



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LB1930M

Monolithic Digital IC

Low-Voltage, Low-Saturation

Bidirectional Motor Driver

Overview

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

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: $V_{sat1} = 0.25V$ typical ($I_O = 0.2A$)
 - (High side + low side): $V_{sat2} = 0.55V$ typical ($I_O = 0.5A$)
 - Operating temperature range: $T_a = -30$ to $+85^\circ C$
- The LB1930M features the wide operating voltage range of 2.2 to 10.8V 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 $V_{CC} = 3V$, and $V_{IN} = 5V$.
- If the IC chip exceeds $180^\circ C$ 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 $P_d = 800mW$.

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ C$

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

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Parameter	Symbol	Conditions	Ratings	Unit
Allowable power dissipation	Pd max	Mounted on a specified board *	800	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

* Specified board: 114.3mm × 76.1mm × 1.5mm, glass epoxy board.

Allowable Operating Ranges at Ta = 25°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 Ta = 25°C, V_{CC} = 3V

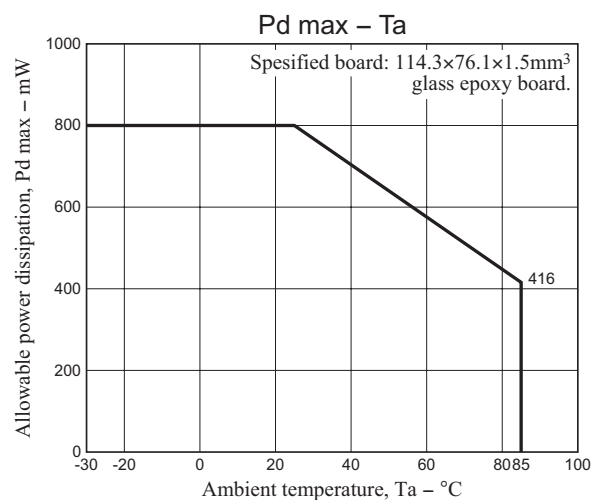
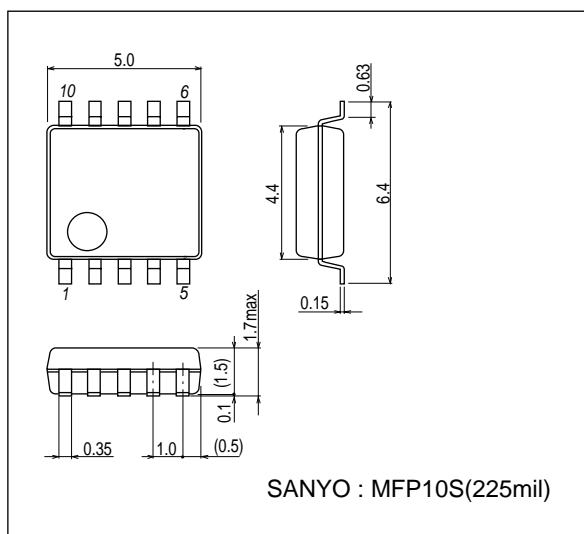
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I _{CC1}	Standby mode		0.1	5	μA
	I _{CC2}	Forward or reverse drive operation		15	21	mA
	I _{CC3}	Braking		22	31	mA
Output saturation voltage	V _{O(sat)1}	Forward or reverse drive: High side + low side, I _O = 200mA		0.25	0.35	V
	V _{O(sat)2}	Forward or reverse drive: High side + low side, I _O = 500mA		0.55	0.75	V
	V _{O(sat)3}	Forward or reverse drive: High side only, I _O = 200mA		0.15	0.25	V
Input current	I _{IN}	V _{IN} = 5V		70	95	μA
Thermal detection operating temperature	THD	Design guarantee value*	150	180	200	°C
Spark killer diode						
Forward voltage	V _{SF}	I _O = 200mA		0.9	1.7	V
Reverse current	I _{RS}	V _{OUT} = 10V		0.1	5	μA

* Design guarantee value, Do not measurement.

Package Dimensions

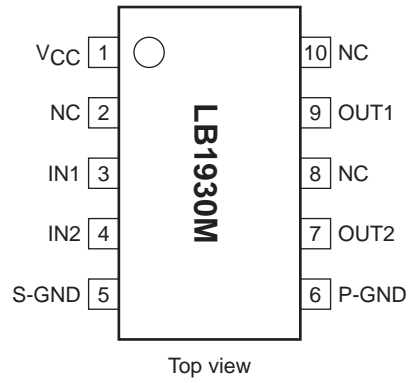
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3086B

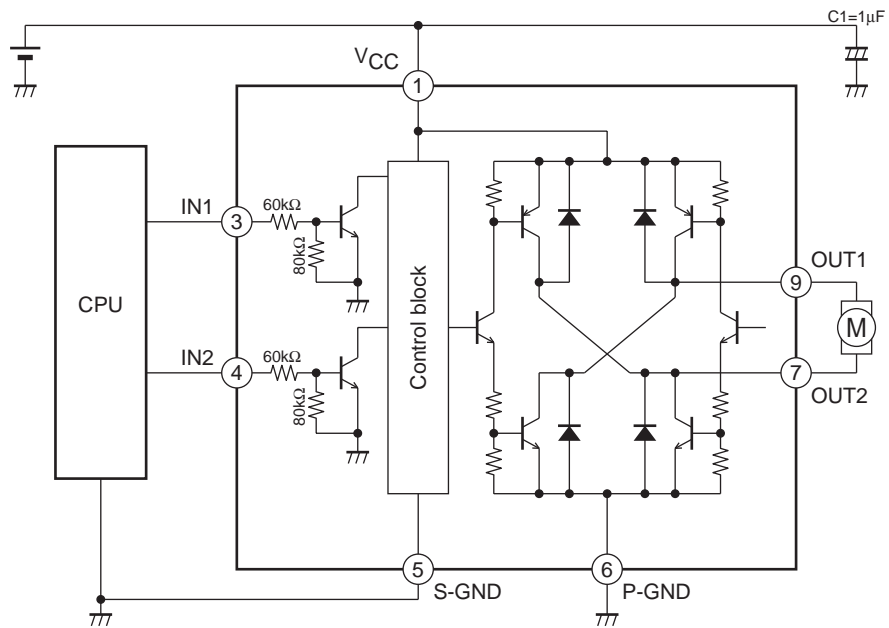


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Pin Assignment



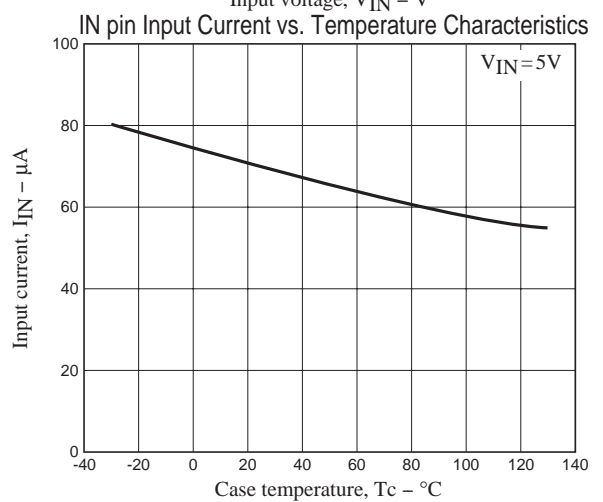
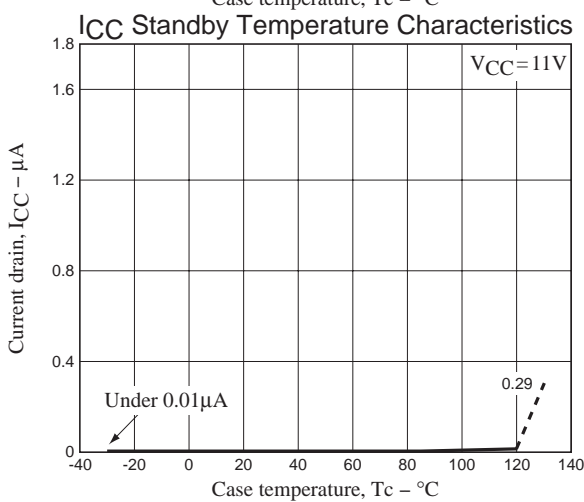
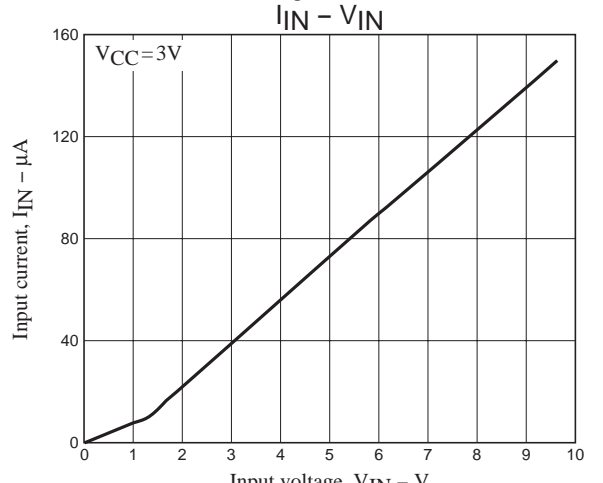
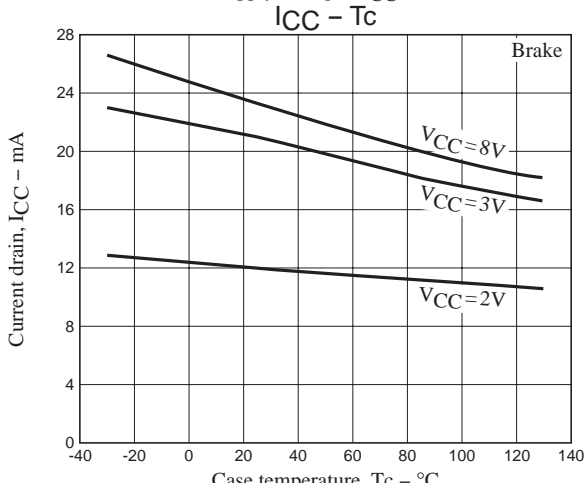
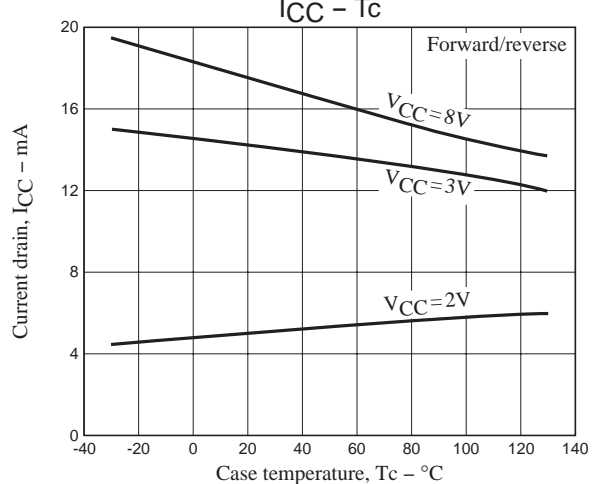
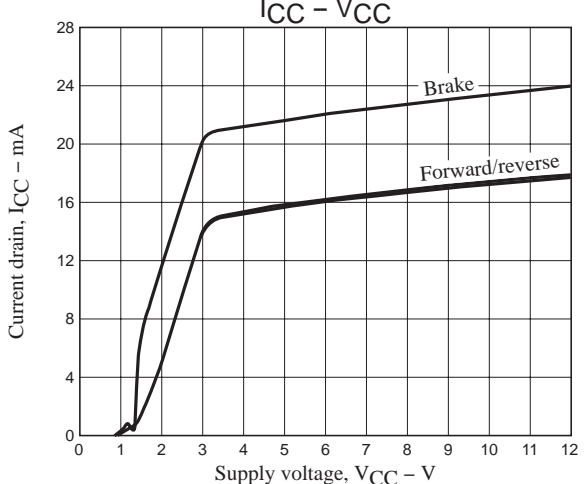
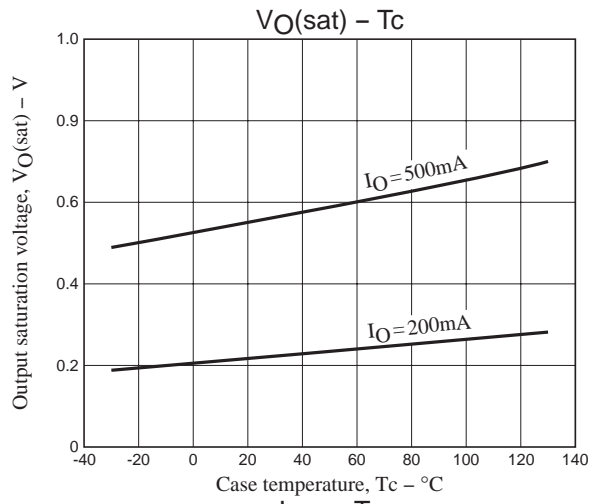
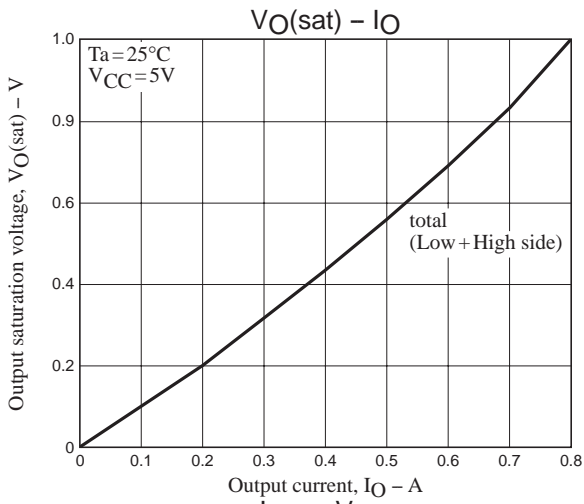
Block Diagram and Application Circuit Example



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

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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.

- (1) Lower the inductance of the wiring by making lines wider and shorter.
- (2) Insert capacitors with good frequency characteristics close to the IC.
- (3) 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 $10k\Omega$ in series between the controller outputs and the inputs on this IC.

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