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LV8019V

Bi-CMOS IC
Forward/Reverse Motor Driver

ON Semiconductor®

http://onsemi.com

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 Ta = 25°C and SGND = PGND = 0V

Parameter	Symbol	Conditions	Ratings	Unit
Output block supply voltage	VM 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 ≤ 200ms, f = 2Hz	3	A
	I_O peak2	t ≤ 10ms, f = 2Hz	5	A
Input signal voltage	V_{IN} max		-0.5 to V_{CC}+0.5	A
Allowable power dissipation	Pd max	When mounted on a circuit board *1	0.8	W
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

*1 Specified circuit board : 114.3 × 76.1 × 1.6mm^3, glass epoxy

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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	V_{CC}		2.7 to 6.0	V
Constant current output block supply voltage	VRGIN		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 Ta = 25°C, V_{CC} = 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		$V_{IN}H$		2.5		V_{CC}	V
Low-level input voltage		$V_{IN}L$		0		0.8	V
High-level input current		$I_{IN}H$				1.0	μA
Low-level input current		$I_{IN}L$		-1.0			μA
High-level EN pin current		$I_{EN}H$	EN pin	15	25	35	μA
Low-level EN pin current		$I_{EN}L$	EN pin			1.0	μA
Output on resistance	1	$R_{ON}1$	VM = 5V, sink + source		0.45	0.55	Ω
	2	$R_{ON}2$	VM = 3V, sink + source		0.60	0.75	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

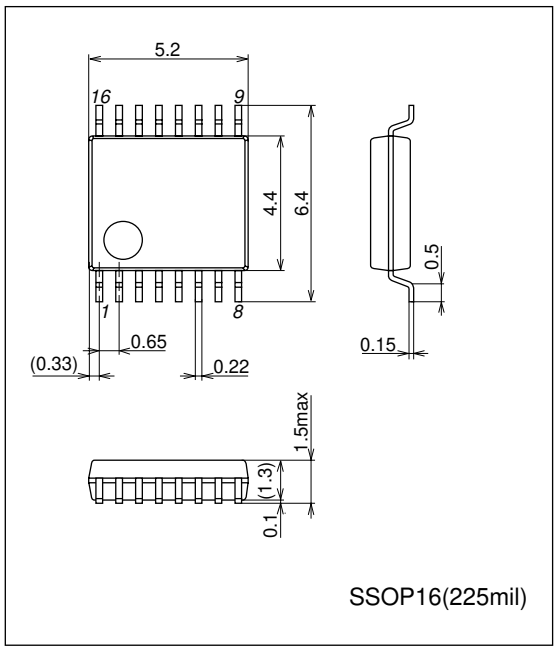
*1 : Voltage between CC pin and ISET pin

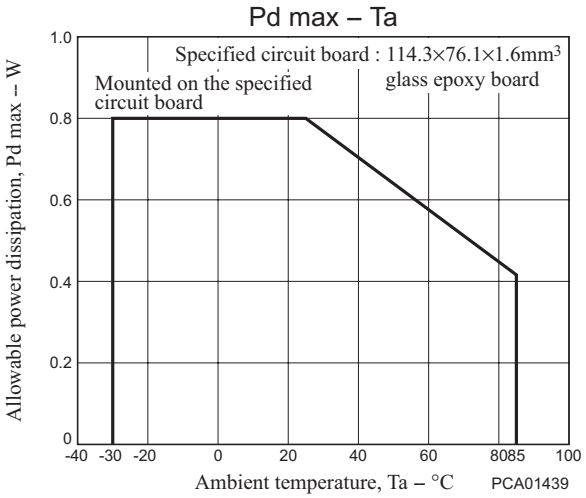
*2 : Design guarantee: These characteristics are not measured.

Package Dimensions

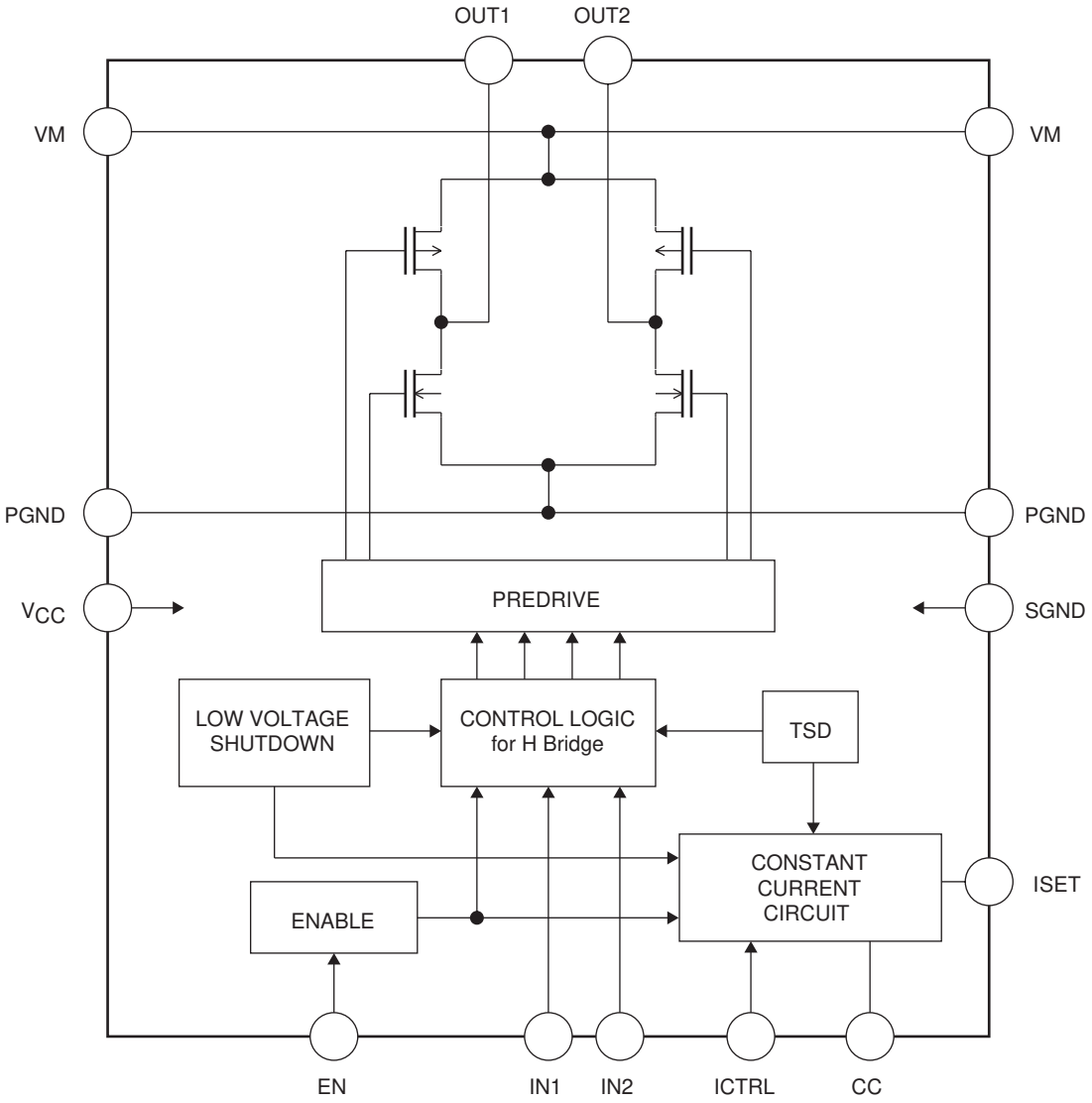
unit : mm (typ)

3178B





Block Diagram

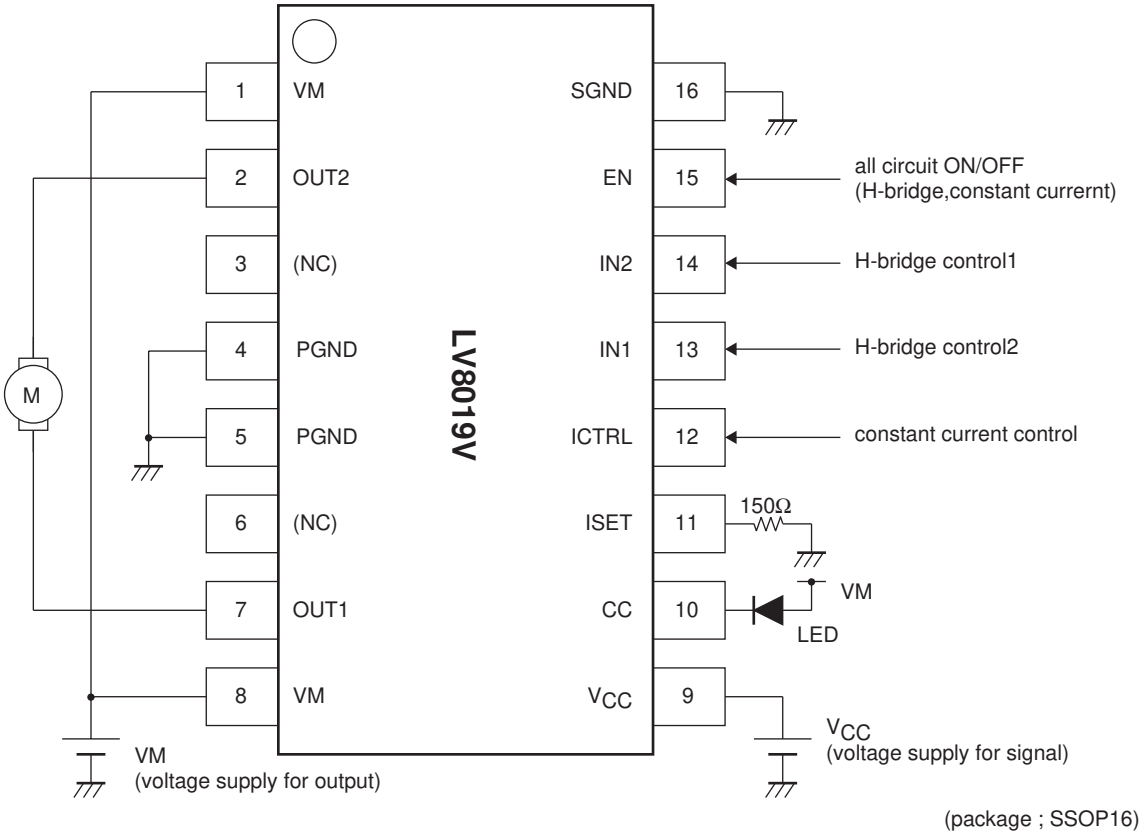


Truth Table

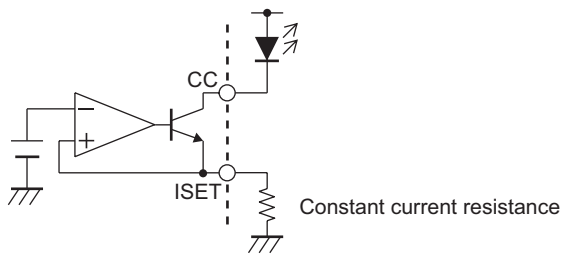
EN	IN1	IN2	ICTRL	OUT1	OUT2	CC	Mode
H	H	H	X	L	L	X	Break
H	H	L	X	H	L	X	Forward
H	L	H	X	L	H	X	Reverse
H	L	L	X	Z	Z	X	Standby
L	X	X	X	L	L	L	Standby
H	X	X	L	X	X	Z	Constant current output off
H	X	X	H	X	X	ON	Constant current output on

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

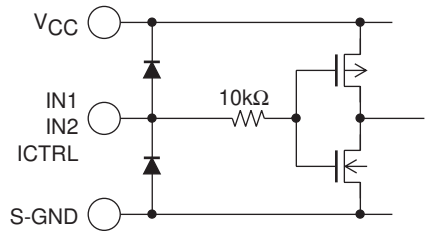
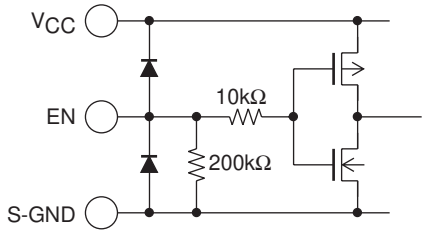
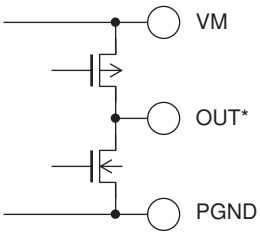
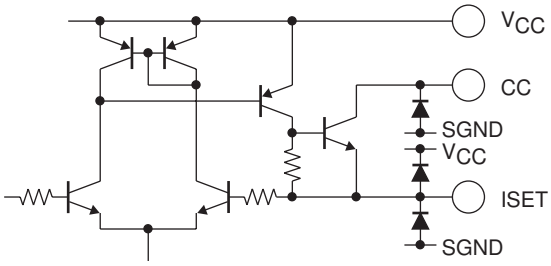
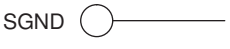
Pin Assignment and Application Example



Constant current output



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_{CC}	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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