Ordering number : EN6068A

Monolithic digital IC

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.

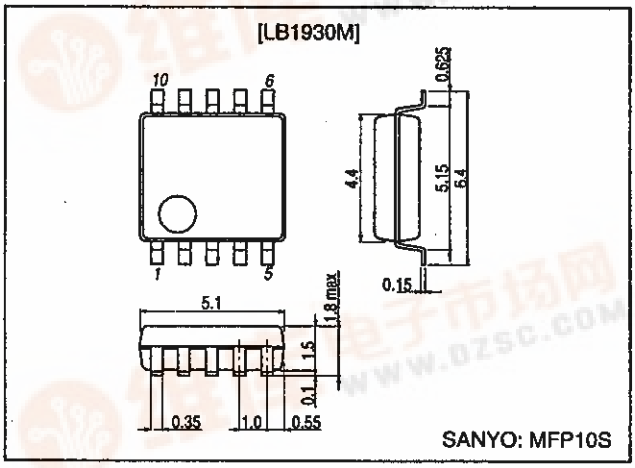
Functions and Features

- 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 μA, 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 Pd = 800 mW.

Package Dimensions

unit: mm

3148-MFP10S



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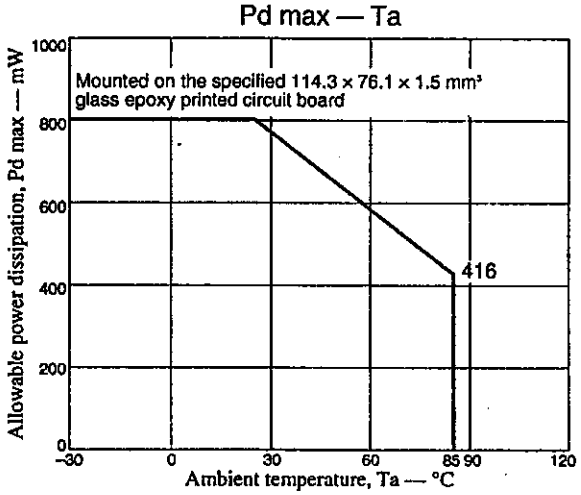
Specifications

Absolute Maximum Ratings at Ta = 25°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		Vcc + V_{SF}	V
Applied input voltage	I_H max		10.5	V
Allowable power dissipation	Pd max	Mounted on the specified printed circuit board*	800	mW
Operating temperature	Topr		−30 to +85	°C
Storage temperature	Tstg		−55 to +150	°C

Note *: 114.3 × 76.1 × 1.5 mm³ glass epoxy printed circuit 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} = 3 V

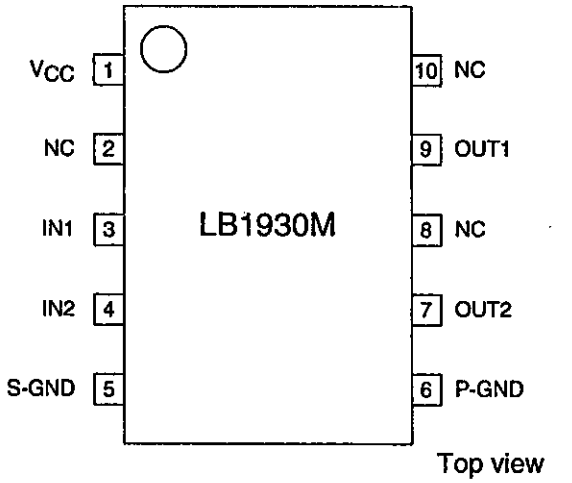
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	$I_{CC}1$	Standby mode		0.1	5	μA
	$I_{CC}2$	Forward or reverse drive operation		15	21	mA
	$I_{CC}3$	Braking		22	31	mA
Output saturation voltage	V_O (sat)1	Forward or reverse drive: High side + low side, I_O = 200 mA		0.25	0.35	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	μA
Input current	I_{IN}	V_{IN} = 5 V		70	95	μA
Thermal detection operating temperature	THD	Design target value*	150	180	200	°C

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

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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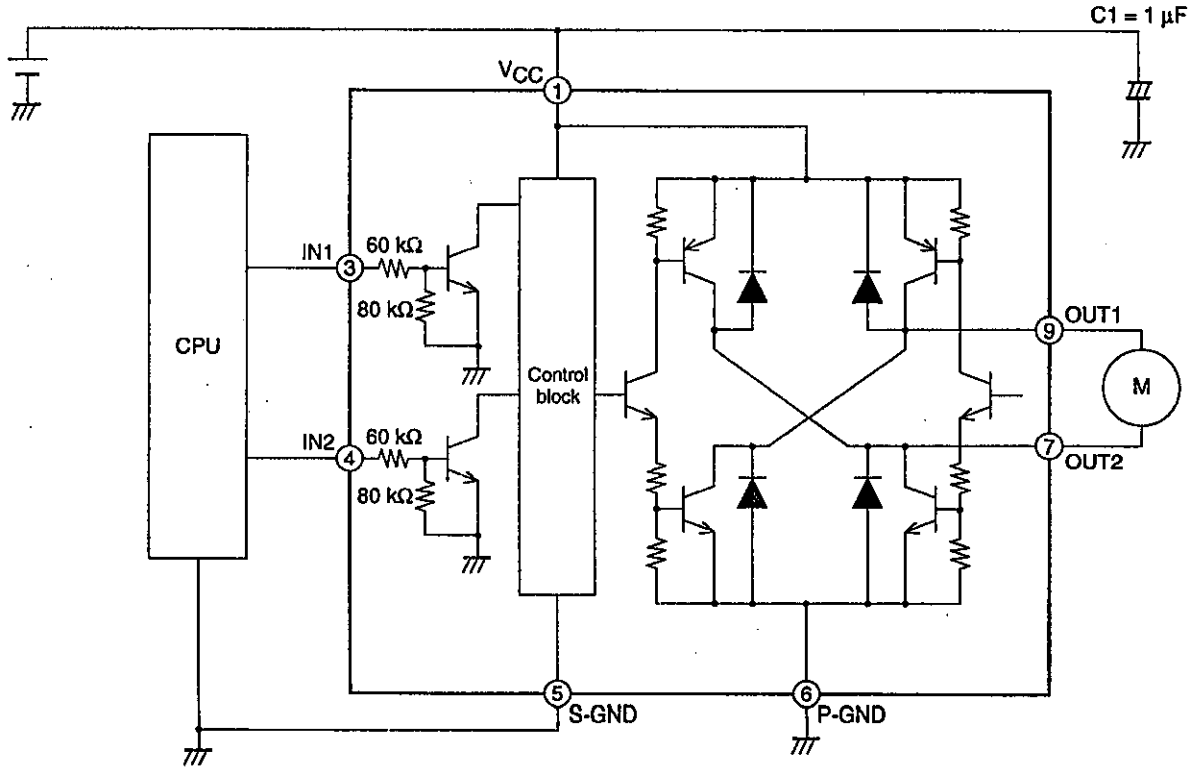
Block Diagram and Sample Application Circuit



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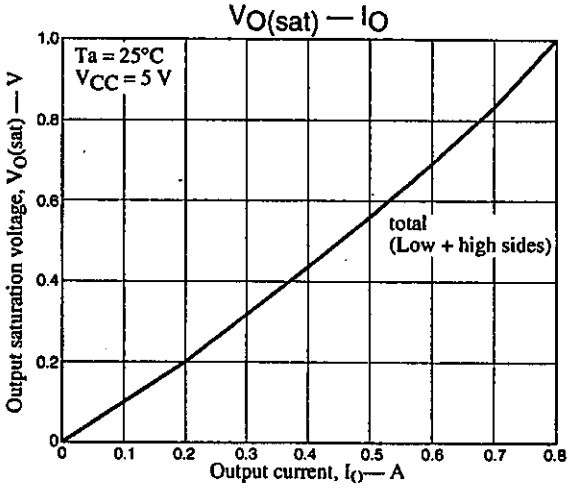
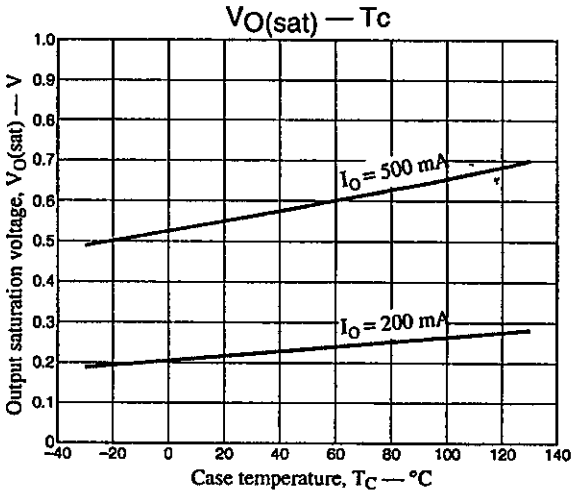
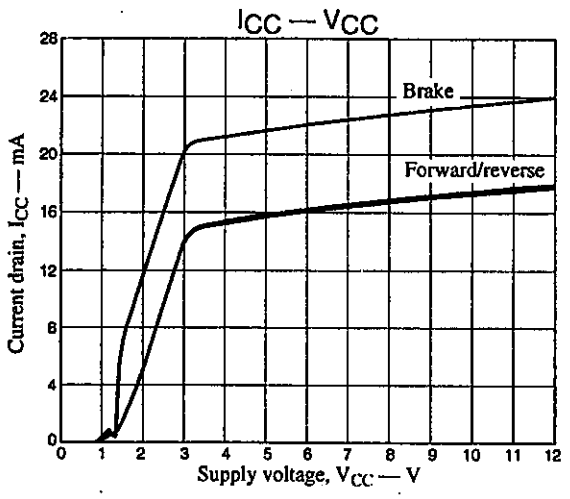
Usage Notes

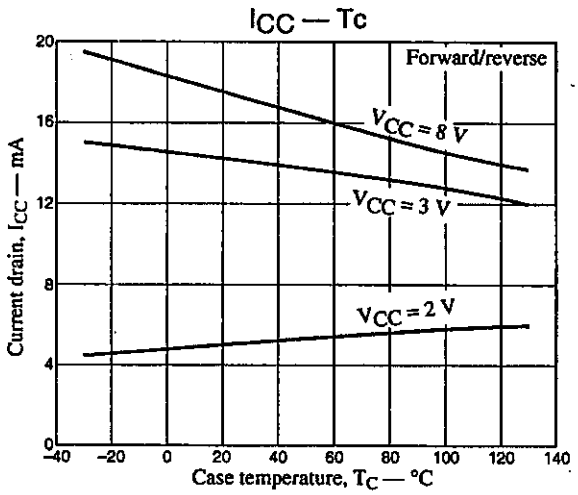
Oscillation may occur in the V_{CC} and P-GND lines, since these lines carry a wide range of currents. The following may help if this is a problem.

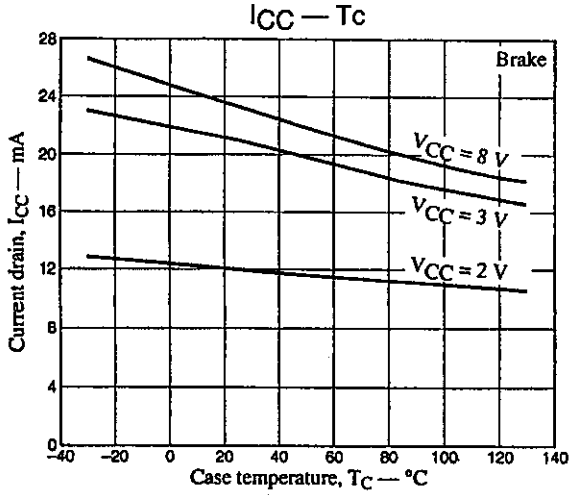
- Lower the inductance of the wiring by making lines wider and shorter.
- Insert capacitors with good frequency characteristics close to the IC.
- Consider adopting the following methods if the CPU and this IC are mounted on different printed circuit boards that could easily have different ground potentials.
  Connect S-GND to the CPU ground and connect P-GND to the power system ground.
  Insert resistors of about 10 kΩ in series between the controller outputs and the inputs on this IC.

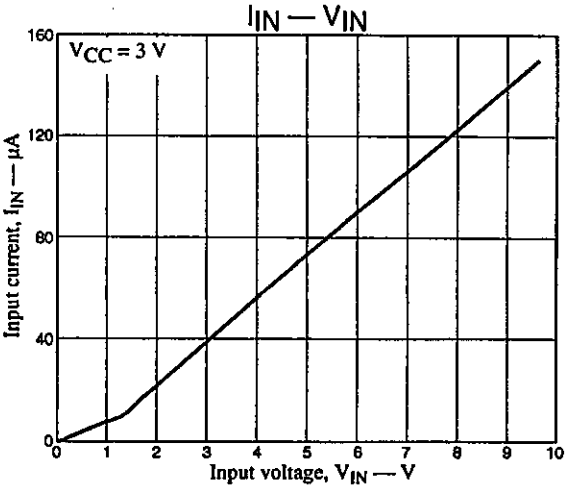




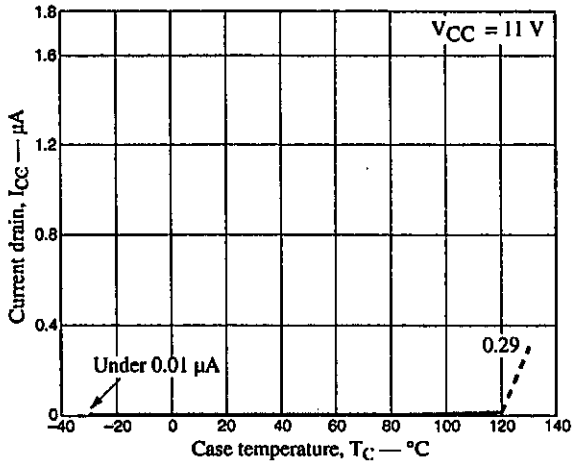








I_{CC} Standby Temperature Characteristics



IN Pin Input Current vs. Temperature Characteristics