


**SANYO Semiconductors**

# DATA SHEET

An ON Semiconductor Company

Monolithic Digital IC

## LB1909M — Stepping Motor Driver IC

### Overview

The LB1909M is a 2-channel low saturation voltage forward/reverse motor driver that can operate on a wide supply voltage range (2.5V to 16V). The IC is ideal for use in 2-phase excitation drive of general-purpose 2-phase bipolar stepping motors including dampers for refrigerators.

### Features

- Wide supply voltage range : 2.5V to 16V
- Low saturation voltage :  $V_{O(sat)} = 0.25V$  typ at  $I_O = 200mA$ .
- Built-in shoot-through current protection circuit.
- No standby current consumption (or zero).
- Built-in thermal shutdown circuit.
- Small package : MFP10S (225mil)

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power source voltage	$V_{CC \text{ max}}$		-0.3 to +20	V
Applied output voltage	$V_{OUT \text{ max}}$		-0.3 to +20	V
Applied input voltage	$V_{IN \text{ max}}$		-0.3 to +18	V
GND pin outflow current	$I_{GND}$		800	mA
Allowable power consumption	$P_d \text{ max}$	Independent IC	350	mW
		Mounted on the specified board *	870	mW
Operating temperature	$T_{opr}$		-30 to +85	$^\circ C$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ C$

\* Specified board: 114.3mm × 76.1mm × 1.6mm, glass epoxy board.

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co., Ltd.**
<http://semicon.sanyo.com/en/network>

# LB1909M

## Allowable Operating Range at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V <sub>CC</sub>		2.5 to 16	V
Input high level voltage	V <sub>IH</sub>	Pins ENA, IN1, IN2	1.8 to 10	V
Input low level voltage	V <sub>IL</sub>		-0.3 to +0.7	V

## Electrical Characteristics at Ta = 25°C, V<sub>CC</sub> = 12V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Power source current	I <sub>CC0</sub>	ENA = L		0.1	10	μA
	I <sub>CC1</sub>	ENA = H		25	35	mA
Output saturation voltage	V <sub>OUT1</sub>	I <sub>OUT</sub> = 200mA		0.25	0.35	V
	V <sub>OUT2</sub>	I <sub>OUT</sub> = 400mA		0.50	0.75	V
Input current	I <sub>IN</sub>	V <sub>IN</sub> = 5V		120	160	μA
Thermal protection block *1						
Thermal shutdown operation temperature	T <sub>tsd</sub>	Design guarantee *2		180		°C
Temperature hysteresis width	ΔT <sub>tsd</sub>			60		°C
Spark killer diode						
Reverse current	I <sub>S</sub> (leak)				30	μA
Forward voltage	V <sub>SF</sub>	I <sub>OUT</sub> = 400mA			1.7	V

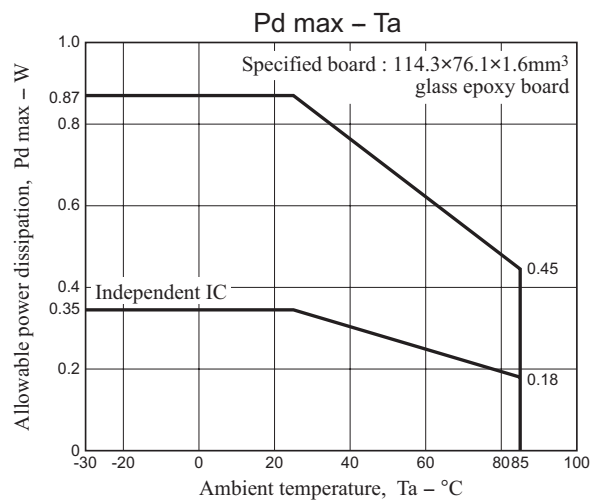
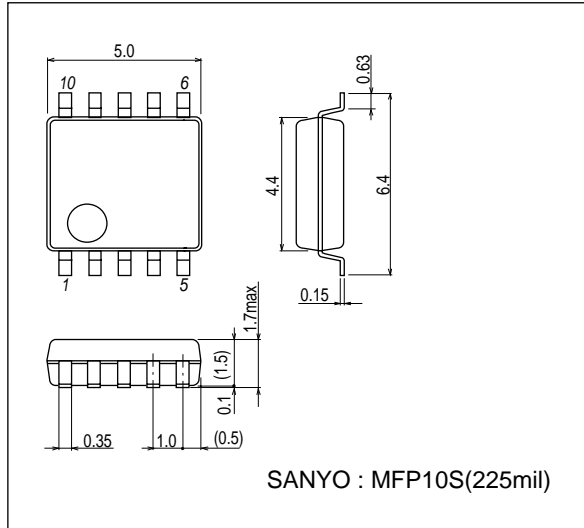
\*1 The thermal protection function is a feature to prevent the product from smoking and firing under unusual conditions. It is not intended to guarantee operation of the product under an ambient temperature exceeding the operating temperature range.

\*2 Design guarantee is not tested in individual units.

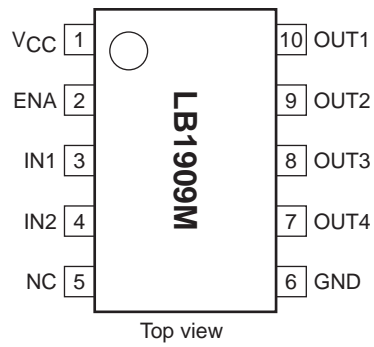
## Package Dimensions

unit : mm (typ)

3086B



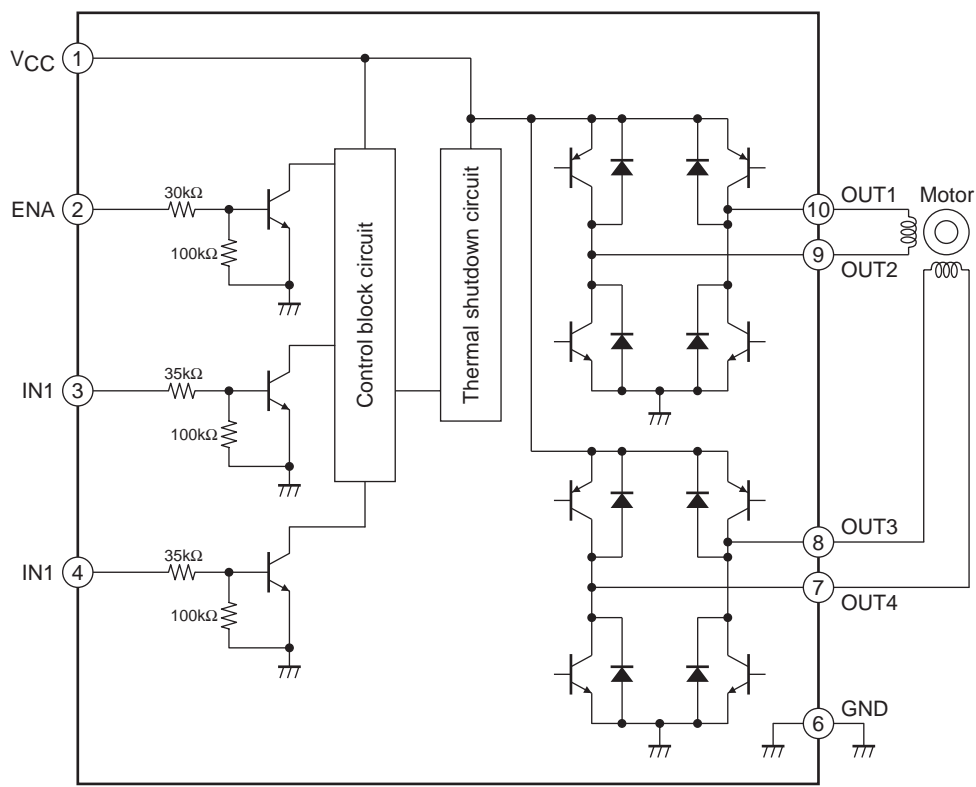
Pin Assignment

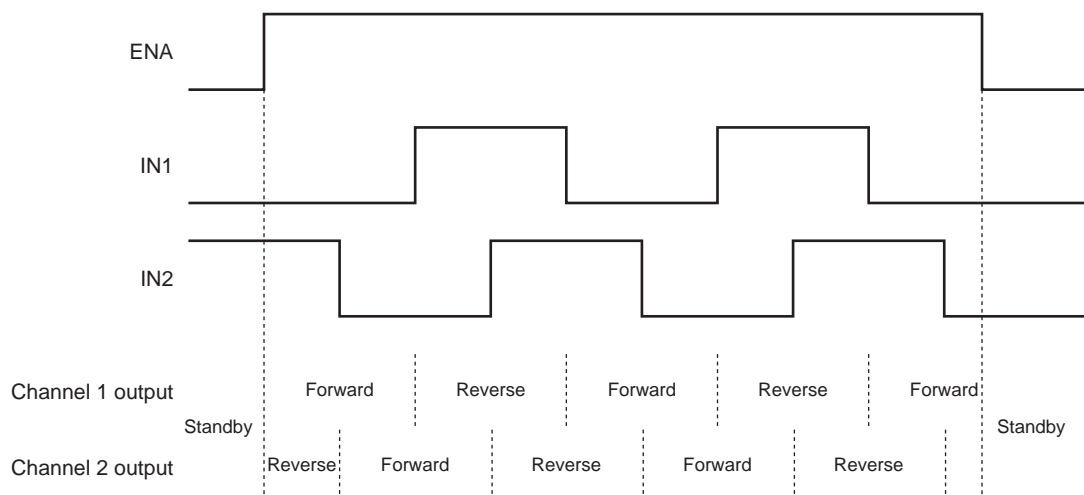


Truth table

Input			Output				Remarks	
ENA	IN1	IN2	OUT1	OUT2	OUT3	OUT4		
L	×	×	OFF	OFF	OFF	OFF	Standby mode	
H	L		H	L			Channel 1	Forward
	H		L	H				Reverse
					H	L	Channel 2	Forward
					L	H		Reverse

Block Diagram



**Timing Chart** (2 phase excitation drive)

- SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents 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 Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require 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 consent of SANYO Semiconductor 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 Semiconductor Co.,Ltd. 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.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of October, 2008. Specifications and information herein are subject to change without notice.

# AMEYA360

## Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit [www.ameya360.com](http://www.ameya360.com)

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd  
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email [amall@ameya360.com](mailto:amall@ameya360.com)

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email [service@ameya360.com](mailto:service@ameya360.com)

➤ Partnership :

Tel +86 (21) 64016692-8333

Email [mkt@ameya360.com](mailto:mkt@ameya360.com)