

**SANYO****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.

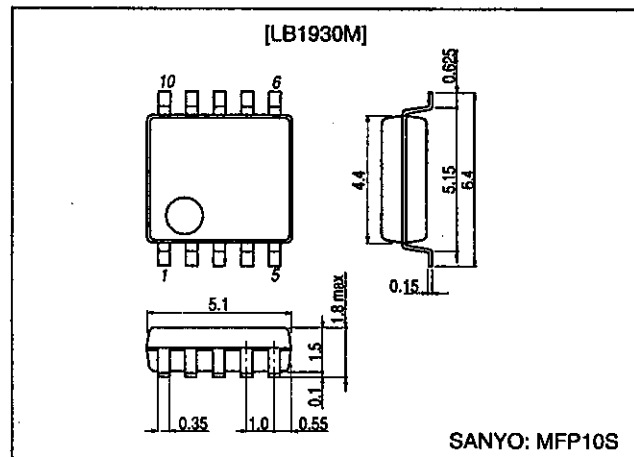
**Functions and Features**

- 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:
    - Vsat1 = 0.25 V typical ( $I_O = 0.2$  A)
    - (High side + low side):
    - Vsat2 = 0.55 V typical ( $I_O = 0.5$  A)
  - Operating temperature range:
    - Ta = -30 to +85°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  $\mu$ 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  $V_{CC} = 3$  V, and  $V_{IN} = 5$  V.

- If the IC chip exceeds 180°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  $P_d = 800$  mW.

**Package Dimensions**

unit: mm

**3148-MFP10S**

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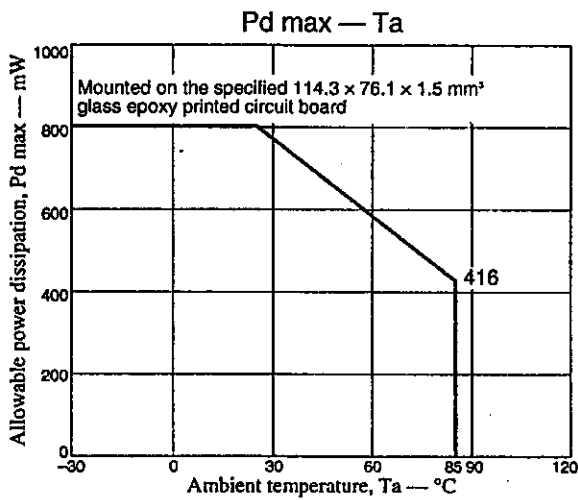
# LB1930M

## Specifications

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

Parameter	Symbol	Conditions	Rating	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 \*:  $114.3 \times 76.1 \times 1.5 \text{ mm}^3$  glass epoxy printed circuit board



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

Parameter	Symbol	Conditions	Rating	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 $T_a = 25^\circ\text{C}$ , $V_{CC} = 3 \text{ V}$

Parameter	Symbol	Conditions	Rating			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	$V_O(\text{sat})1$	Forward or reverse drive: High side + low side, $I_O = 200 \text{ mA}$		0.25	0.35	V
	$V_O(\text{sat})2$	Forward or reverse drive: High side + low side, $I_O = 500 \text{ mA}$		0.55	0.75	V
	$V_O(\text{sat})3$	Forward or reverse drive: High side only, $I_O = 200 \text{ mA}$		0.15	0.25	V
Spark killer diode forward voltage	$V_{SF}$	$I_O = 200 \text{ mA}$		0.9	1.7	V
Spark killer diode reverse current	$I_{RS}$	$V_{OUT} = 10 \text{ V}$		0.1	5	$\mu\text{A}$
Input current	$I_{IN}$	$V_{IN} = 5 \text{ V}$		70	95	$\mu\text{A}$
Thermal detection operating temperature	THD	Design target value*	150	180	200	$^\circ\text{C}$

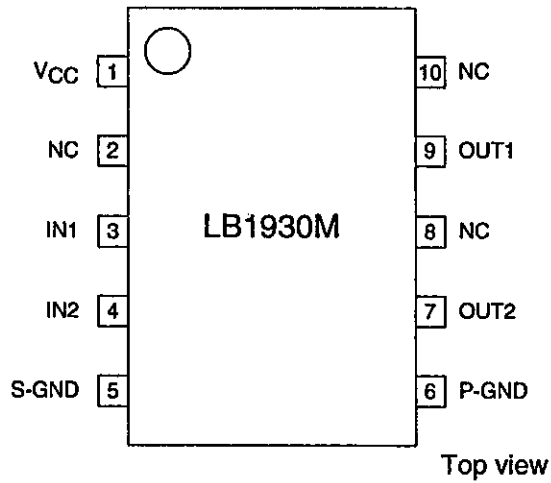
Note \*: This value is a design guarantee and is not measured.

# LB1930M

## Truth Table

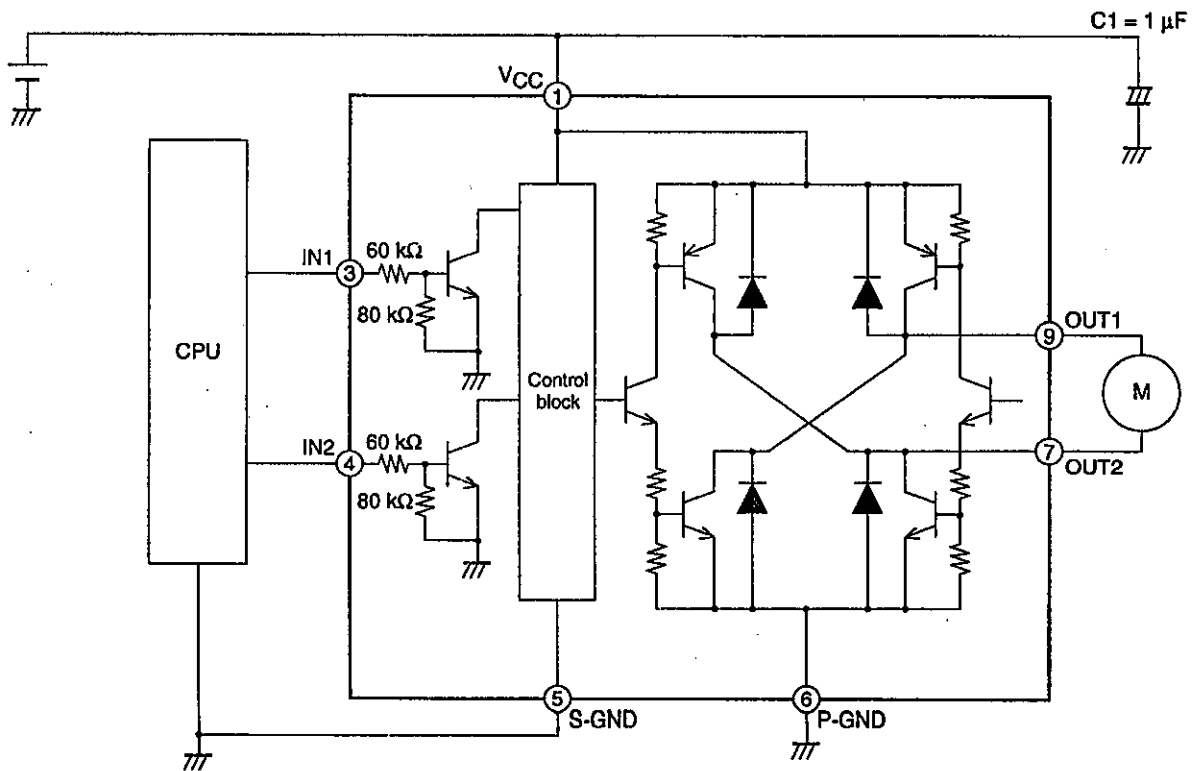
IN1	IN2	OUT1	OUT2	Mode
L	L	OFF	OFF	Standby
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	H	H	Brake

## Pin Assignment



A11865

## Block Diagram and Sample Application Circuit



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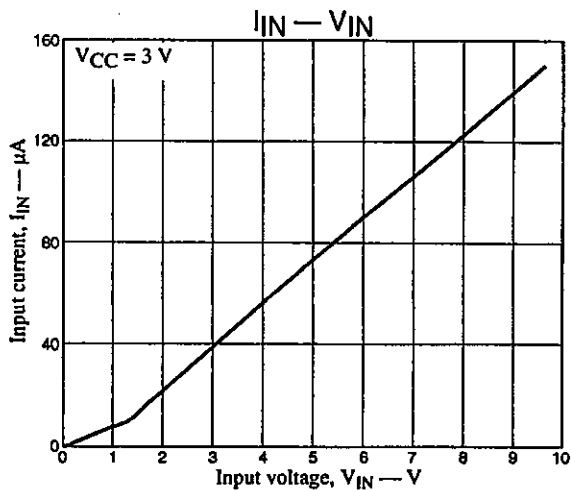
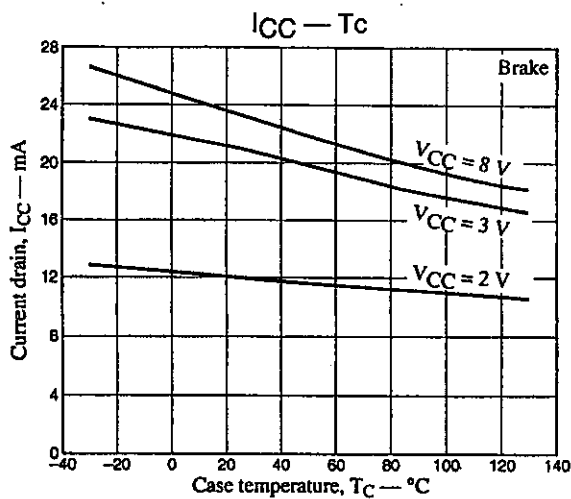
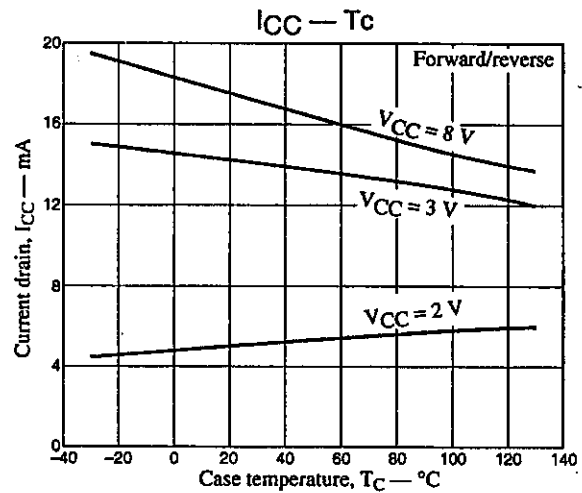
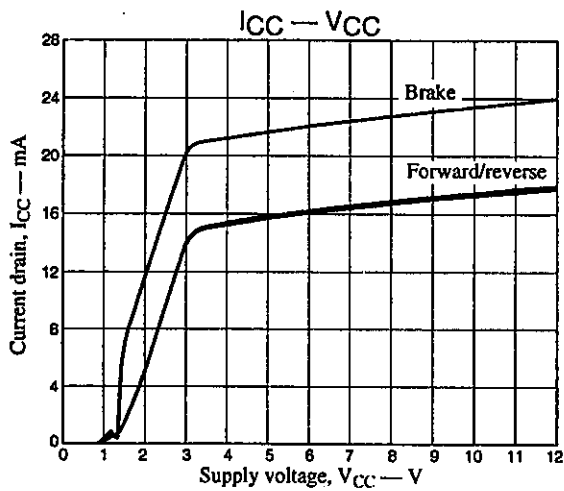
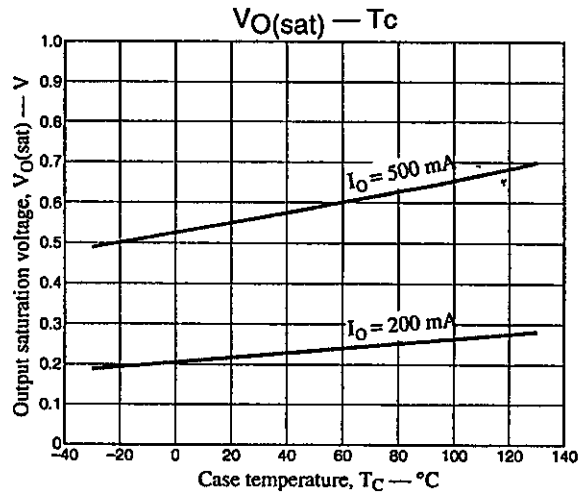
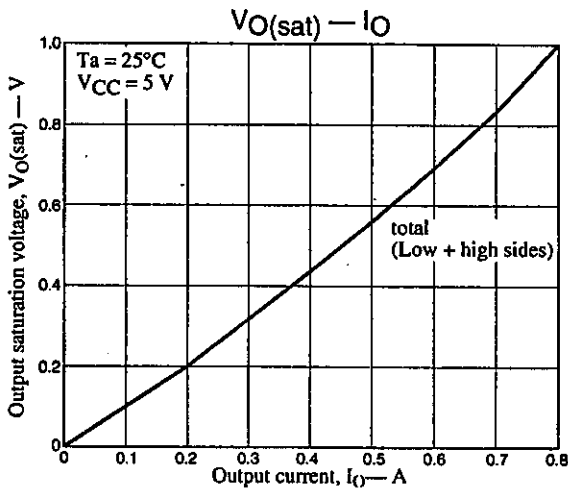
Usage Notes

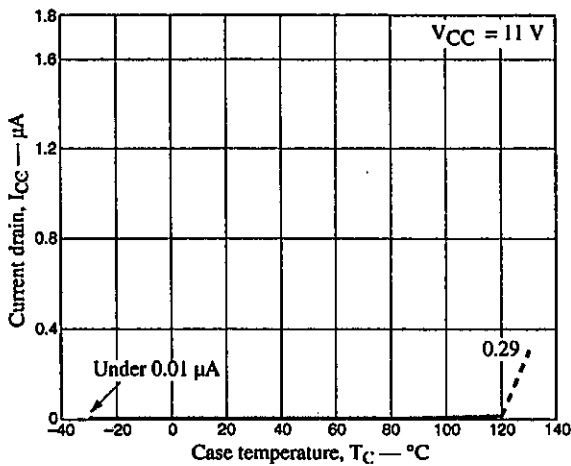
Oscillation may occur in the  $V_{CC}$  and P-GND lines, since these lines carry a wide range of currents. The following may help if this is a problem.

- 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.

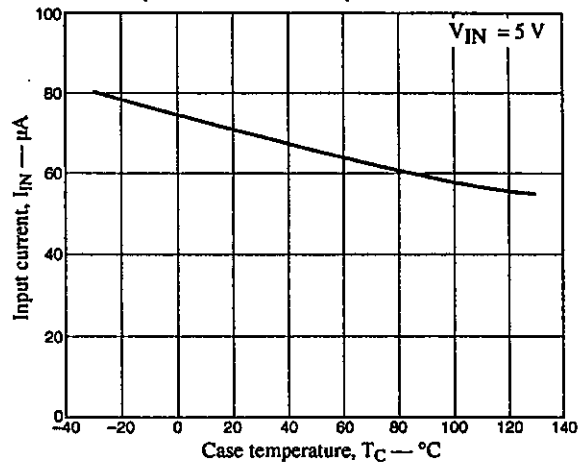
Connect S-GND to the CPU ground and connect P-GND to the power system ground.

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



$I_{CC}$  Standby Temperature Characteristics

IN Pin Input Current vs. Temperature Characteristics



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