

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

LV8416CB —

For DSC, and Cell Phone Camera Modules H-Bridge × 4-channel Motor Driver

Overview

The LV8416CB is an H-bridge×4-channel motor driver IC and is able to control 4 modes of forward, reverse, brake and standby.

Bi-CMOS LSI

This IC housed in a wafer level package (WLP) is optimum for use in a stepping motor driving system for DSC or a camera module of cell phones.

Functions

- Saturation drive H-bridge: 4-channels
- Various protection circuits (thermal protection, low voltage malfunction protection)

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V _{CC} max		6.0	V
Output peak current	I _O peak	Channels 1 to 4, t ≤ 10msec, ON-duty ≤ 20%	600	mA
Output continuous current	I _O max	Channels 1 to 4	400	mA
Allowable power dissipation	Pd max	Mounted on a circuit board*	1000	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

[•] Specified circuit board : 60mm × 60mm × 1.7mm, glass epoxy two-layer board.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage range	V _{CC} op		2.5 to 5.5	V
Logic input voltage range	V _{IN}		0 to V _{CC} +0.3	V
Input frequency	f _{IN}	IN1 to 8	to 100	kHz

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Electrical Characteristics at Ta = 25°C, $V_{CC} = 5V$

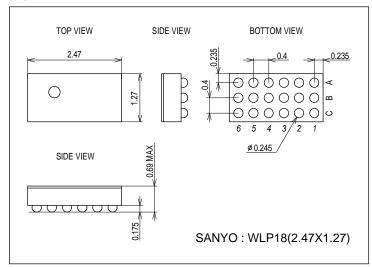
D	O. wash ad	O an distance	Ratings			1.1-34	
Parameter	Symbol Conditions		min	typ	max	Unit	
Standby mode current drain	Ist	IN1 to IN8 = "L"			1.0	μА	
V _{CC} current drain	I _{CC} 1	V _{CC} =V _{IN} 1 = 3.3V	40	80	160	μА	
	I _{CC} 2	V _{CC} =V _{IN} 1 = 5.0V	50	100	200	μА	
V _{CC} low-voltage cutoff voltage	VthV _{CC}		2.0	2.25	2.5	V	
Low-voltage hysteresis voltage	VthHIS		100	150	200	mV	
Thermal shutdown temperature	TSD	Design guarantee value *	160	180	200	°C	
Thermal hysteresis width	ΔTSD	Design guarantee value *	10	30	50	°C	
Input pin			•				
Logic pin input current	linL	V _{IN} = 0V, IN1 to IN8			1.0	μА	
	linH	V _{IN} = 3.3V, IN1 to IN8	8.3	16.5	33	μА	
Logic input high-level voltage	Vinh	IN1 to IN8	0.5×V _{CC}			V	
Logic input low-level voltage	Vinl	IN1 to IN8			0.2×V _{CC}	V	
Input circuit current consumption	Iccin	V _{IN} = 3.3V, power hit of IN1 to IN8 *1	30	80	250	μА	
Motor driver			•				
Output on-resistance	Ronu	I _O = 100mA, upper ON resistance		0.5	0.75	Ω	
	Rond	I _O = 100mA, lower ON resistance		0.3	0.55	Ω	
Output leakage current	l _O leak				1.0	μА	
Diode forward voltage	VD	ID = -100mA	0.4	0.75	1.2	V	
Turn-on time	Ton	Time of Input 50% → Output 50% *2		0.10	0.50	μsec	
Turn-off time	Toff	Time of Input 50% → Output 50%		0.15	0.55	μsec	
At the rise time	Tr	Time of Output 10% → 90%		0.05	0.20	μsec	
Standing fall time	Tf	Time of Output 90% → 10%		0.05	0.20	μsec	

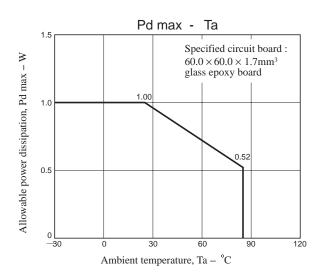
^{*1:} The input circuit current consumption in CMOS circuit composition of the input steps is generated though it is unquestionable for IC operation when impressing it to V_{IN} voltage that is lower than the V_{CC} voltage.

Package Dimensions

unit: mm (typ)

3401

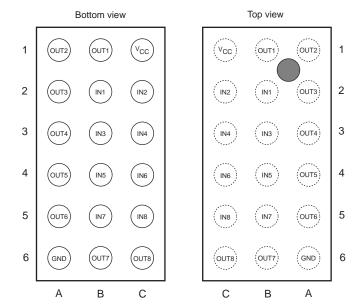




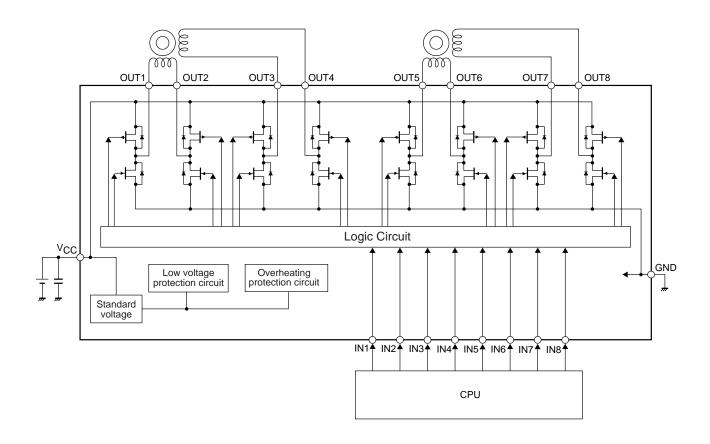
^{*2:} Time from change edge to change edge (0.5×VCC) of control input at output level.

It doesn't have an enable pin, and as for this IC, either in the input pin begins and the internal logic begins operation of "High". Therefore, the turn-on time becomes about three microseconds only at the initial motion work of the input terminal "High".

Pin Assignment



Block Diagram



Pin Functions

Pin No.	Pin name	Pin Function	Equivalent Circuit
B2	IN1	Control signal input pin	
C2	IN2	Control signal input pin	Vcc → • • • • • • • • • • • • • • • • • •
B3	IN3	Control signal input pin	• •
C3	IN4	Control signal input pin	
B4	IN5	Control signal input pin	
C4	IN6	Control signal input pin	"¬
B5	IN7	Control signal input pin	•
C5	IN8		
Co	IINO	Control signal input pin	"¬
			10kΩ
			↓
			\$ 200kΩ +
			GND
B1	OUT1	Motor driver output pin	
A1	OUT2	Motor driver output pin	Vcc
A2	OUT3	Motor driver output pin	φ
А3	OUT4	Motor driver output pin	
A4	OUT5	Motor driver output pin	
A5	OUT6	Motor driver output pin	
B6	OUT7	Motor driver output pin	—— > ↑
C6	OUT8	Motor driver output pin	∳
			•
			GND
			5115
C1	V _{CC}	Logic system power supply connection pin	
A6	GND	Signal ground	

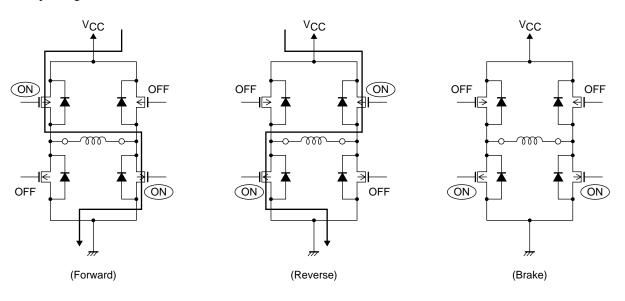
Logic input specifications

• Common channels 1 to 4

ch1: IN1 to IN2, OUT1 to OUT2 ch2: IN3 to IN4, OUT3 to OUT4 ch3: IN5 to IN6, OUT5 to OUT6 ch4: IN7 to IN8, OUT7 to OUT8

Input		Output		0
IN1	IN2	OUT1	OUT2	Operation mode
L	L	OFF	OFF	Standby
Н	L	Н	L	CW (forward)
L	Н	L	Н	CCW (reverse)
Н	Н	L	L	Brake

• Output stage transistor function



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