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AP1013

18V 1ch H-Bridge Motor Driver IC

Overview

The AP1013 has four drive mode of forward, reverse, break and standby by 1 channel H-bridge Motor Driver corresponding to operating voltage 18V. The AP1013 layout Nch LDMOS FET in high side and low side in output circuit and realize a small package. Also it has Under voltage detection and thermal shut down circuits. It is suitable for driving various small motor.

Features

□ Control Supply Voltage:	2.7V to 5.5V
□ Logic Terminal Supply Voltage:	1.62V to Control Supply Voltage
□ Wide Motor Drive Operating Voltage:	2V to 18V（NMOS high side and Low side architecture）
□ Maximum Output Current (DC):	1.3A
□ Maximum Output Current (Peak):	2.2A (Ta=25°C, under 10ms in 200ms)
□ Maximum Output Current (Peak):	3.3A (Ta=25°C, under 5ms in 200ms)
□ Maximum Output Current (Peak):	5.0A (Ta=25°C, under 2ms in 200ms)
□ H-Bridge On Resistance:	RON(TOP+BOT)=0.38Ω (Typ.)@25°C
□ Power-Down Mode:	Quiescent current under 1μA at Power save mode (Ta=25°C)
□ Built-in Under Voltage Detection Circuit:	Detect VC Supply Voltage under 2.2V(Typ.)
□ Built-in Thermal Shut Down Circuit (Tj):	175°C (Typ.)
□ Junction Temperature:	150°C (Max.)
□ Package:	16pins 3mm×3mm QFN Package

Block Diagram

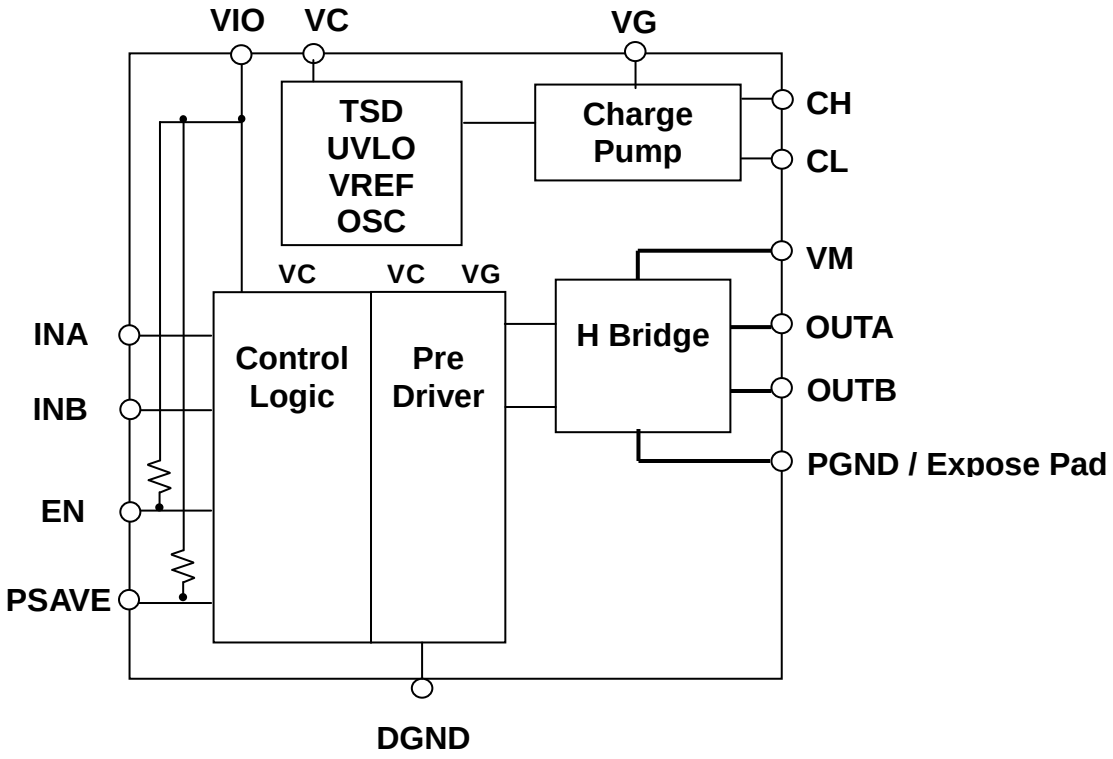


Figure1. Block Diagram

Absolute Maximum Ratings

Ta = 25°C unless otherwise specified

Parameter	Symbol	Min	Max	Unit	Remark
Control supply voltage	VC	-0.5	6	V	
Logic terminal supply voltage	VIO	-0.5	6	V	
Motor driver supply voltage	VM	-0.5	19	V	
VC, VIO level terminal voltage (PSAVE, EN, INA and INB)	Vterminal1	-0.5	5.5	V	
VM level terminal voltage （OUTA, and OUTB）	Vterminal2	-0.5	19	V	
VG, CH terminal voltage	Vterminal3	-0.5	25	V	
Maximum DC output current	Iload_dc_MD		1.3	A	OUTA and OUTB terminal
Maximum peak output current	Iload_peak_MD	-	2.2 3.3 5.0	A	OUTA and OUTB terminal Under 10ms in 200ms Under 5ms in 200ms Under 2ms in 200ms
Power dissipation	PD Ta=25°C		2083	mW	(Note3)
	PD Ta=85°C		1083	mW	(Note3)
Operating Temperature range	Ta	-30	85	°C	
Junction temperature	Tj		150	°C	
Storage temperature	Tstg	-65	150	°C	

(Note1) All above voltage is defined to V_{SS} (DGND/PGND terminal voltage)
(Note2) Product quality may suffer if the absolute maximum rating is exceeded even momentarily for any parameter. That is, the absolute maximum ratings are rated values at which the products on the verge of suffering physical damages, and therefore products must be used under conditions that ensure that the absolute maximum ratings are not exceeded.
(Note3) When 2 layer board is used, this is calculated $R_{\theta J}$=(60)°C/W. EP terminal is connected ground.
(Note4) Input terminal does not work until input logic terminal power supply VIO, is handled as low fixation.
(Note5) The each power supply of VM, VC and VIO is sequence-free.

Recommended Operation Conditions

Ta = 25°C

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Control supply voltage	VC	2.7	3.3	5.5	V	
Logic terminal supply voltage	VIO	1.62	1.8/3.3	VC	V	
Motor driver supply voltage	VM	2.0	-	18	V	
Input frequency range (50%duty)	Fin	-	-	200	kHz	

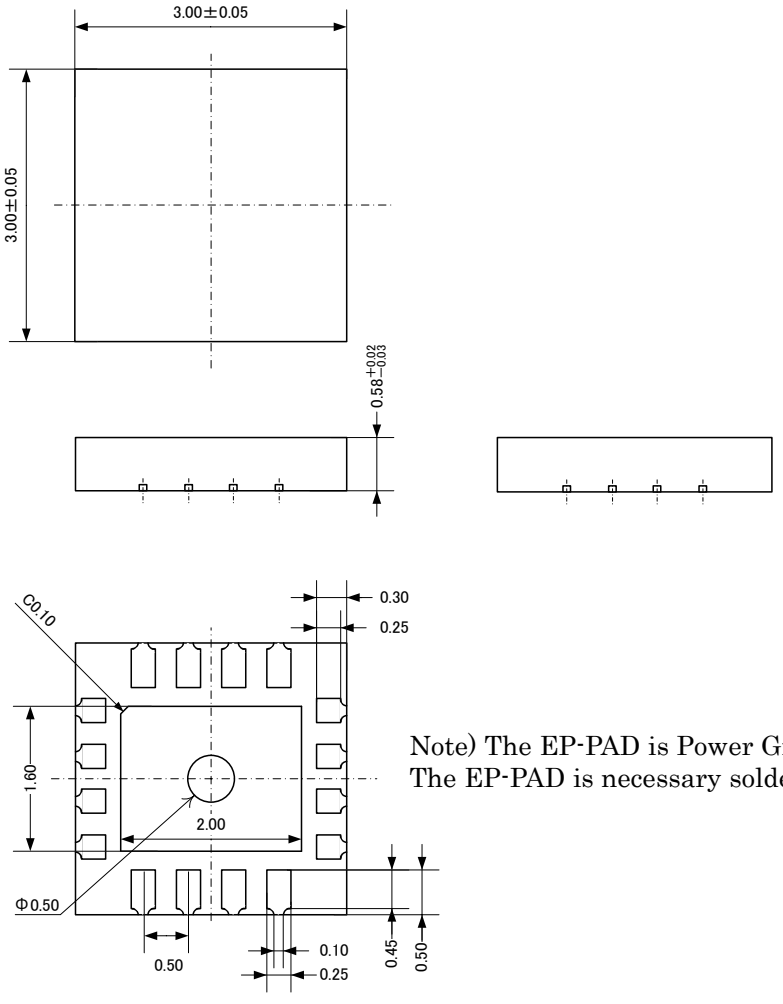
Control Logic

PSAVE	EN	Input		Output		Motion
		INA	INB	OUTA	OUTB	
L	H	L	L	Z	Z	Standby（Idling）
L	H	L	H	L	H	Reverse
L	H	H	L	H	L	Forward
L	H	H	H	L	L	Break（Stop）
L	L	X	X	L	L	Stop（OSC and charge pump operation）
H	X	X	X	Z	Z	Power save（Note1）

(Note1) TSD/UVLO/VREF/OSC/Charge pump are shut down.
(Note2) Input terminal is handled as Low fixation when VIO is not input power, OUTA/OUTB are L condition as same as PSAVE=L and EN=L.

Package

1. Mecanical demensions（reference）: 16pins QFN package



Note) The EP-PAD is Power Ground.
The EP-PAD is necessary soldered to PCB.

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