



# LB1930M

## Single-Channel Low Saturation Voltage Forward/Reverse Motor Driver

### Overview

The LB1930M is a low saturation voltage H-bridge forward/reverse motor driver that supports low-voltage drive. This device is optimal for CD, MD, and cassette player loading motors.

### Functions and Features

- The low saturation voltage reduces IC internal heating and allows a high voltage to be applied to the motor. Thus this device can be used even in environments with a high operating ambient temperature.

Output saturation voltage:

$$V_{sat1} = 0.25 \text{ V typical (} I_O = 0.2 \text{ A)}$$

(High side + low side):

$$V_{sat2} = 0.55 \text{ V typical (} I_O = 0.5 \text{ A)}$$

Operating temperature range:

$$T_a = -30 \text{ to } +85^\circ\text{C}$$

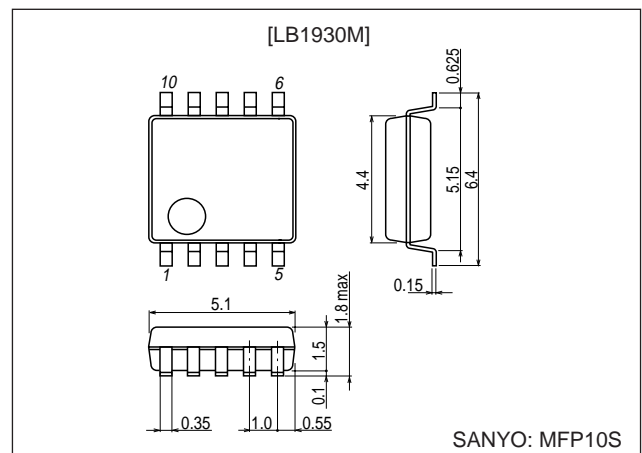
- The LB1930M features the wide operating voltage range of 2.2 to 10.8 V and the low standby current drain of 0.1  $\mu\text{A}$ , and therefore can easily be used in battery operated systems.
- To minimize through currents, the LB1930M internal logic passes through an internal standby state when switched by the input signals between forward/reverse and brake, or between forward and reverse.
- There are no constraints on the relationship between the input voltage and the supply voltage. For example, the LB1930M can be used with  $V_{CC} = 3 \text{ V}$ , and  $V_{IN} = 5 \text{ V}$ .

- If the IC chip exceeds  $180^\circ\text{C}$  due to an output short causing a large current flow, the built-in thermal protection circuit suppresses the drive current to prevent fires or destruction of the IC.
- MFP-10S miniature package. Also, the LB1930M features the high allowable power dissipation of  $P_d = 800 \text{ mW}$ .

### Package Dimensions

unit: mm

#### 3148-MFP10S



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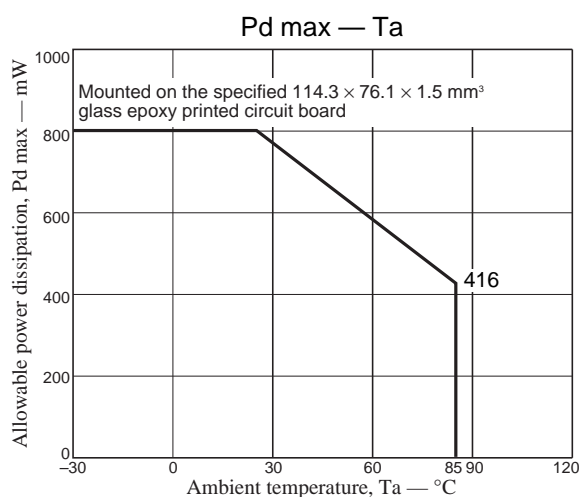
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## Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$ max		11	V
Output current	$I_{OUT}$ max		1000	mA
Output voltage handling	$V_{OUT}$ max		$V_{CC} + V_{SF}$	V
Applied input voltage	$I_H$ max		10.5	V
Allowable power dissipation	$P_d$ max	Mounted on the specified printed circuit board*	800	mW
Operating temperature	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

Note \*:  $114.3 \times 76.1 \times 1.5$  mm<sup>3</sup> glass epoxy printed circuit board



### Allowable Operating Ranges at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		2.2 to 10.8	V
High-level input voltage	$V_{IH}$		2.0 to 10	V
Low-level input voltage	$V_{IL}$		-0.3 to +0.3	V

### Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 3$ V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	$I_{CC1}$	Standby mode		0.1	5	$\mu\text{A}$
	$I_{CC2}$	Forward or reverse drive operation		15	21	mA
	$I_{CC3}$	Braking		22	31	mA
Output saturation voltage	$V_O$ (sat)1	Forward or reverse drive: High side + low side, $I_O = 200$ mA		0.25	0.35	V
	$V_O$ (sat)2	Forward or reverse drive: High side + low side, $I_O = 500$ mA		0.55	0.75	V
	$V_O$ (sat)3	Forward or reverse drive: High side only, $I_O = 200$ mA		0.15	0.25	V
Spark killer diode forward voltage	$V_{SF}$	$I_O = 200$ mA		0.9	1.7	V
Spark killer diode reverse current	$I_{RS}$	$V_{OUT} = 10$ V		0.1	5	$\mu\text{A}$
Input current	$I_{IN}$	$V_{IN} = 5$ V		70	95	$\mu\text{A}$
Thermal detection operating temperature	THD	Design target value*	150	180	200	$^\circ\text{C}$

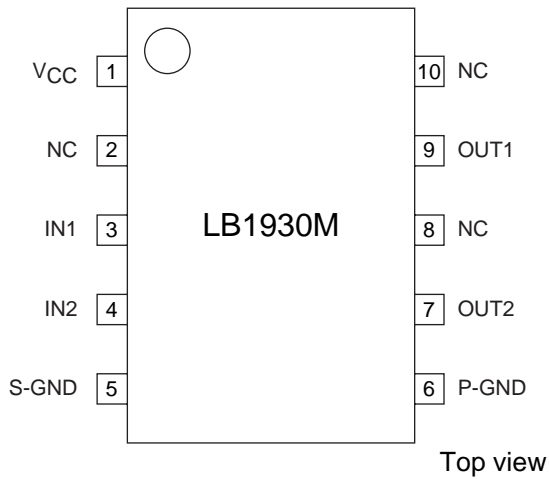
Note \*: This value is a design guarantee and is not measured.

# LB1930M

## Truth Table

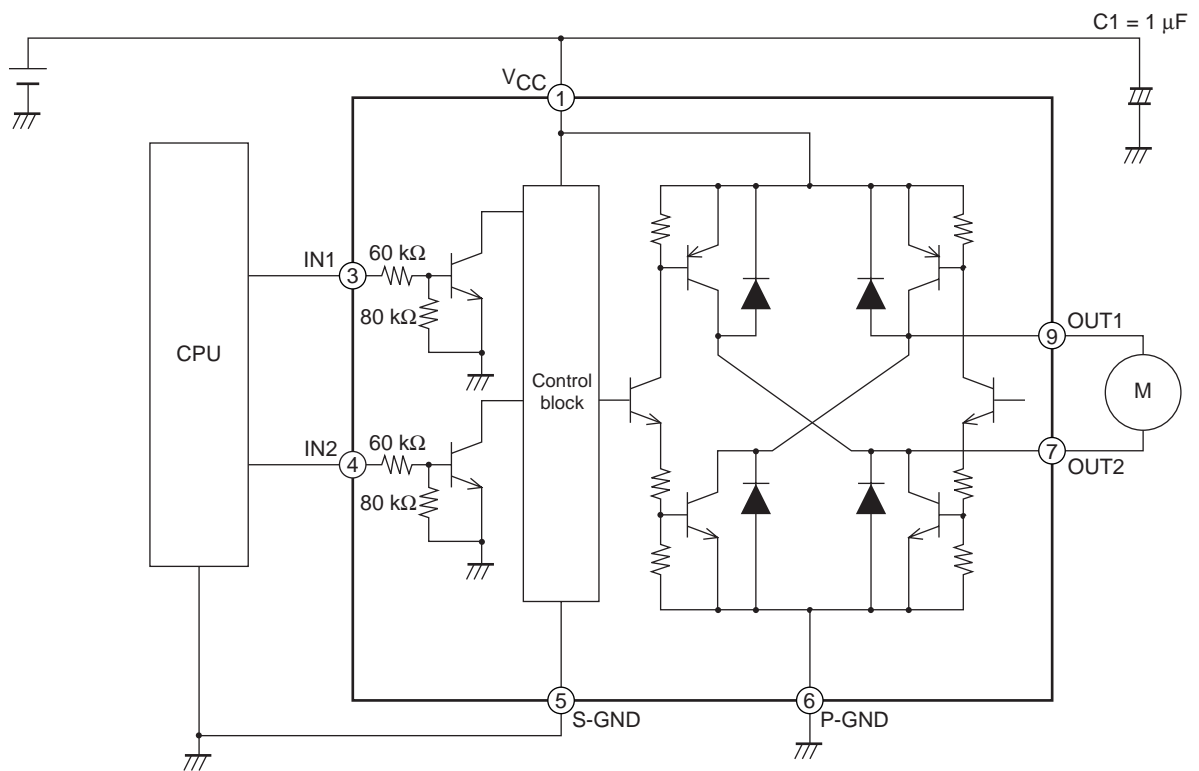
IN1	IN2	OUT1	OUT2	Mode
L	L	OFF	OFF	Standby
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	H	H	Brake

## Pin Assignment



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## Block Diagram and Sample Application Circuit



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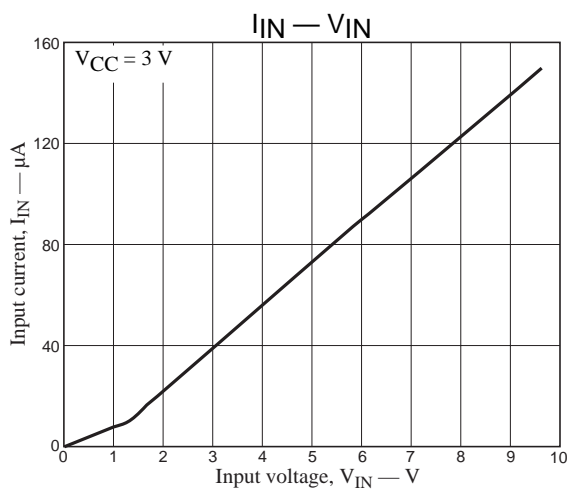
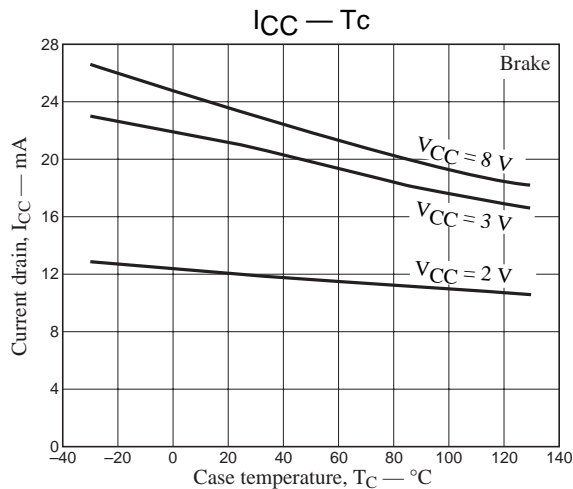
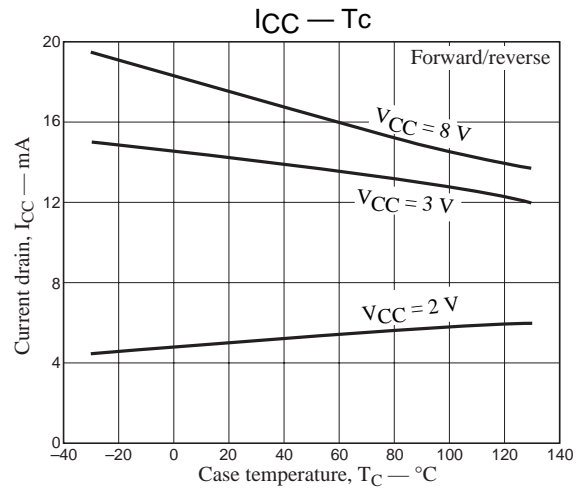
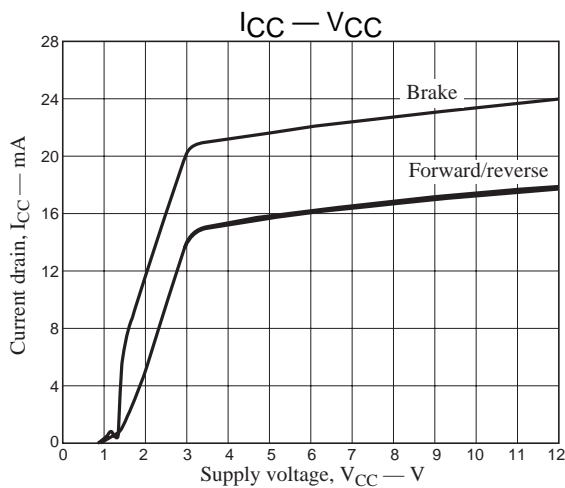
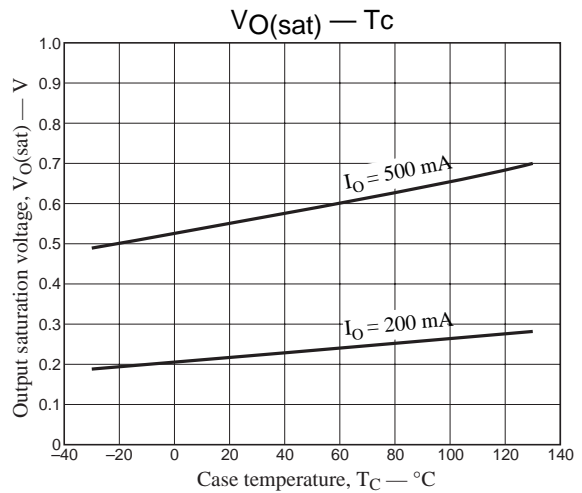
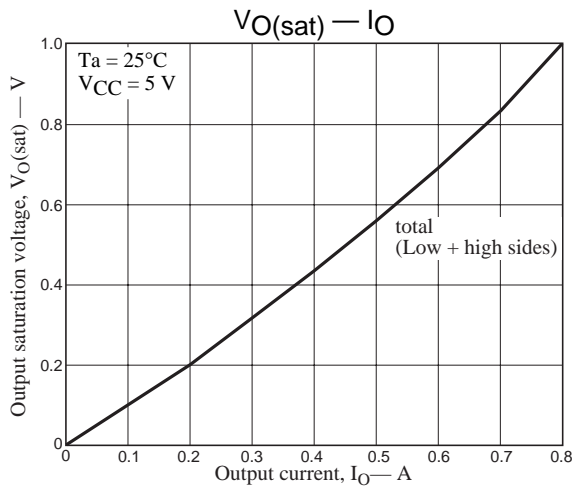
Usage Notes

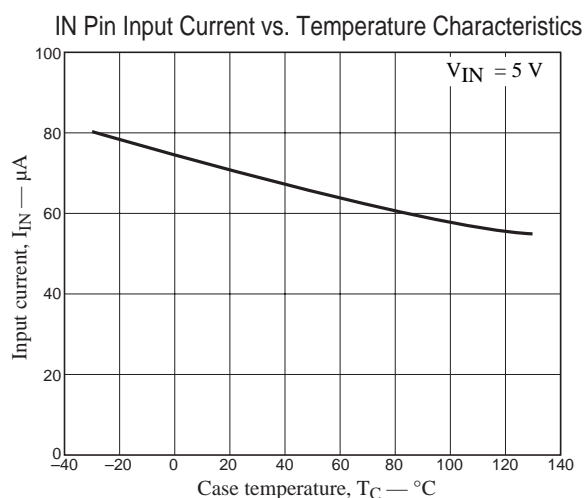
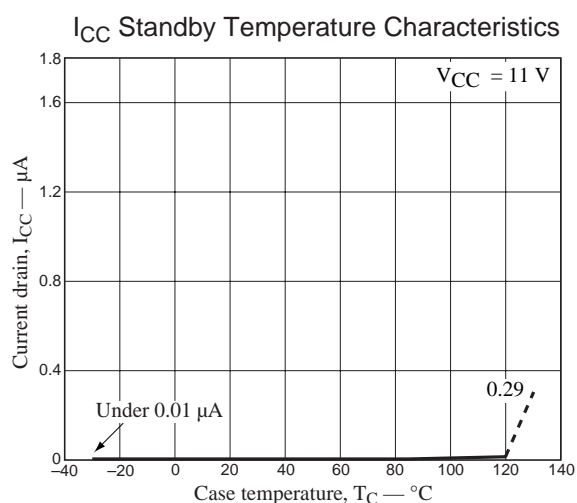
Oscillation may occur in the  $V_{CC}$  and P-GND lines, since these lines carry a wide range of currents. The following may help if this is a problem.

- Lower the inductance of the wiring by making lines wider and shorter.
- Insert capacitors with good frequency characteristics close to the IC.
- Consider adopting the following methods if the CPU and this IC are mounted on different printed circuit boards that could easily have different ground potentials.

Connect S-GND to the CPU ground and connect P-GND to the power system ground.

Insert resistors of about 10 k $\Omega$  in series between the controller outputs and the inputs on this IC.





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