

ASSP

# DUAL REVERSIBLE MOTOR DRIVER

## MB3863

### ■ DESCRIPTION

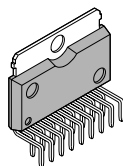
The MB3863 is an IC motor driver with two independent reverse control functions. It drives motor drives of front-loading VCRs and auto-reverse cassette decks and stepping motors by reversible control at TTL and CMOS levels. A heat protection circuit is incorporated to prevent damage by overheating.

### ■ FEATURES

- Wide voltage range:  $V_{CC} = +4$  to  $+36V$
- Motor drive current: 500 mA (1.2 A for surge current)
- Two internal independent drivers
- Internal heat protection circuit
- Control at TTL and CMOS level
- Stand-by mode
- Brake function to stop motors
- Surge absorption diode
- Stepping motor application
- Symmetrical pin layout

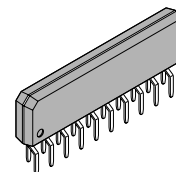
### ■ PACKAGE

Plastic ZIP, 17 pin



(ZIP-17P-M03)

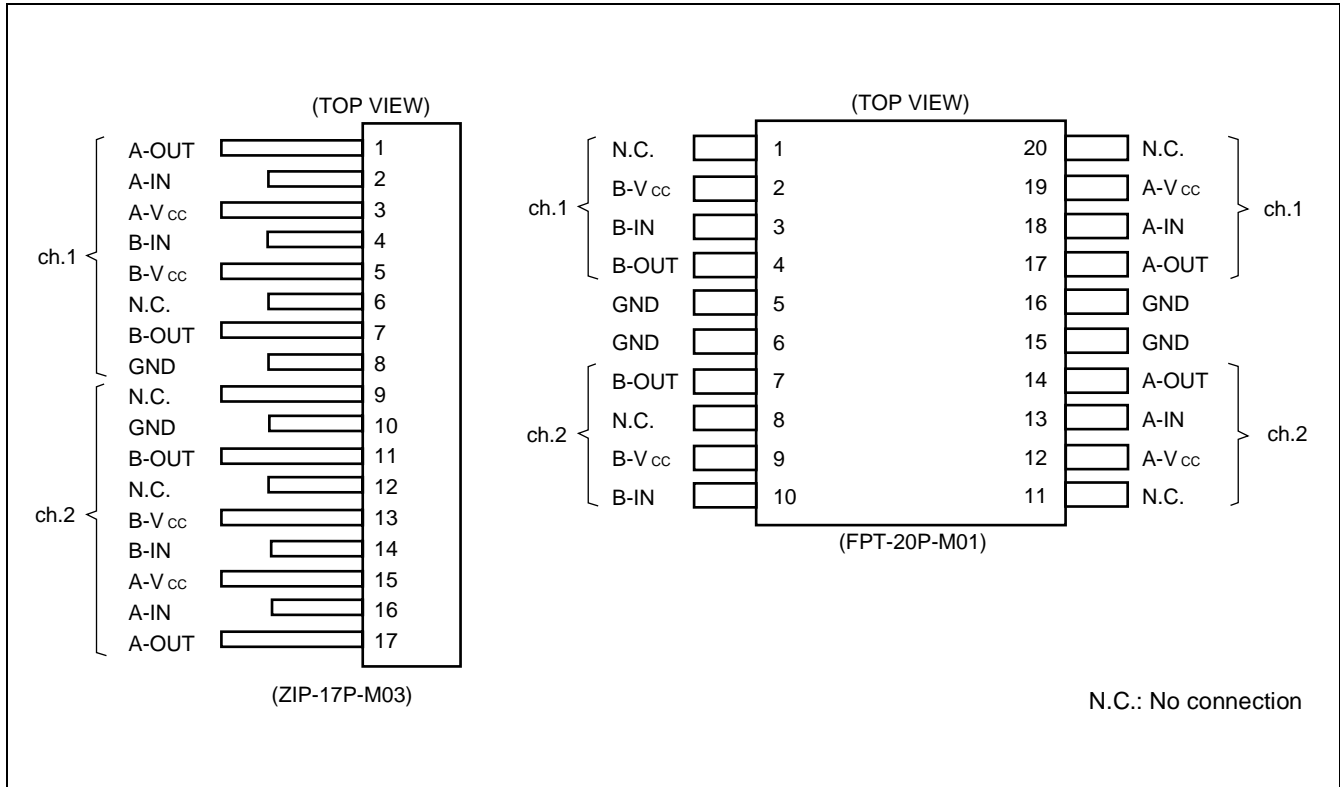
Plastic ZIP, 20 pin



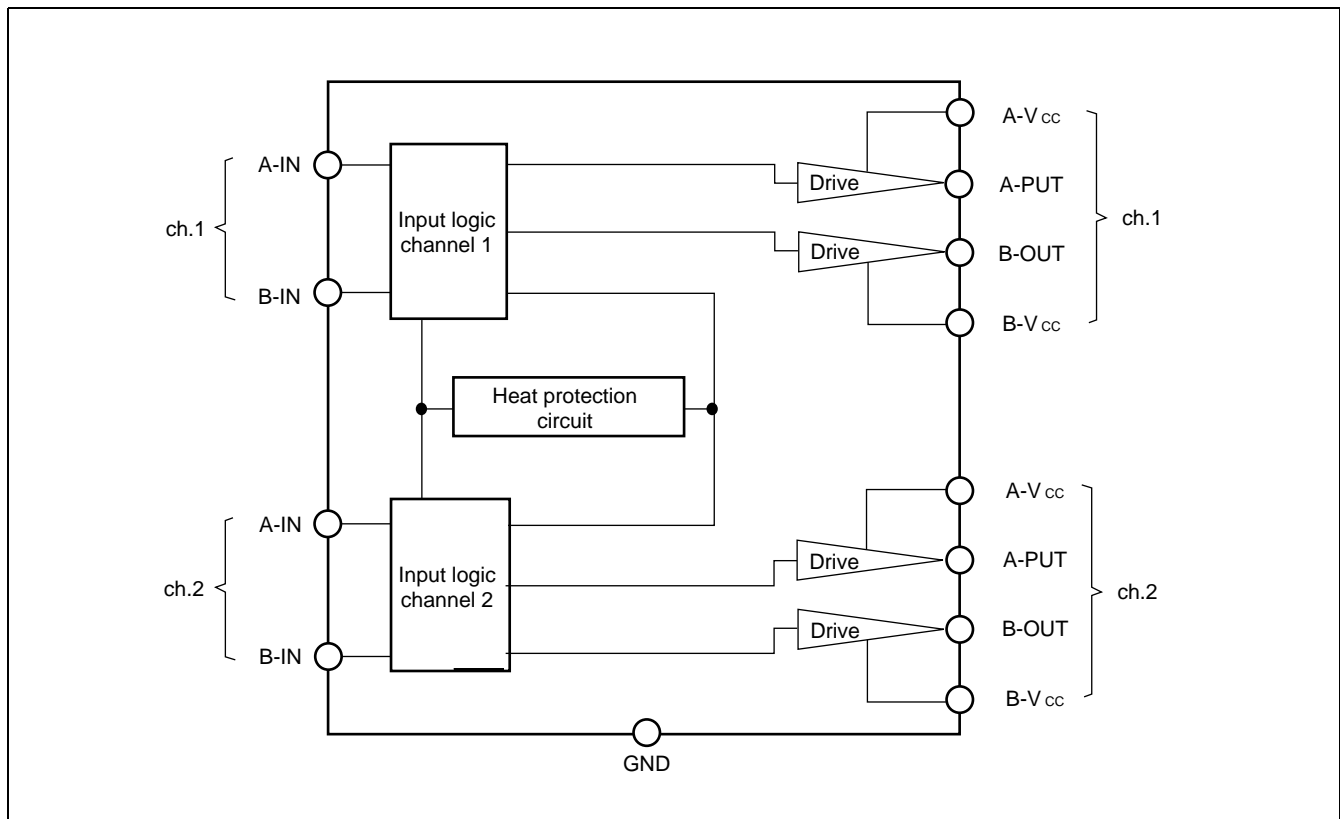
(ZIP-20P-M01)

# MB3863

## ■ PIN ASSIGNMENT



## ■ BLOCK DIAGRAM



**MB3863****■ ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Ratings	Unit
Supply Voltage	V <sub>CC</sub>	+38	V
Output Current	I <sub>O</sub>	550	mA
Maximum Output Current (within 5 ms)	I <sub>Omax</sub>	1.2	A
Allowable Loss	P <sub>D</sub>	6.5 (ZIP-17)	W
		1.6 (SOP-20)	
Operating Temperature	T <sub>OP</sub>	-20 to +75	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**■ RECOMMENDED OPERATING CONDITIONS**

Parameter	Symbol	Ratings	Unit	
Supply Voltage	V <sub>CC</sub>	+4 to +36	V	
Output Current	I <sub>O</sub>	0 to 500	mA	
Input Voltage	High level	V <sub>IH</sub>	2.4 to V <sub>CC</sub> +0.3	V
	Low level	V <sub>IL</sub>	0 to 0.4	V

**■ ELECTRICAL CHARACTERISTICS**(V<sub>CC</sub> = 24V, V<sub>IN</sub> = 2.4V, T<sub>a</sub> = +25°C)

Parameter	Symbol	Conditions	Values			Unit	
			Min.	Typ.	Max.		
Stand-by Supply Voltage	I <sub>CC0</sub>	V <sub>CC</sub> = +24V, V <sub>IA</sub> = V <sub>IB</sub> = 0V	—	—	100	μA	
Supply Voltage	I <sub>CC1</sub>	I <sub>O</sub> = 0 mA	—	24	38	mA	
	I <sub>CC2</sub>	I <sub>O</sub> = 500 mA	—	24	—	mA	
	I <sub>CC3</sub>	I <sub>O</sub> = 0 mA, V <sub>IA</sub> = V <sub>IB</sub> = +2.4V	—	37	—	mA	
Output Voltage	High level	V <sub>OH</sub>	I <sub>O</sub> = 500 mA	22.65	23	—	V
	Low level	V <sub>OL</sub>	I <sub>O</sub> = 500 mA	—	0.35	0.65	V
Saturated Output Voltage	V <sub>SAT</sub>	I <sub>O</sub> = 500 mA	—	1.35	2.00	V	
Input Current	T	V <sub>IN</sub> = +2.4V	—	250	400	μA	
Surge Absorption Diode Voltage in Forward Direction	I <sub>IH</sub> V <sub>F</sub>	I <sub>O</sub> = 1.2A	—	2.0	—	V	

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## ■ OPERATIONS

### 1. Forward and Reverse

Switching control mode A or B pairs Q2 and Q3, or Q1 and Q4, respectively, while reversing the supply current to the motor for each switching. When Q2 and Q3 are in use, B-OUT and A-OUT are High level and Low level, respectively. In this case, current flows B-OUT motor A-OUT, causing forward operation as described in the table below.

When Q1 and Q4 are in use, current flows in the reverse direction to the above flow, causing reverse motor operation.

### 2. Brake

Control mode C operates Q3 and Q4 while stopping Q1 and Q3.

Since A-OUT and B-OUT are held at Low level, both poles of the motor are short-circuited and the motor is stopped.

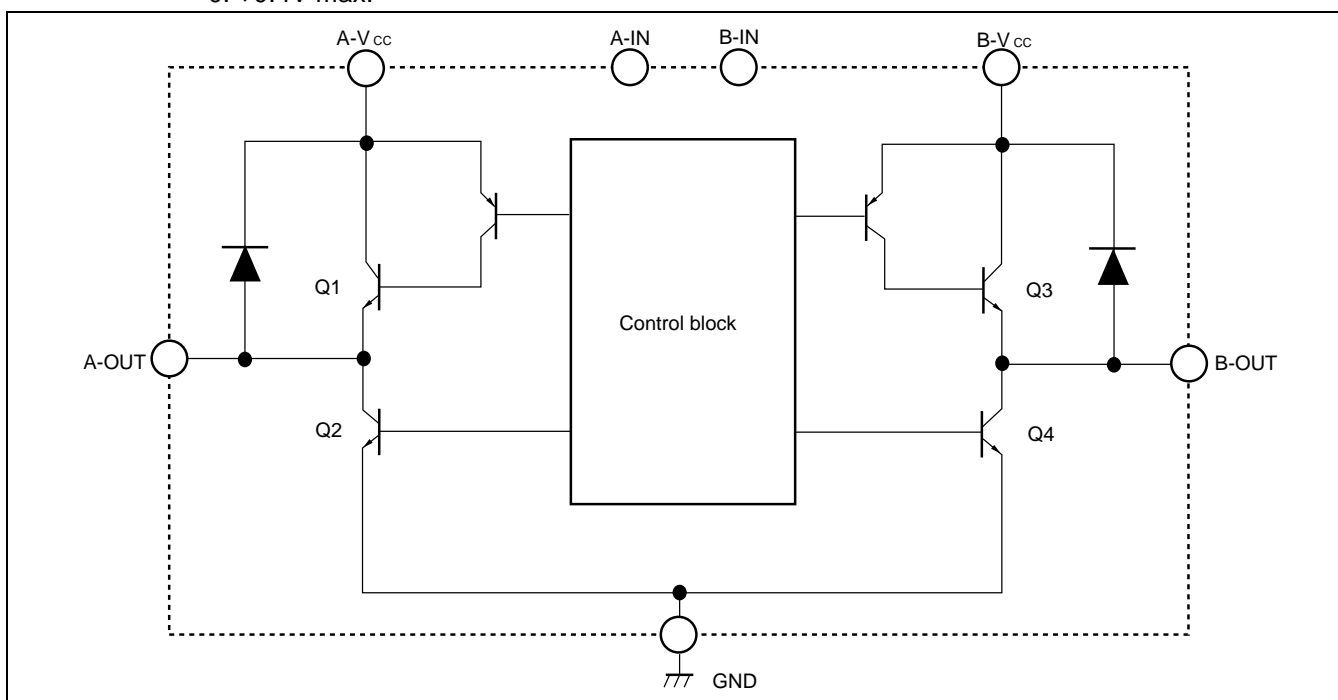
### 3. Stand-by

Control mode D turns Q1 to Q4 OFF and the motor has no current flow.

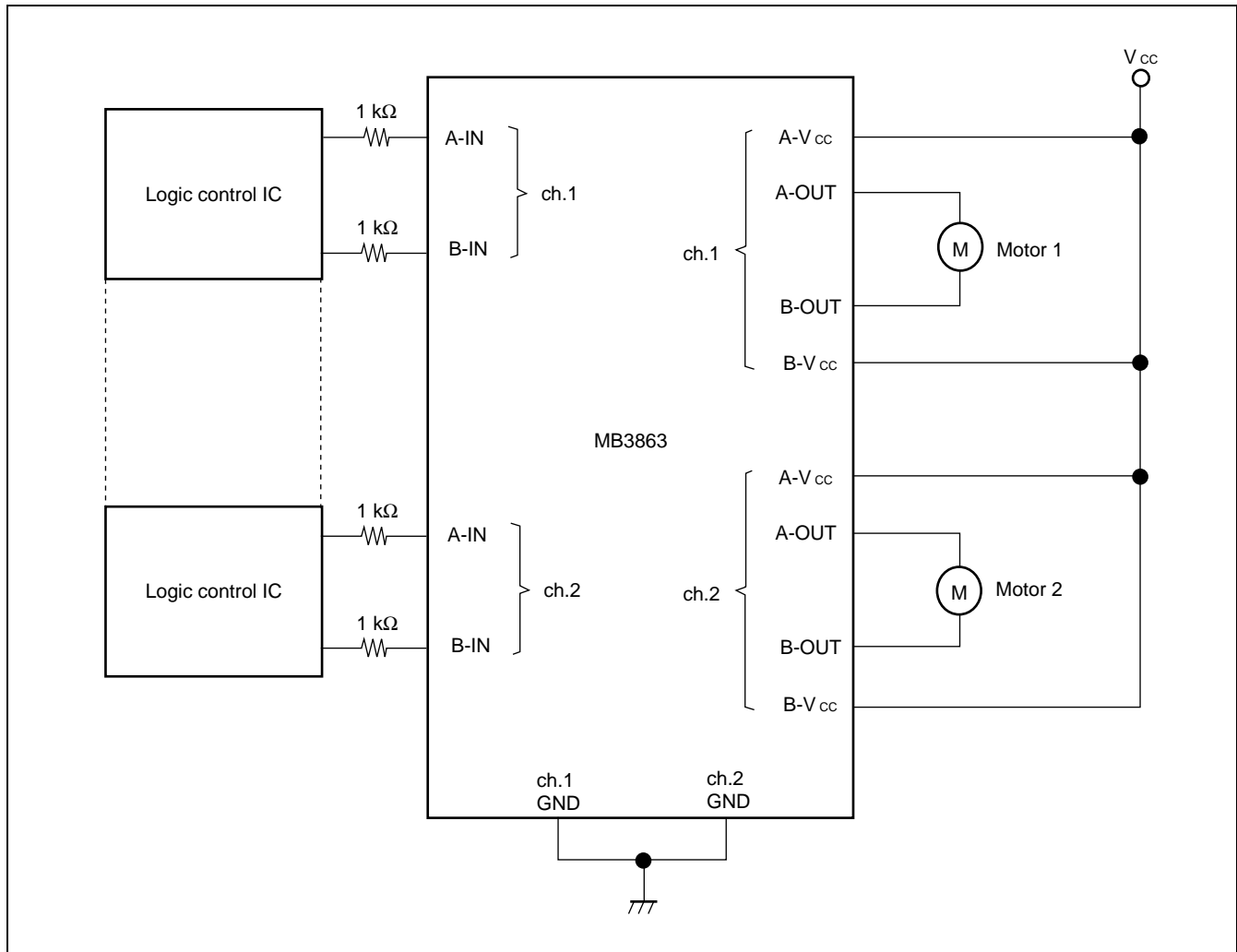
In this mode, the power current is less than 100  $\mu$ A.

Mode	Input mode*		Operation state of output transistor				State of output pin		Output operation mode
	A=IN	B=IN	Q1	Q2	Q3	Q4	A-OUT	B-OUT	
A	1	0	OFF	ON	ON	OFF	L	H	Forward (Reverse)
B	0	1	ON	OFF	OFF	ON	H	L	Reverse (Forward)
C	1	1	OFF	ON	OFF	ON	L	L	Brake
D	0	0	OFF	OFF	OFF	OFF	—	—	Open (High impedance)

\* : Input mode: -1: +2.4V min.  
-0: +0.4V max.



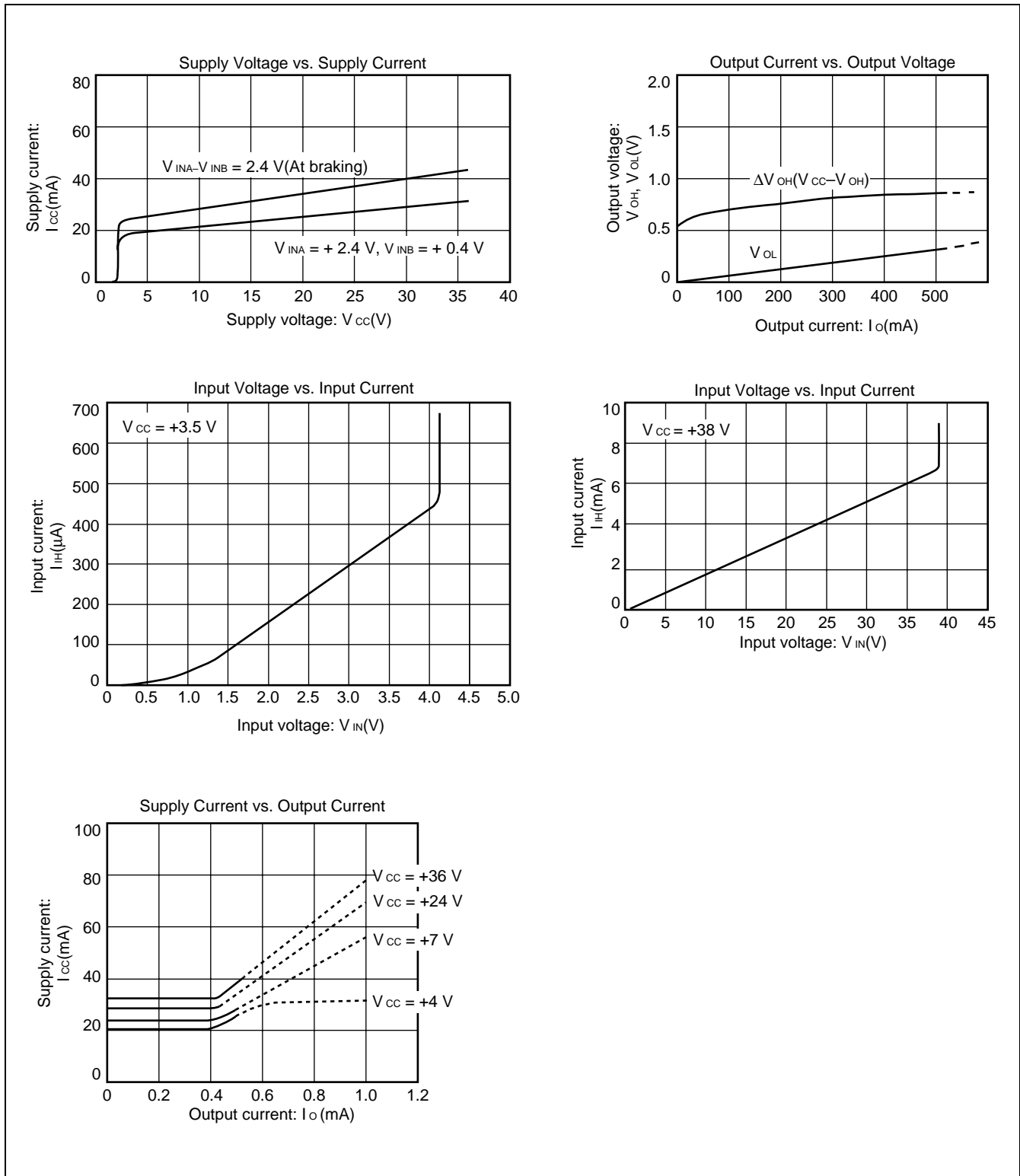
## ■ TYPICAL CONNECTION



Note: If input voltage is applied when power is not supplied, over-current flows into the device via the input pins. In this case, connect a resistor of at least 1 kΩ in series with the input pins to prevent passage of a large current.

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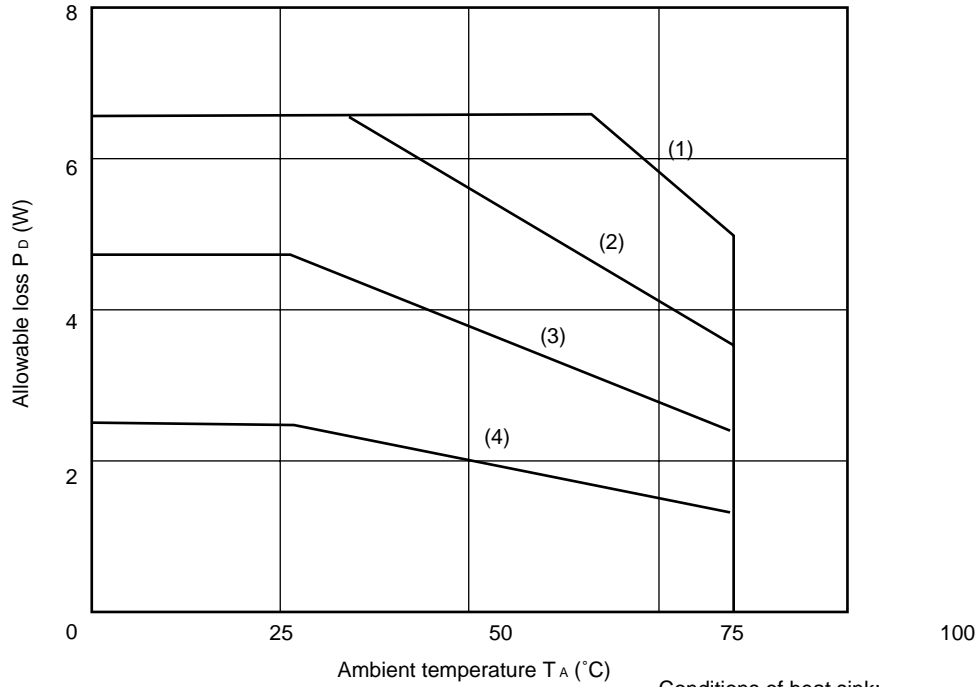
## TYPICAL CHARACTERISTIC CURVES



Note: The above characteristic curves are at  $T_a = +25^\circ\text{C}$

## POWER DERATING CHARACTERISTICS

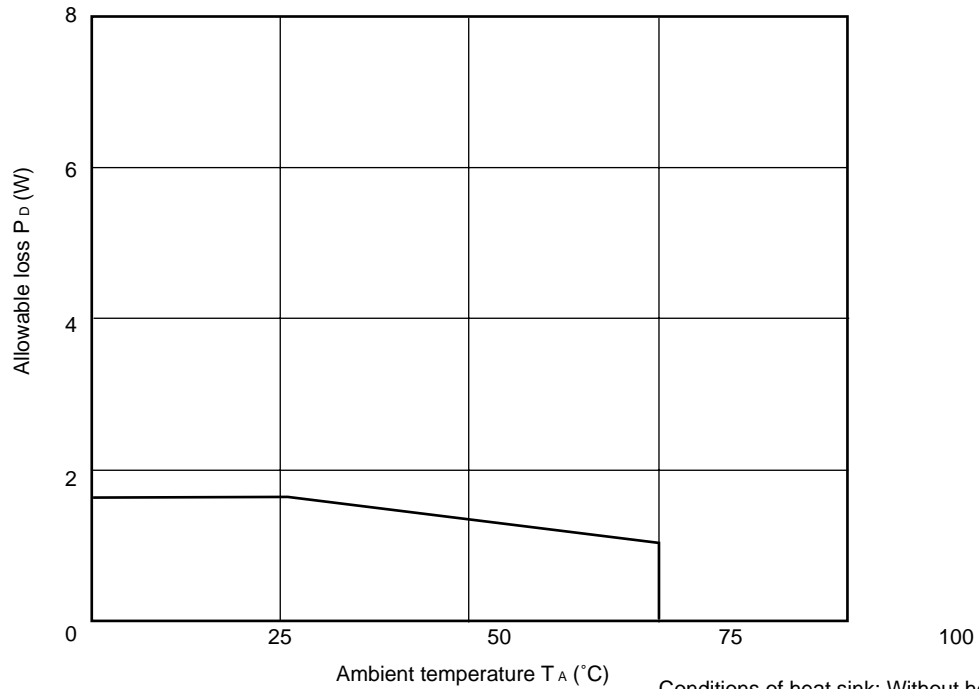
(1) ZIP-17P



Conditions of heat sink:

- (1) With 50-cm square and 2-mm thickness plate
- (2) With 25-cm square and 2-mm thickness plate
- (3) With 10-cm square and 2-mm thickness plate
- (4) Without heat sink

(2) SOP-20P

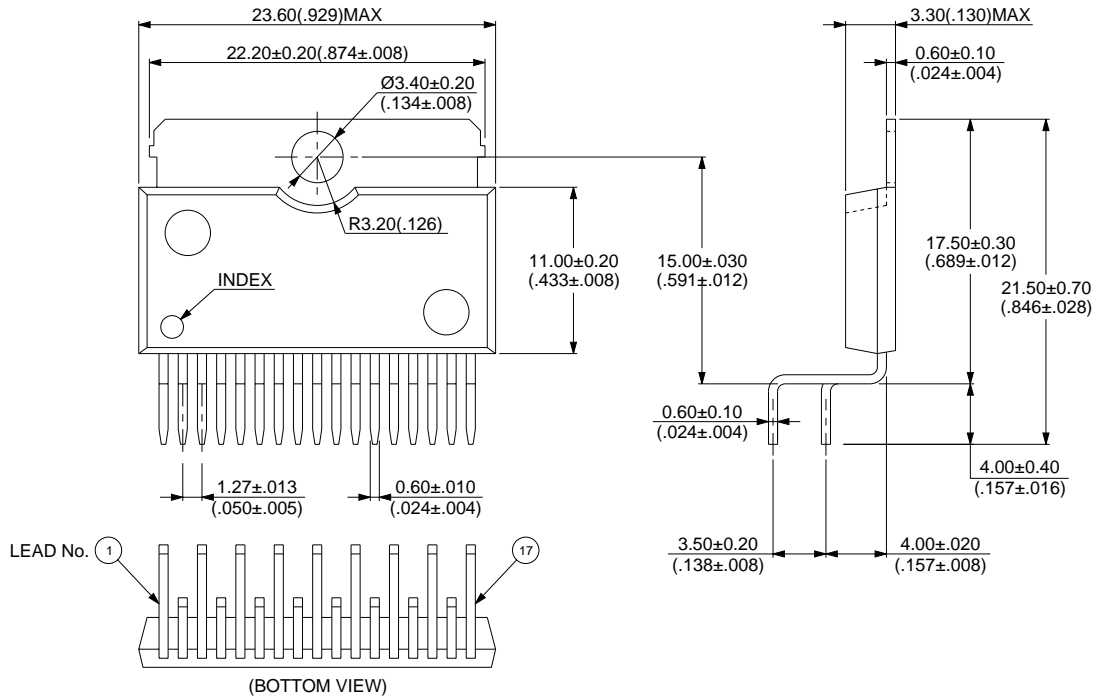


Conditions of heat sink: Without heat sink plate

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## ■ PACKAGE DIMENSIONS

Plastic ZIP, 17 pin  
(ZIP-17P-M03)



Dimensions in mm (inches)

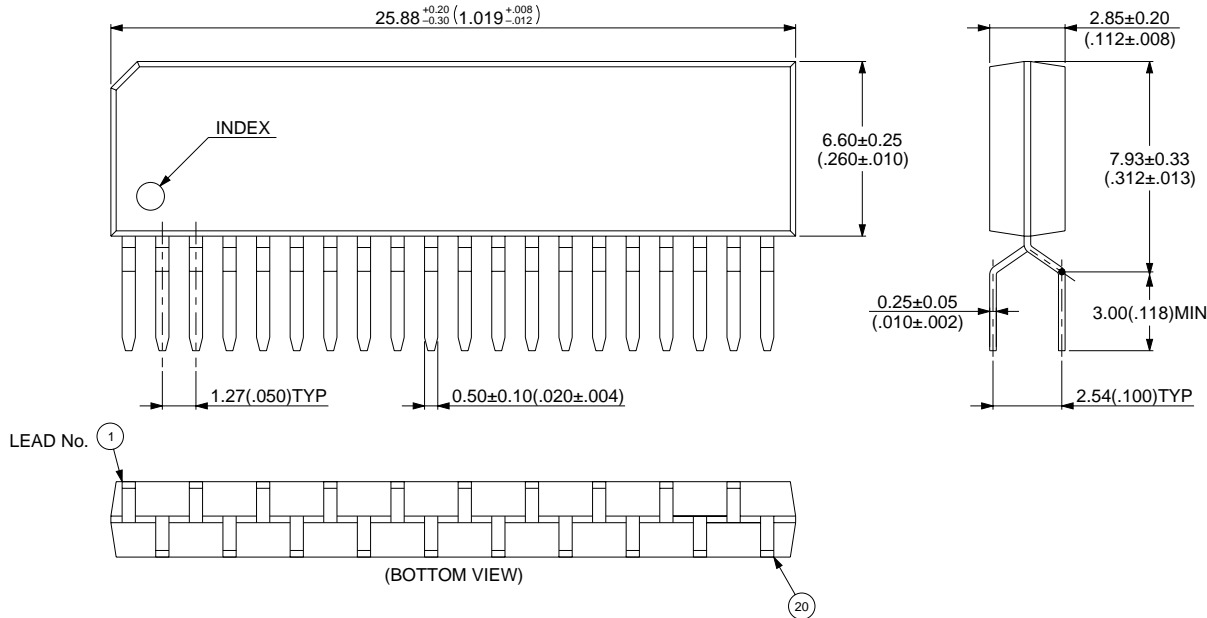
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# MB3863

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Plastic ZIP, 20 pin  
(ZIP-20P-M01)



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Dimensions in mm (inches)

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