

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

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	$I_O \text{ max}$		1.0	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	$P_d \text{ max1}$	Independent IC	0.2	W
	$P_d \text{ max2}$	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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Recommended Operating Conditions at Ta = 25°C and SGND = PGND = 0V

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	VM		3.0 to 7.4	V
Control block supply voltage	VCC		2.7 to 6.0	V
Constant current output block supply voltage	VRGIN		1.5 to VCC	V
Input signal voltage	VIN		0 to VCC	V
Maximum input signal frequency	fmax	Duty = 50%	100	kHz

Electrical Characteristics Ta = 25°C, VCC = VM = 5V, and SGND = PGND = 0V 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	μA
Control block current consumption	Standby mode	I _{CCO}	EN = 0V, IN1 = IN2 = ICTRL = 0V	0	1.0	μA
	Operation mode	I _{CC}	EN = 5V	0.8	1.3	mA
High-level input voltage	V _{INH}	IN*	2.5		V _{CC}	V
Low-level input voltage	V _{INL}	IN*	0		0.8	V
High-level input current	I _{INH}	IN*			1.0	μA
Low-level input current	I _{INL}	IN*	-1.0			μA
High-level EN pin current	I _{ENH}	EN	15	25	35	μA
Low-level EN pin current	I _{ENL}	EN			1.0	μA
Output on resistance	1	R _{ON1}	VM = 5V, sink + source	0.30	0.40	Ω
	2	R _{ON2}	VM = 3V, sink + source	0.45	0.60	Ω
ISET setting resistance	RSET	Between ISET pin and SGND	80			Ω
ISET pin voltage	VISET	RSET > 80Ω	0.90	1.05	1.20	V
CC pin output saturation voltage	VCSAT	RSET = 150Ω *1			1.5	V
CC pin output leakage current	ICONL	CTRL = 0V			1.0	μA
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	μs
Low-level output turn-on time	TOL	The transition from 90% to 10% of the output amplitude *2		0.2	2.0	μs
Thermal shutdown temperature	TSD	*2	150	180		°C
Thermal shutdown hysteresis	ΔTSD	*2		40		°C

*1 : Voltage between CC pin and ISET pin

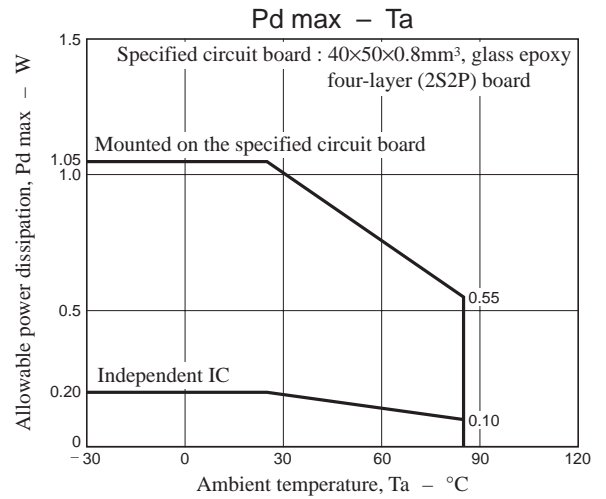
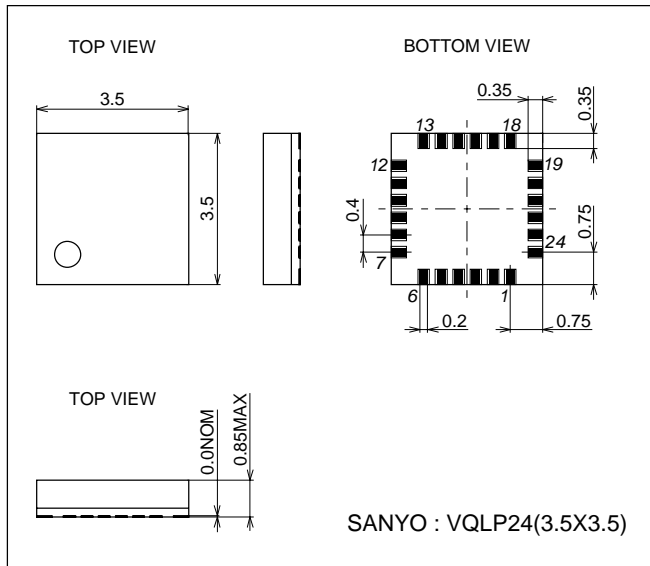
*2 : Design guarantee: These characteristics are not measured.

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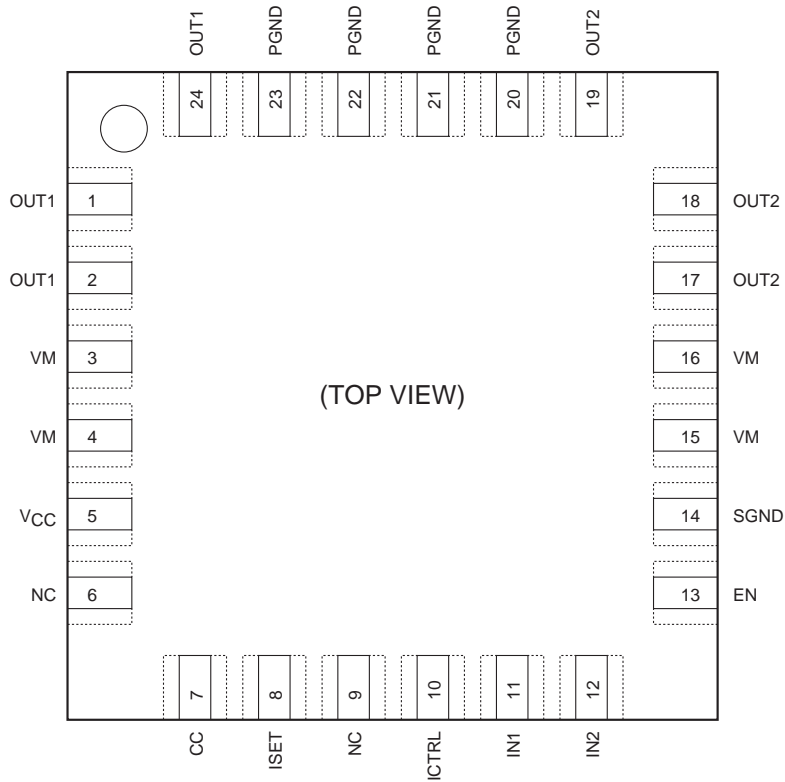
Package Dimensions

mm (typ)

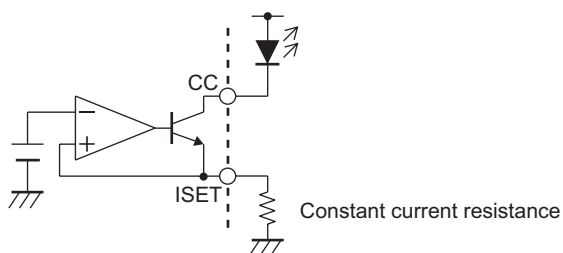
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Pin Assignment



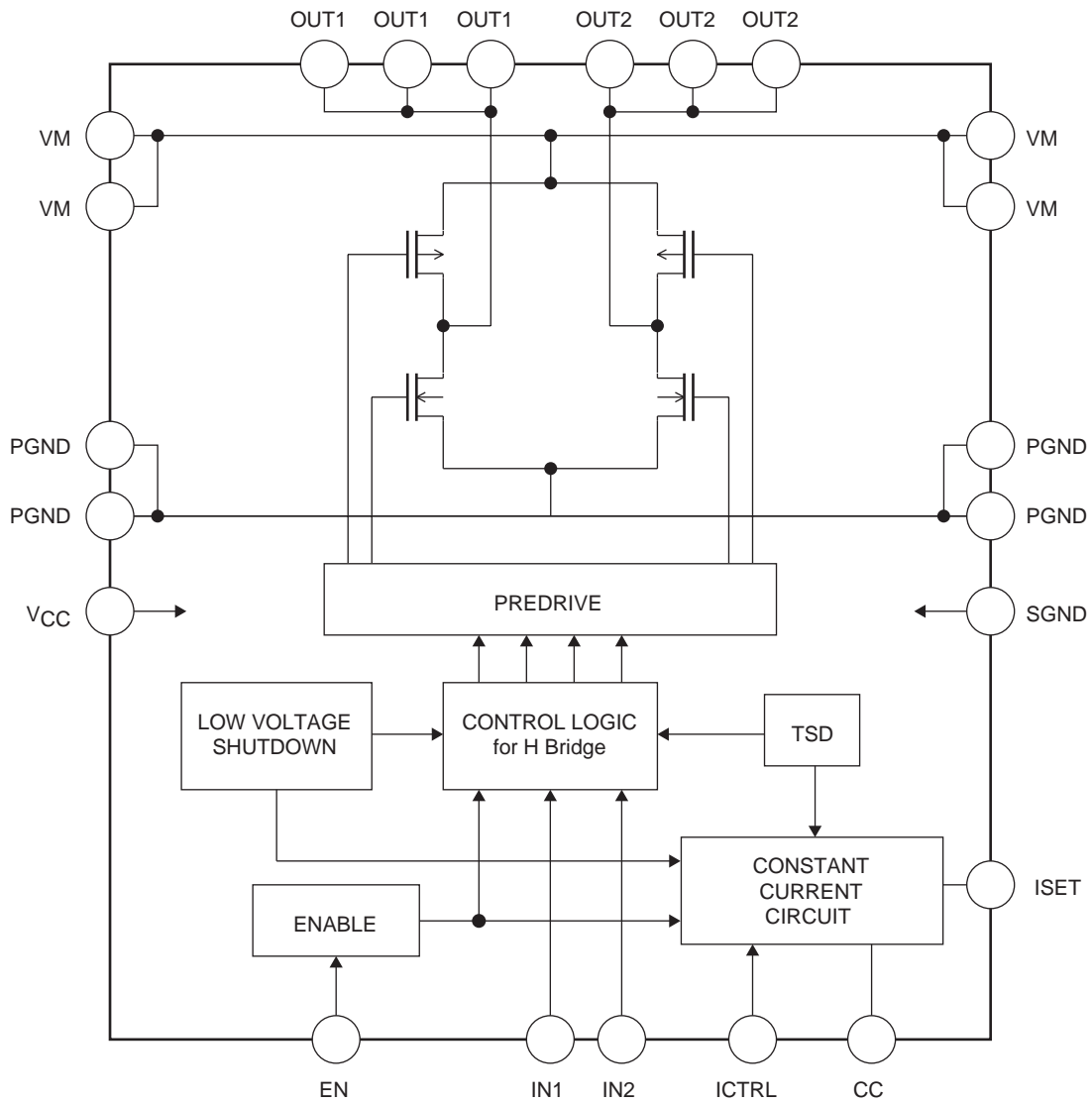
Constant current output



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Block Diagram

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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

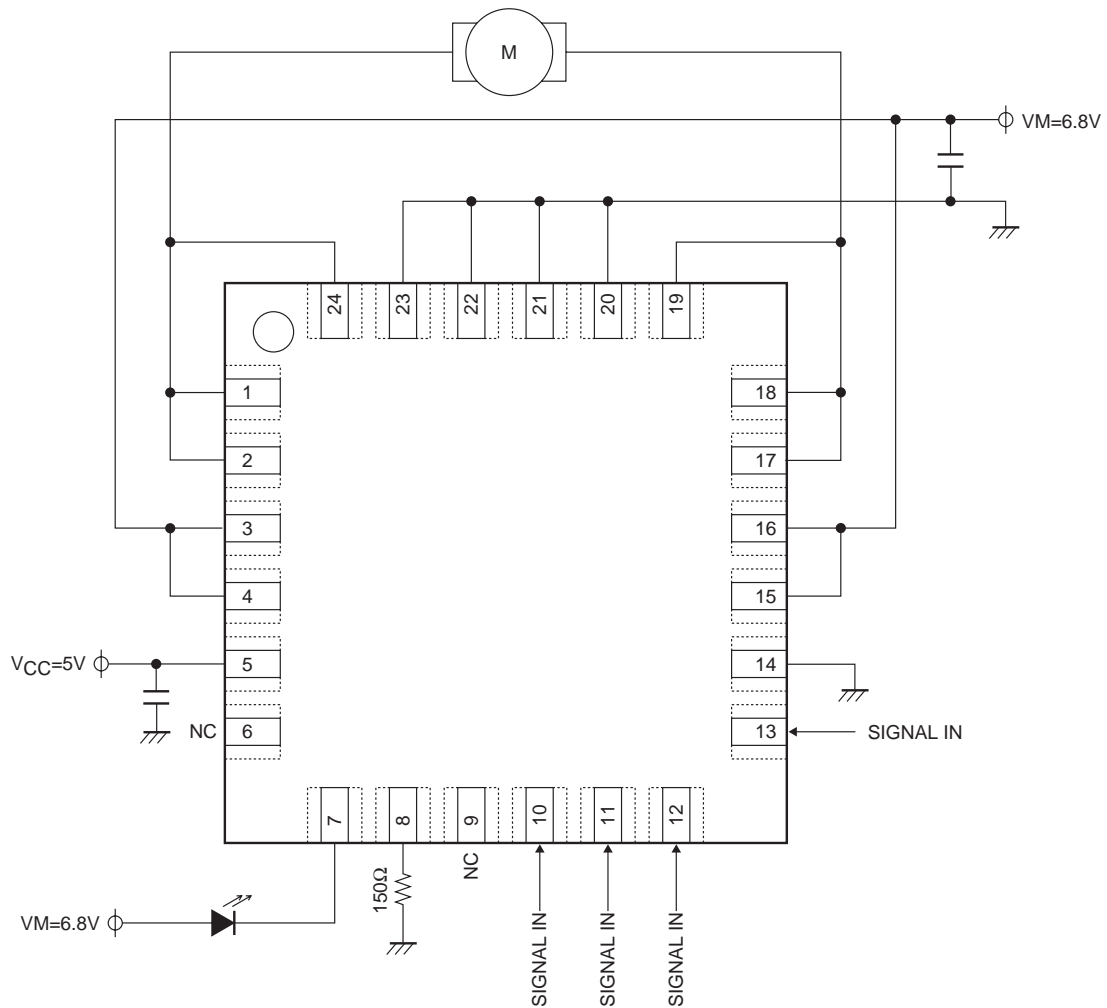
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Pin Functions

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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