DATA SHEET

Part No.	AN44075A
Package Code No.	HSOP034-P-0300A

Contents

AN44075A

Driver IC for DC motor

■ Overview

AN44075A is a one channel H-bridge driver IC. 1-ch. DC motor can be controlled by a single driver IC.

■ Features

- Built-in thermal protection and low voltage detection circuit
- Built-in over current protection (when external resistance is added to pin 7 and pin 8.)
- Built-in 5 V power supply

■ Applications

- IC for DC motor drives

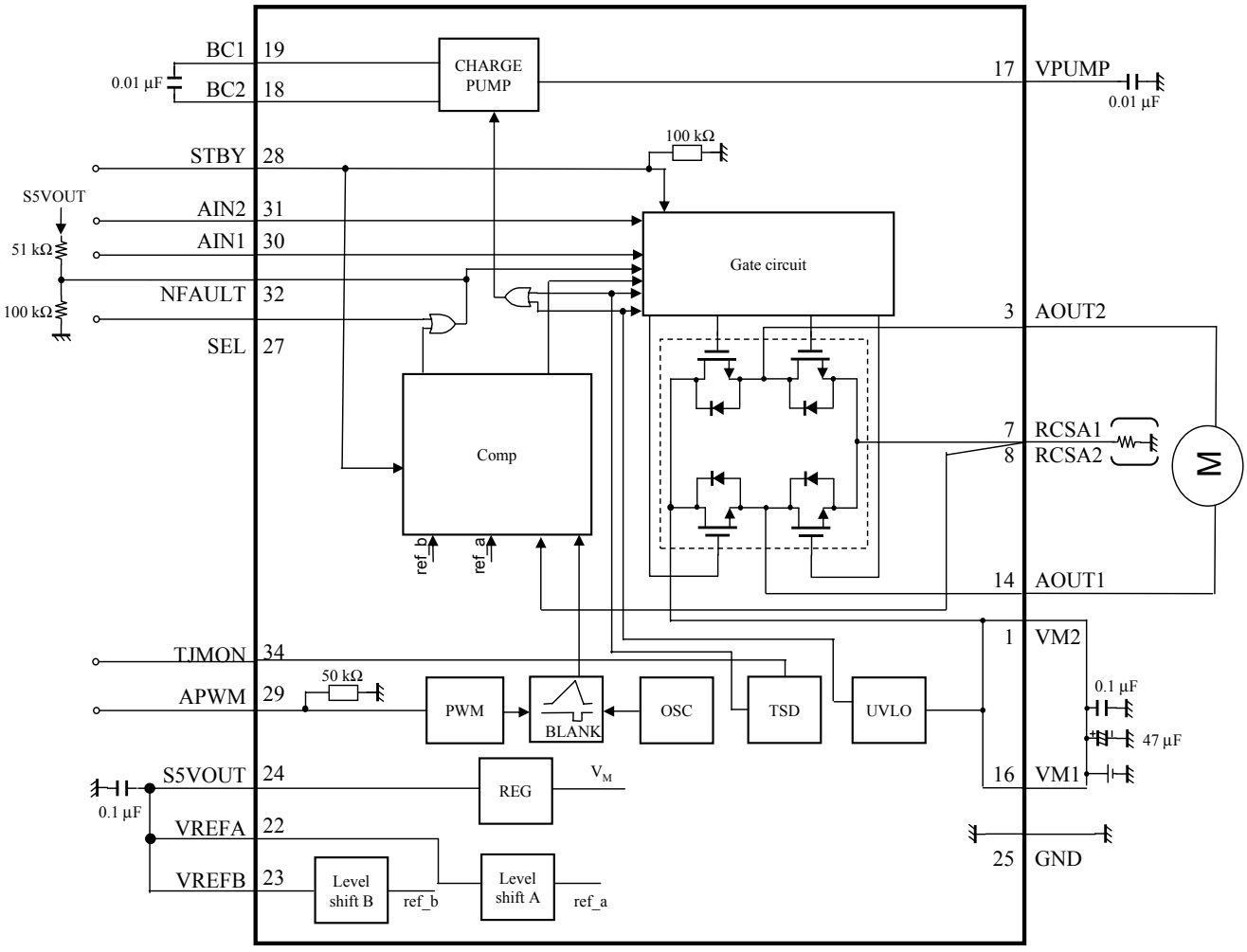
■ Package

- 34 pin plastic small outline package with back heat sink (SOP type)

■ Type

- Bi-CDMOS IC

■ Application Circuit Example (Block Diagram)



Note) This application circuit is shown as an example but does not guarantee the design for mass production set.

■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	VM2	Power supply	Motor power supply 2
2	N.C.	—	not used
3	AOUT2	Output	Motor drive output 2
4	N.C.	—	not used
5	N.C.	—	not used
6	N.C.	—	not used
7	RCSA1	Input / Output	Current detection 1
8	RCSA2	Input / Output	Current detection 2
9	GND	Ground	Die pad ground
10	N.C.	—	not used
11	N.C.	—	not used
12	N.C.	—	not used
13	N.C.	—	not used
14	AOUT1	Output	Motor drive output 1
15	N.C.	—	not used
16	VM1	Power supply	Motor power supply 1
17	VPUMP	Output	Charge pump circuit output
18	BC2	Output	Charge pump capacitor connection 2
19	BC1	Output	Charge pump capacitor connection 1
20	N.C.	—	not used
21	N.C.	—	not used
22	VREFA	Input	Peak current setting input
23	VREFB	Input	Load short threshold input
24	S5VOUT	Output	Internal reference voltage (5 V output)
25	GND	Ground	Signal ground
26	GND	Ground	Die pad ground
27	SEL	Input	Test mode input
28	STBY	Input	Standby input
29	APWM	Input	PWM input
30	AIN1	Input	Forward-reverse input
31	AIN2	Input	Brake mode input
32	NFAULT	Output	Abnormal detection output
33	N.C.	—	not used
34	TJMON	Output	VBE monitor

■ Absolute Maximum Ratings

A No.	Parameter	Symbol	Rating	Unit	Note
1	Supply voltage (pin 1, pin 16)	V_M	37	V	*1
5	Output pin voltage (pin 3, pin 14)	V_{OUT}	37	V	*2
6	Motor drive current (pin 3, pin 14)	I_{OUT}	±3.0	A	*2, *3
7	Flywheel diode current (pin 3, pin 14)	I_f	3.0	A	*2, *3
2	Power dissipation	P_D	0.466	W	*4
3	Operating ambient temperature	T_{opr}	–20 to +70	°C	*5
4	Storage temperature	T_{stg}	–55 to +150	°C	*5

Note) *1: The range under absolute maximum ratings, power dissipation.

*2: Do not apply external currents to any pin specially mentioned. For circuit currents, (+) denotes current flowing into the IC and (–) denotes current flowing out of the IC.

*3: Rating when cooling fin on the back side of the IC is connected to the GND pattern of the glass epoxy 4-layer board.
(GND area: 2nd-layer or 3rd-layer: more than 1 500 mm^2)
In case of no cooling fin on the back side of the IC, rating current is 1.5 A on the glass epoxy 2-layer board.

*4: Power dissipation shows the value of only package at T_a = 70°C.
When using this IC, refer to the • P_D – T_a diagram in the ■ Technical Data and use under the condition not exceeding the allowable value.

*5: Expect for the storage temperature and operating ambient temperature, all ratings are for T_a = 25°C.

■ Operating Supply Voltage Range

Parameter	Symbol	Range	Unit	Note
Supply voltage range	V_M	10.0 to 35.0	V	—

Note) The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

■ Electrical Characteristics at V_{CC} = 24 V

Note) T_a = 25°C±2°C unless otherwise specified.

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
Output drivers								
1	High-level output saturation voltage	V_{OH}	$I_{SA1} = I_{SA2} = -1$ A	V_M – 0.47	V_M – 0.36	—	V	—
2	Low-level output saturation voltage	V_{OL}	$I_{SA1} = I_{SA2} = 1$ A	—	0.50	0.65	V	—
3	Flywheel diode forward voltage	V_{DI}	$I_{DI} = \pm 1$ A	0.5	1.0	1.5	V	—
4	Output leakage current	I_{LEAK}	V_M = 37 V, V_{SRCS} = 0 V	—	10	20	µA	—
Power supply								
5	Supply current 1 (sleep)	I_{M1}	V_{STBY} = 0 V	—	65	105	µA	—
6	Supply current 2 (with circuit turned on)	I_{M2}	V_{STBY} = 5 V	—	7.3	12	mA	—
7	Reference voltage	V_{S5VOUT}	I_{S5VOUT} = –2.5 mA	4.5	5.0	5.5	V	—
8	Output impedance	Z_{S5VOUT}	ΔI_{S5VOUT} = –5 mA	—	18	27	Ω	—
IN input								
9	High-level IN input voltage	V_{INH}	—	2.1	—	5	V	—
10	Low-level IN input voltage	V_{INL}	—	0	—	0.6	V	—
11	High-level IN input current	I_{INH}	$V_{AIN1} = V_{AIN2}$ = 5 V	– 10	—	10	µA	—
12	Low-level IN input current	I_{INL}	$V_{AIN1} = V_{AIN2}$ = 0 V	–10	—	10	µA	—
Standby input								
13	High-level STBY input voltage	V_{STBYH}	—	2.1	—	5	V	—
14	Low-level STBY input voltage	V_{STBYL}	—	0	—	0.6	V	—
15	High-level STBY input current	I_{STBYH}	V_{STBY} = 5 V	30	—	80	µA	—
16	Low-level STBY input current	I_{STBYL}	V_{STBY} = 0 V	–10	—	10	µA	—
PWM input								
17	High-level PWM input voltage	V_{PWMH}	—	2.1	—	5	V	—
18	Low-level PWM input voltage	V_{PWML}	—	0	—	0.6	V	—
19	High-level PWM input current	I_{PWMH}	V_{APWM} = 5 V	60	—	150	µA	—
20	Low-level PWM input current	I_{PWML}	V_{APWM} = 0 V	–10	—	10	µA	—
21	PWM input max. frequency	f_{PWM}	—	—	—	200	kHz	—
22	Input min. pulse width	t_W	—	2	—	—	µs	—

■ Electrical Characteristics at V_{CC} = 24 V (continued)

Note) T_a = 25°C±2°C unless otherwise specified.

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
Peak current detection / over current protection								
23	Input bias current	I_{REF}	V_{REFA} = V_{REFB} = 5 V	83	100	125	µA	—
24	PWM frequency	f_{PWM}	V_{REFA} = 0 V, V_{REFB} = 5 V	17	26	35	kHz	—
25	Pulse blanking time	T_B	V_{REFA} = 0 V, V_{REFB} = 5 V	1.5	2.5	4.5	µs	—
26	Comp threshold 1	VT_{H1}	V_{REFA} = V_{REFB} = 5 V	480	500	520	mV	—
27	Comp threshold 2	VT_{H2}	V_{REFA} = 5.5 V, V_{REFB} = 2.5 V	475	500	525	mV	—
28	NFAULT output voltage	V_{NFLT}	I_{NFLT} = 1 mA	—	—	0.4	V	—

■ Electrical Characteristics (Reference values for design) at V_{CC} = 9 V

Note) T_a = 25°C±2°C unless otherwise specified.
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.
If a problem does occur related to these characteristics, Panasonic will respond in good faith to user concerns.

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
Output drivers								
29	Output slew rate 1	VT_r	Rising edge	—	270	—	V/µs	—
30	Output slew rate 2	VT_f	Falling edge	—	330	—	V/µs	—
31	Dead time	T_D	—	—	0.45	—	µs	—
Thermal protection								
32	Thermal protection operating temperature	TSD_{on}	—	—	150	—	ºC	—
33	Thermal protection hysteresis width	ΔTSD	—	—	40	—	ºC	—
Low voltage protection								
34	Protection operating voltage	UVLO1	—	—	8.0	—	V	—
35	Protection release voltage	UVLO2	—	—	8.6	—	V	—

■ Technical Data

- Control mode (truth table)

INPUT				OUTPUT		
STBY	AIN1	AIN2	APWM	AOUT1	AOUT2	Mode
"H"	—	"H"	"L"	"H"	"H"	Short brake
	"L"	—	"H"	"L"	"H"	Forward
	"H"	—	"H"	"H"	"L"	Reverse
	—	"L"	"L"	OFF	OFF	Stop
"L"	—	—	—	OFF	OFF	Standby

INPUT	OUTPUT
SEL	Mode
"H"	Short detect off
"L"	Short detect on

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