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AP1012

18V Dual H-Bridge Motor Driver IC

Overview

The AP1012 is the dual H-bridge motor driver which has four drive modes, forward, reverse, brake and standby, to operate up to 18V motor supply voltage. N type LDMOS is built in both high and low side for output driver to achieve small package. It also has under voltage detection and thermal shut down circuits. It is suitable for driving various types of small motors.

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):	3.0A (Ta=25°C, less than 10ms in 200ms or less than 5ms in100ms)
□ Maximum Output Current (Peak):	4.5A (Ta=25°C, less than 5ms in 200ms or less than 2.5ms in 200ms)
□ H-Bridge On Resistance:	RON(TOP+BOT)=0.36Ω (Typ.)@25°C
□ Power-Down Mode:	VM leakage current less than 2μA (Ta=25°C)
□ Built-in Under Voltage Detection Circuit:	Detection Voltage ; 2.2V(Typ.)
□ Built-in Thermal Shut Down Circuit (Tj):	175°C (Typ.)
□ Junction Temperature:	150°C (Max.)
□ Package:	24pins 4mm×4mm QFN Package

Block Diagram

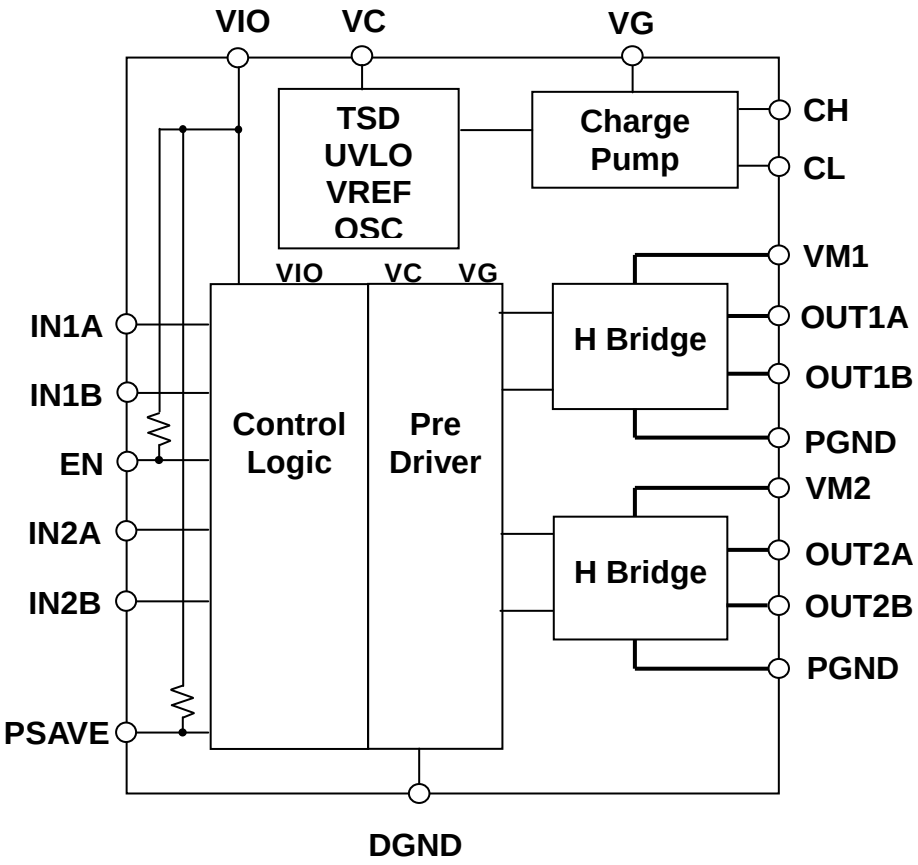


Figure1. Block Diagram

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	VIO is under VC voltage (Note4)
Motor driver supply voltage	VM	-0.5	19	V	
VIO level terminal voltage (PSAVE, EN, IN1A, IN1B, IN2A and IN2B)	Vterminal1	-0.5	5.5	V	
VM level terminal voltage （OUT1A,OUT1B, OUT2A and OUT2B）	Vterminal2	-0.5	19	V	
VG, CH terminal voltage	Vterminal3	-0.5	25	V	
Maximum DC output current	Iload_dc_MD		1.3	A	OUTnA and OUTnB terminal
Maximum peak output current	Iload_peak_MD		3 4.5	A	OUTnA, OUTnB Terminals Less than 10ms in 200ms Less than 5ms in 200ms
Power dissipation	PD Ta=85°C		1625	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 DGND/PGND terminal voltage
(Note2) The use under the condition which exceeds the absolute maximum ratings even momentarily may damage the product quality. That is, the absolute maximum ratings are rated values at which the products on the verge of suffering physical damages.
(Note3) The rating is calculated by $R_{\theta J}$=40°C/W under the condition when 4layer board is used. EP terminal is connected to ground. Compliant to SEMI JEDEC JESD51-6, JESD51-7.
(Note4) Logic terminal supply voltage, VIO, needs to be turned on prior to or at the same time as Control supply voltage, VC.

Recommended Operation Conditions

Ta = 25°C unless otherwise specified

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	

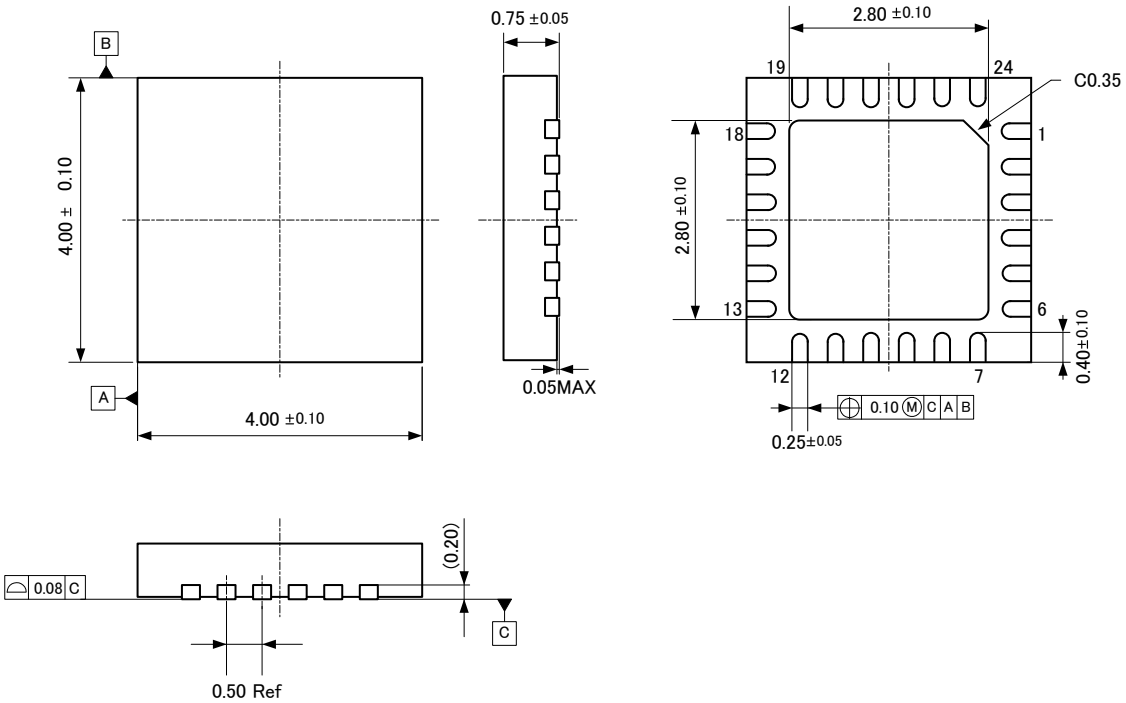
Control Logic

PSAVE	EN	Input		Output		Motion
		INnA	INnB	OUTnA	OUTnB	
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	Brake
L	L	X	X	L	L	Brake
H	X	X	X	Z	Z	Power save（Note1）

(Note1) TSD/UVLO/VREF/OSC/Charge pump circuits are shut down.

Package

1. Mecanical demensions（reference）: 24 pins QFN package



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