FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-29104-2E

ASSP

DUAL REVERSIBLE MOTOR DRIVER

MB3863

■ DESCRIPTION

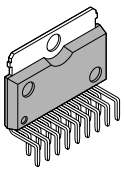
The MB3863 is an IC motor driver with two independent reverse control functions. It drives motor drives of front-loading VCRs and auto-reverse cassette decks and stepping motors by reversible control at TTL and CMOS levels. A heat protection circuit is incorporated to prevent damage by overheating.

■ 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

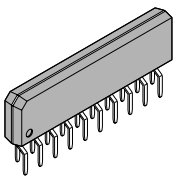
■ PACKAGE

Plastic ZIP, 17 pin



(ZIP-17P-M03)

Plastic ZIP, 20 pin



(ZIP-20P-M01)

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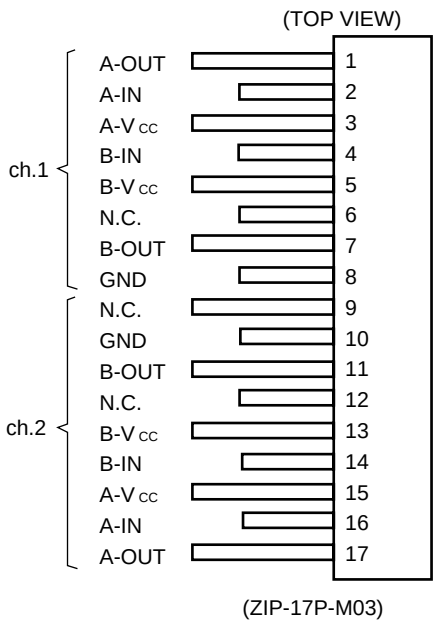
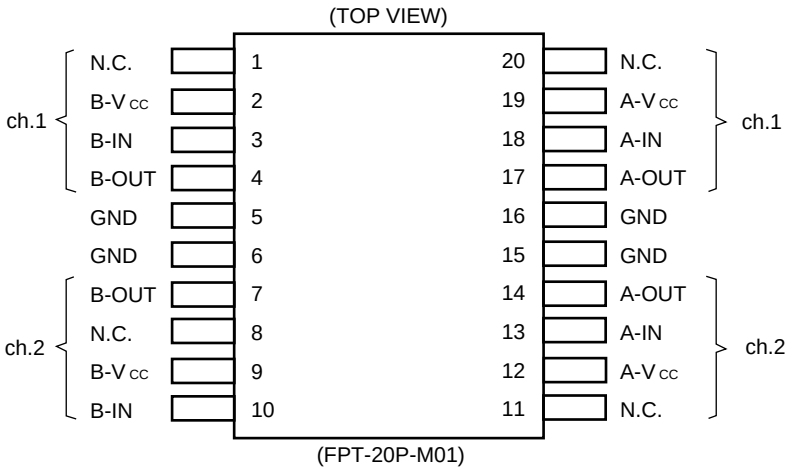
■ PIN ASSIGNMENT



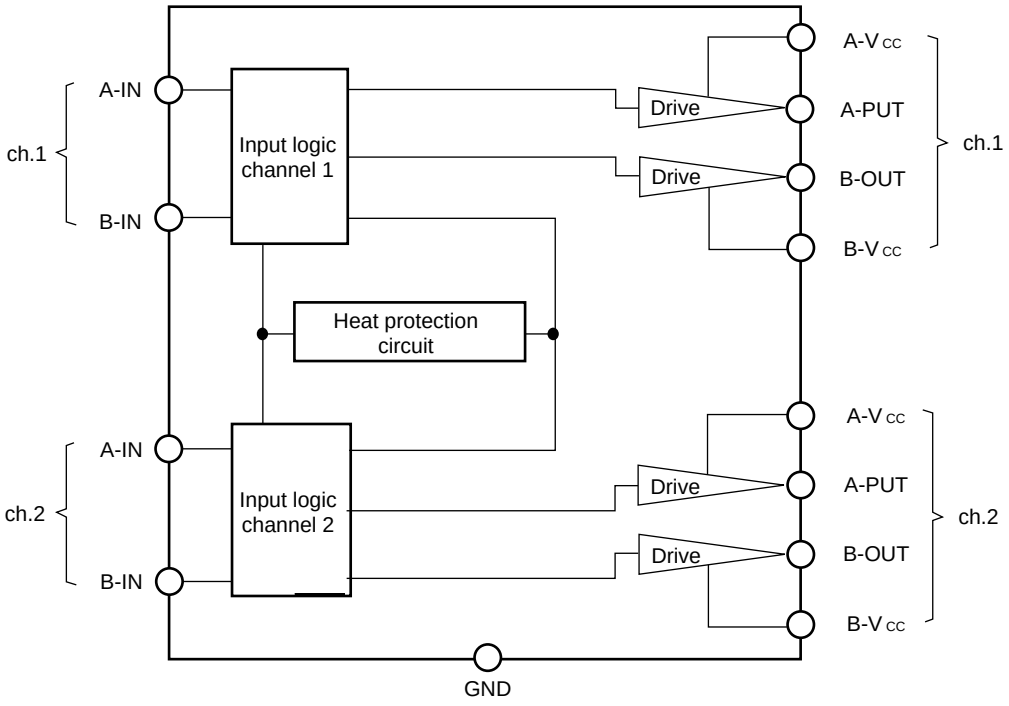
(ZIP-17P-M03)



(FPT-20P-M01)

N.C.: No connection

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	+38	V
Output Current	I_O	550	mA
Maximum Output Current (within 5 ms)	IOmax	1.2	A
Allowable Loss	P_D	6.5 (ZIP-17)	W
		1.6 (SOP-20)	
Operating Temperature	T_{OP}	–20 to +75	°C
Storage Temperature	Tstg	–55 to +150	°C

■ RECOMMENDED OPERATING CONDITIONS

Parameter		Symbol	Ratings	Unit
Supply Voltage		V_{CC}	+4 to +36	V
Output Current		I_O	0 to 500	mA
Input Voltage	High level	V_{IH}	2.4 to V_{CC} +0.3	V
	Low level	V_{IL}	0 to 0.4	V

■ ELECTRICAL CHARACTERISTICS

(V_{CC} = 24V, V_{IN} = 2.4V, Ta = +25°C)

Parameter		Symbol	Conditions	Values			Unit
				Min.	Typ.	Max.	
Stand-by Supply Voltage		I_{CC0}	V_{CC} = +24V, V_{IA} = V_{IB} = 0V	—	—	100	µA
Supply Voltage		I_{CC1}	I_O = 0 mA	—	24	38	mA
		I_{CC2}	I_O = 500 mA	—	24	—	mA
		I_{CC3}	I_O = 0 mA, V_{IA} = V_{IB} = +2.4V	—	37	—	mA
Output Voltage	High level	V_{OH}	I_O = 500 mA	22.65	23	—	V
	Low level	V_{OL}	I_O = 500 mA	—	0.35	0.65	V
Saturated Output Voltage		V_{SAT}	I_O = 500 mA	—	1.35	2.00	V
Input Current		T	V_{IN} = +2.4V	—	250	400	µA
Surge Absorption Diode Voltage in Forward Direction		I_{IH} V_F	I_O = 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.

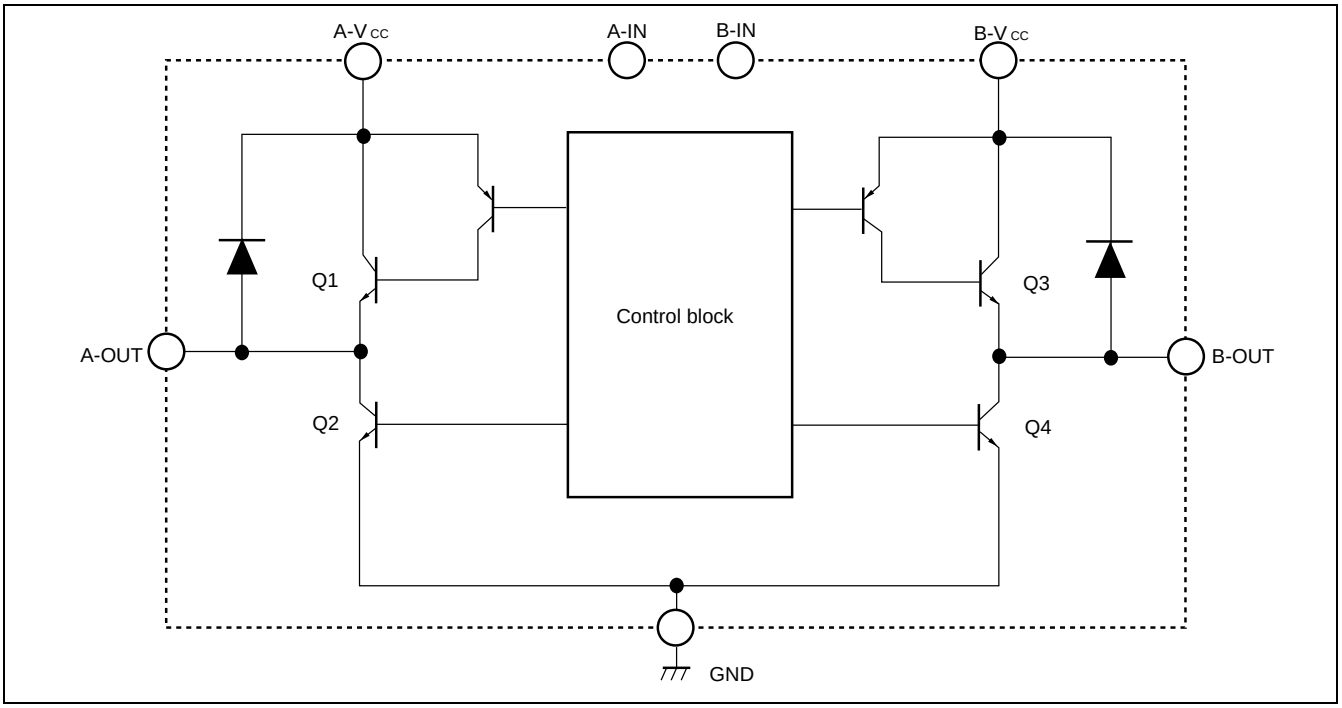
3. Stand-by

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

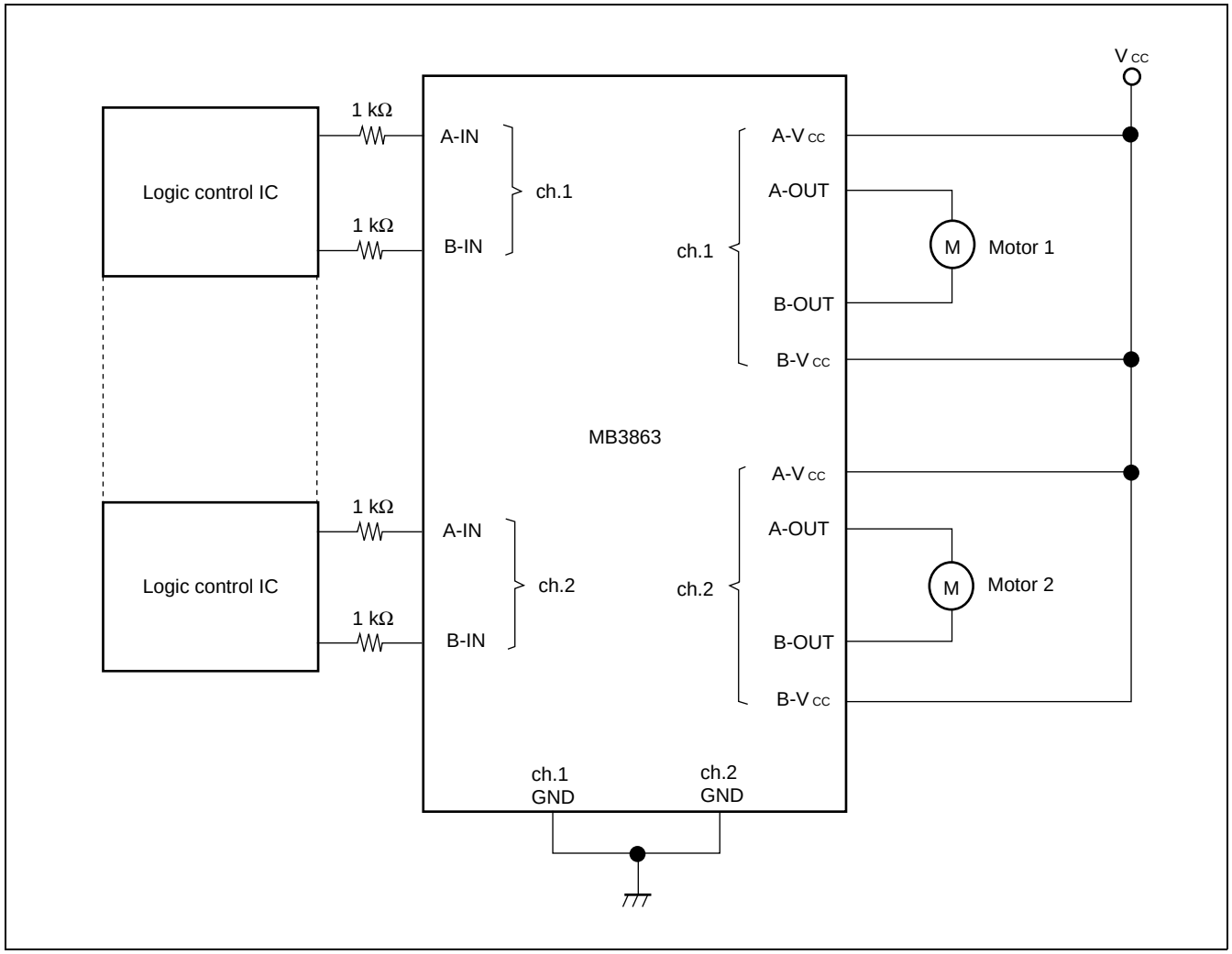
In this mode, the power current is less than 100 μA.

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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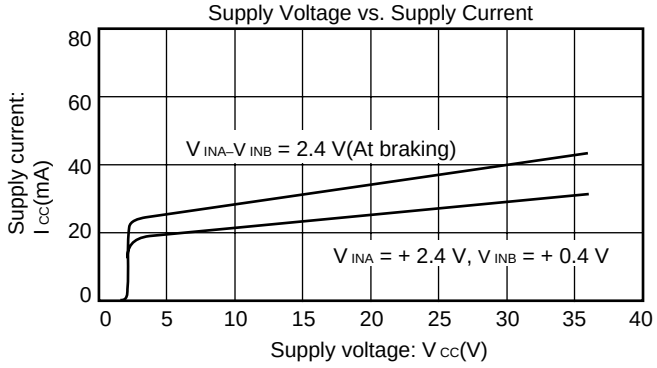
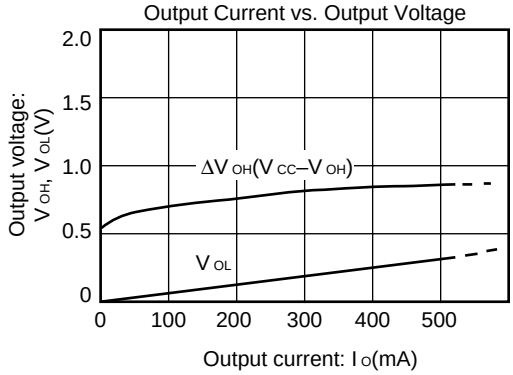
■ TYPICAL CHARACTERISTIC CURVES

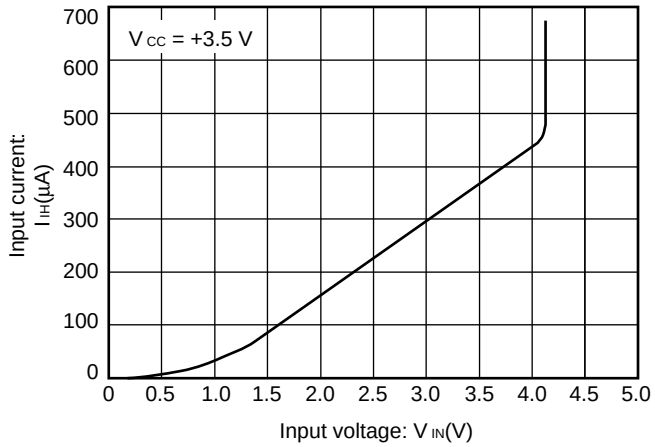
Supply Voltage vs. Supply Current



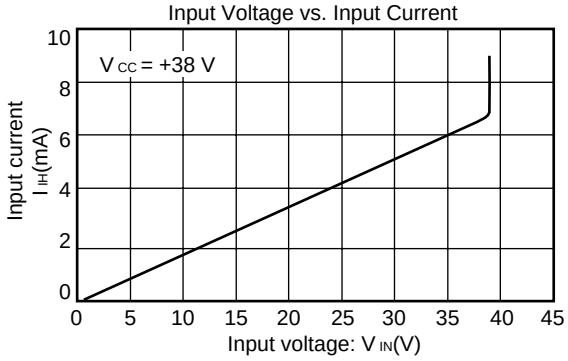
Output Current vs. Output Voltage



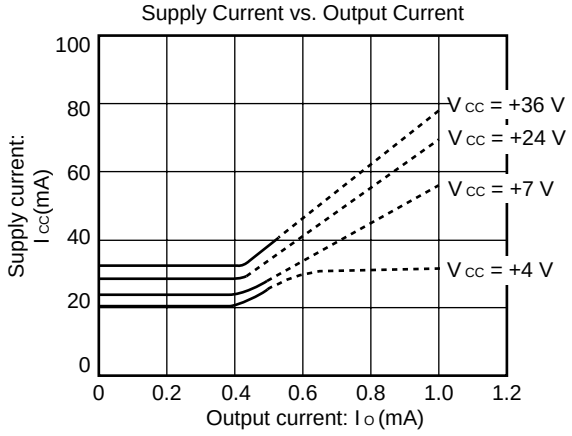
Input Voltage vs. Input Current



Input Voltage vs. Input Current



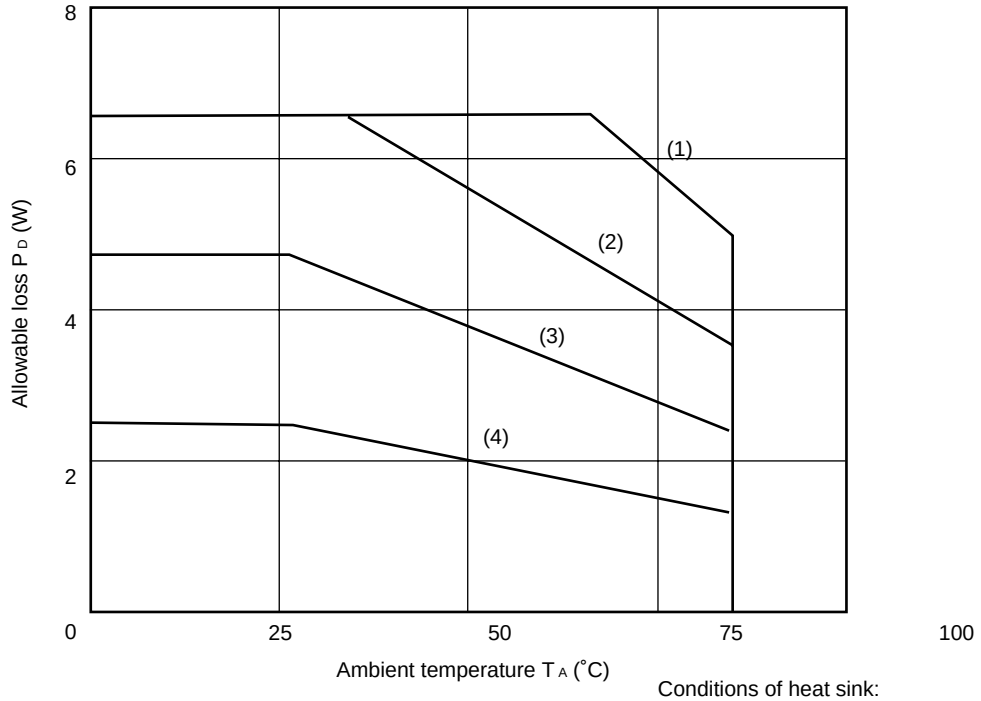
Supply Current vs. Output Current



Note: The above characteristic curves are at Ta = +25°C

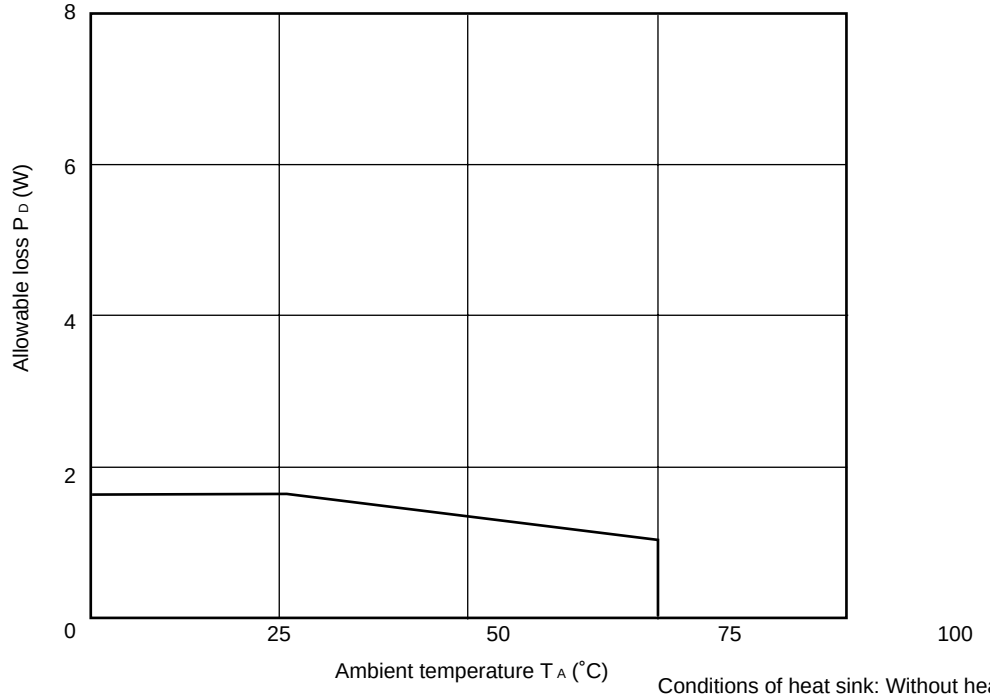
■ POWER DERATING CHARACTERISTICS

(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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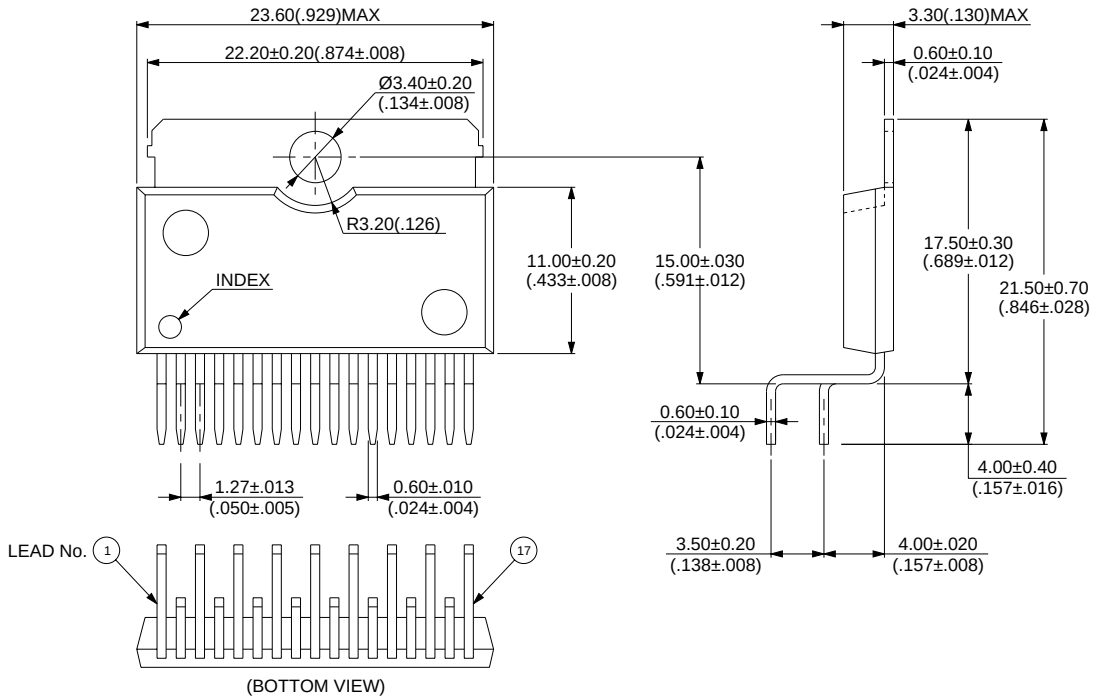
■ PACKAGE DIMENSIONS

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



Dimensions in mm (inches)

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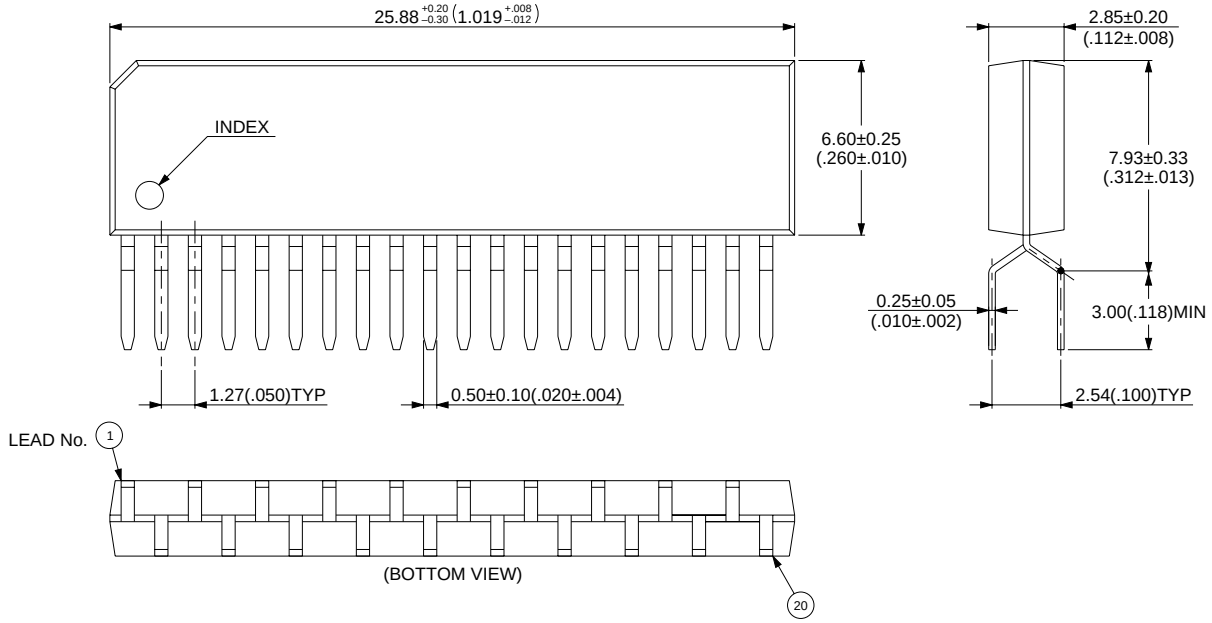
Plastic ZIP, 20 pin
(ZIP-20P-M01)



Dimensions in mm (inches)

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