



# LV8019V — Bi-CMOS IC Forward/Reverse Motor Driver

## Overview

The LV8019V is a forward/reverse motor driver.

## Features

- One H-bridge driver channel
- Provides a constant current output
- Built-in thermal shutdown circuit

## Specifications

**Maximum Ratings** at  $T_a = 25^\circ\text{C}$  and  $SGND = PGND = 0V$

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	$V_M$ max		-0.5 to 8.4	V
Control block supply voltage	$V_{CC}$ max		-0.5 to 7.0	V
Constant current output block supply voltage	$V_{RG}$ max		-0.5 to 6.0	V
Maximum output current	$I_O$ max		1.0	A
	$I_O$ peak1	$t \leq 200\text{ms}$ , $f = 2\text{Hz}$	3	A
	$I_O$ peak2	$t \leq 10\text{ms}$ , $f = 2\text{Hz}$	5	A
Input signal voltage	$V_{IN}$ max		-0.5 to $V_{CC}+0.5$	A
Allowable power dissipation	$P_d$ max	When mounted on a circuit board *1	0.8	W
Operating temperature	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\*1 Specified circuit board :  $114.3 \times 76.1 \times 1.6\text{mm}^3$ , glass epoxy

■ 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.

# LV8019V

## Recommended Operating Conditions at $T_a = 25^\circ\text{C}$ and $\text{SGND} = \text{PGND} = 0\text{V}$

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	$V_M$		3.0 to 7.4	V
Control block supply voltage	$V_{CC}$		2.7 to 6.0	V
Constant current output block supply voltage	$V_{RGIN}$		1.5 to $V_{CC}$	V
Input signal voltage	$V_{IN}$		0 to $V_{CC}$	V
Maximum input signal frequency	$f_{max}$	Duty = 50%	100	kHz

## Electrical Characteristics $T_a = 25^\circ\text{C}$ , $V_{CC} = V_M = 5\text{V}$ , and $\text{SGND} = \text{PGND} = 0\text{V}$ unless otherwise specified.

Parameter		Symbol	Conditions	Ratings			Unit
				min	typ	max	
Standby mode output block current consumption		IMO	EN = 0V, IN1 = IN2 = ICTRL = 0V			1.0	$\mu\text{A}$
Control block current consumption	Standby mode	$I_{CCO}$	EN = 0V, IN1 = IN2 = ICTRL = 0V		0	1.0	$\mu\text{A}$
	Operation mode	$I_{CC}$	EN = 5V		0.8	1.3	mA
High-level input voltage		$V_{INH}$		2.5		$V_{CC}$	V
Low-level input voltage		$V_{INL}$		0		0.8	V
High-level input current		$I_{INH}$				1.0	$\mu\text{A}$
Low-level input current		$I_{INL}$		-1.0			$\mu\text{A}$
High-level EN pin current		$I_{ENH}$	EN pin	15	25	35	$\mu\text{A}$
Low-level EN pin current		$I_{ENL}$	EN pin			1.0	$\mu\text{A}$
Output on resistance	1	$R_{ON1}$	$V_M = 5\text{V}$ , sink + source		0.45	0.55	$\Omega$
	2	$R_{ON2}$	$V_M = 3\text{V}$ , sink + source		0.60	0.75	$\Omega$
ISET setting resistance		RSET	Between ISET pin and SGND	80			$\Omega$
ISET pin voltage		VISET	$R_{SET} > 80\Omega$	0.90	1.05	1.20	V
CC pin output saturation voltage		VCSAT	$R_{SET} > 150\Omega$ *1			1.5	V
CC pin output leakage current		ICONL	CTRL = 0V			1.0	$\mu\text{A}$
Low voltage shutdown operation voltage		VLVD	$V_{CC}$ pin voltage detection	2.10	2.35	2.60	V
High-level output turn-on time		TOH	The transition from 10% to 90% of the output amplitude *2		0.1	1.0	$\mu\text{s}$
Low-level output turn-on time		TOL	The transition from 90% to 10% of the output amplitude *2		0.2	2.0	$\mu\text{s}$
Thermal shutdown temperature		TSD	*2	150	180		$^\circ\text{C}$
Thermal shutdown hysteresis		$\Delta\text{TSD}$	*2		40		$^\circ\text{C}$

\*1 : Voltage between CC pin and ISET pin

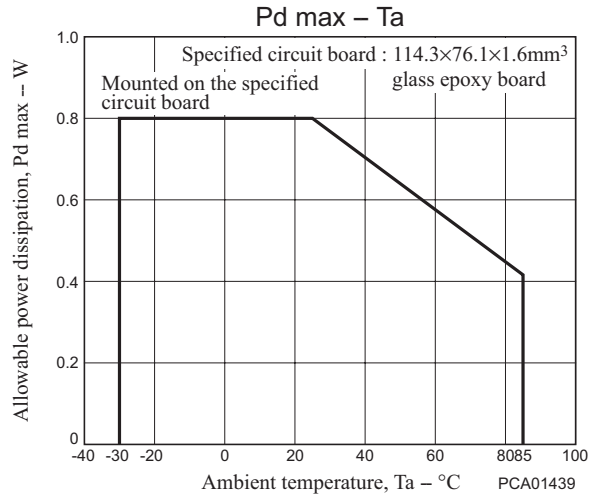
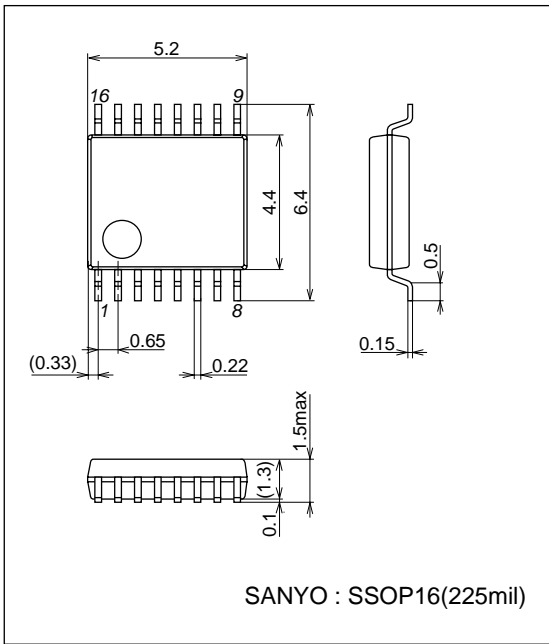
\*2 : Design guarantee: These characteristics are not measured.

# LV8019V

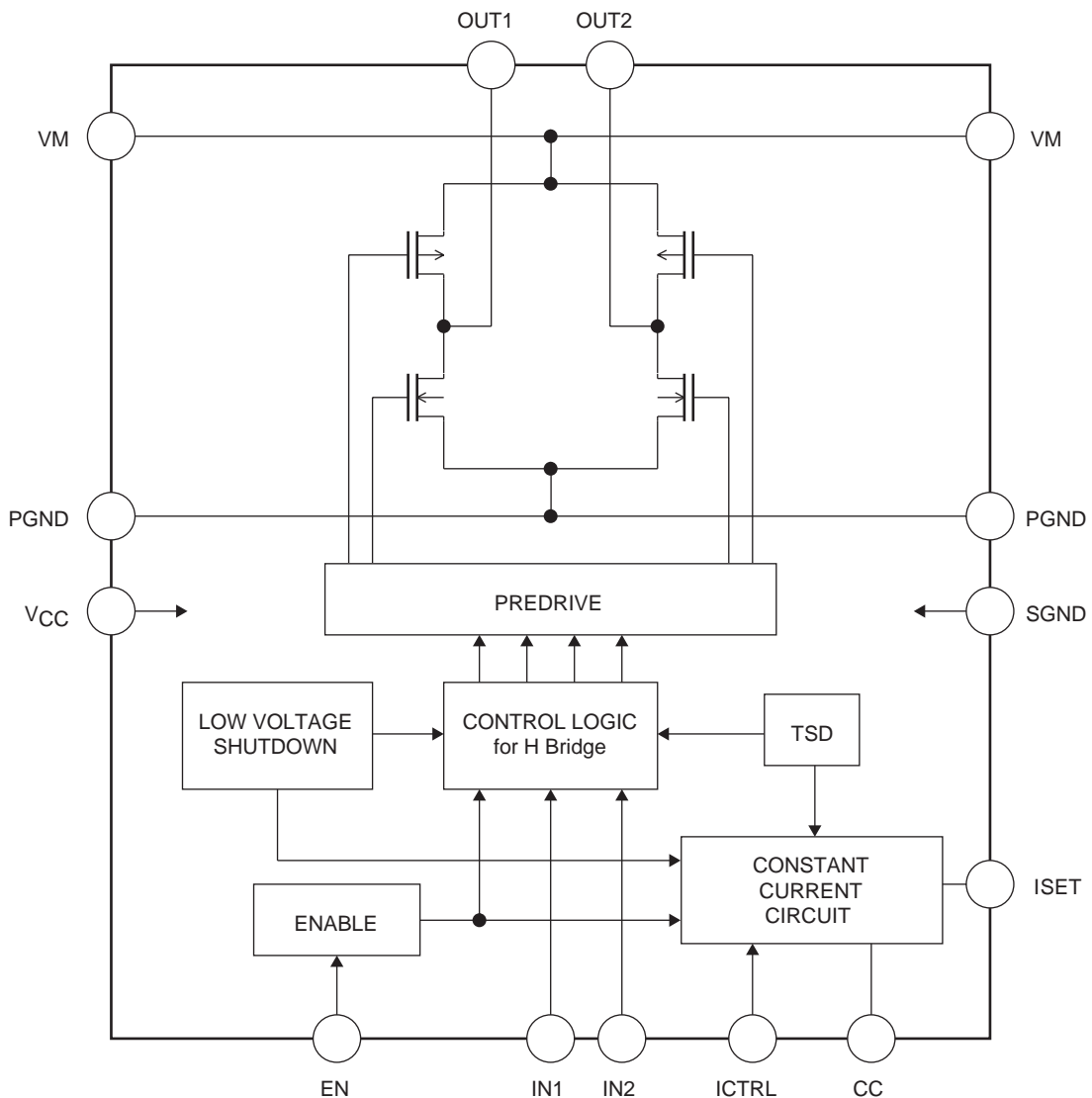
## Package Dimensions

unit : mm (typ)

3178B



## Block Diagram



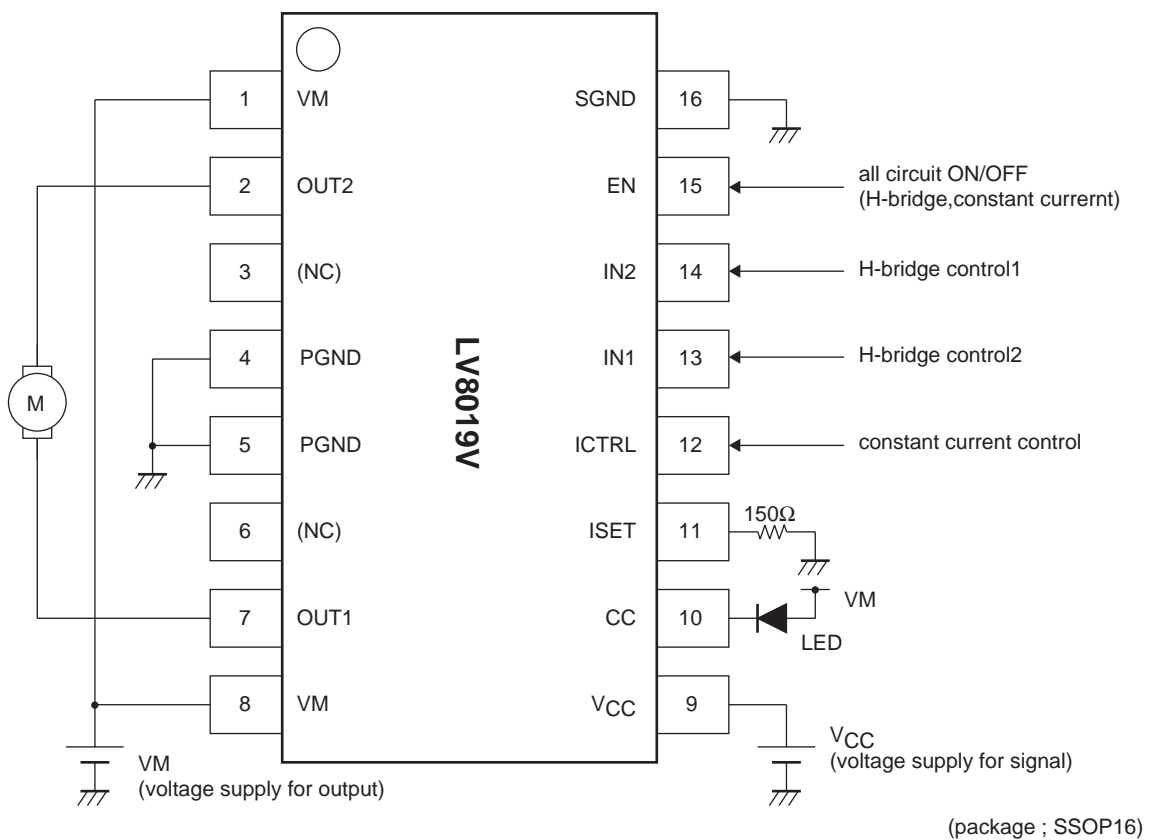
# LV8019V

## Truth Table

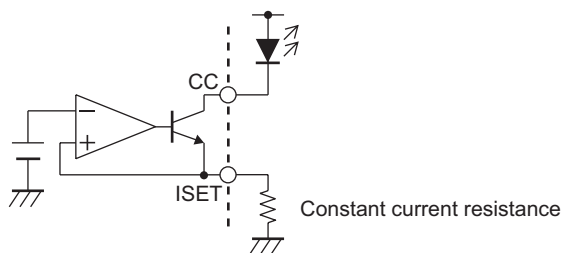
EN	IN1	IN2	ICTRL	OUT1	OUT2	CC	Mode
H	H	H	X	L	L	X	Break
H	H	L	X	H	L	X	Forward
H	L	H	X	L	H	X	Reverse
H	L	L	X	Z	Z	X	Standby
L	X	X	X	L	L	L	Standby
H	X	X	L	X	X	Z	Constant current output off
H	X	X	H	X	X	ON	Constant current output on

H : High level  
 L : Low level  
 Z : Hi-impedance  
 X : Don't care

## Pin Assignment and Application Example



## Constant current output



# LV8019V

## Pin Functions

Pin No.	Pin	Description	Equivalent circuit
13 14	IN1 IN2	Logic input 1 Logic input 2 The output is set by the combination of the input 1 and 2 states. See the truth table for details.	
12	ICTRL	Controls the output on/off state of the constant current block.	
15	EN	EN pin. Controls the on/off state of the H-bridge output (OUT1 and OUT2) and the constant current output. See the truth table for details.	
7 2	OUT1 OUT2	Output 1. Output 2. The source side is a p-channel transistor and sink side is an n-channel transistor.	
10 11	CC ISET	Constant current output. Constant current setting. The output current (CC) is set by connecting a resistor between the ISET pin and ground.	
9	V <sub>CC</sub>	Signal system power supply.	
8	VM	Power system power supply.	
16	SGND	Signal system ground.	
4,5	PGND	Power system ground.	

- 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 March, 2007. Specifications and information herein are subject to change without notice.