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DATA SHEET

An ON Semiconductor Company

Bi-CMOS LSI

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.

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

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

Parameter	Symbol	Conditions	Ratings min	Ratings typ	Ratings max	Unit
Standby mode current drain	Ist	IN1 to IN8 = "L"			1.0	μA
V_{CC} current drain	$I_{CC}1$	$V_{CC}=V_{IN}1$ = 3.3V	40	80	160	μA
	$I_{CC}2$	$V_{CC}=V_{IN}1$ = 5.0V	50	100	200	μA
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	IinL	V_{IN} = 0V, IN1 to IN8			1.0	μA
	IinH	V_{IN} = 3.3V, IN1 to IN8	8.3	16.5	33	μA
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	I_{CC}in	V_{IN} = 3.3V, power hit of IN1 to IN8 *1	30	80	250	μA
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	$I_O$leak				1.0	μA
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.
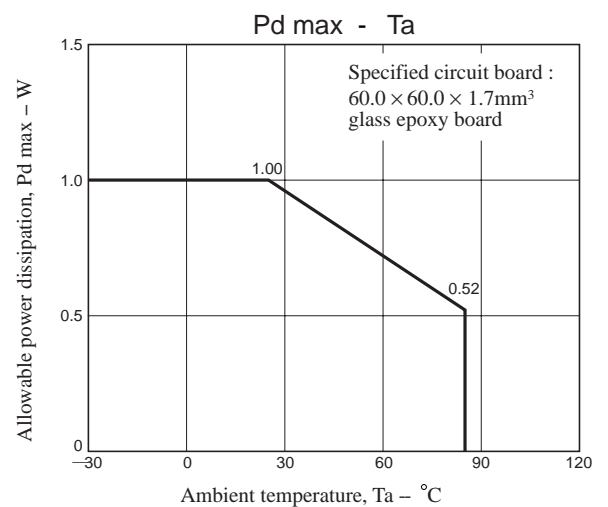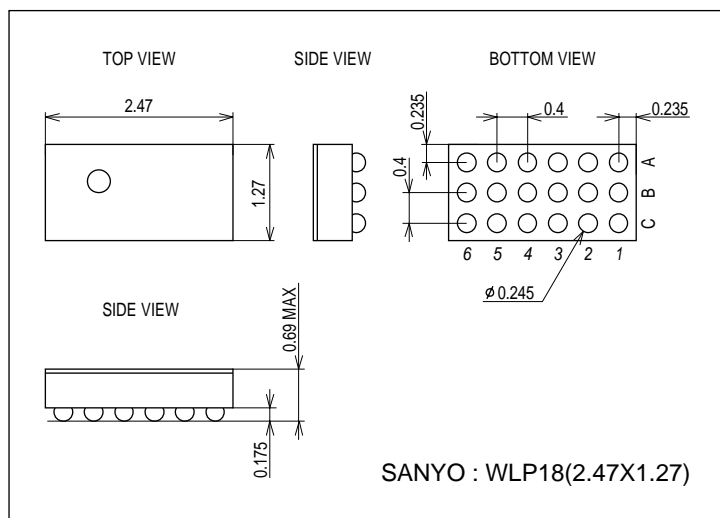
*2: Time from change edge to change edge (0.5×VCC) of control input at output level.

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".
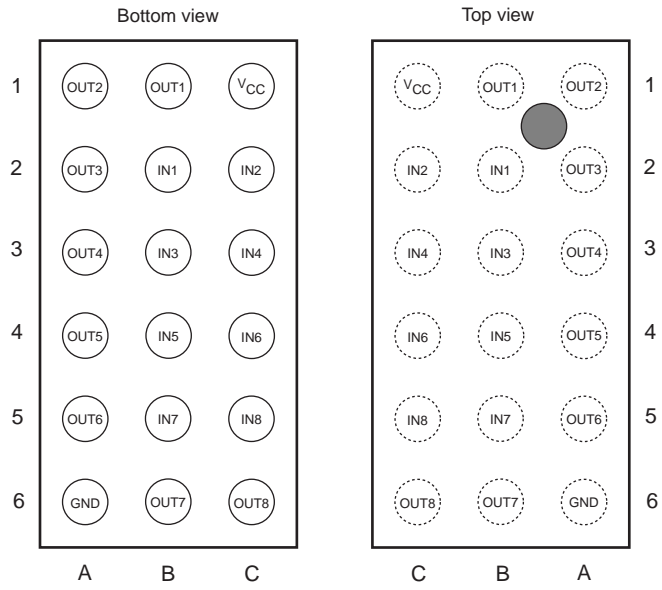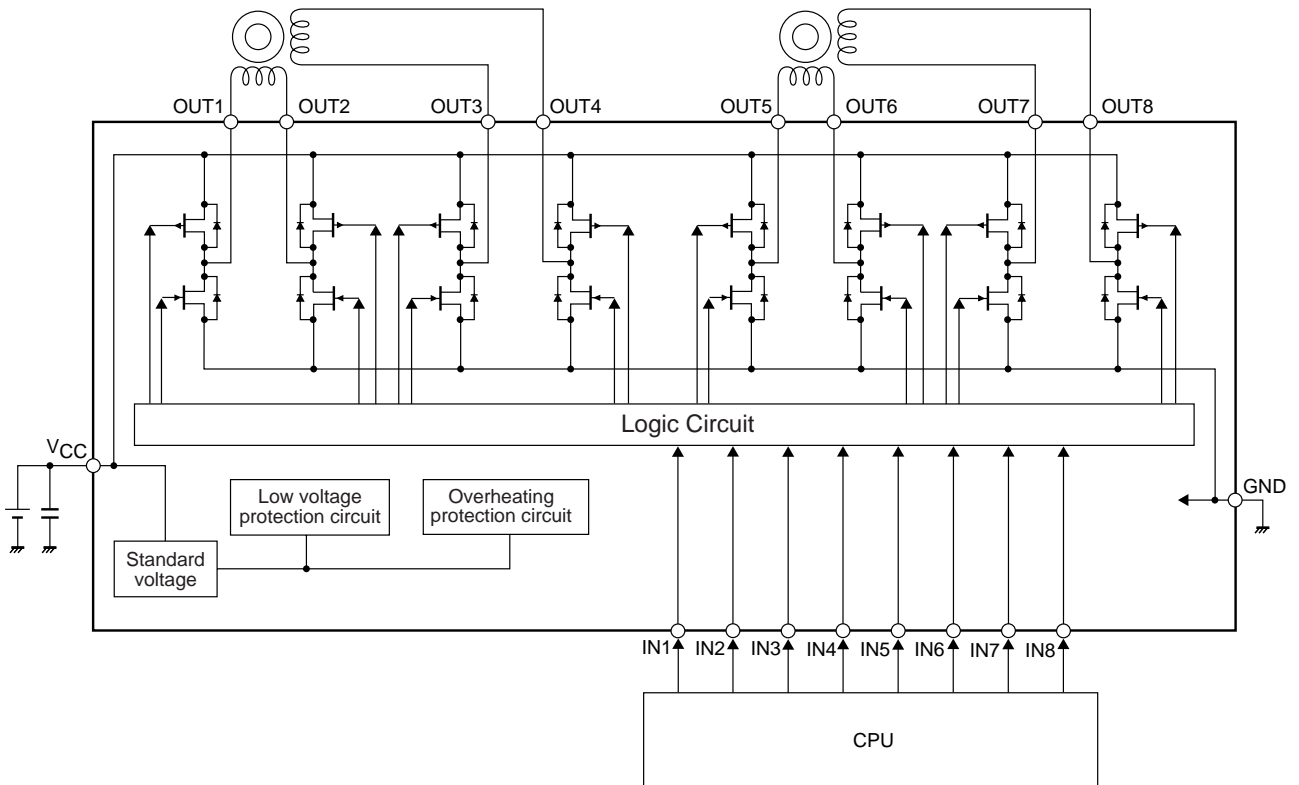
Package Dimensions

unit : mm (typ)

3401

SANYO : WLP18(2.47X1.27)

Pd max - Ta

Specified circuit board :
$60.0 \times 60.0 \times 1.7 mm^3$
glass epoxy board

Pin Assignment

Bottom view

	A	B	C
1	OUT2	OUT1	V_CC
2	OUT3	IN1	IN2
3	OUT4	IN3	IN4
4	OUT5	IN5	IN6
5	OUT6	IN7	IN8
6	GND	OUT7	OUT8

Top view

	C	B	A	
1	V_CC	OUT1	OUT2	1
2	IN2	IN1	OUT3	2
3	IN4	IN3	OUT4	3
4	IN6	IN5	OUT5	4
5	IN8	IN7	OUT6	5
6	OUT8	OUT7	GND	6

Block Diagram

LV8416CB

Pin Functions

Pin No.	Pin name	Pin Function	Equivalent Circuit
B2	IN1	Control signal input pin	
C2	IN2	Control signal input pin	
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	Control signal input pin	
B1	OUT1	Motor driver output pin	
A1	OUT2	Motor driver output pin	
A2	OUT3	Motor driver output pin	
A3	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	
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		Operation mode
IN1	IN2	OUT1	OUT2	
L	L	OFF	OFF	Standby
H	L	H	L	CW (forward)
L	H	L	H	CCW (reverse)
H	H	L	L	Brake

• Output stage transistor function

(Forward)   (Reverse)   (Brake)

This catalog provides information as of August, 2010. Specifications and information herein are subject to change without notice.