FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-29101-5E

ASSP

Bidirectional Motor Driver

MB3763

■ DESCRIPTION

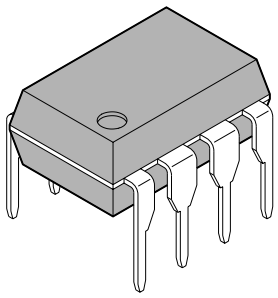
Fujitsu's MB3763 Motor Driver with forward/reverse control capability, is used in applications such as the front-loading mechanism in video tape, or the auto-reverse tape deck, driven by a TTL signal. The MB3763 has 150 mA drive units and braking capability with TTL control.

■ 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)

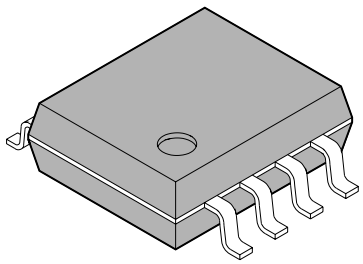
■ PACKAGE

8-pin plastic DIP



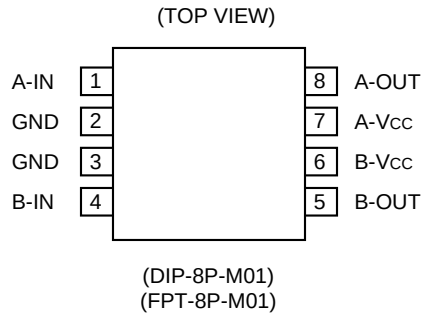
(DIP-8P-M01)

8-pin plastic SOP

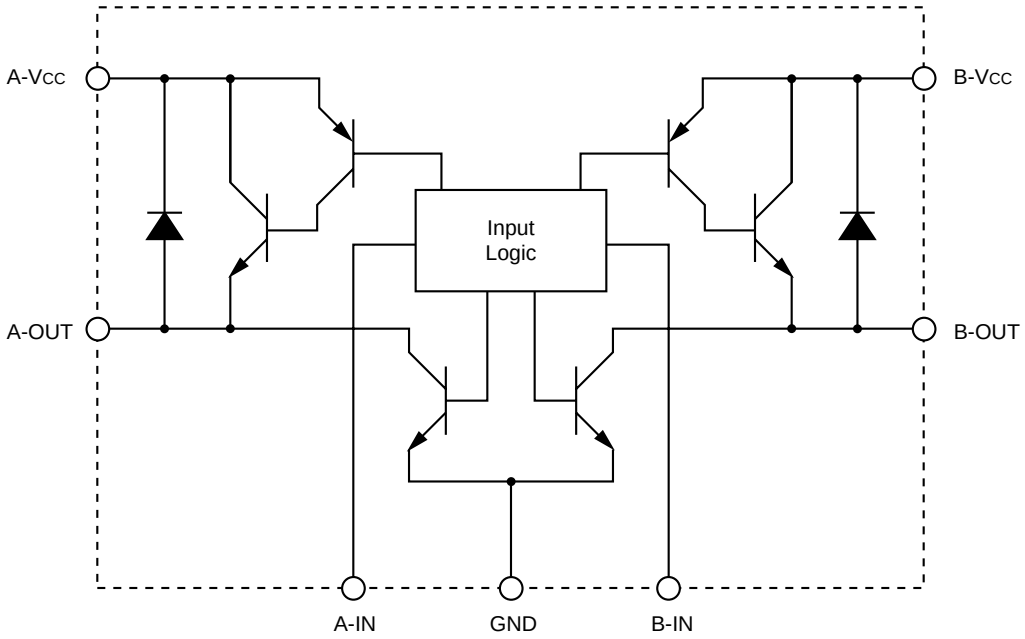


(FPT-8P-M01)

■ 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	Tstg	–55	+125	°C

*1: $t_{ON} \leq 1$ 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: $t_{ON} \leq 1$ s, Duty = 50%
*2: When $V_{IH} \geq V_{CC}$, $I_{IH} \leq V_{CC} \times 0.2$ 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 FUJITSU representatives beforehand.

■ ELECTRICAL CHARACTERISTICS

(V_{CC} = 12 V, Ta = +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)

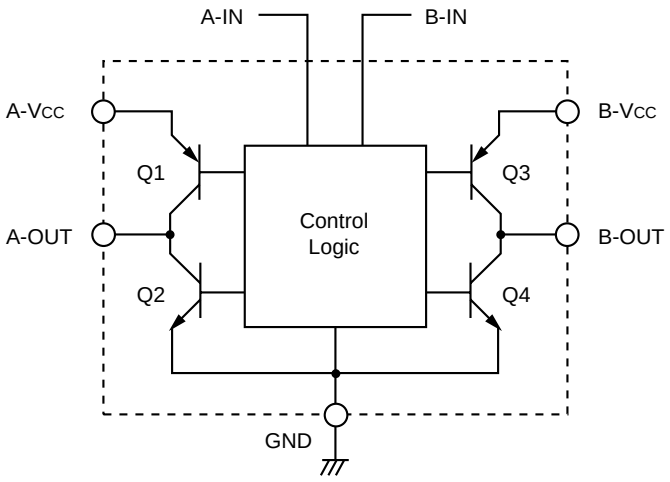
When the mode A is selected, Q1 and Q3 are inactive and Q2 and Q4 are active. A-OUT and B-OUT are stuck at low-level; terminals of motor are shorted and the motor is forced to stop.

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-V_{CC} and B-V_{CC}, the supply current is still less than or equal to 1 mA.

■ CONTROL MODE

Control Block Diagram

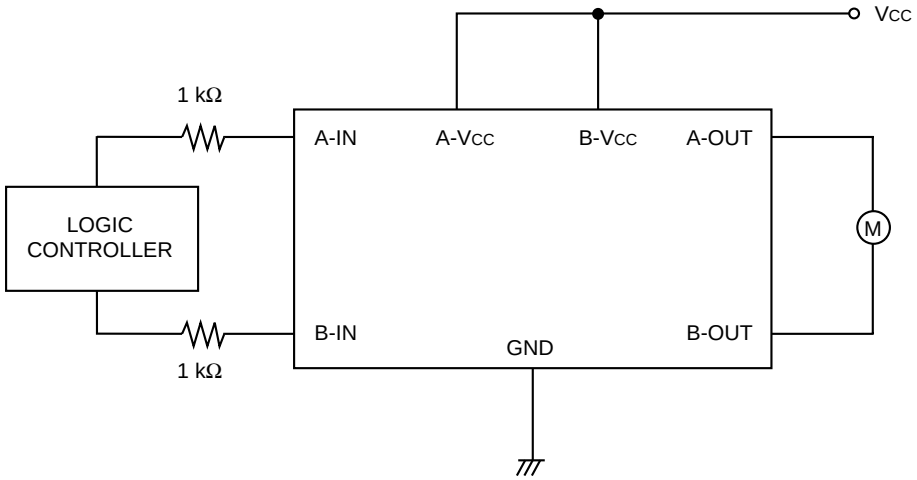


Mode	Input mode		Output mode		Operation
	A-IN	B-IN	A-OUT	B-OUT	
A	1	1	L	L	short (Brake)
B	1	0	L	H	Forward
C	0	1	H	L	Reverse
D	0	0	—	—	Open (Standby)

Notes: 1: ≥ 2.4V
0: ≤ 0.4V

■ TYPICAL APPLICATION

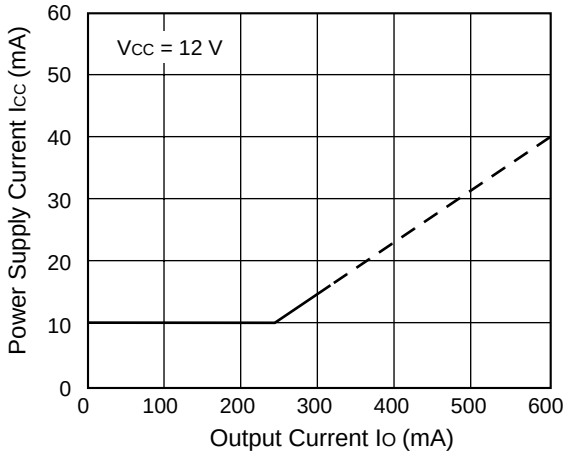
Typical Application Example



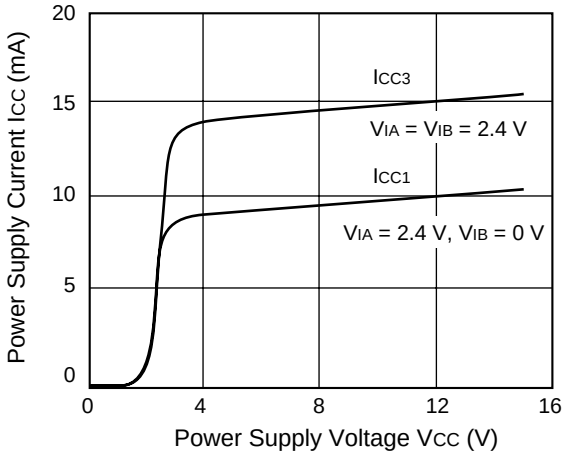
Note: In the case the control voltage is input when the power supply voltage is not applied because of the time lag between those two voltages, excess current flows into IC from the input terminals. In this case, please connect a resistor (≥ 1 kΩ) serially to input pin in order to prevent excess current flow.

■ TYPICAL PERFORMANCE CHARACTERISTICS

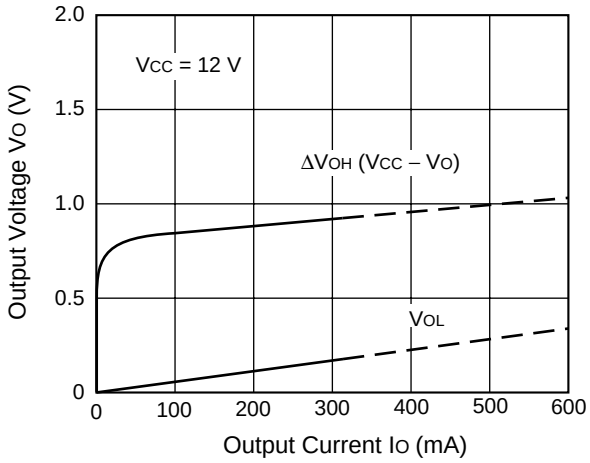
Output Current vs. Power Supply Current



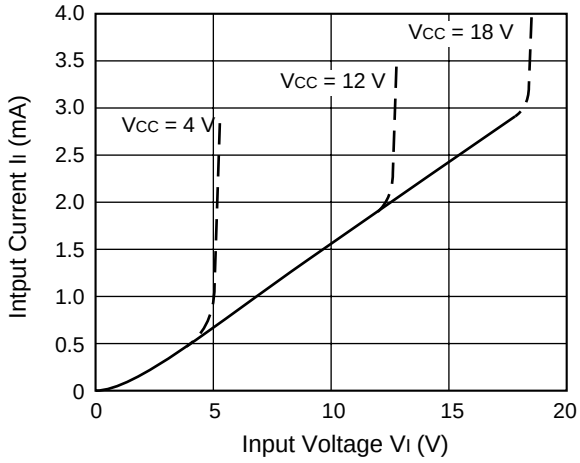
Power Supply Voltage vs. Power Supply Current



Output Current vs. Output Voltage



Input Voltage vs. Input Current



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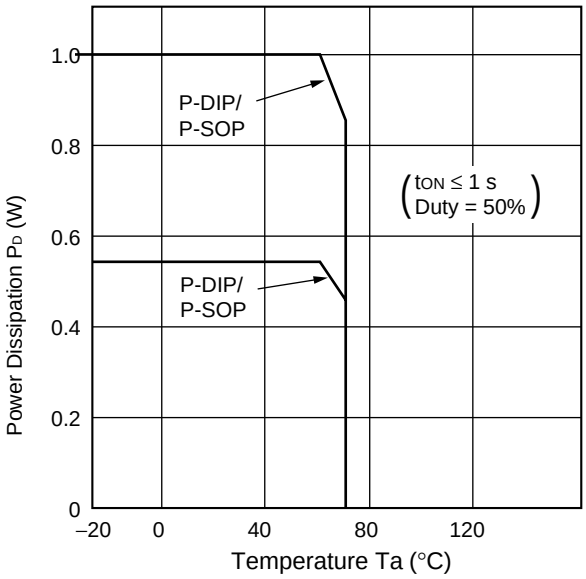
Temperature vs. Power Dissipation



P-SOP's value is measured on the ceramic board (3.0 cm x 3.0 cm x 0.05 cm)

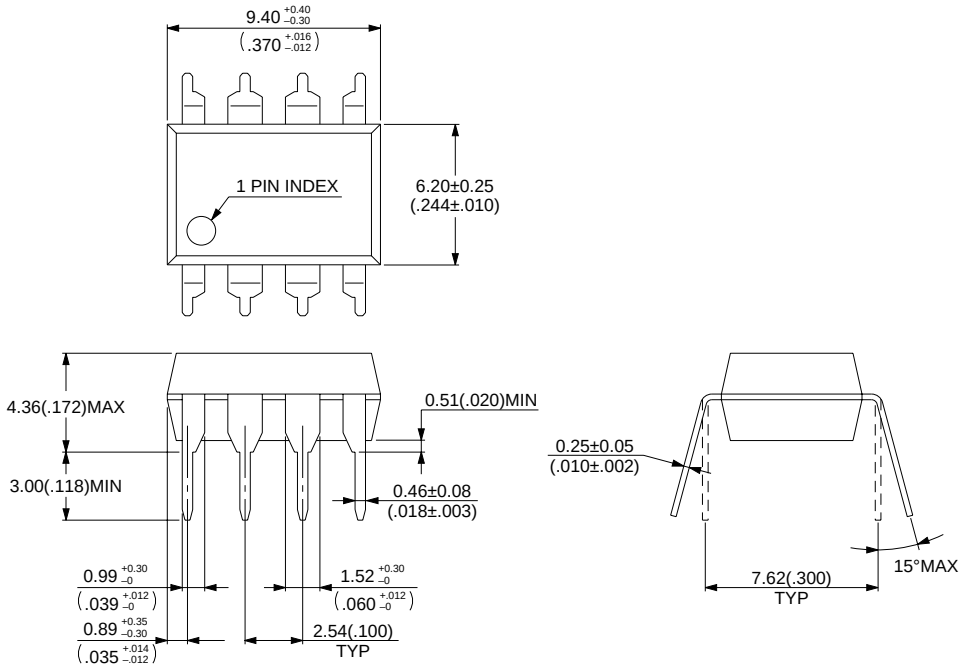
Maximum power dissipation must be kept.

■ 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)

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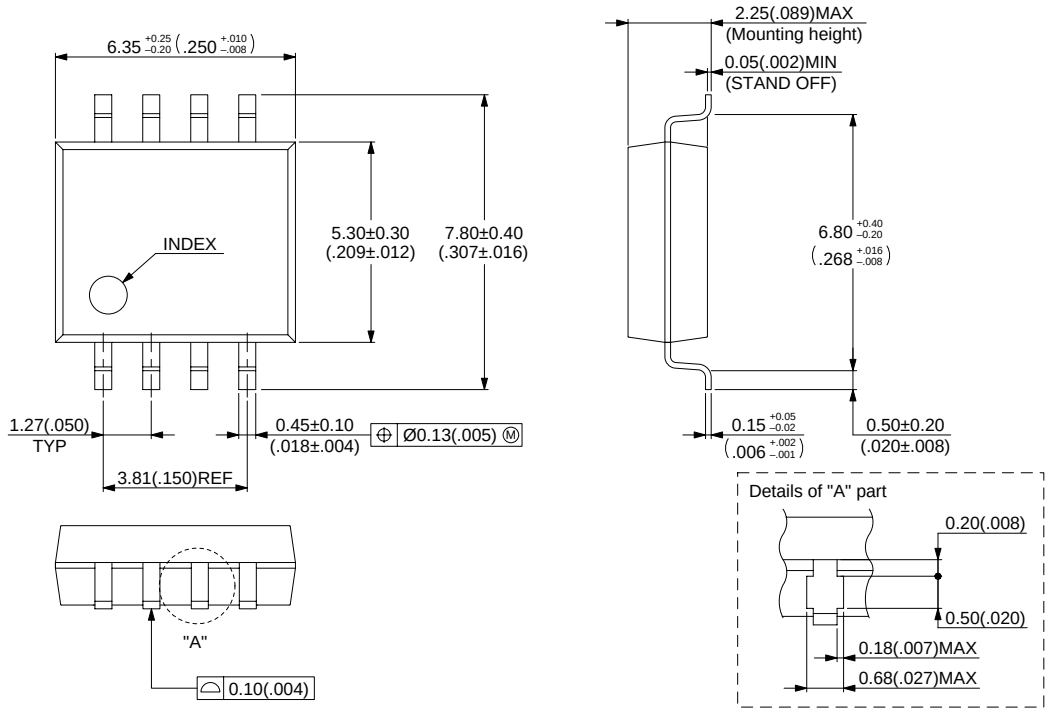
8-pin plastic SOP
(FPT-8P-M01)



Dimensions in mm (inches)

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