



ON Semiconductor®

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# LB1846MC

Monolithic Digital IC

## Low-Voltage/Low Saturation Voltage Type Bidirectional Motor Driver

### Overview

The LB1846MC is 2-channel low-voltage, low saturation voltage type bidirectional motor driver IC that is optimal for use as 2-phase stepping motor drivers in printers, cameras and other portable equipment. The output circuits are of the bipolar type, with PNP transistors in the upper side and NPN transistors in the lower side, and they achieve low saturation output and low power characteristics despite being provided in a miniature package.

The LB1846MC products can directly control a motor from signals from a microcontroller. The LB1846MC is optimal for 1-2 phase excitation drive for 2-phase stepping motors using 4-input logic (IN1, IN2, IN3 and IN4).

Another point is that these IC include built-in thermal shutdown circuits so that IC scorching or burning is prevented in advance even if the IC output is shorted.

### Functions

- Optimal for 1-2 phase excitation drive for 2-phase stepping motors
- Low saturation voltage.  $V_O(\text{sat}) = 0.55\text{V}$  typical at  $I_O = 400\text{mA}$
- No limitations on the magnitude relationship between the power supply voltage ( $V_{CC}$ ) and the input voltage ( $V_{IN}$ )
- Standby current: Zero
- Thermal shutdown circuit

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		-0.3 to +8.0	V
Output voltage	$V_{OUT}$		$V_{CC} + V_{SF}$	V
Input voltage	$V_{IN}$		-0.3 to +8.0	V
Ground pin outflow current	$I_{GND}$	Per channel	800	mA
Allowable power dissipation	$P_d \text{ max}$	When mounted*	870	mW
Operating temperature	$T_{opr}$		-20 to +75	°C
Storage temperature	$T_{stg}$		-40 to +150	°C

\*1: When mounted on the specified printed circuit board (114.3mm × 76.2mm × 1.5mm), glass epoxy board

Caution 1) Absolute maximum ratings represent the value which cannot be exceeded for any length of time.

Caution 2) Even when the device is used within the range of absolute maximum ratings, as a result of continuous usage under high temperature, high current, high voltage, or drastic temperature change, the reliability of the IC may be degraded. Please contact us for the further details.

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LB1846MC

Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	VCC		2.5 to 7.5	V
Input high-level voltage	VIH		2.5 to 7.5	V
Input low-level voltage	VIL		-0.3 to +0.7	V

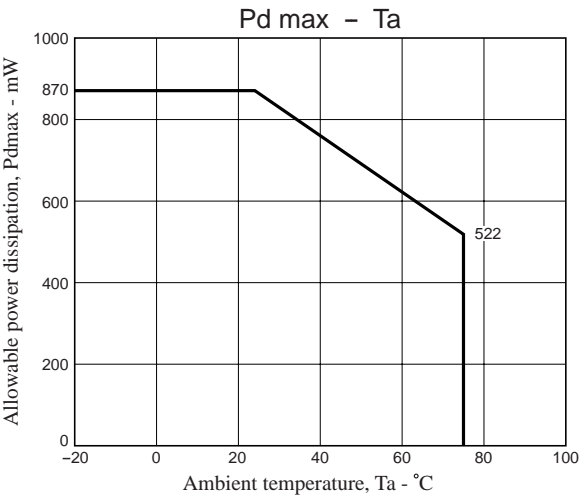
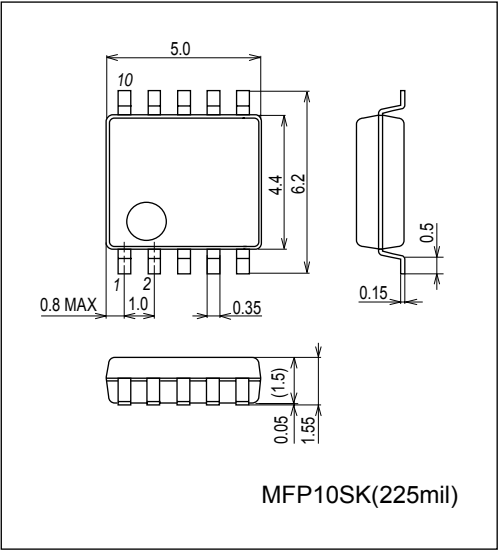
Electrical Characteristics at Ta = 25°C, VCC = 5V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	ICC0	IN1, 2, 3, 4 = 0V		0.1	10	μA
	ICC1	IN1, 3 = 3V, IN2, 4 = 0V		30	40	mA
Output saturation voltage	VOU1	VIN = 3V or 0V, VCC = 3 to 7.5V, IOUT = 200mA		0.27	0.4	V
	VOU2	VIN = 3V or 0V, VCC = 4 to 7.5V, IOUT = 400mA		0.55	0.8	V
Input current	IIN	VIN = 5V		150	200	μA
Spark Killer Diode						
Reverse current	IS (leak)				30	μA
Forward voltage	VSF	IOUT = 400mA			1.7	V

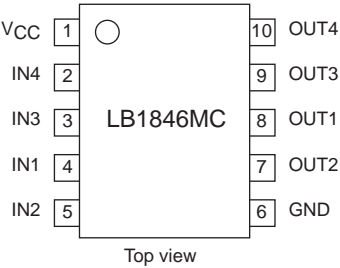
Package Dimensions

unit : mm (typ)

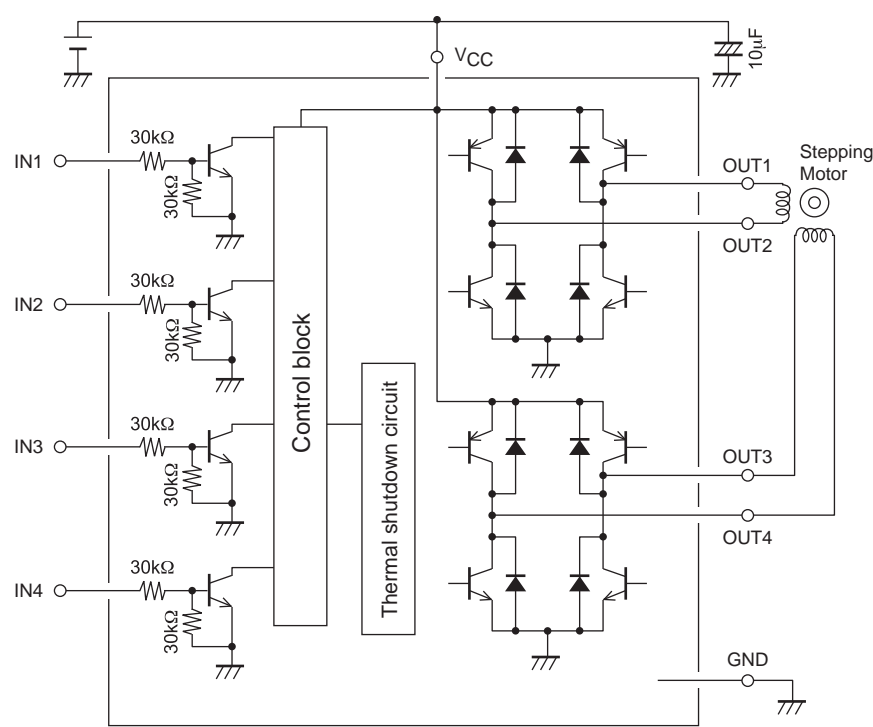
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Pin Assignment



Block Diagram

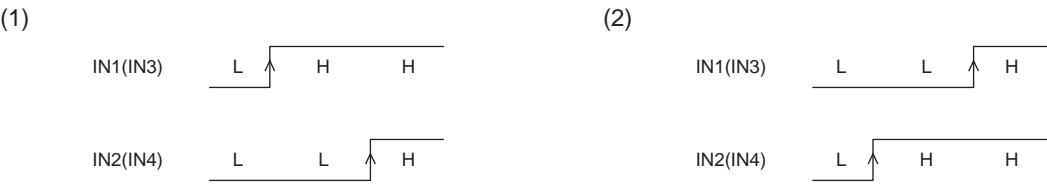


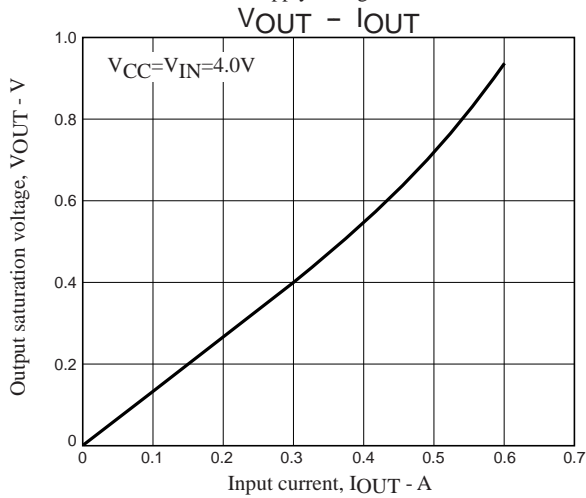
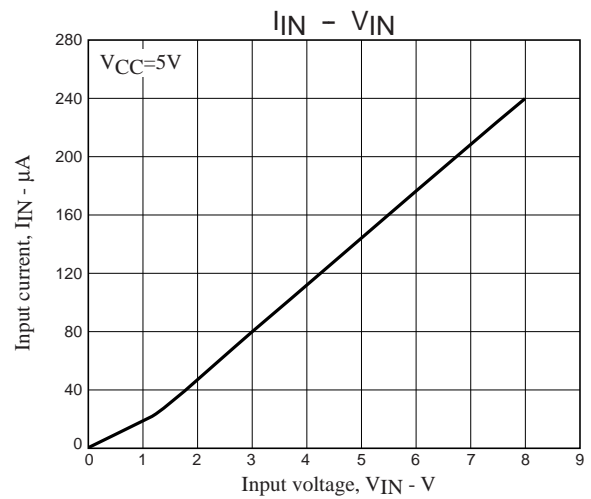
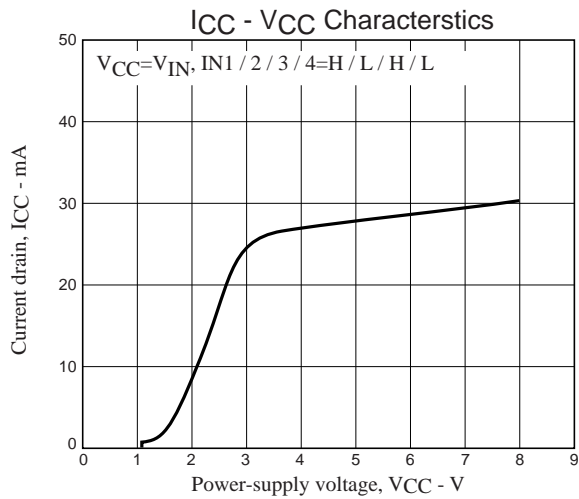
Truth Tables

IN1	IN2	IN3	IN4	OUT1	OUT2	OUT3	OUT4	Note
L	L	L	L	OFF	OFF	OFF	OFF	Standby
H	L	L	L	H	L	OFF	OFF	1-2 phase excitation
H	L	H	L	H	L	H	L	
L	L	H	L	OFF	OFF	H	L	
L	H	H	L	L	H	H	L	
L	H	L	L	L	H	OFF	OFF	
L	H	L	H	L	H	L	H	
L	L	L	H	OFF	OFF	L	H	
H	L	L	H	H	L	L	H	
H	H	-	-	The logic output for the first high-level input is produced. *2				
-	-	H	H					

Note: \*1 "-" indicates a "don't care" input.

\*2 If two high levels (H/H) are input to the IN1/IN2 pins with the timing shown in (1) in the figure below, then the IN2 input that arrived later will be ignored and the IC will function as though an H/L combination is applied to the IN1/IN2 pins. Similarly, the timing shown in (2) results in a L/H combination on the IN1/IN2 pins.





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