



LB1938T

1ch, Low-saturation Forward/Reverse Motor Driver

Overview

The LB1938T is an H-bridge motor driver that supports low-voltage drive and features low-saturation outputs in an ultraminiature slim package. The LB1938T provides forward, reverse, brake, and standby modes controlled by two input signals, and is an optimal DC motor driver for notebook personal computers, digital cameras, cell phones, and other portable equipment.

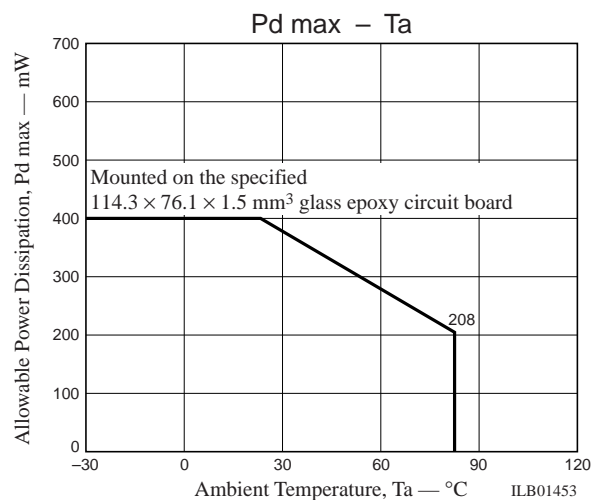
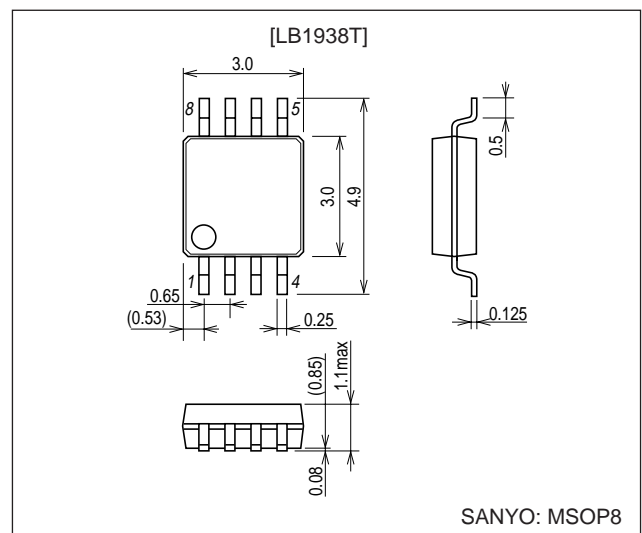
Functions and Features

- Ultraminiature MSOP-8 package (3.0 × 4.9 × 0.93 mm)
- The low saturation voltage means that the voltage applied to the motor is higher and IC heat generation is reduced. This allows this IC to be used in environments with higher ambient operating temperatures.
Output saturation voltage (high side + low side): $V_{O\text{sat}} = 0.15\text{ V}$ typical ($I_O = 100\text{ mA}$)
- The wide usable voltage range and the low standby mode current drain of $0.1\text{ }\mu\text{A}$ make this IC optimal for battery operated equipment.
- There are no constraints on the relationship between the input signal voltage and the supply voltage. For example, this IC can be used at $V_{CC} = 3\text{ V}$ and $V_{IN} = 5\text{ V}$.
- Thermal protection circuit limits the drive current and prevents the IC from causing a fire or being destroyed if the IC chip temperature reaches or exceeds 180°C due to large currents flowing when the outputs are shorted due to, for example, motor layer shorting or other phenomena.

Package Dimensions

unit: mm

3245A-MSOP8



■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

SANYO Electric Co., Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

LB1938T

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC} max		10.5	V
Allowable Power dissipation	Pd max	Mounted on a board *	400	mW
Output current	I _{OUT} max		800	mA
Output voltage	V _{OUT} max		V _{CC} + V _{SF}	V
Input applied voltage	V _{IH} max		10	V
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

Note: * Mounted on the specified board (114.3 × 76.1 × 1.5 mm³: Glass epoxy, wiring density 20%)

Allowable Operating Range at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC}		2.2 to 10	V
Input high-level voltage	V _{IH}		2.0 to 9.5	V
Input low-level voltage	V _{IL}		-0.3 to +0.3	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 3 V

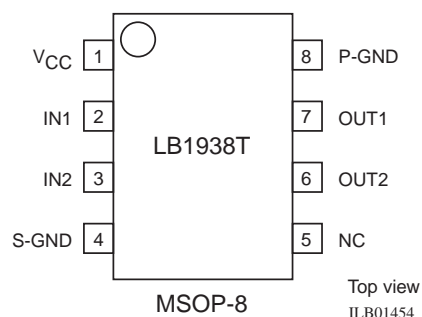
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit Current	I _{CC1}	Standby		0.1	5	μA
	I _{CC2}	Forward/reverse drive		14	19	mA
	I _{CC3}	Brake		20	29	mA
Output saturation voltage	V _{OSat1}	Upper+lower I _O = 100 mA for forward/ reverse rotation		0.15	0.2	V
	V _{OSat2}	Upper+lower I _O = 300 mA for forward/ reverse rotation		0.35	0.5	V
	V _{OSat3}	Upper I _O = 100 mA for braking		0.1	0.15	V
Spark killer diode forward voltage	V _{SF}	I _O = 300 mA		0.9	1.7	V
Spark killer diode inverse current	I _{RS}	V _{OUT} = 10 V		0.1	5	μA
Input current	I _{IN}	V _{IN} = 5 V		75	98	μA
Thermal protection operating temperature	TSD	Design target value*		180		°C

Note: * Design target value : Measurement with a single unit not made.

Truth Table

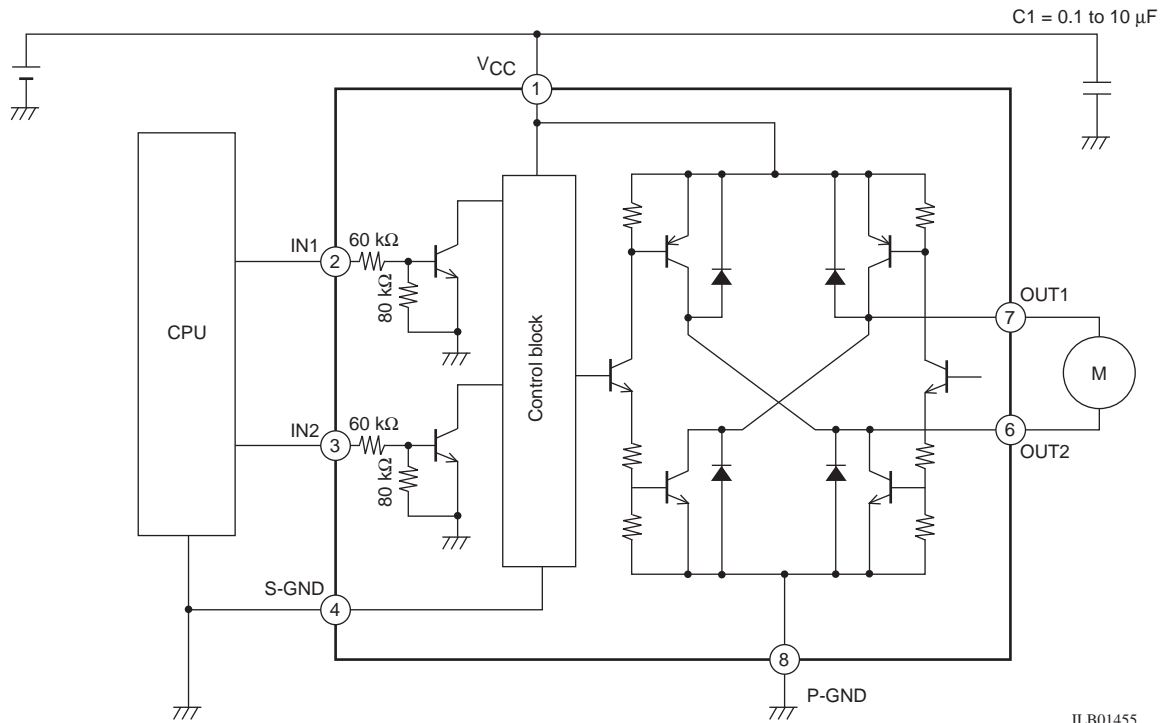
IN1	IN2	OUT1	OUT2	Mode
L	L	OFF	OFF	Standby
H	L	H	L	Forward rotation
L	H	L	H	Reverse rotation
H	H	H	H	Brake

Pin Assignment



S-GND: GND for the control system
P-GND: GND for the power system

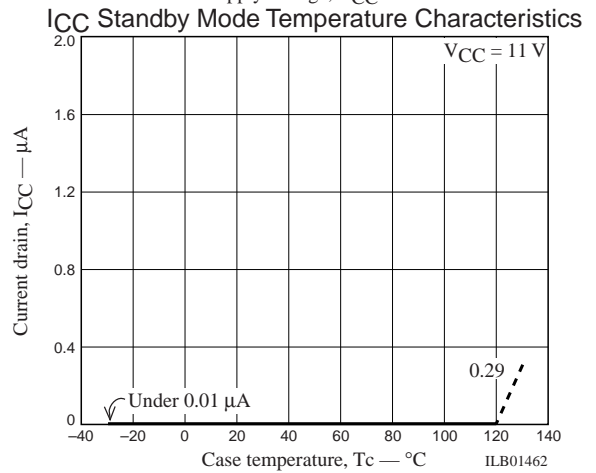
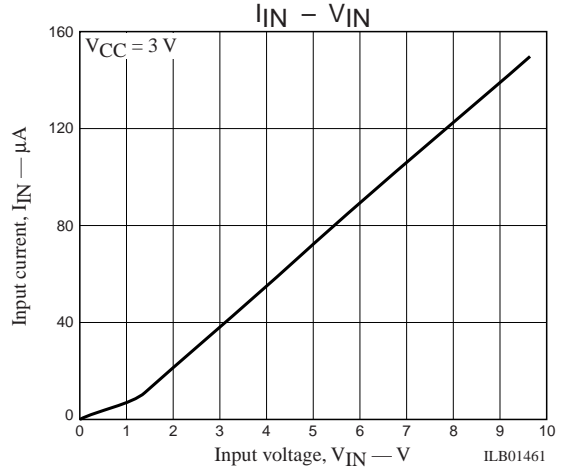
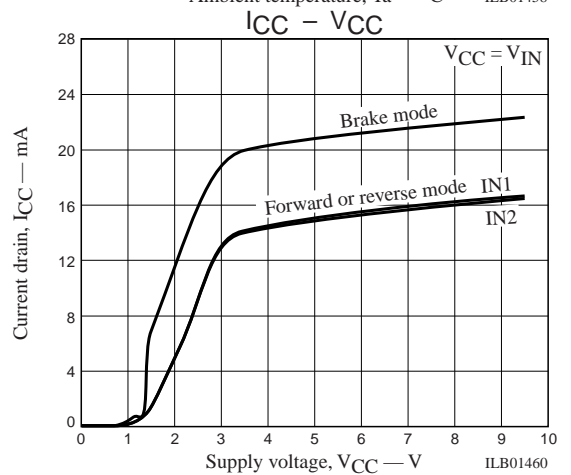
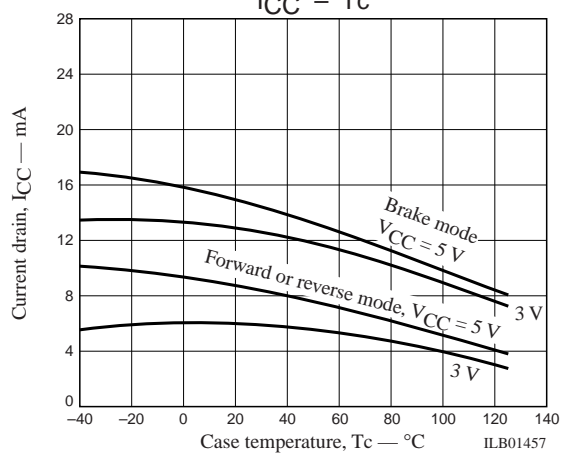
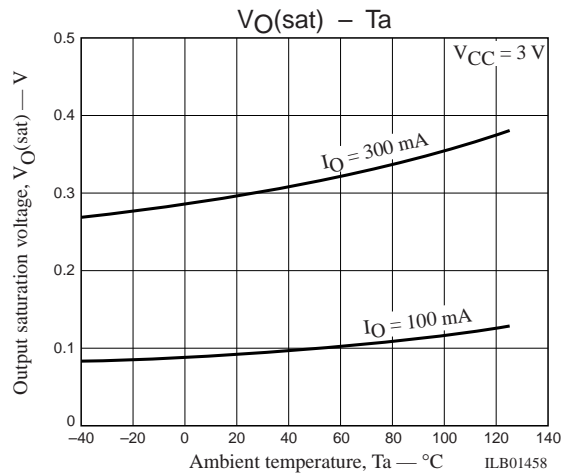
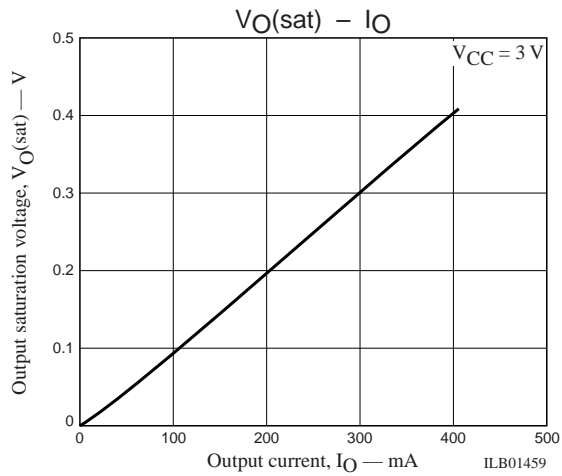
Sample Application Circuit



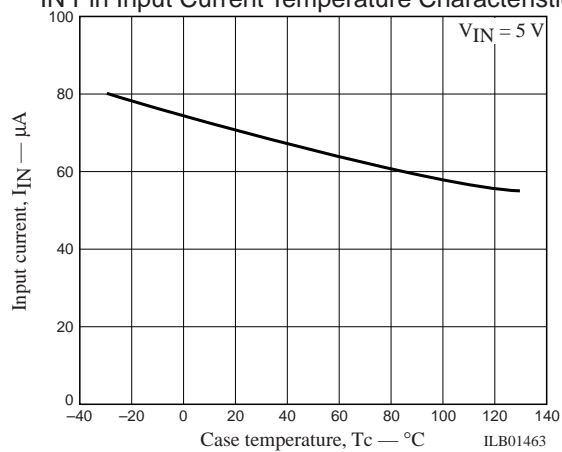
ILB01455

Cautions:

- V_{CC} and GND lines suffer substantial fluctuation in the current quantity, causing a problem of line oscillation in certain cases. In this case, take following points into account:
 - (1) Use a thick and short wiring to reduce the wiring inductance.
 - (2) Insert a capacitor with satisfactory frequency characteristics near IC.
 - (3) Connect S-GND to the control system GND on the CPU side and P-GND to the power system GND.



IN Pin Input Current Temperature Characteristics



- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of September, 2003. Specifications and information herein are subject to change without notice.