

ASSP

DUAL REVERSIBLE MOTOR DRIVER

MB3863

■ DESCRIPTION

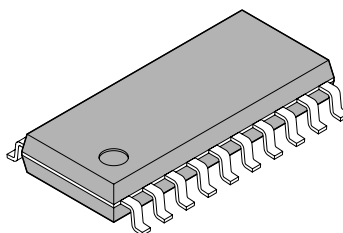
The MB3863 is an IC motor driver with two independent reverse control functions. It drives motor drives of front-loading VTRs and auto-reverse cassette decks and stepping motors by reversible control at TTL and CMOS levels. A heat protection circuit is incorporated to prevent damage by overheating.

■ FEATURES

- Wide voltage range: $V_{CC} = +4$ to $+36$ V
- 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
- Internal surge absorption diode
- Stepping motor application
- Symmetrical pin layout

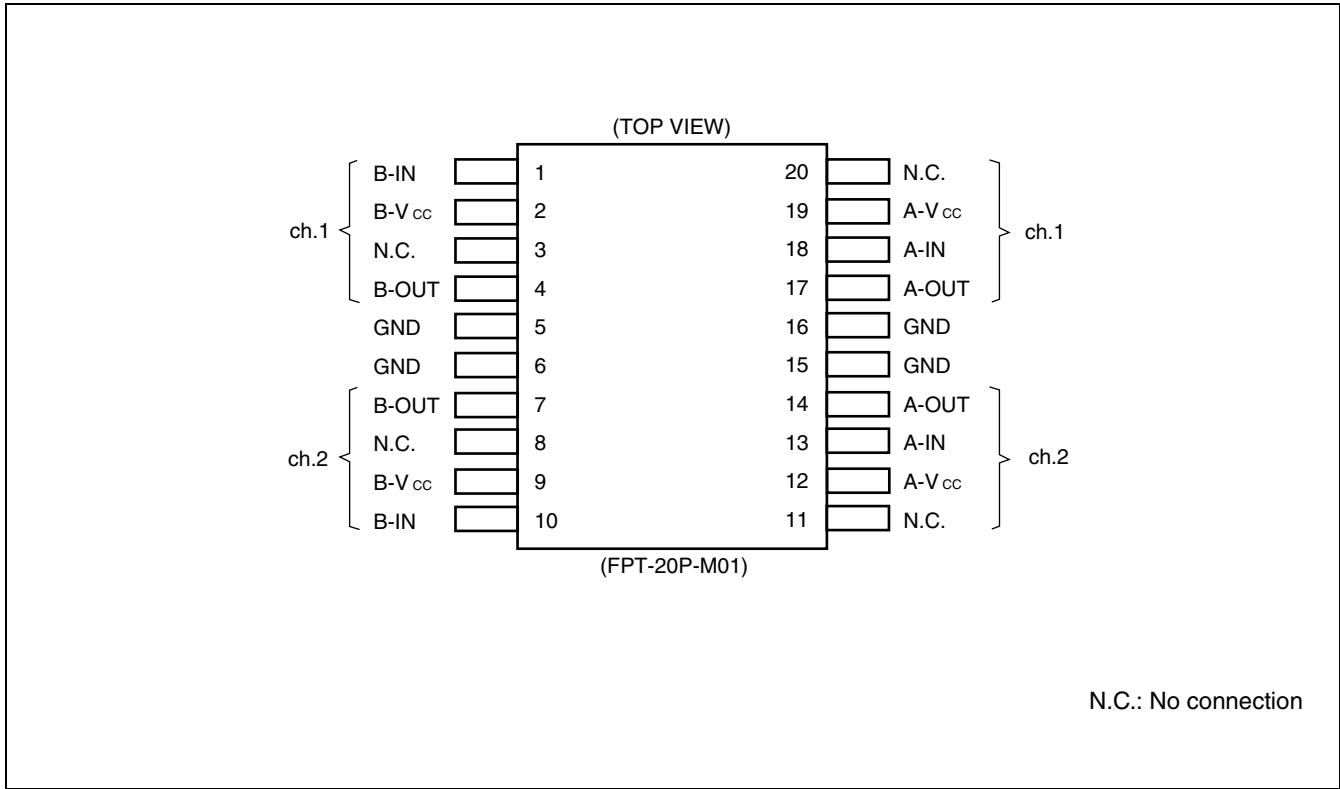
■ PACKAGE

20-pin Plastic SOP

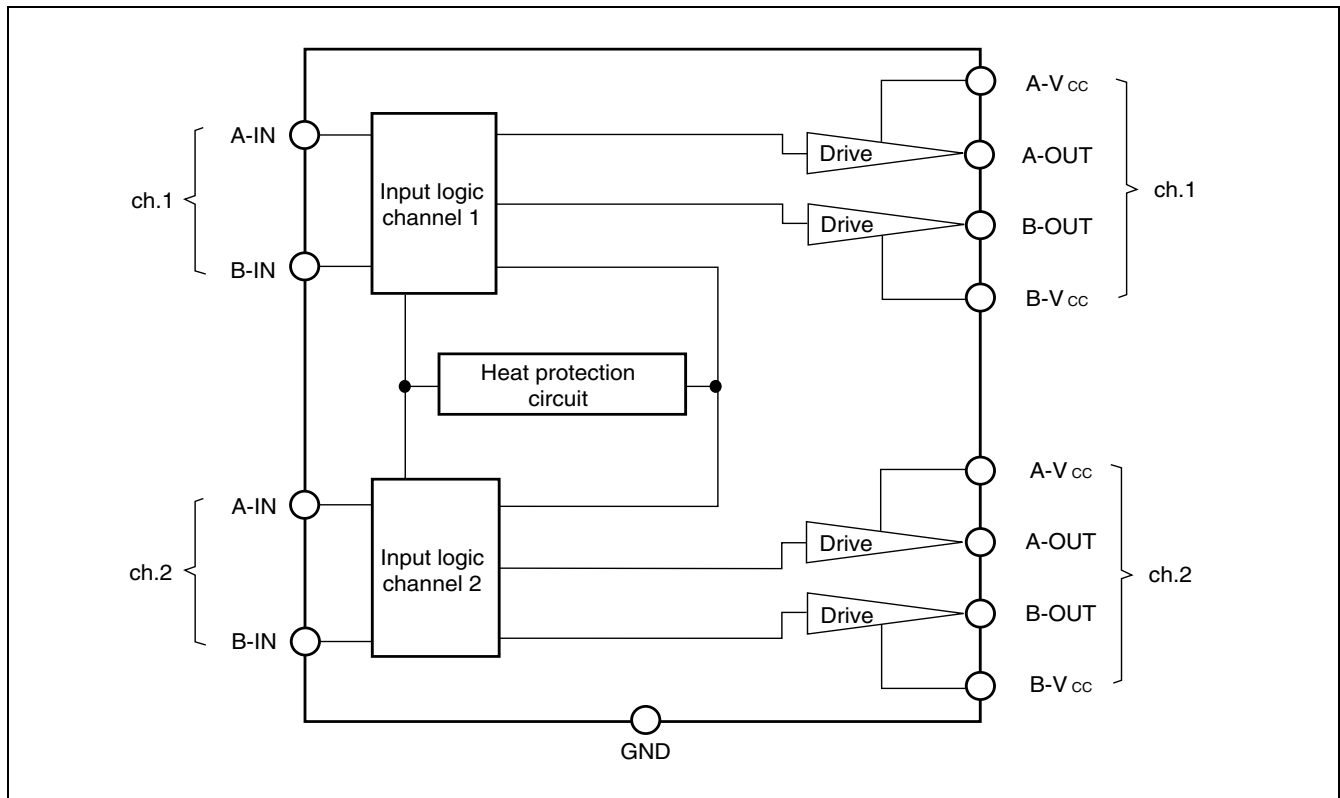


(FPT-20P-M01)

■ PIN ASSIGNMENT



■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings		Unit
		Min.	Max.	
Supply Voltage	V _{CC}	—	+38	V
Output Current	I _O	—	550	mA
Maximum Output Current (within 5 ms)	I _{Omax}	—	1.2	A
Allowable Loss	P _D	—	1.6 (SOP-20)	W
Operating Temperature	T _{OP}	-20	+75	°C
Storage Temperature	T _{stg}	-55	+150	°C

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	Ratings		Unit
			Min.	Max.	
Supply Voltage		V _{CC}	+4	+36	V
Output Current		I _O	0	500	mA
Input Voltage	High level	V _{IH}	2.4	V _{CC} + 0.3	V
	Low level	V _{IL}	0	0.4	V

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.

MB3863

■ ELECTRICAL CHARACTERISTICS

($V_{CC} = 24\text{ V}$, $V_{IN} = 2.4\text{ V}$, $T_a = +25\text{ }^\circ\text{C}$)

Parameter	Symbol	Conditions	Values			Unit	
			Min.	Typ.	Max.		
Stand-by Supply Voltage	I_{CC0}	$V_{CC} = +24\text{ V}$, $V_{IA} = V_{IB} = 0\text{ V}$	—	—	100	μA	
Supply Voltage	I_{CC1}	$I_o = 0\text{ mA}$	—	24	38	mA	
	I_{CC2}	$I_o = 500\text{ mA}$	—	24	—	mA	
	I_{CC3}	$I_o = 0\text{ mA}$, $V_{IA} = V_{IB} = +2.4\text{ V}$	—	37	—	mA	
Output Voltage	High level	V_{OH}	$I_o = 500\text{ mA}$	22.65	23	—	V
	Low level	V_{OL}	$I_o = 500\text{ mA}$	—	0.35	0.65	V
Saturated Output Voltage	V_{SAT}	$I_o = 500\text{ mA}$	—	1.35	2.00	V	
Input Current	I_{IH}	$V_{IN} = +2.4\text{ V}$	—	250	400	μA	
Surge Absorption Diode Voltage in Forward Direction	V_F	$I_o = 1.2\text{ A}$	—	2.0	—	V	

■ 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 Q2 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

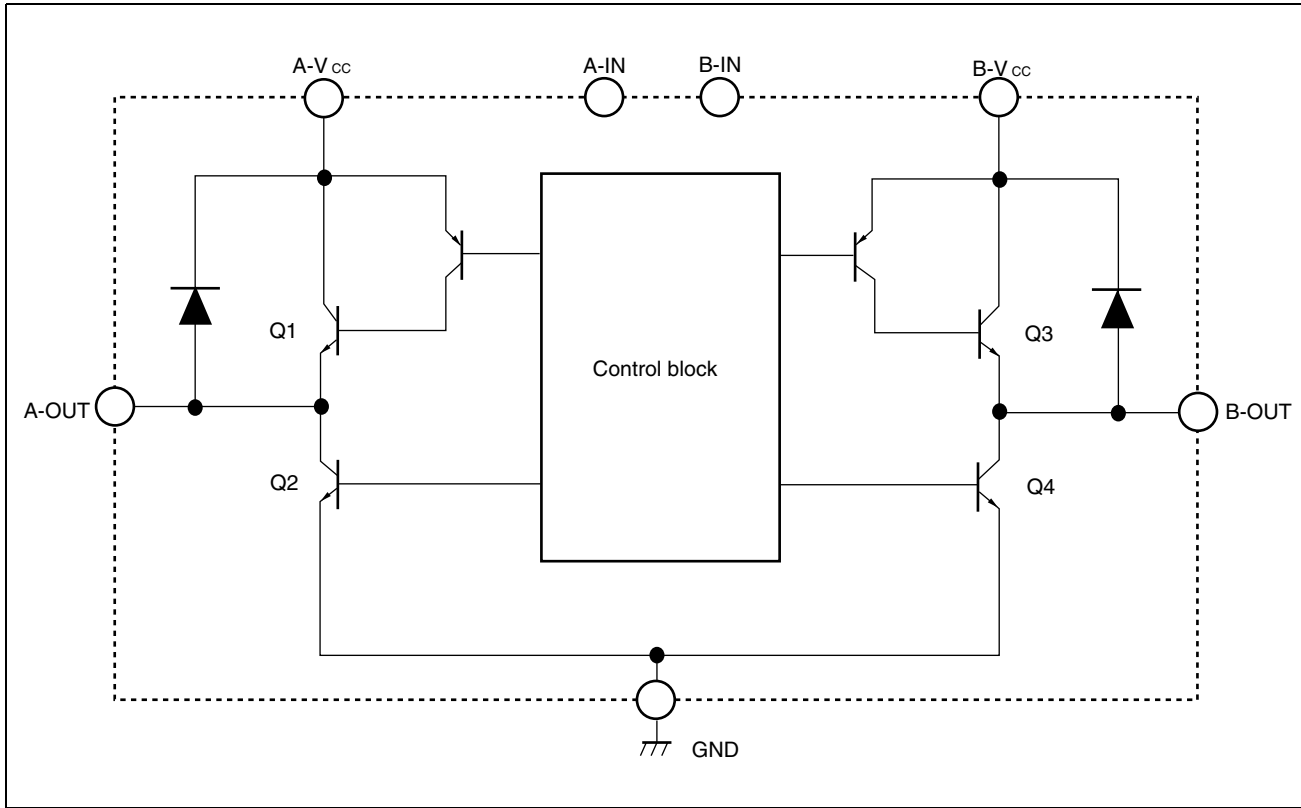
Control mode D turns Q1 to Q4 OFF and the motor has no current flow.

In this mode, the power supply current is less than 100 μ A.

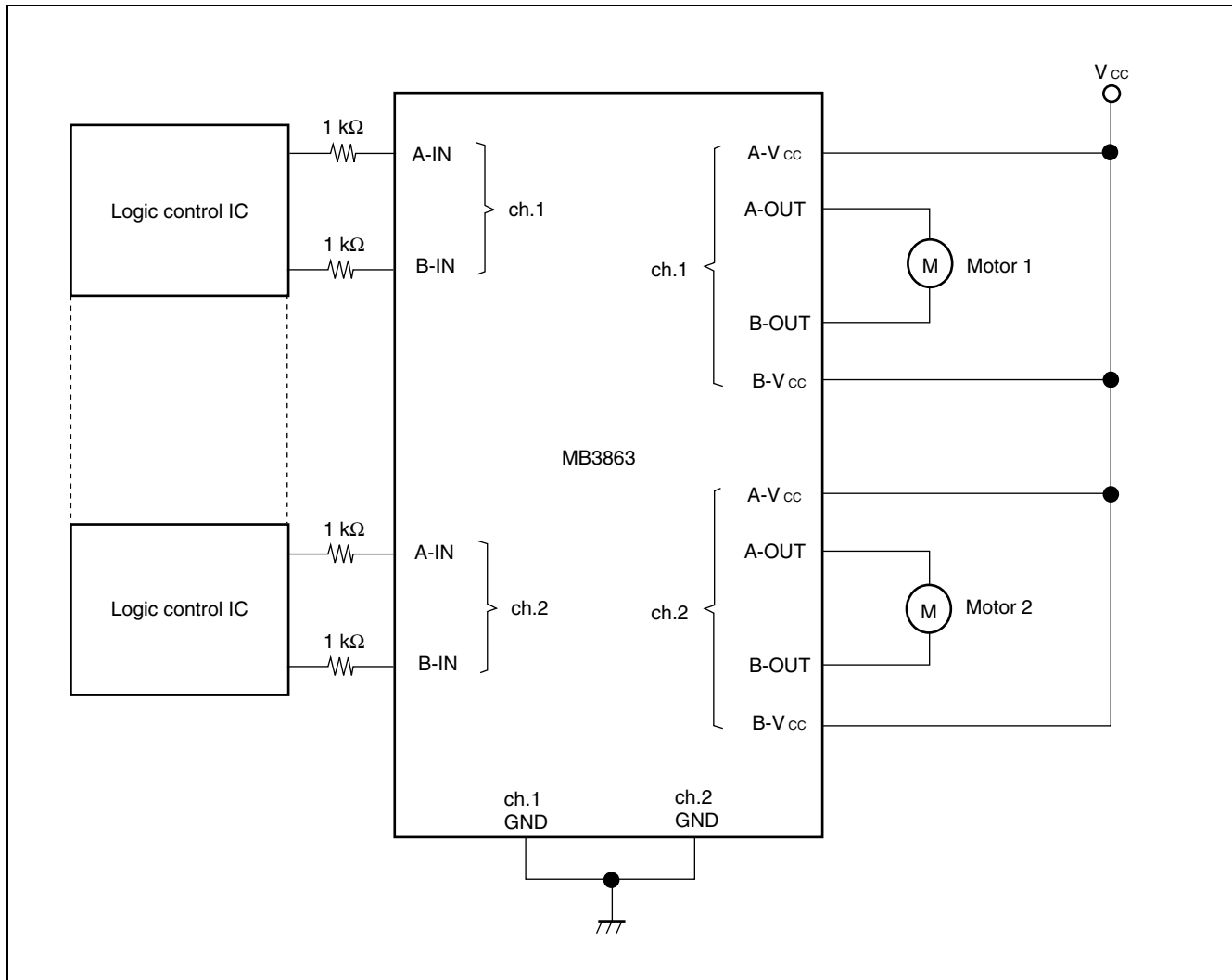
Mode	Input mode*		Operation state of output transistor				State of output pin		Output operation mode
	A=IN	B=IN	Q1	Q2	Q3	Q4	A-OUT	B-OUT	
A	1	0	OFF	ON	ON	OFF	L	H	Forward (Reverse)
B	0	1	ON	OFF	OFF	ON	H	L	Reverse (Forward)
C	1	1	OFF	ON	OFF	ON	L	L	Brake
D	0	0	OFF	OFF	OFF	OFF	—	—	Open (High impedance)

* : Input mode:1: +2.4 V Min.
0: +0.4 V Max.

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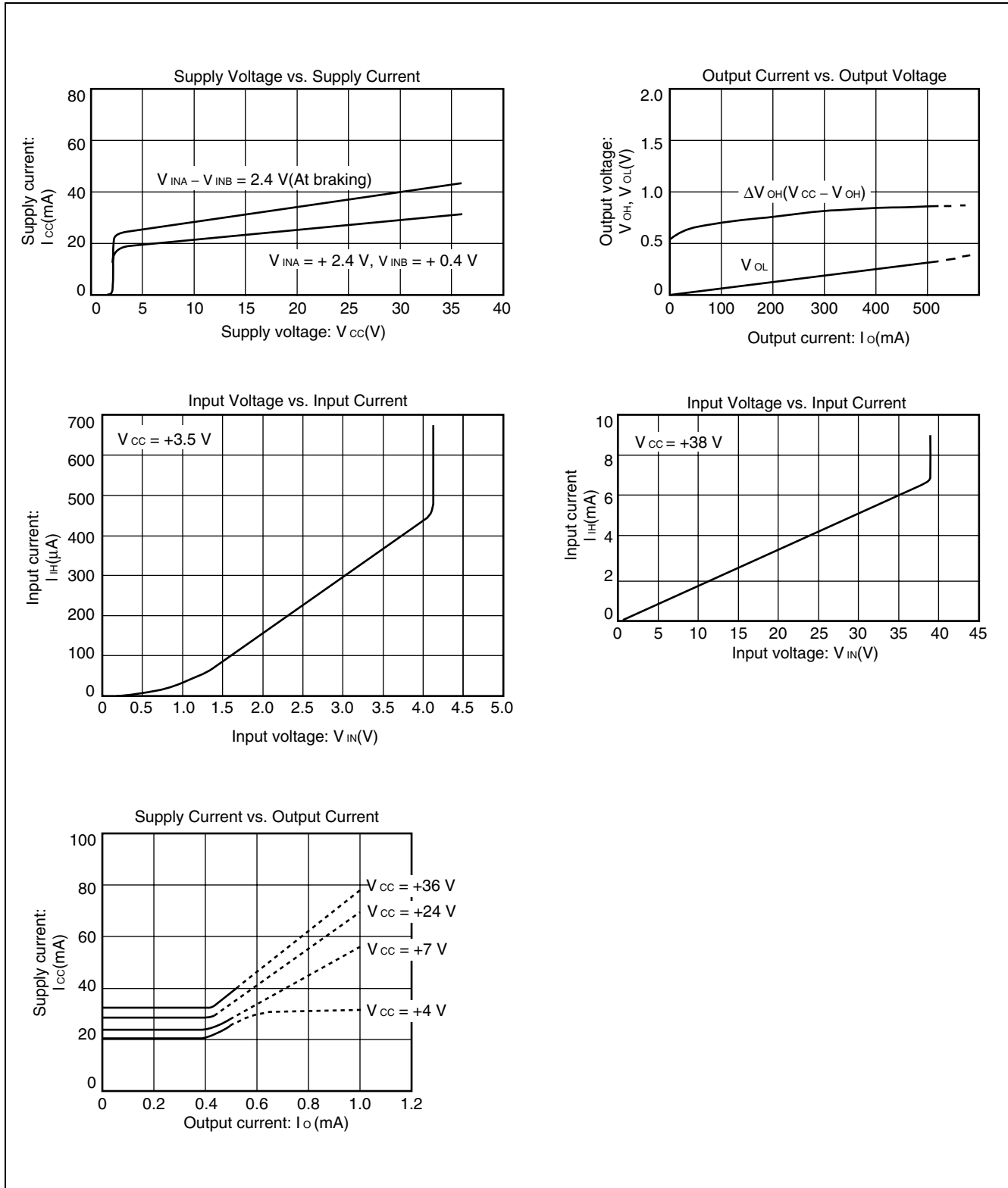


■ TYPICAL CONNECTION



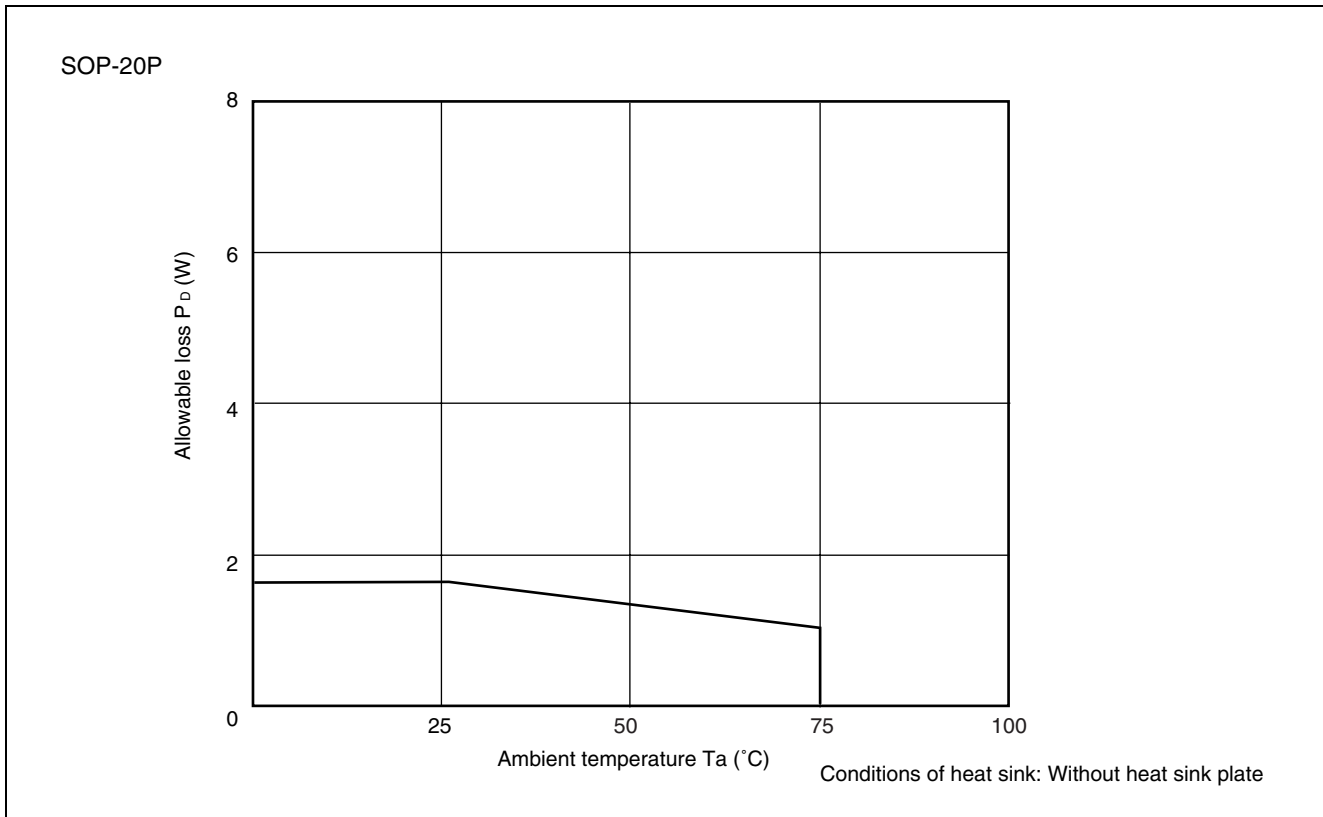
Note : If input voltage is applied when power is not supplied, over-current flows into the device via the input pins. In this case, connect a resistor of at least 1 kΩ in series with the input pins to prevent passage of a large current.

TYPICAL CHARACTERISTIC CURVES



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

■ POWER DERATING CHARACTERISTICS



MB3863

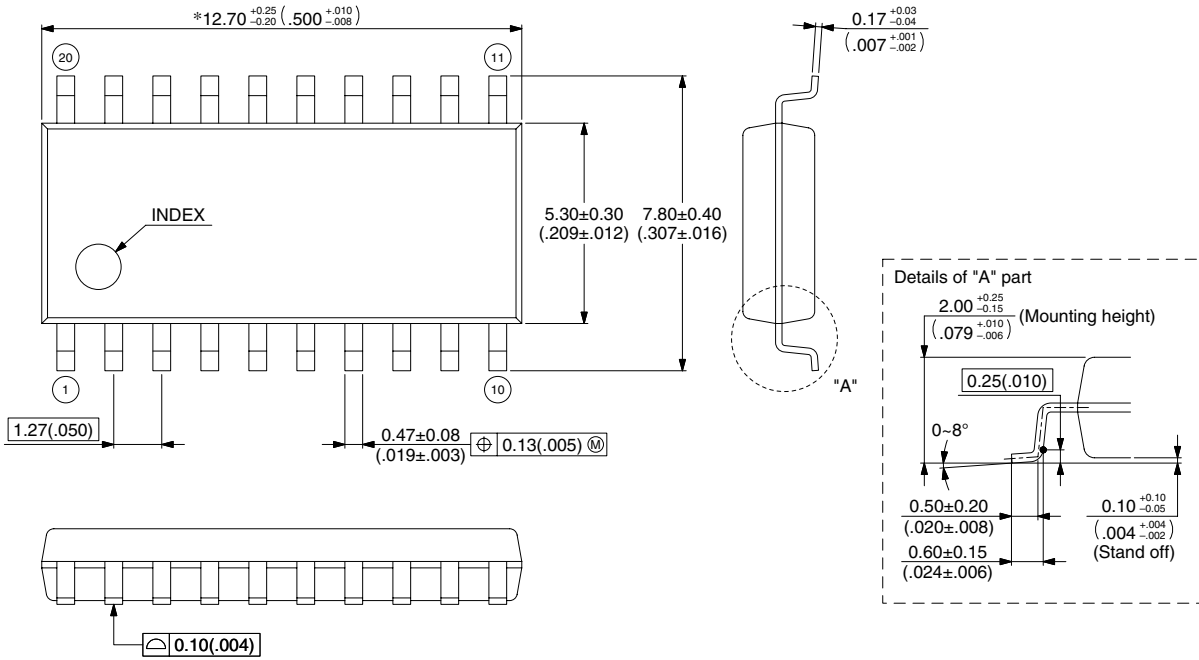
■ ORDERING INFORMATION

Part number	Package	Remarks
MB3863PF	20-pin plastic SOP (FPT-20P-M01)	

■ PACKAGE DIMENSION

20-pin plastic SOP
(FPT-20P-M01)

Note 1 : Pins width and pins thickness include plating thickness.
Note 2 : *This dimension includes resin protrusion.



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Dimensions in mm (inches)

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