Ordering number : ENA1819

SANYO Semiconductors
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			Unit
			min	typ	max	
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

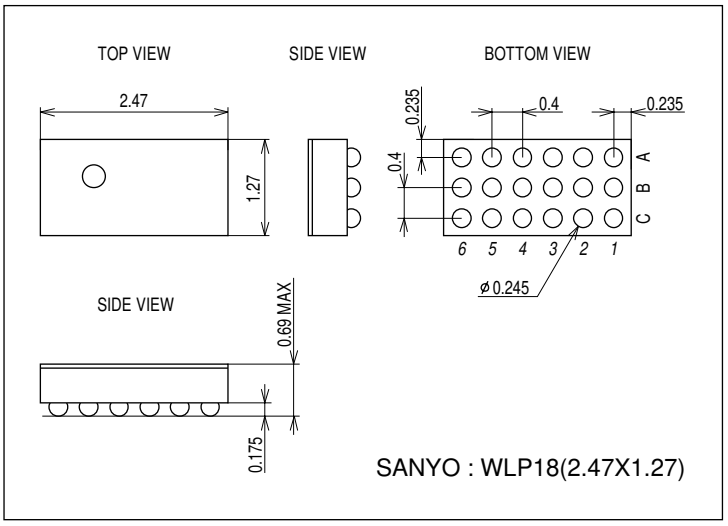
*1: The input circuit current consumption in CMOS circuit composition of the input steps is generated though it is unquestionable for IC operation when impressing it to V_{IN} voltage that is lower than the V_{CC} voltage.

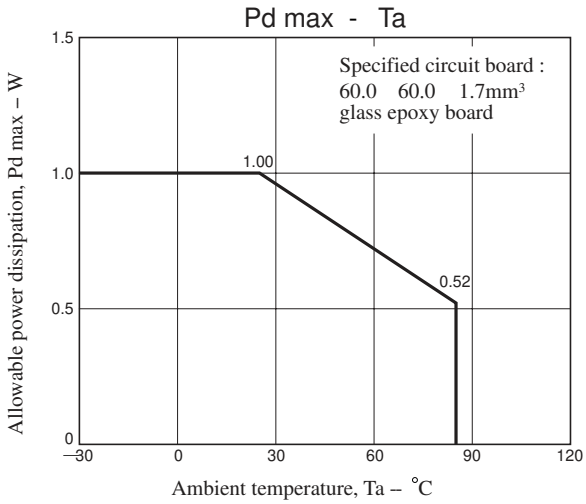
*2: Time from change edge to change edge (0.5×VCC) of control input at output level.
It doesn't have an enable pin, and as for this IC, either in the input pin begins and the internal logic begins operation of "High". Therefore, the turn-on time becomes about three microseconds only at the initial motion work of the input terminal "High".

Package Dimensions

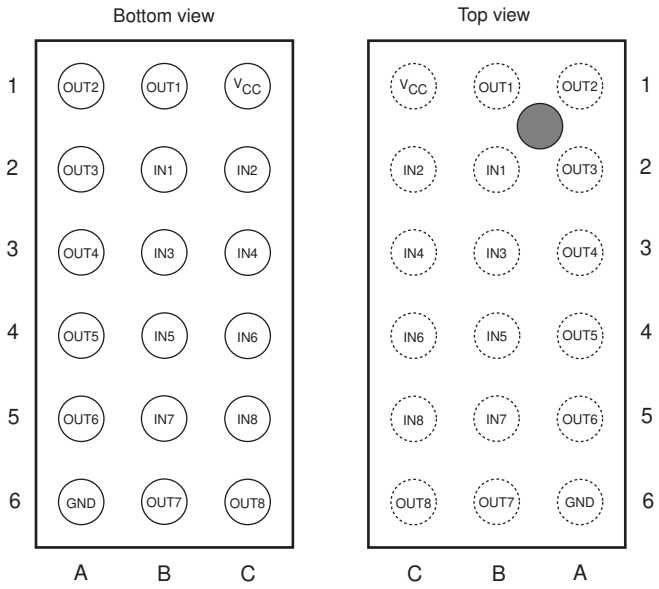
unit : mm (typ)

3401

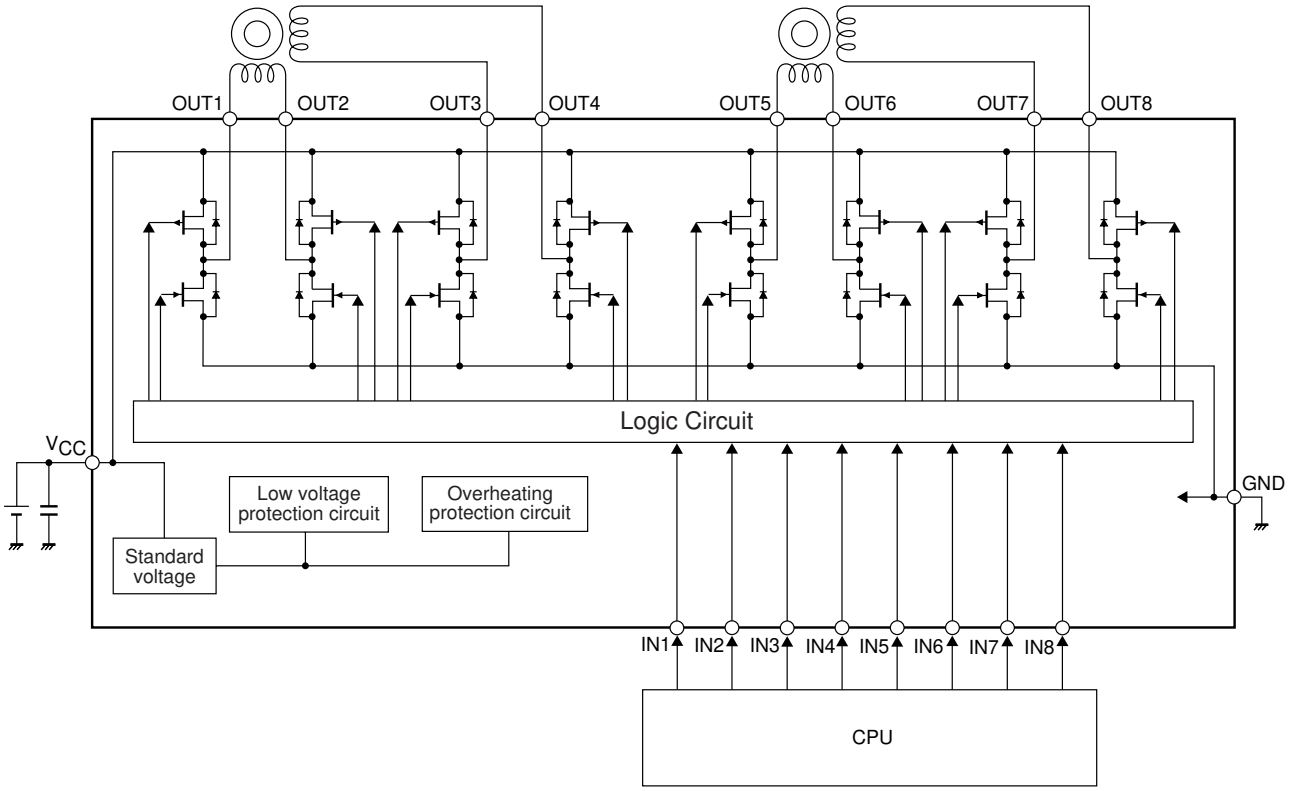




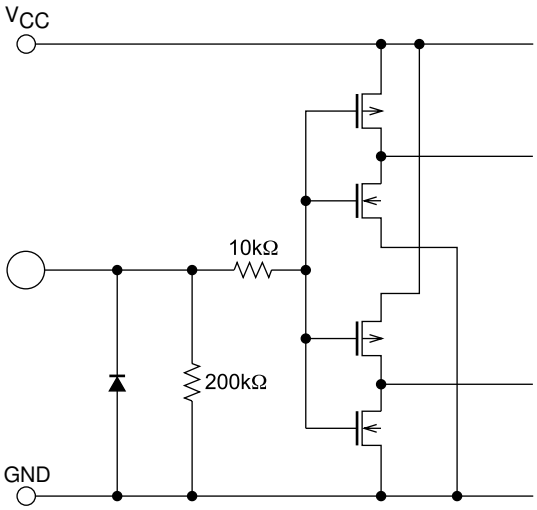
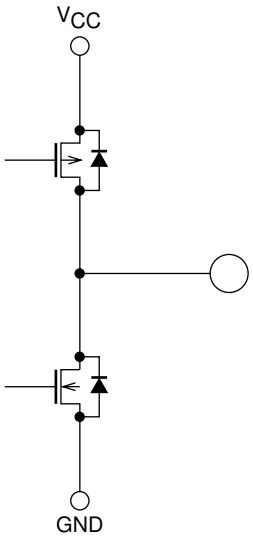
Pin Assignment



Block Diagram



Pin Functions

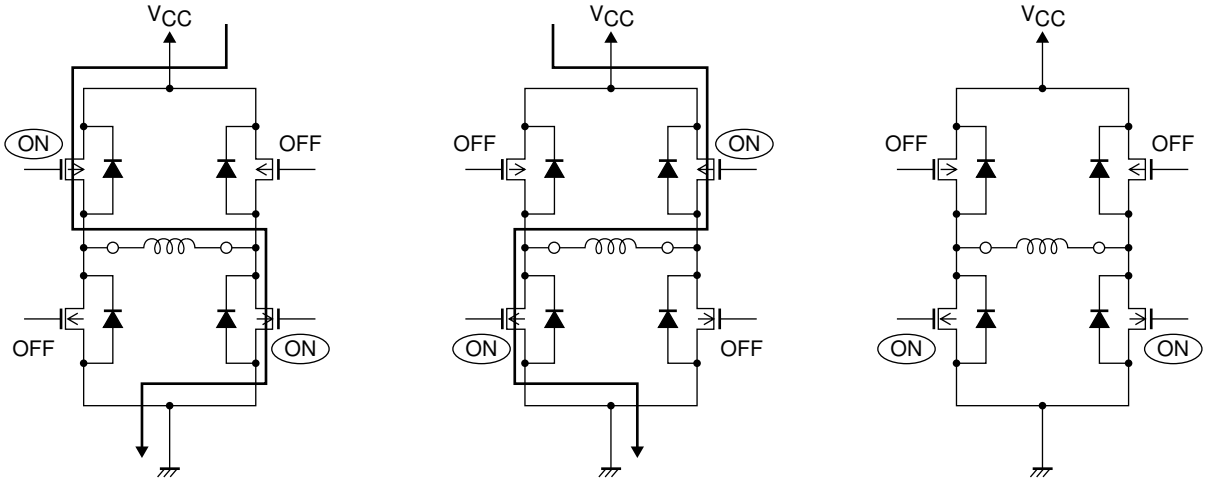
Pin No.	Pin name	Pin Function	Equivalent Circuit
B2 C2 B3 C3 B4 C4 B5 C5	IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8	Control signal input pin Control signal input pin Control signal input pin Control signal input pin Control signal input pin Control signal input pin Control signal input pin Control signal input pin	
B1 A1 A2 A3 A4 A5 B6 C6	OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUT8	Motor driver output pin Motor driver output pin Motor driver output pin Motor driver output pin Motor driver output pin Motor driver output pin Motor driver output pin 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)