



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## LV8019LP — Bi-CMOS IC Forward/Reverse Motor Driver

### Overview

The LV8019LP 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	$VRG$ max		-0.5 to 6.0	V
Maximum output current	$I_O$ max		1.2	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	$P_d$ max1	Independent IC	0.2	W
	$P_d$ max2	When mounted on a circuit board *1	1.05	W
Operating temperature	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\* : Specified substrate :  $40 \times 50 \times 0.8\text{mm}^3$ , glass epoxy four-layer (2S2P) board

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# LV8019LP

## 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	$I_{MO}$	$\text{EN} = 0\text{V}$ , $\text{IN1} = \text{IN2} = \text{CTRL} = 0\text{V}$			1.0	$\mu\text{A}$
Control block current consumption	Standby mode $I_{CCO}$	$\text{EN} = 0\text{V}$ , $\text{IN1} = \text{IN2} = \text{CTRL} = 0\text{V}$		0	1.0	$\mu\text{A}$
	Operation mode $I_{CC}$	$\text{EN} = 5\text{V}$		0.8	1.3	mA
High-level input voltage	$V_{INH}$	$\text{IN}^*$	2.5		$V_{CC}$	V
Low-level input voltage	$V_{INL}$	$\text{IN}^*$	0		0.8	V
High-level input current	$I_{INH}$	$\text{IN}^*$			1.0	$\mu\text{A}$
Low-level input current	$I_{INL}$	$\text{IN}^*$	-1.0			$\mu\text{A}$
High-level EN pin current	$I_{ENH}$	EN	15	25	35	$\mu\text{A}$
Low-level EN pin current	$I_{ENL}$	EN			1.0	$\mu\text{A}$
Output on resistance	1 $R_{ON1}$	$V_M = 5\text{V}$ , sink + source		0.30	0.40	$\Omega$
	2 $R_{ON2}$	$V_M = 3\text{V}$ , sink + source		0.45	0.60	$\Omega$
ISET setting resistance	RSET	Between ISET pin and SGND	80			$\Omega$
ISET pin voltage	$V_{ISET}$	$R_{SET} > 80\Omega$	0.90	1.05	1.20	V
CC pin output saturation voltage	$V_{CSAT}$	$R_{SET} = 150\Omega$ *1			1.5	V
CC pin output leakage current	$I_{CONL}$	$\text{CTRL} = 0\text{V}$			1.0	$\mu\text{A}$
Low voltage shutdown operation voltage	$V_{LVD}$	$V_{CC}$ 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

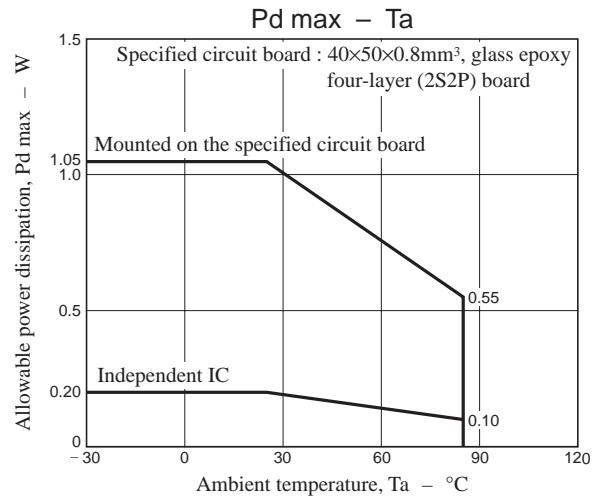
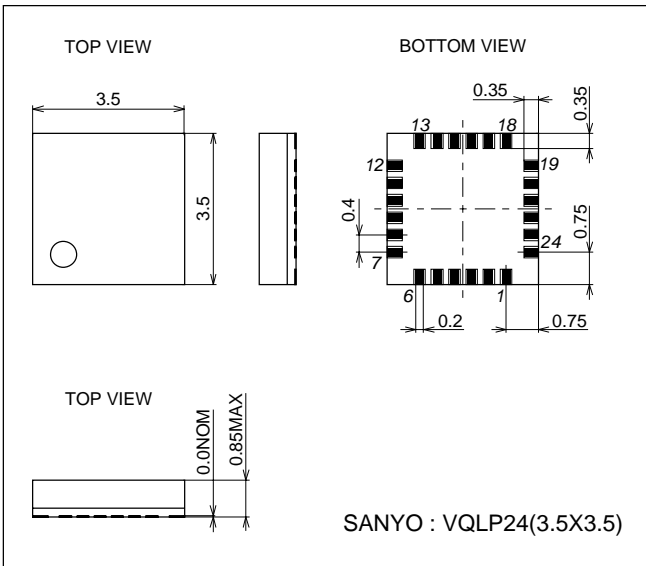
\*2 : Design guarantee: These characteristics are not measured.

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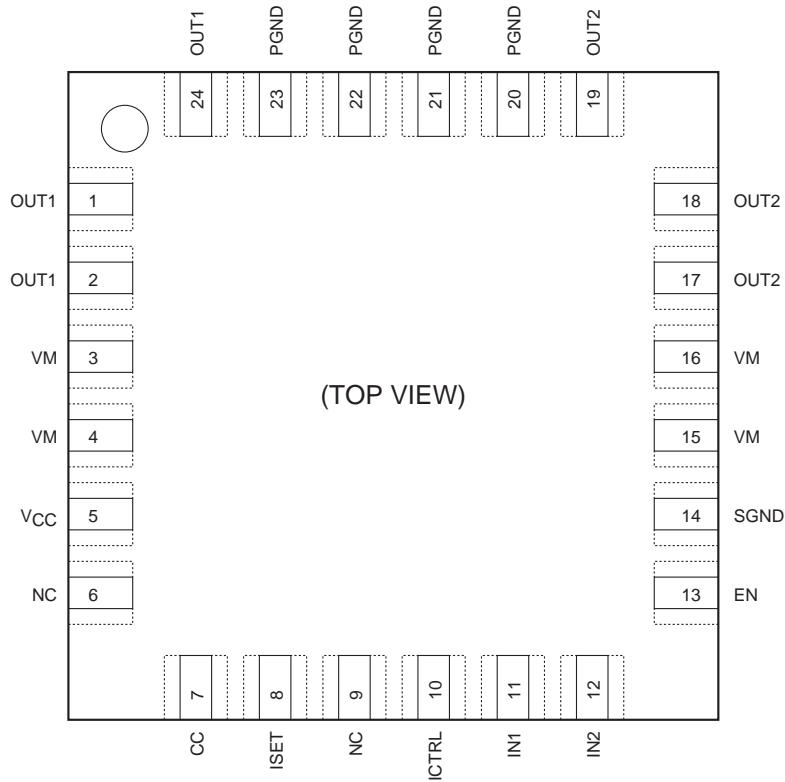
## Package Dimensions

unit : mm (typ)

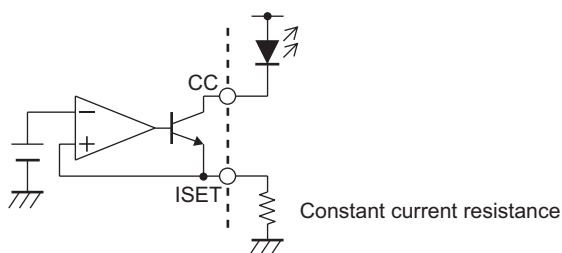
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## Pin Assignment

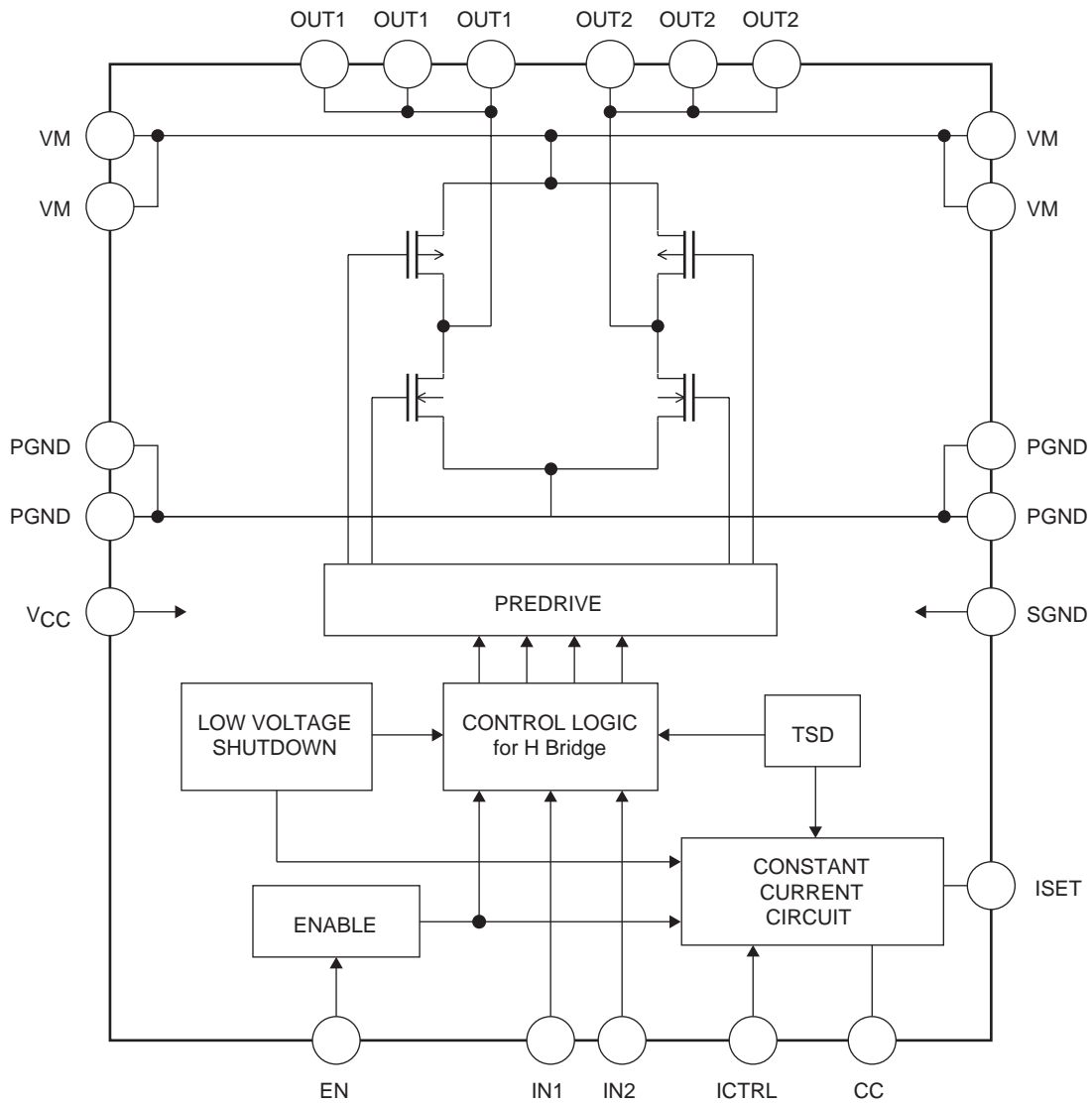


## Constant current output



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## Block Diagram



## Truth Table

EN	IN1	IN2	CTRL	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

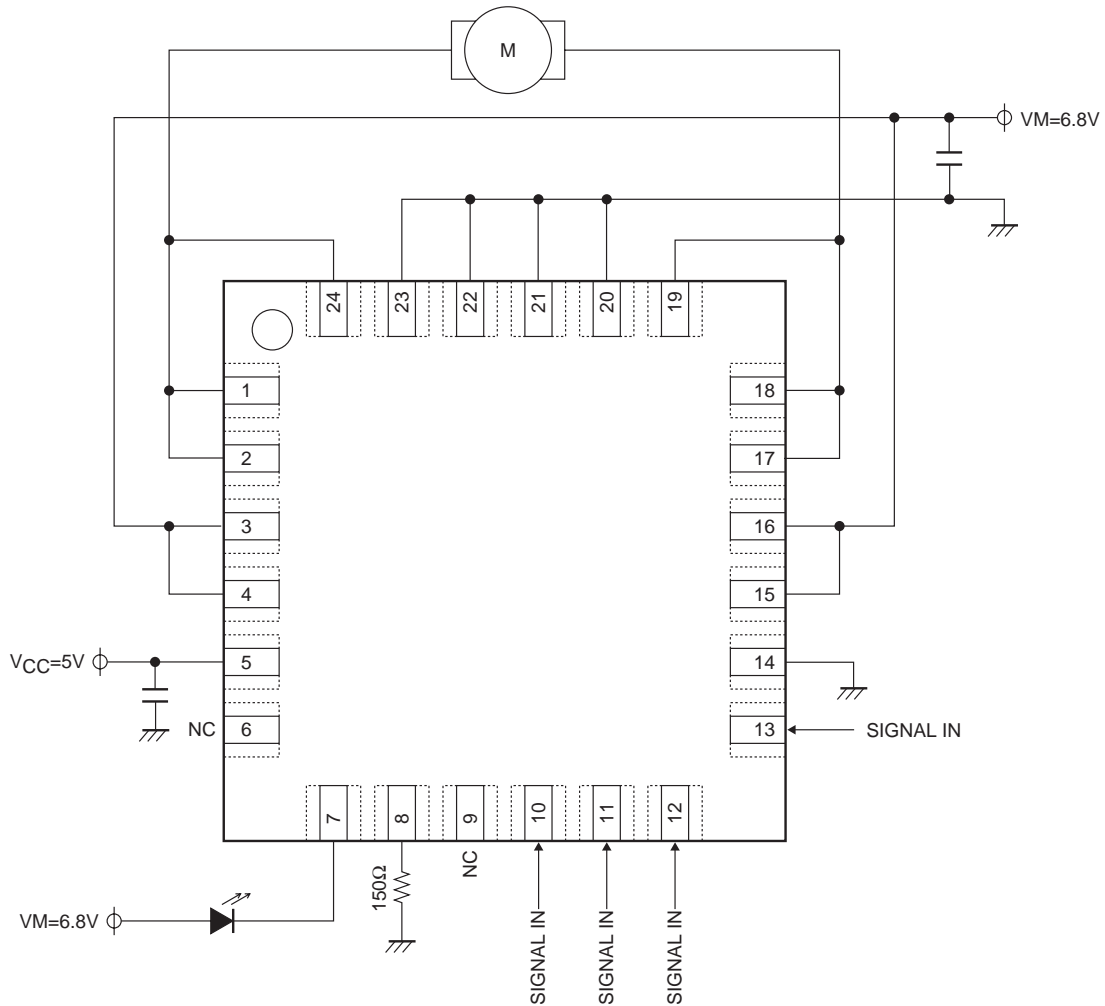
H : High level  
 L : Low level  
 Z : Hi-impedance  
 X : Don't care

# LV8019LP

## Pin Functions

Pin No.	Pin	Description	Equivalent circuit
11 12	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.	
10	ICTRL	Controls the output on/off state of the constant current block.	
13	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.	
1, 2, 24, 17, 18, 19	OUT1 OUT2	Output 1 Output 2 The source side is a p-channel transistor and sink side is an n-channel transistor.	
7 8	CC ISET	Constant current output Constant current setting The output current (CC) is set by connecting a resistor between the ISET pin and ground.	
5	VCC	Signal system power supply	
3, 4, 15, 16	VM	Power system power supply	
14	SGND	Signal system ground	
21, 22, 23	PGND	Power system ground	

Application Example



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