



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## 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  $\text{SGND} = \text{PGND} = 0\text{V}$

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	$V_M \text{ max}$		-0.5 to 8.4	V
Control block supply voltage	$V_{CC} \text{ max}$		-0.5 to 7.0	V
Constant current output block supply voltage	$V_{RG} \text{ max}$		-0.5 to 6.0	V
Maximum output current	$I_O \text{ max}$		1.2	A
	$I_O \text{ peak1}$	$t \leq 200\text{ms}, f = 2\text{Hz}$	3	A
	$I_O \text{ peak2}$	$t \leq 10\text{ms}, f = 2\text{Hz}$	5	A
Input signal voltage	$V_{IN} \text{ max}$		-0.5 to $V_{CC}+0.5$	A
Allowable power dissipation	$P_d \text{ max}$	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

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# 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

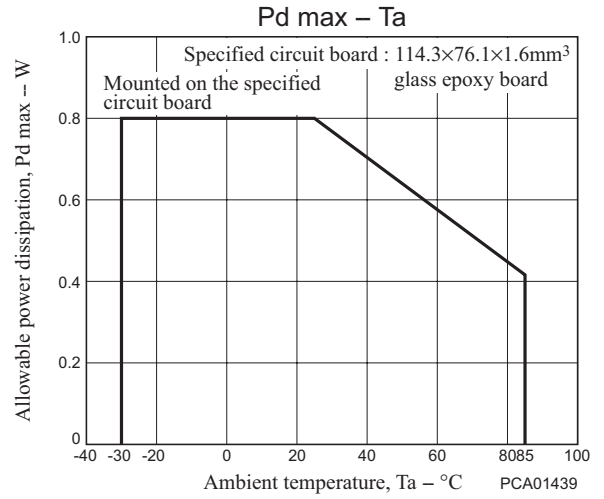
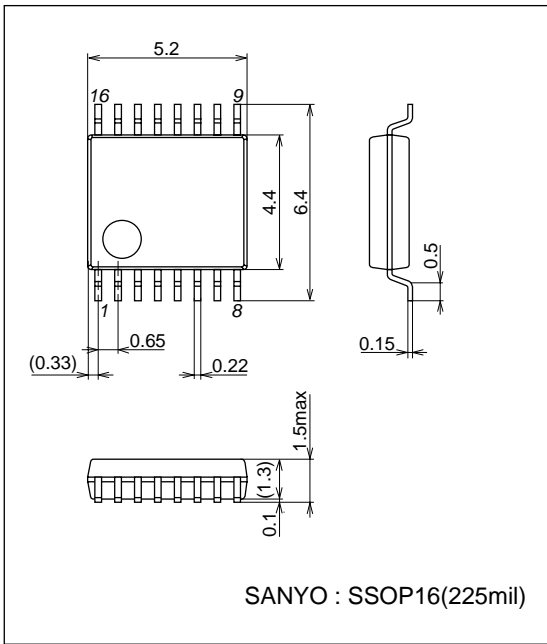
\*2 : Design guarantee: These characteristics are not measured.

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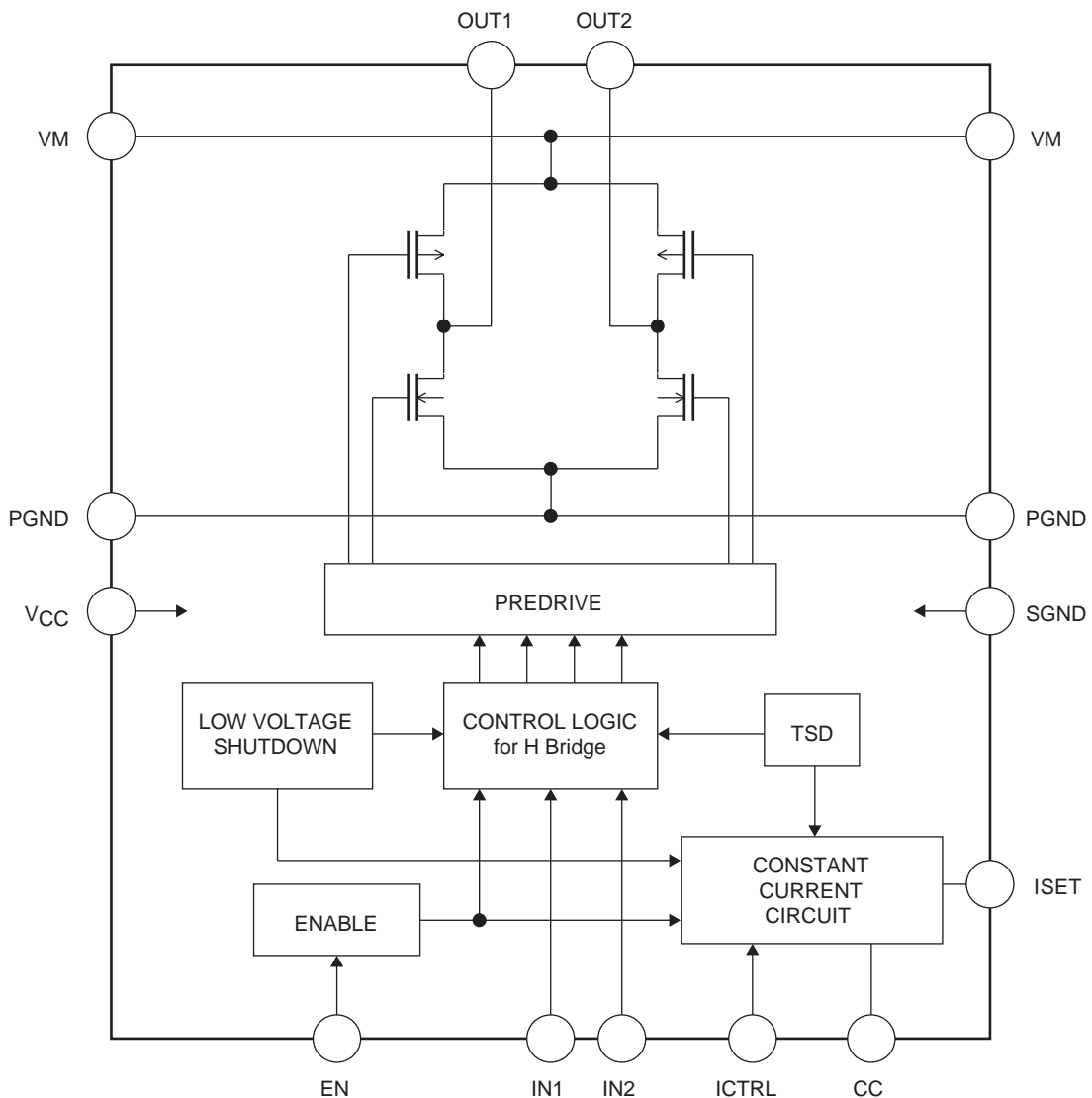
## Package Dimensions

unit : mm (typ)

3178B



## Block Diagram



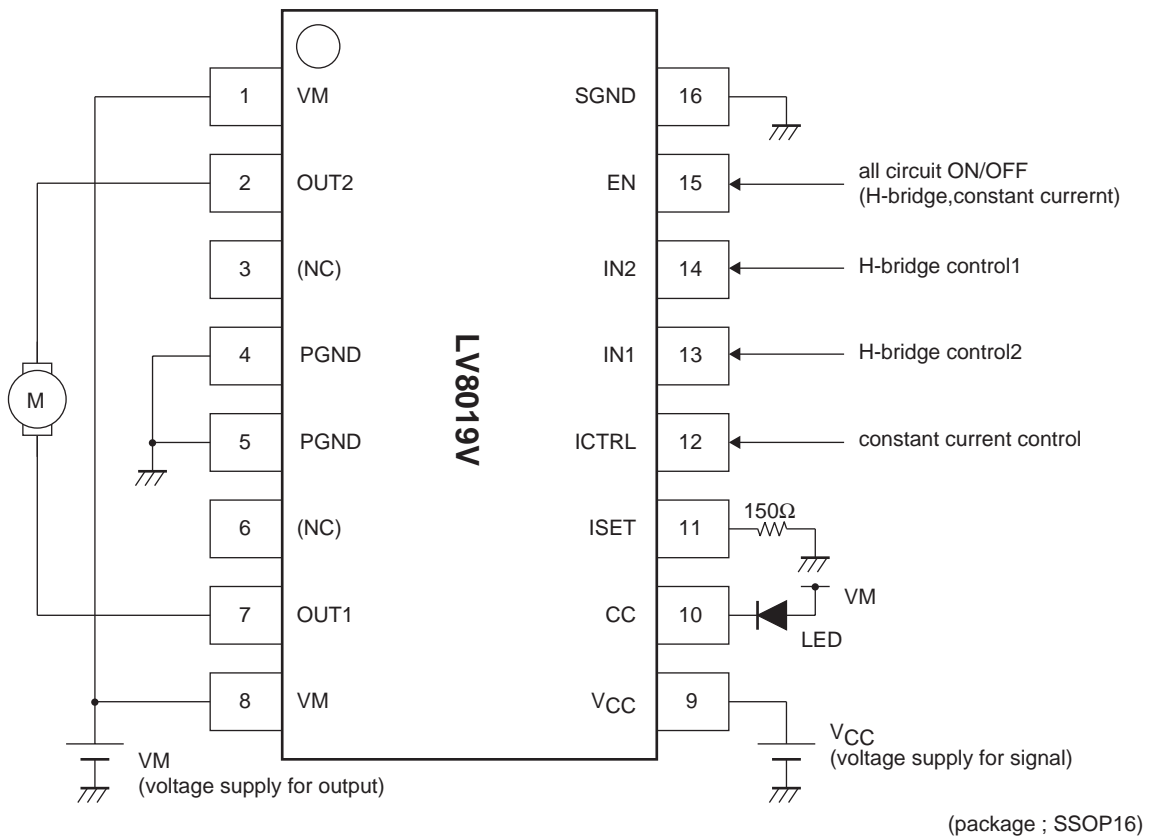
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## Truth Table

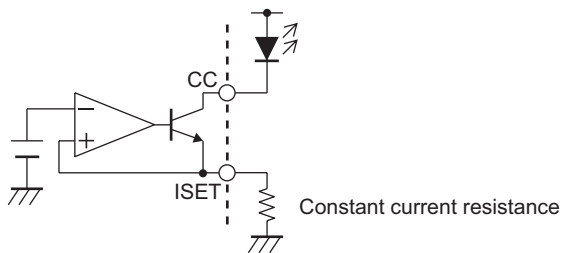
EN	IN1	IN2	ICTRL	OUT1	OUT2	CC	Mode
H	H	H	X	L	L	X	Break
H	H	L	X	H	L	X	Forward
H	L	H	X	L	H	X	Reverse
H	L	L	X	Z	Z	X	Standby
L	X	X	X	L	L	L	Standby
H	X	X	L	X	X	Z	Constant current output off
H	X	X	H	X	X	ON	Constant current output on

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

## Pin Assignment and Application Example



## Constant current output



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## 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	VCC	Signal system power supply.	
8	VM	Power system power supply.	
16	SGND	Signal system ground.	
4,5	PGND	Power system ground.	

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