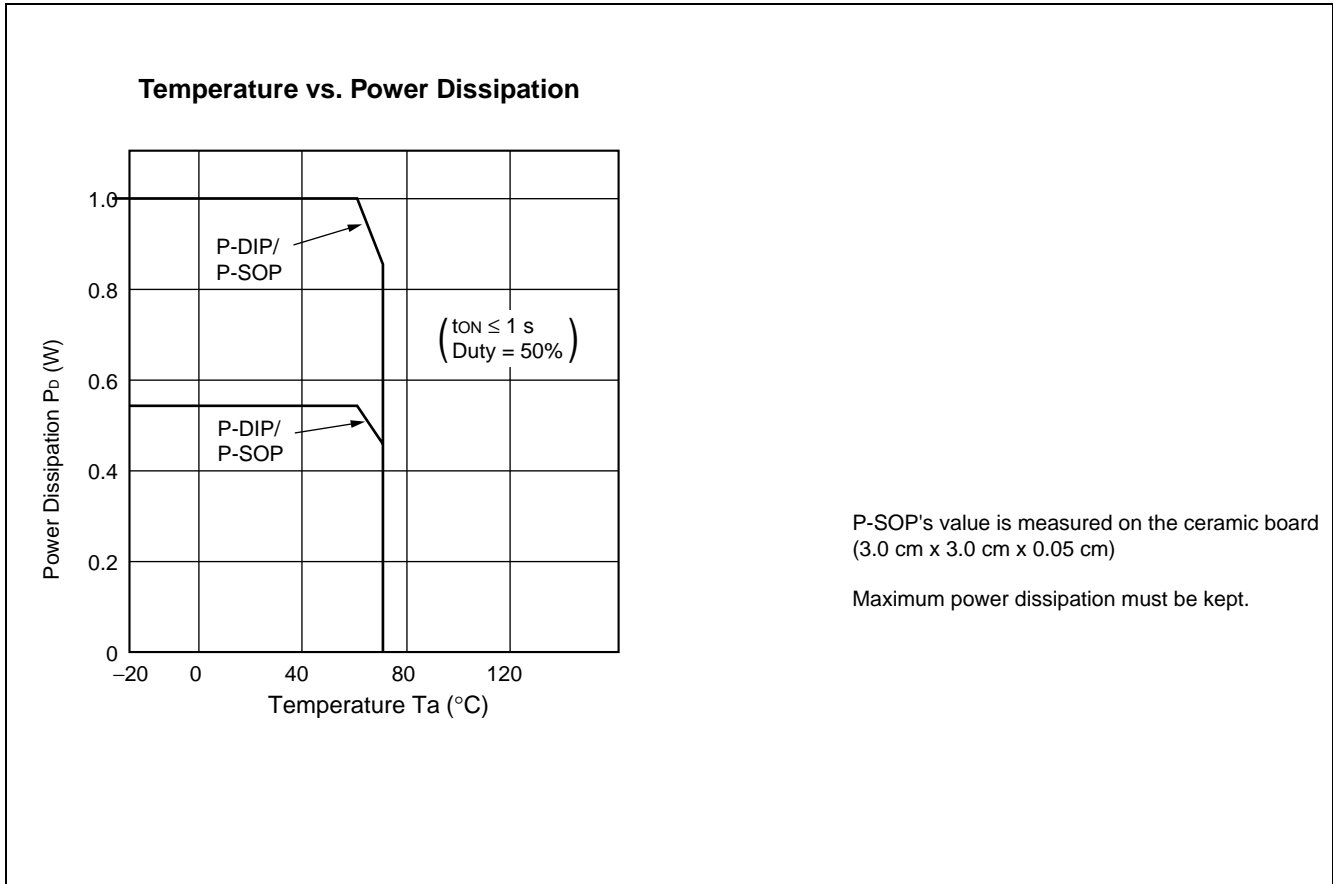
Input Voltage vs. Input Current



(Continued)

MB3763

(Continued)

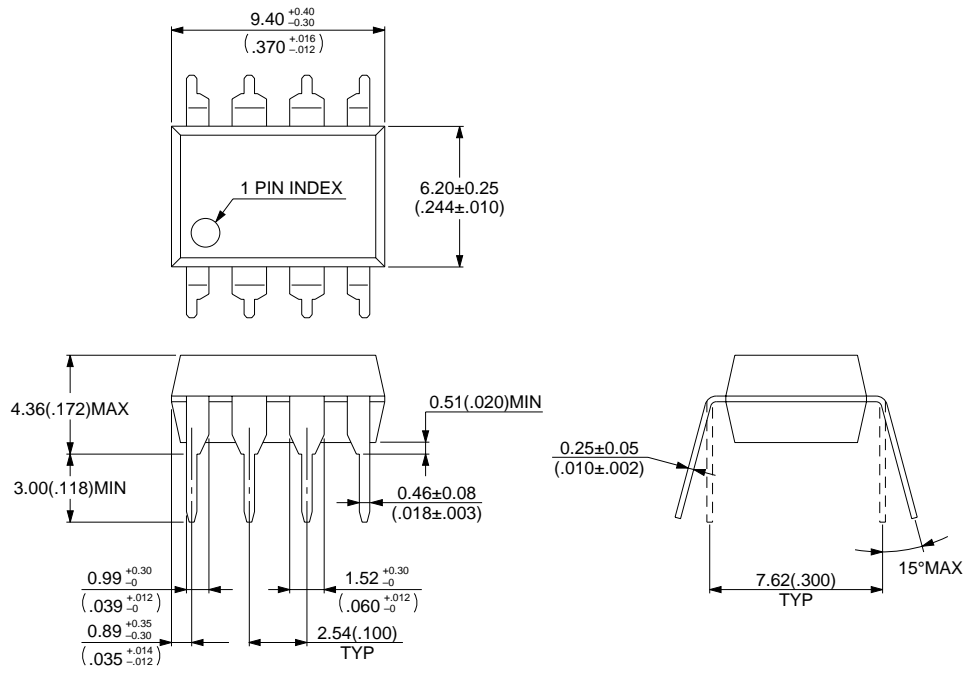


■ ORDERING INFORMATION

Part number	Package	Remarks
MB3763	8-pin plastic DIP (DIP-8P-M01)	
MB3763PF	8-pin plastic SOP (FPT-8P-M01)	

■ PACKAGE DIMENSIONS

8-pin plastic DIP
(DIP-8P-M01)



Dimensions in mm (inches)

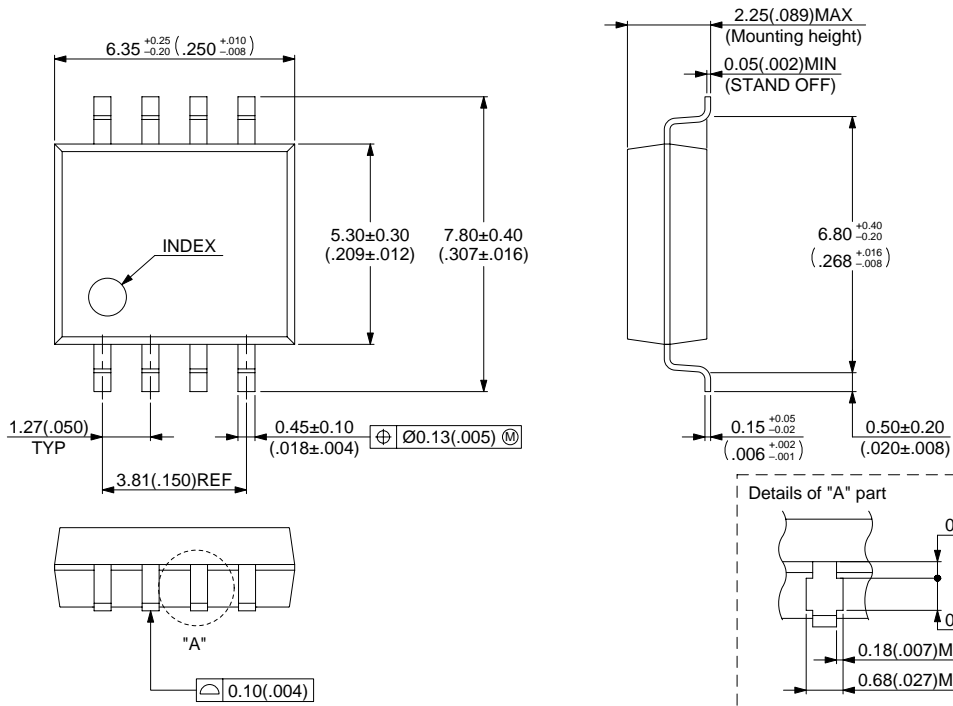
© 1994 FUJITSU LIMITED D08006S-2C-3

(Continued)

MB3763

(Continued)

8-pin plastic SOP
(FPT-8P-M01)



Dimensions in mm (inches)

© 2000 FUJITSU LIMITED F08002S-4C-5

MEMO

FUJITSU MICROELECTRONICS LIMITED

Shinjuku Dai-Ichi Seimei Bldg. 7-1, Nishishinjuku 2-chome, Shinjuku-ku,
Tokyo 163-0722, Japan Tel: +81-3-5322-3347 Fax: +81-3-5322-3387
<http://jp.fujitsu.com/fml/en/>

For further information please contact:

North and South America

FUJITSU MICROELECTRONICS AMERICA, INC.
1250 E. Arques Avenue, M/S 333
Sunnyvale, CA 94085-5401, U.S.A.
Tel: +1-408-737-5600 Fax: +1-408-737-5999
<http://www.fma.fujitsu.com/>

Europe

FUJITSU MICROELECTRONICS EUROPE GmbH
Pittlerstrasse 47, 63225 Langen,
Germany
Tel: +49-6103-690-0 Fax: +49-6103-690-122
<http://emea.fujitsu.com/microelectronics/>

Korea

FUJITSU MICROELECTRONICS KOREA LTD.
206 KOSMO TOWER, 1002 Daechi-Dong,
Kangnam-Gu, Seoul 135-280
Korea
Tel: +82-2-3484-7100 Fax: +82-2-3484-7111
<http://www.fmk.fujitsu.com/>

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE LTD.
151 Lorong Chuan, #05-08 New Tech Park,
Singapore 556741
Tel: +65-6281-0770 Fax: +65-6281-0220
<http://www.fujitsu.com/sg/services/micro/semiconductor/>

FUJITSU MICROELECTRONICS SHANGHAI CO., LTD.
Rm.3102, Bund Center, No.222 Yan An Road(E),
Shanghai 200002, China
Tel: +86-21-6335-1560 Fax: +86-21-6335-1605
<http://cn.fujitsu.com/fmc/>

FUJITSU MICROELECTRONICS PACIFIC ASIA LTD.
10/F., World Commerce Centre, 11 Canton Road
Tsimshatsui, Kowloon
Hong Kong
Tel: +852-2377-0226 Fax: +852-2376-3269
<http://cn.fujitsu.com/fmc/tw>

All Rights Reserved.

The contents of this document are subject to change without notice.

Customers are advised to consult with sales representatives before ordering.

The information, such as descriptions of function and application circuit examples, in this document are presented solely for the purpose of reference to show examples of operations and uses of FUJITSU MICROELECTRONICS device; FUJITSU MICROELECTRONICS does not warrant proper operation of the device with respect to use based on such information. When you develop equipment incorporating the device based on such information, you must assume any responsibility arising out of such use of the information.

FUJITSU MICROELECTRONICS assumes no liability for any damages whatsoever arising out of the use of the information.

Any information in this document, including descriptions of function and schematic diagrams, shall not be construed as license of the use or exercise of any intellectual property right, such as patent right or copyright, or any other right of FUJITSU MICROELECTRONICS or any third party or does FUJITSU MICROELECTRONICS warrant non-infringement of any third-party's intellectual property right or other right by using such information. FUJITSU MICROELECTRONICS assumes no liability for any infringement of the intellectual property rights or other rights of third parties which would result from the use of information contained herein.

The products described in this document are designed, developed and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite).

Please note that FUJITSU MICROELECTRONICS will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.

Any semiconductor devices have an inherent chance 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.

Exportation/release of any products described in this document may require necessary procedures in accordance with the regulations of the Foreign Exchange and Foreign Trade Control Law of Japan and/or US export control laws.

The company names and brand names herein are the trademarks or registered trademarks of their respective owners.