Ordering number : ENA1341B

LV8413GP

ON Semiconductor®

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Bi-CMOS LSI

For DSC, and Cell Phone Camera Modules

H-Bridge × 2-channel Motor Driver

Overview

The LV8413GP is an H-bridge × 2-channel motor driver IC and is able to control 4 modes of forward, reverse, brake, and standby.

This IC housed in a miniature package is optimum for use in a stepping motor driving system for DSC or a camera module of cell phones.

Features

- Saturation drive H-bridge : 2-channels
- Built-in thermal protection circuit
- Built-in low voltage malfunction prevention circuit
- Incorporates a transistor for driving photosensors

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage 1	VM max		6	V
Power supply voltage 2	V_{CC} max		6	V
Output peak current	I_O peak	Outs 1 to 4, t ≤ 10msec, ON-duty ≤ 20%	600	mA
Output continuous current 1	I_O max1	Outs 1 to 4	400	mA
Output continuous current 2	I_O max2	PI	15	mA
Allowable power dissipation	Pd max	Mounted on a circuit board*	0.7	W
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

* Specified circuit board : 50.0mm × 40.0mm × 0.8mm : glass epoxy four-layer board (2S2P)

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

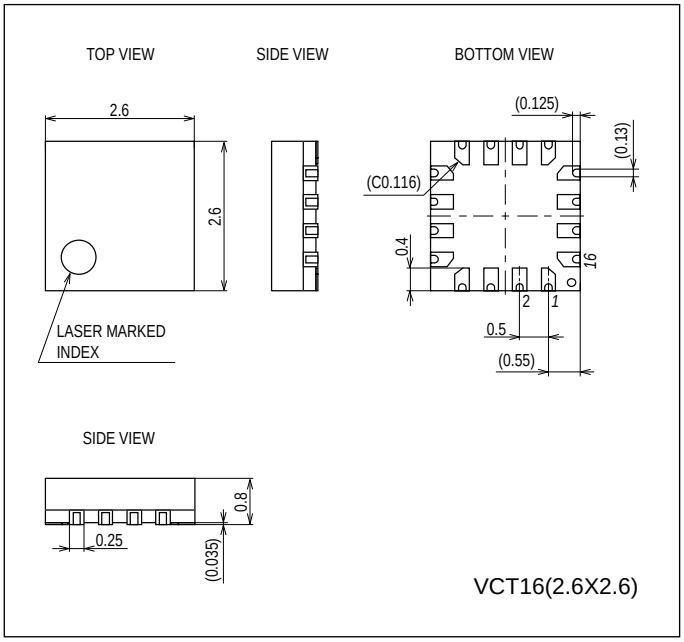
Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage range 1	VM		2.5 to 5.5	V
Power supply voltage range 2	V_{CC}		2.5 to 5.5	V
Logic input voltage range	V_{IN}		0 to V_{CC}+0.3	V
Input frequency	f_{IN}	IN1 to 4, INA	to 100	kHz

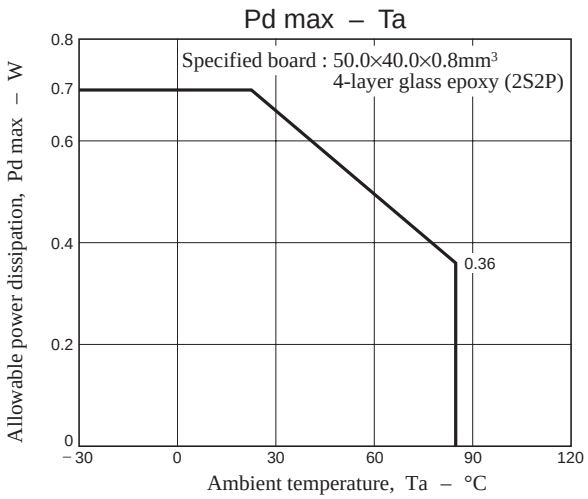
Electrical Characteristics at Ta = 25°C, VM = 5V, V_{CC} = 3.3V, unless otherwise specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby mode current drain	Istn	IN1 to 4 = "L"			1.0	μA
VM current drain	IM	Any one of IN1 to 4 = "H", with no load		70	150	μA
V_{CC} current drain	I_{CC}	Any one of IN1 to 4 = "H"		0.6	1.2	mA
V_{CC} low-voltage cutoff voltage	VthV_{CC}		1.85	2.10	2.35	V
Low-voltage hysteresis voltage	VthHYS		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
OUT1 to 4						
Logic pin internal pull-down resistance	Rin	IN1 to 4	50	100	200	kΩ
Logic pin input current	IinL	V_{IN} = 0, IN1 to 4			1.0	μA
	IinH	V_{IN} = 3.3V, IN1 to 4	20	33	60	μA
Logic input high-level voltage	VinH	IN1 to 4	2.5			V
Logic input low-level voltage	VinL	IN1 to 4			1.0	V
Output on-resistance	Ronu	I_O = 400mA, upper ON resistance		0.5	0.8	Ω
	Rond	I_O = 400mA, lower ON resistance		0.3	0.5	Ω
Output leakage current	$I_O$leak				1	μA
Diode forward voltage	VD	ID = -400mA		1.0		V
PI						
Logic pin internal pull-down resistance	Rin	INA	50	100	200	kΩ
Logic pin input current	IinL	V_{IN} = 0, INA			1.0	μA
	IinH	V_{IN} = 3.3V, INA	20	33	50	μA
Logic input high-level voltage	VinH	INA	2.5			V
Logic input low-level voltage	VinL	INA			1.0	V
Output on-resistance	Ron	I_O = 10mA		4	6	Ω
Output leakage current	$I_O$leak				1	μA

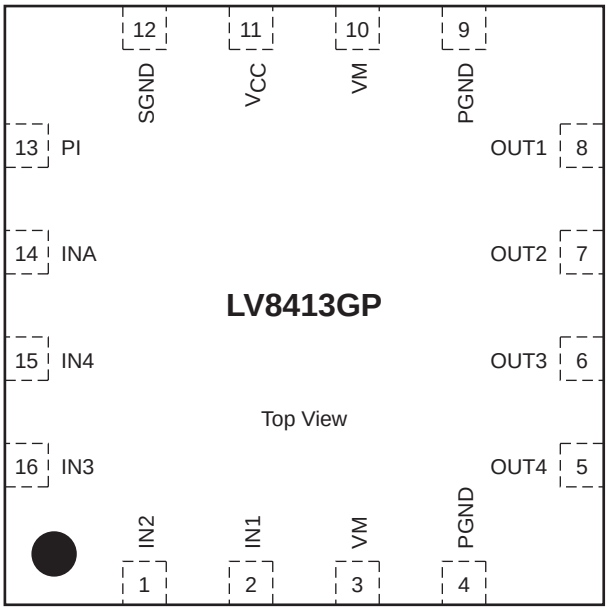
Package Dimensions

unit : mm (typ)
3318

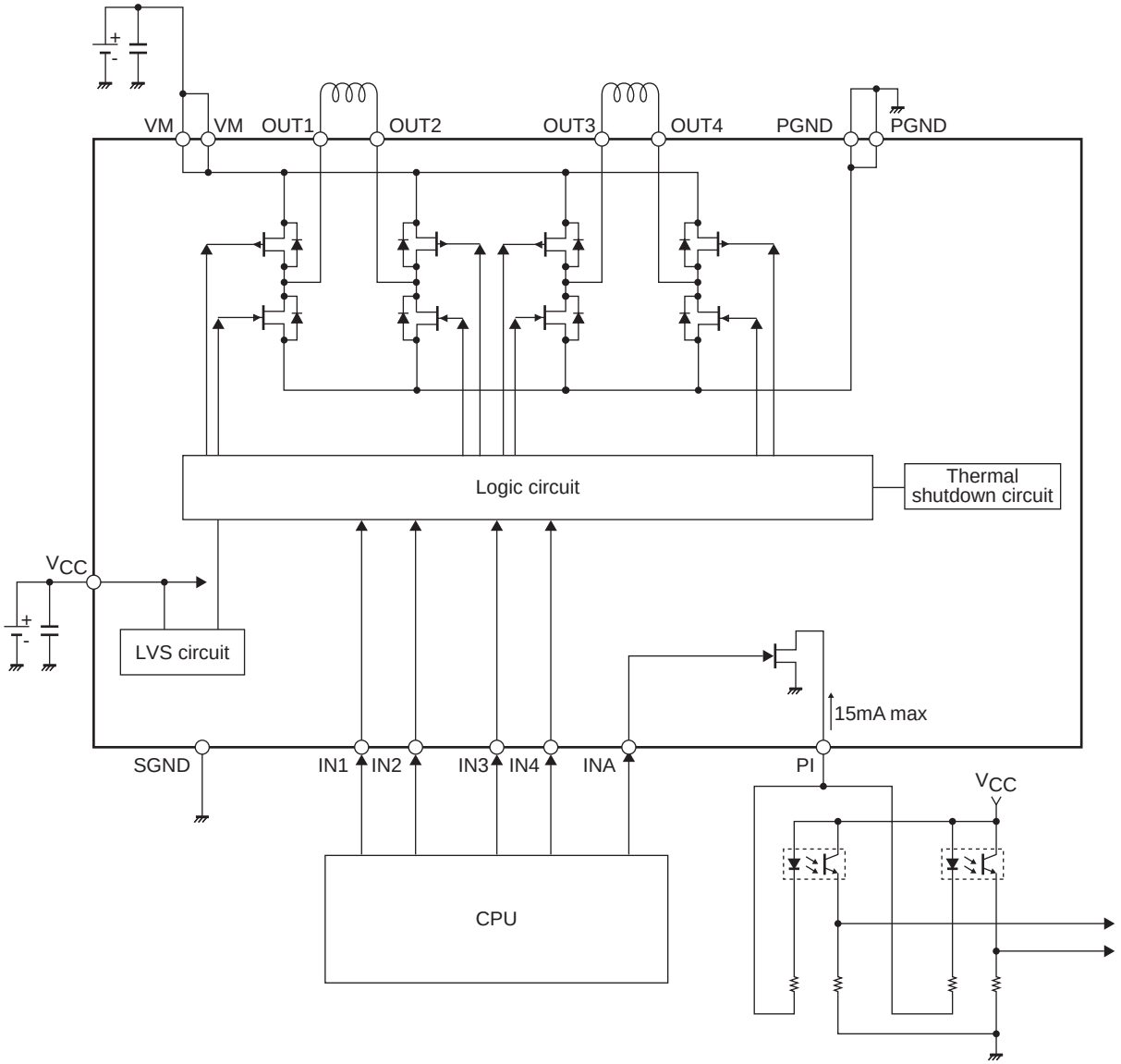




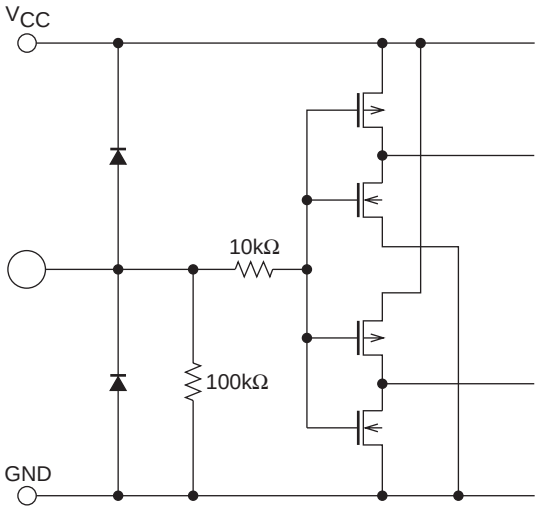
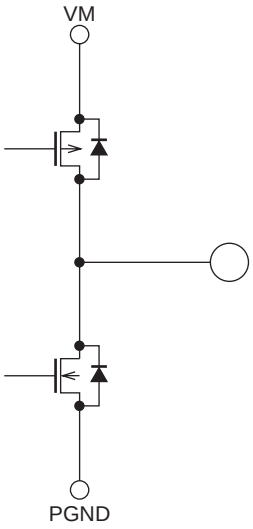
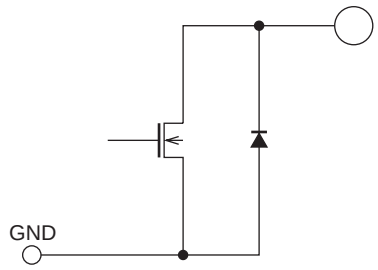
Pin Assignment



Block Diagram



Pin Functions

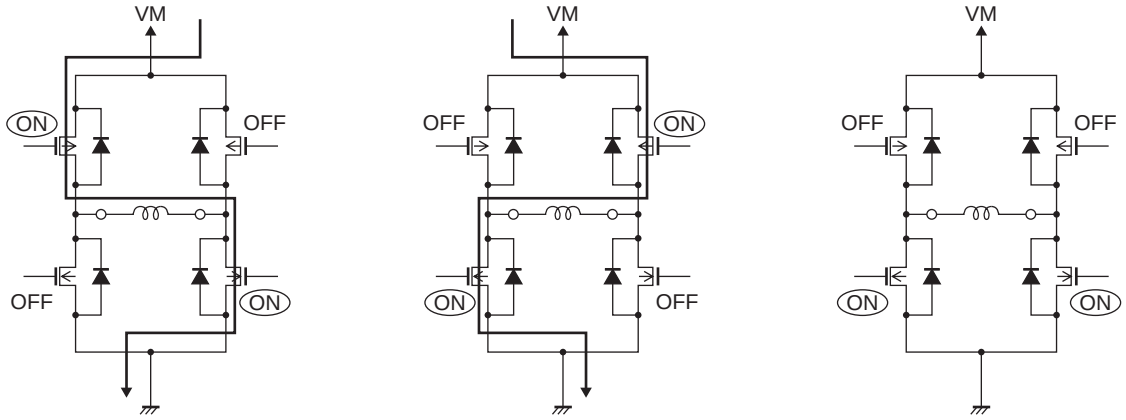
Pin No.	Pin name	Pin Function	Equivalent Circuit
2 1 16 15 14	IN1 IN2 IN3 IN4 INA	Control signal input pin Control signal input pin Control signal input pin Control signal input pin Control signal input pin	
8 7 6 5	OUT1 OUT2 OUT3 OUT4	Outpin Outpin Outpin Outpin	
13	PI	Outpin	
11	V_{CC}	Logic system power supply connection pin	
3 10	VM VM	Motor power supply connection pin Motor power supply connection pin	
12	SGND	Signal ground	
4 9	PGND PGND	Power ground Power ground	

Logic input specifications

• Common channels 1 to 2
ch1 : IN1 to IN2, OUT1 to OUT2
ch2 : IN3 to IN4, OUT3 to OUT4

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



• Photo sensor driving transistor
When thermal shutdown and V_{CC} low-voltage cut circuits are activated, OUT1 through OUT4 are turned OFF under control of the internal circuit. But the output (PI) of photo sensor driving transistor continues operation.

Input INA	Photo sensor driving PI
L	OFF
H	ON

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