

MB3854

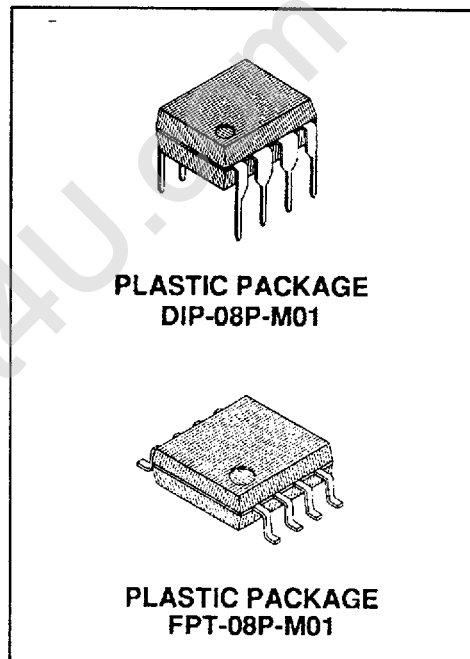
BI-DIRECTIONAL MOTOR DRIVER

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The Fujitsu MB3854 is a low voltage motor driver with forward/reverse control capability for motors such as those in auto focus film advancing mechanism, in front loading camera mechanisms, in CD player, and others driven by TTL-level signals.

The MB3854 has 300 mA drive units and brake capability for stop with TTL control input.

- Motor drive current: 300 mA max.
- Low power supply voltage operation 23V to 10V
- TTL-control capability
- Standby capability when input is off
- Brake capability at motor stop mode
- Built-in diode for surge absorption
- Plastic 8-pin dual in-line package (Suffix: -P)
- Plastic 8-pin flat package (Suffix: -PF)



ABSOLUTE MAXIMUM RATINGS (see Note)

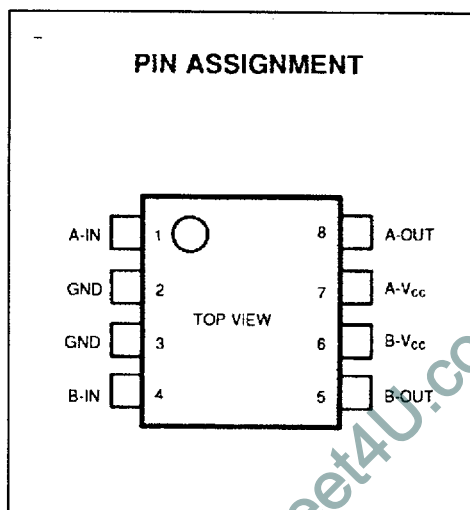
Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	12	V
Output Current	I_O	330(550) ¹	mA
Maximum Output Current	I_{OMAX}^2	0.8	mA
Power Dissipation	P_D	560 ³	A
Operating Temperature	T_A	-20 to +75	°C
Storage Temperature	T_{STG}	-55 to +125	°C

¹ $t_{ON} \leq 1$ sec, Duty = 50%

² $t \leq 5$ ms

³ $T_A \leq 60^\circ\text{C}$

Note : Permanent device damage may occur if the above Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

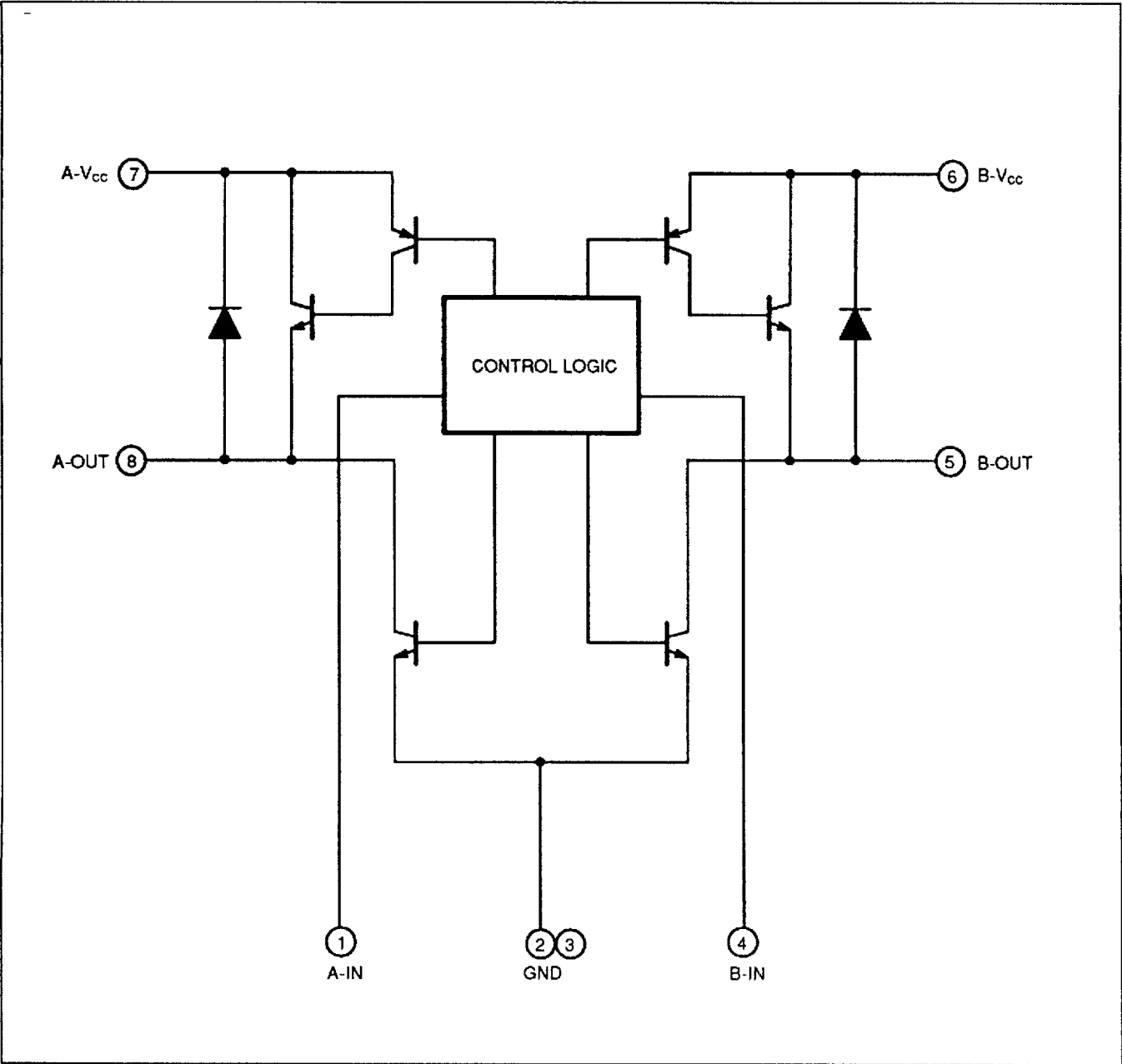


Figure 1. MB3854 Block Diagram

FUNCTIONAL DESCRIPTIONS

In Control mode, output transistors shown in Figure 2 work as follows.

- **FORWARD/REVERSE mode**

According to the control B/C mode, transistor pairs 02-03 and 01-04 work alternately and exchange the supply current to the motor. When mode B is selected, 02 and 03 are active; A-OUT is at low level and B-OUT is at high level, current flows from B-OUT to A-OUT through the motor.

On the other hand, when the mode C is selected, the current flows in reverse direction.

- **BRAKE mode**

When control mode A is selected, 01 and 03 are inactive, 02 and 04 are active. A-OUT and B-OUT are clamped at low level, terminals of the motor are shorted and the motor is forced to stop.

- **STANDBY mode**

When stand-by mode is selected, all transistors are inactive and current does not flow through the motor. In this case, the supply current is less than 100 pA.

Table 1. Mode Table

Mode	Input Mode		Output Mode		Operation
	A-IN	B-IN	A-OUT	B-OUT	
A	1	1	L	L	Shot (Brake)
B	1	0	L	H	Forward
C	0	1	H	L	Reverse
D	0	0	--	--	Open (Stand-by)

Input mode 1: $\geq 2.1V$
2: $\leq 0.4V$

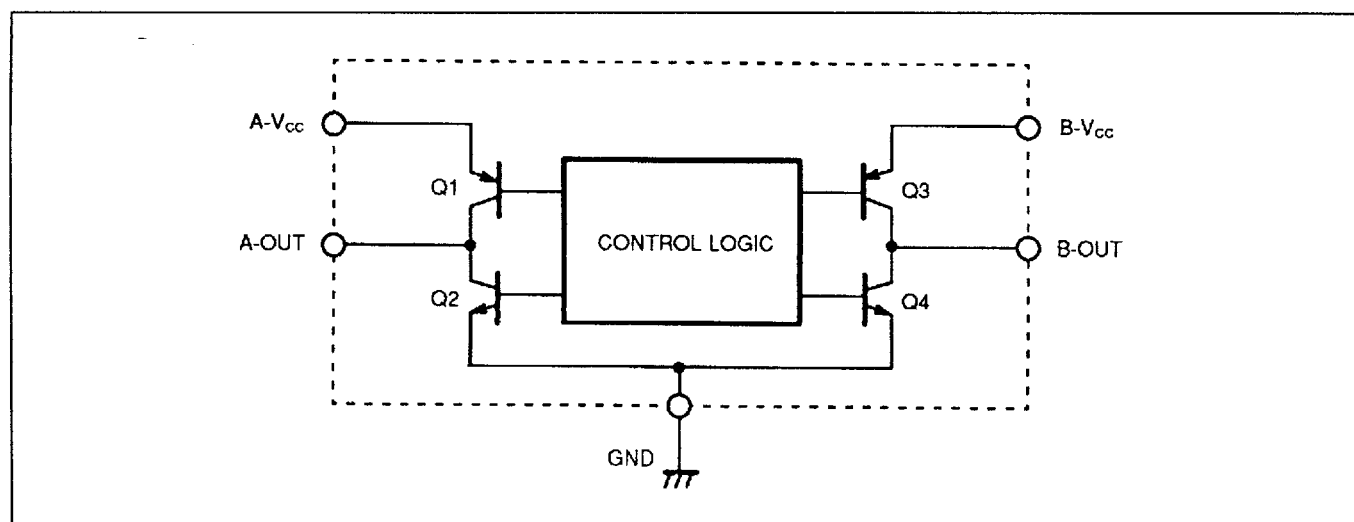


Figure 2. Output Transistors

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	2.3 to 10	V
Output Current	I_O	0 to 300 (500 ¹)	mA
Input High Voltage	V_{IH}	2.1 to $V_{CC} + 0.3^2$	V
Input Low Voltage	V_{IL}	0 to 0.4	V

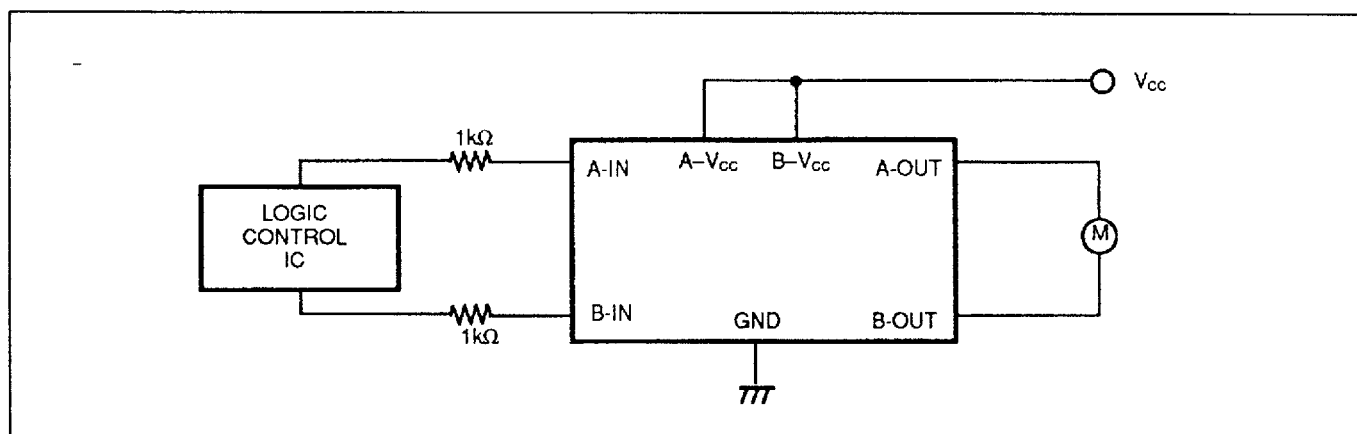
¹ $t_{ON} \leq 1$ sec, duty = 50%

² When $V_{IH} \geq V_{CC}$, $I_{IH} \leq V_{CC} \times 0.2$ mA

ELECTRICAL CHARACTERISTICS

($V_{CC} = 3V$, $V_{IH} = 2.4V$, $I_O = 300$ mA, $T_A = 25^\circ C$)

Parameter	Symbol	Condition	Value			Unit
			Min	Typ	Max	
Stand-by Current	I_{CC0}	$V_{CC} = 6V$, $V_{IA} = V_{IB} = 0V$			100	μA
Power Supply Current	I_{CC1}	$I_O = 0$ mA		4.5	8	mA
	I_{CC2}	$I_O = 300$ mA		24		
	I_{CC3}	$I_O = 0$ mA, $V_{IA} = V_{IB} = 2.4V$		7		
Output High Voltage	V_{OH}		1.85	2.1		V
Output Low Voltage	V_{OL}			0.25	0.35	V
Output Saturation Voltage	V_{SAT}			1.15	1.5	V
Input Current	I_{IH}	$V_{IN} = 2.4V$		250	400	μA



Note: If 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, connect a resistor (≥ 1 k Ω) serially to input pin in order to prevent excess current flow.

Figure 3. Application Example

TYPICAL CHARACTERISTICS CURVES ($T_A = 25^\circ\text{C}$)

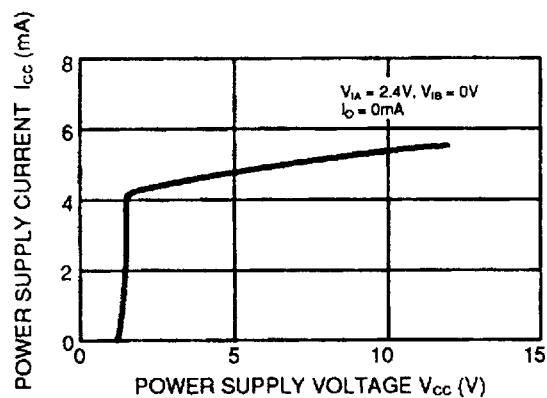


Figure 4. Power Supply Voltage vs. Power Supply Current

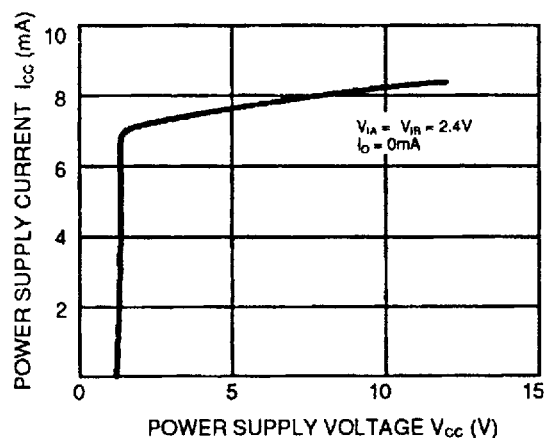


Figure 5. Power Supply Voltage vs. Power Supply Current (Brake Mode)

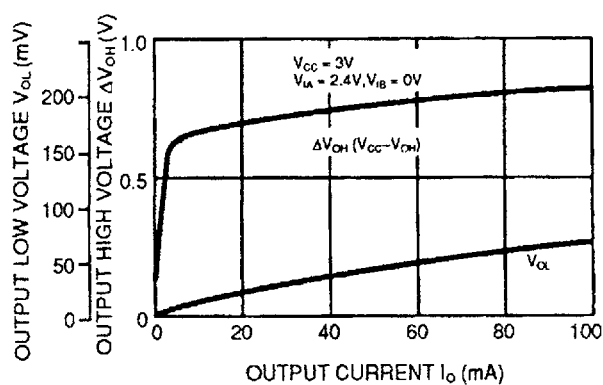


Figure 6. Output Current vs. Output Voltage

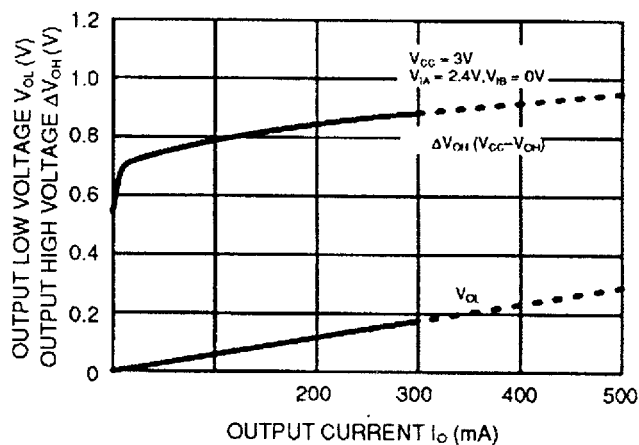


Figure 7. Output Current vs. Output Voltage

TYPICAL CHARACTERISTICS CURVES, continued

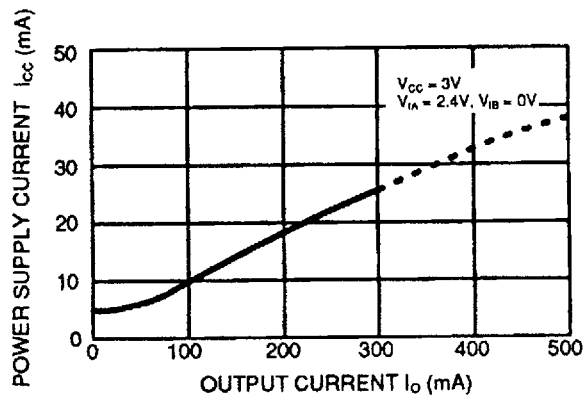


Figure 8. Output Current vs. Power Supply Current

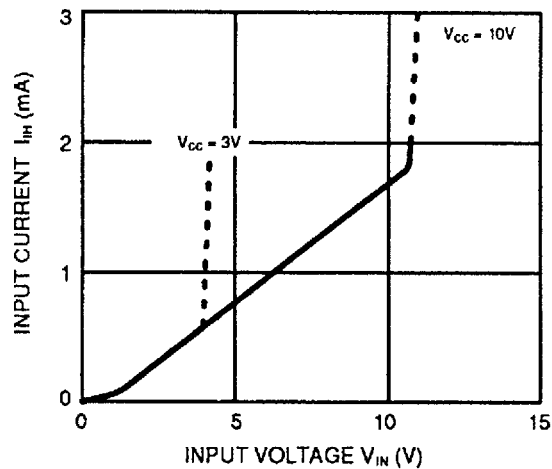


Figure 9. Input Voltage vs. Input Current

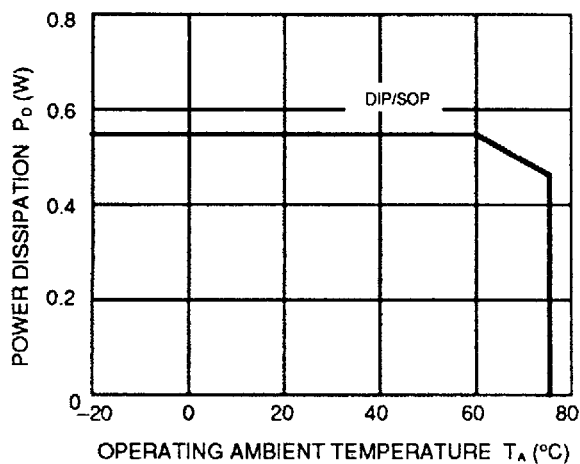
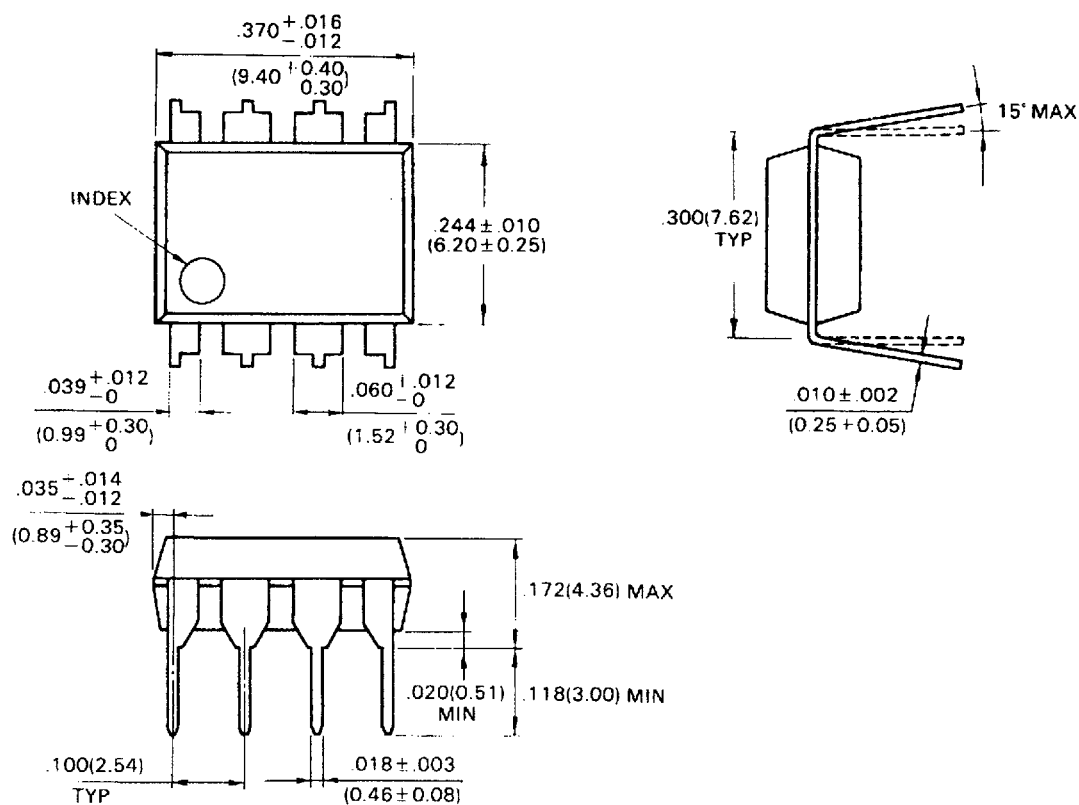


Figure 10. Power Derating Curve

Notes: FPT package is mounted on the ceramic board (3.0cm x 3.0cm x 0.05cm).
Maximum power dissipation must be kept.

PACKAGE DIMENSIONS

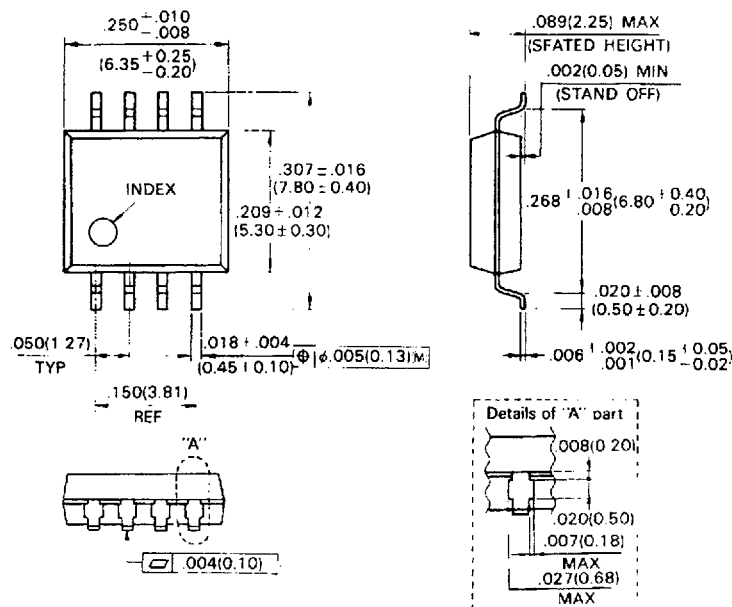
8-LEAD PLASTIC DUAL IN-LINE PACKAGE
(CASE No.: DIP-08P-M01)



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Dimensions in
inches (millimeters)

PACKAGE DIMENSIONS, continued

8-LEAD PLASTIC FLAT PACKAGE
(CASE No.: FPT-08P-M01)

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Dimensions in
inches (millimeters)

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