

# TA8440H

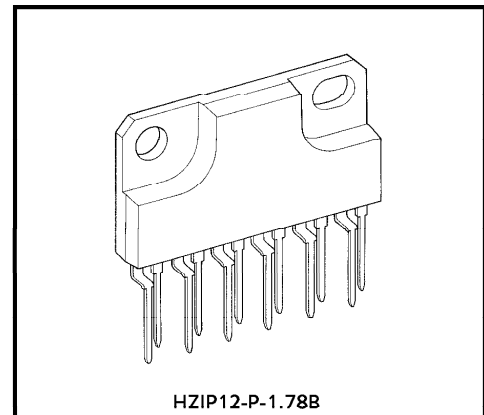
## DC MOTOR FULL BRIDGE DRIVER

The TA8440H is a full-bridge driver for selecting the forward and reverse running of a motor with brushes and is able to control 4 modes of forward, reverse, stop and braking.

The motor driving unit and the control unit have a separate power supply line, independently and the TA8440H is also usable as a stepping motor driver.

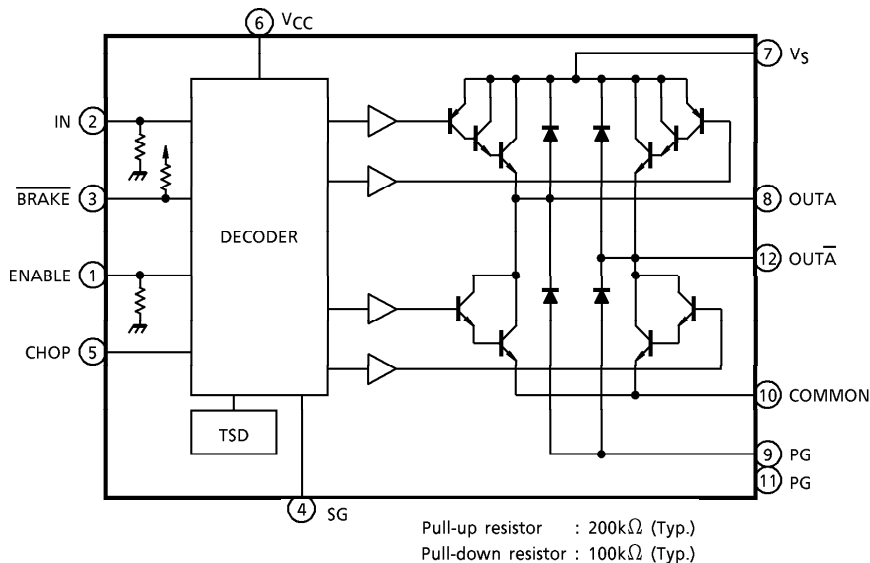
### FEATURES

- Output current is as large as 1.5A (AVE) and 3.0A (PEAK).
- 4 modes of forward, reverse, stop, and braking are available and a counter-electromotive force absorbing diode has been built-in.
- Thermal shutdown circuit incorporated.
- Input is compatible with CMOS.
- Built-in input pull-up resistor. BRAKE = 200kΩ (Typ.)
- Built-in input pull-down resistor. IN, ENABLE = 100kΩ (Typ.)



Weight : 4.04g (Typ.)

### BLOCK DIAGRAM



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**PIN FUNCTION**

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	ENABLE	ENABLE terminal
2	IN	Forward rotation / reverse rotation switch terminal
3	BRAKE	BRAKE terminal
4	SG	Signal GND
5	CHOP	PWM signal input terminal
6	V <sub>CC</sub>	Power voltage supply terminal for control
7	V <sub>S</sub>	Power voltage supply terminal for motor driver
8	OUTA	Output terminal
9	PG	Power GND
10	COMMON	COMMON terminal
11	PG	Power GND
12	OUTA	Output terminal

**FUNCTION**

INPUT				OUTPUT		MODE
IN	BRAKE	ENABLE	CHOP	OUTA	OUTA	MOTOR
H	H	H	L	H	L	CW / CCW
L	H	H	L	L	H	CCW / CW
(*)	(*)	L	(*)	∞	∞	Stop
(*)	L	H	(*)	L	L	Brake
H	H	H	H	∞	L	Chop
L	H	H	H	L	∞	Chop

(\*) Don't care      (∞) High impedance

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT	
Supply Voltage	V <sub>CC</sub>	7	V	
	V <sub>S</sub>	50		
Input Voltage	V <sub>IN</sub>	-0.3~V <sub>CC</sub>	V	
Output Current	AVE.	I <sub>O</sub> (AVE.)	1.5	A
	PEAK	I <sub>O</sub> (PEAK)	3.0 (Note 1)	A
Power Dissipation	P <sub>D</sub>	2.52 (Note 2)	W	
		25.0 (Note 3)		
Operating Temperature	T <sub>opr</sub>	-30~75	°C	
Storage Temperature	T <sub>stg</sub>	-55~150	°C	

- (Note 1) t = 100ms
- (Note 2) No heat sink
- (Note 3) T<sub>c</sub> = 75°C

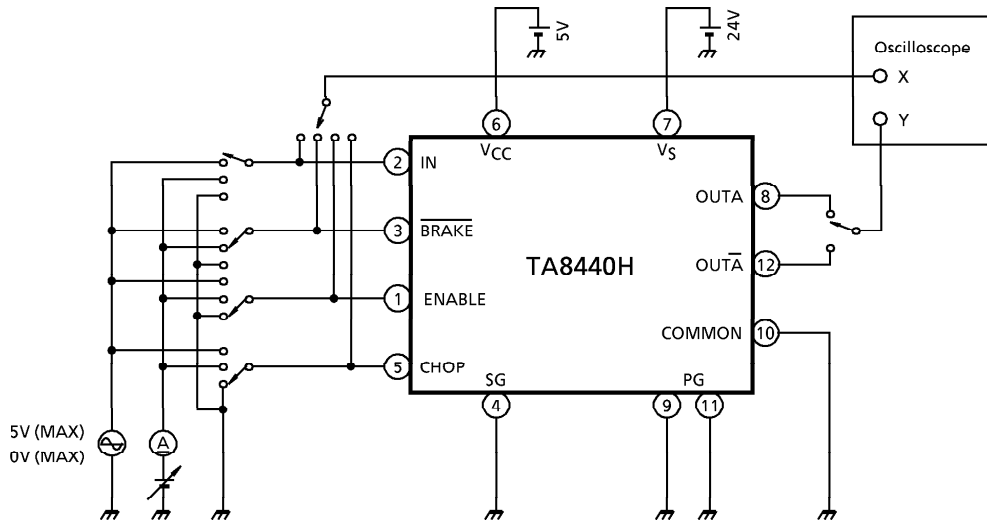
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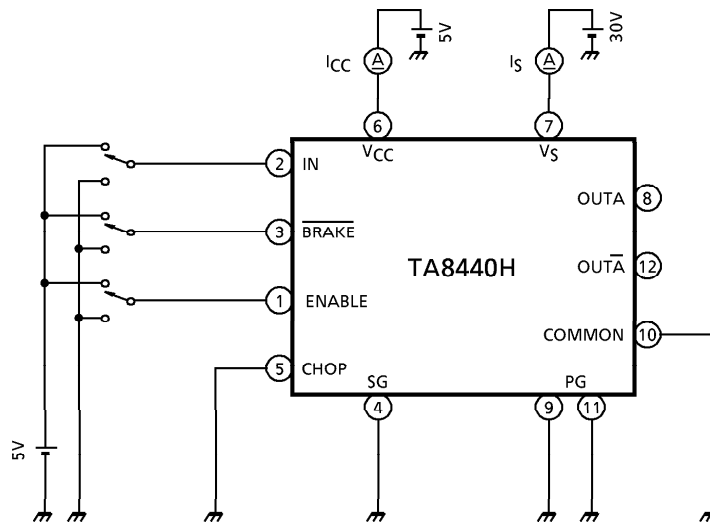
**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 5V$ ,  $V_S = 24V$ ,  $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Input Voltage	High	$V_{IN(H)}$	1	IN, CHOP, ENABLE, $\overline{BRAKE}$	3.5	—	$V_{CC}$	V	
	Low	$V_{IN(L)}$			GND	—	1.5		
Input Current	High	$I_{IN-1(H)}$	1	CHOP	$V_{IN} = 5V$	—	5	52	$\mu A$
		$I_{IN-2(H)}$		IN, ENABLE		—	40	60	
		$I_{IN-3(H)}$		$\overline{BRAKE}$		—	0	5.5	
Input Current	Low	$I_{IN-1(L)}$	1	CHOP	$V_{IN} = 0V$ Source type	—	0	5.5	$\mu A$
		$I_{IN-2(L)}$		IN, ENABLE		—	0	5.5	
		$I_{IN-3(L)}$		$\overline{BRAKE}$		—	25	52	
Current Consumption ( I )		$I_{CC1}$	2	Stop		—	6	10.5	mA
		$I_{CC2}$		Forward / reverse		—	10	14.5	
		$I_{CC3}$		Brake		—	14	18.5	
Current Consumption ( II )		$I_{S1}$	2	Stop		—	2	4.2	mA
		$I_{S2}$		Forward / reverse		—	3.5	5.0	
		$I_{S3}$		Brake		—	2.5	3.7	
Output Saturation Voltage	Upper Side	$V_{sat-U1}$	3	$I_{OUT} = 1.5A$	1.5	2.0	2.7	V	
	Under Side	$V_{sat-L1}$			0.7	1.25	1.9		
	Upper Side	$V_{sat-U2}$		$I_{OUT} = 3.0A$	2.7	3.0	3.9		
	Under Side	$V_{sat-L2}$			1.7	2.0	2.9		
Diode Forward Orientation Voltage	Upper Side	$V_{F-U1}$	—	$I_{OUT} = 1.5A$	—	3.5	—	V	
	Under Side	$V_{F-L1}$			—	1.3	—		
Output Leakage Current	Upper Side	$I_{OH}$	4	$V_S = 30V$	—	—	200	$\mu A$	
	Under Side	$I_{OL}$			—	—	100		
Shut Down Temperature		$T_{SD}$	—	—	—	170	—	$^\circ C$	
Transfer Time		$t_{pLH}$	—	IN-OUT	—	2.7	—	$\mu S$	
		$t_{pHL}$			—	1.2	—		
		$t_{pLH}$		CHOP-OUT	—	0.7	—		
		$t_{pHL}$			—	2.5	—		
		$t_{pLH}$		ENABLE-OUT	—	2.9	—		
		$t_{pHL}$			—	1.1	—		
		$t_{pLH}$		$\overline{BRAKE}$ -OUT	—	45	—		
		$t_{pHL}$			—	45	—		

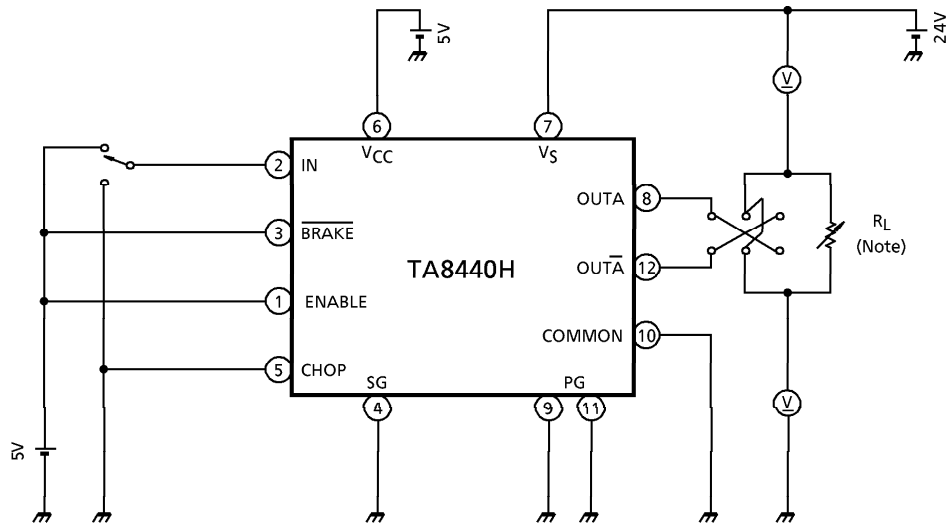
TEST CIRCUIT 1.  $V_{IN}(H)$ ,  $V_{IN}(L)$ ,  $I_{IN}(H)$ ,  $I_{IN}(L)$



TEST CIRCUIT 2.  $I_{CC1}$ ,  $I_{CC2}$ ,  $I_{CC3}$ ,  $I_{S1}$ ,  $I_{S2}$ ,  $I_{S3}$

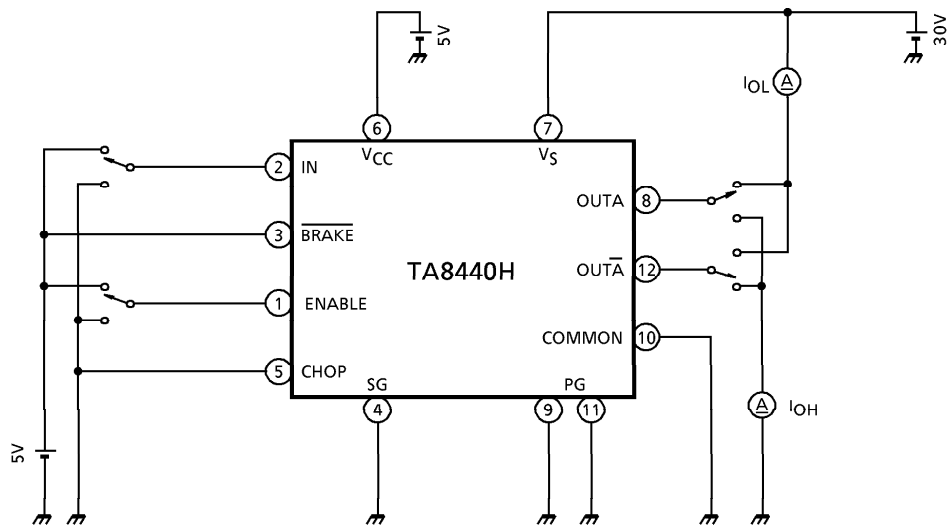


TEST CIRCUIT 3.  $V_{sat-L}$ ,  $V_{sat-U}$

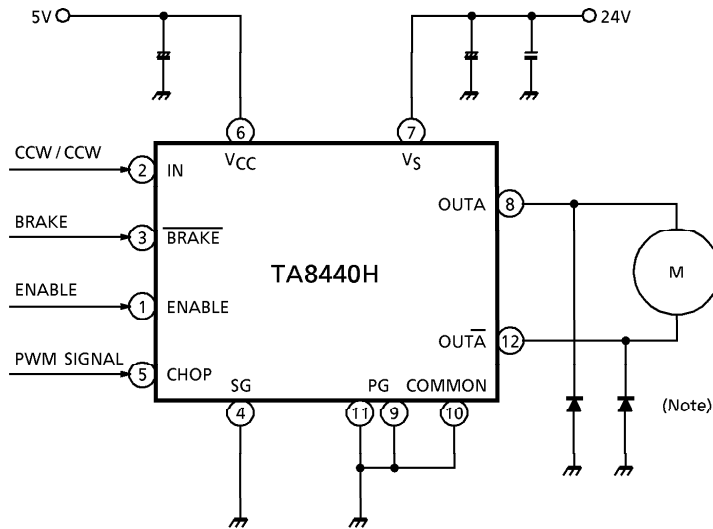


(Note) Calibrate  $I_{OUT}$  to 1.5/3.0A by  $R_L$ .

TEST CIRCUIT 4.  $I_{OH}$ ,  $I_{OL}$



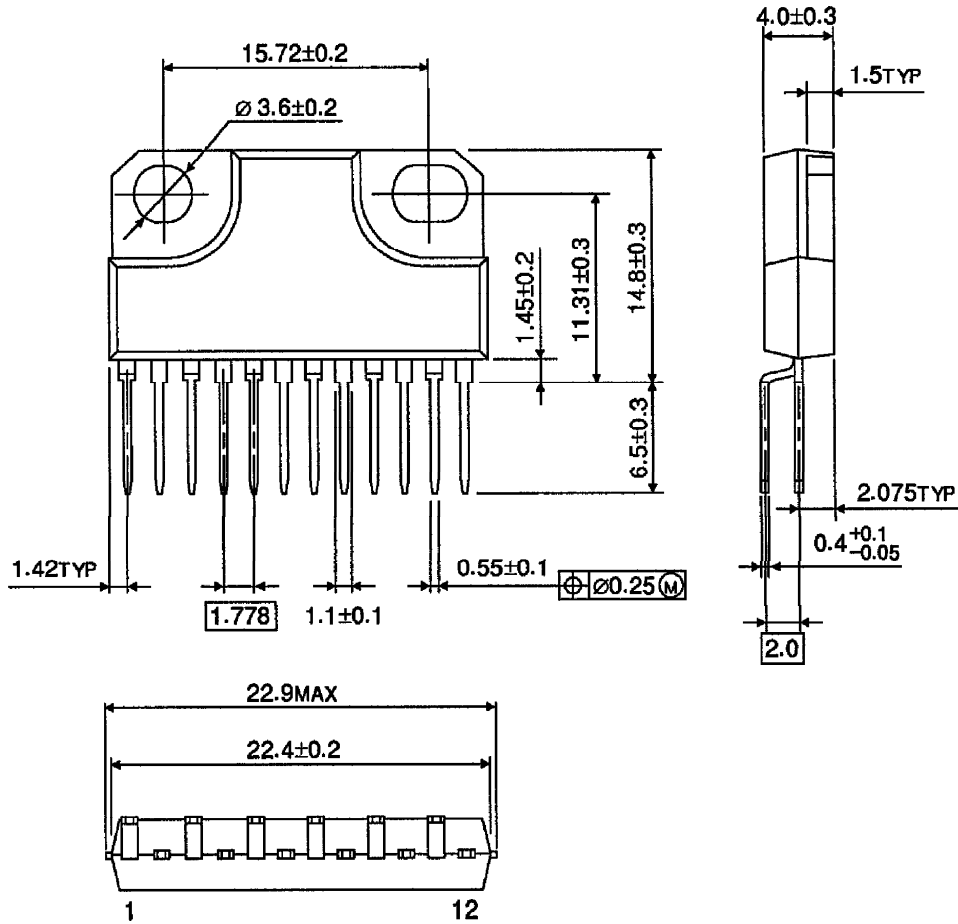
APPLICATION CIRCUIT



- (Note 1) Schottky diode (2GWJ42) to be connected additionally between each output (pin 16/19/20/23) and GND for preventing Punch-Through Current.
- (Note 2) Utmost care is necessary in the design of the output line,  $V_S$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

OUTLINE DRAWING  
HZIP12-P-1.78B

Unit : mm



Weight : 4.04g (Typ.)