

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

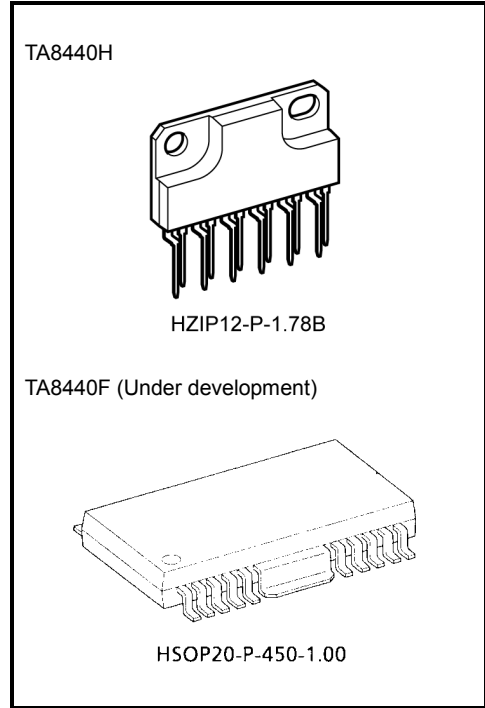
TA8440H, TA8440F

DC MOTOR FULL BRIDGE DRIVER
 F TYPE: UNDER DEVELOPMENT

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.

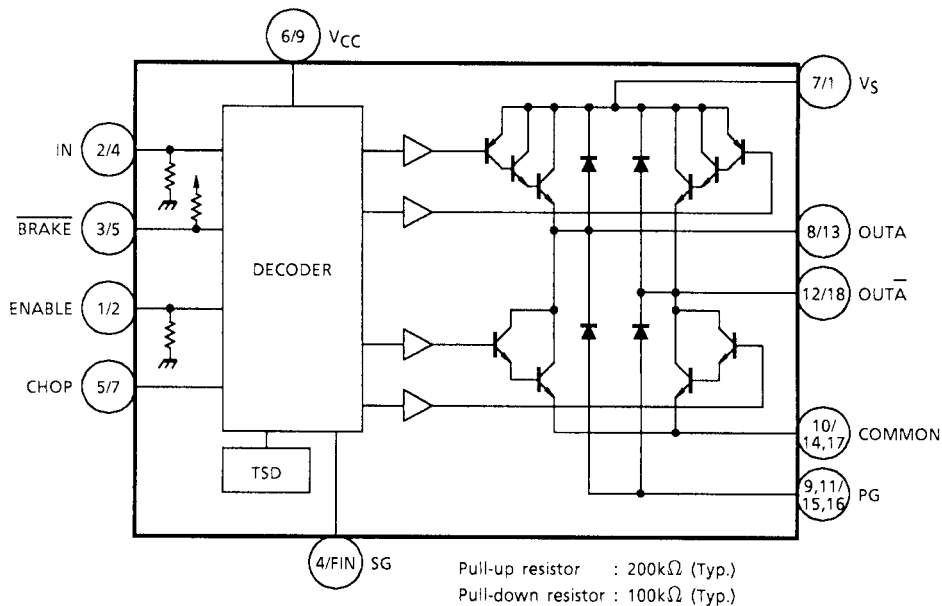
FEATURES

- 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 = 200 kΩ (Typ.)
- Built-in input pull-down resistor. IN, ENABLE = 100 kΩ (Typ.)



Weight
 HZIP12-P-1.78B: 4.04 g (Typ.)
 HSOP20-P-450-1.00: 0.79 g (Typ.)

BLOCK DIAGRAM



TA8440H/TA8440F

TA8440F: 3, 6, 8, 10, 11, 12, 19, 20 pin is No Connection.

PIN FUNCTION

Pin No.		SYMBOL	FUNCTIONAL DESCRIPTION
H	F		
1	2	ENABLE	ENABLE terminal
2	4	IN	Forward rotation / reverse rotation switch terminal
3	5	$\overline{\text{BRAKE}}$	BRAKE terminal
4	FIN	SG	Signal GND
5	7	CHOP	PWM signal input terminal
6	9	V _{CC}	Power voltage supply terminal for control
7	1	V _S	Power voltage supply terminal for motor driver
8	13	OUTA	Output terminal
9	15	PG	Power GND
10	14, 17	COMMON	COMMON terminal
11	16	PG	Power GND
12	18	OUT \bar{A}	Output terminal

TA8440F: 3, 6, 8, 10, 11, 12, 19, 20 pin is No Connection.

FUNCTION

INPUT				OUTPUT		MODE
IN	$\overline{\text{BRAKE}}$	ENABLE	CHOP	OUTA	OUT \bar{A}	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 RATING (Ta = 25°C)

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

Note 1: t = 100 ms

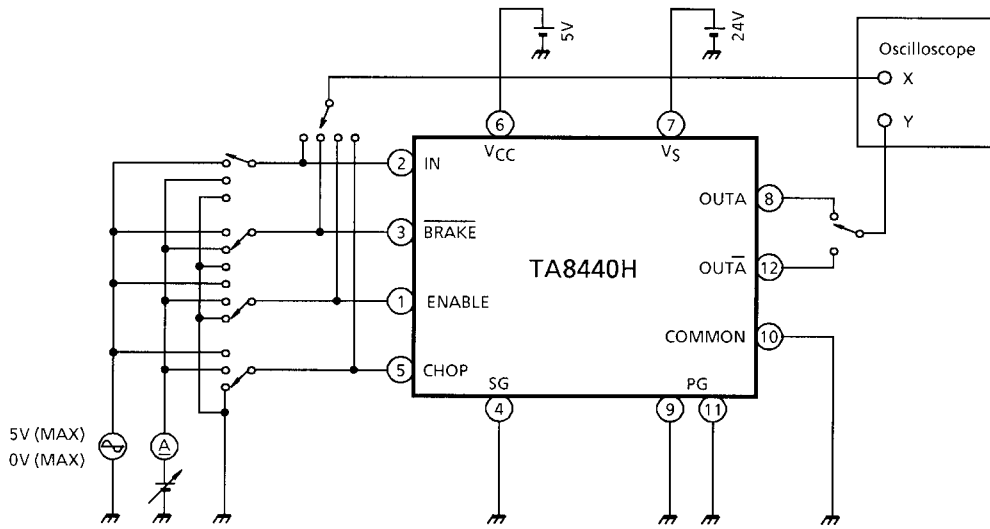
Note 2: No heat sink

Note 3: T_c = 75°C

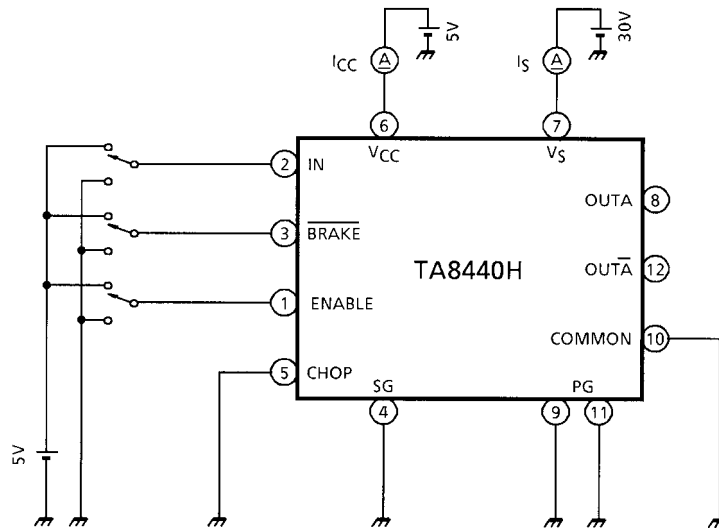
ELECTRICAL CHARACTERISTICS ($V_{CC} = 5\text{ V}$, $V_S = 24\text{ V}$, $T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Input Voltage	High	$V_{IN(H)}$	1	IN, CHOP, ENABLE, $\overline{\text{BRAKE}}$	3.5	—	V_{CC}	V	
	Low	$V_{IN(L)}$			GND	—	1.5		
Input Current	High	$I_{IN-1(H)}$	1	CHOP	$V_{IN} = 5\text{ V}$	—	5	52	μA
		$I_{IN-2(H)}$		IN, ENABLE		—	40	60	
		$I_{IN-3(H)}$		$\overline{\text{BRAKE}}$		—	0	5.5	
Input Current	Low	$I_{IN-1(L)}$	1	CHOP	$V_{IN} = 0\text{ V}$ Source type	—	0	5.5	μA
		$I_{IN-2(L)}$		IN, ENABLE		—	0	5.5	
		$I_{IN-3(L)}$		$\overline{\text{BRAKE}}$		—	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	$I_{OUT} = 1.5\text{A}$	1.5	2.0	2.7	V	
	Under Side	V_{sat-L1}			0.7	1.25	1.9		
	Upper Side	V_{sat-U2}		$I_{OUT} = 3.0\text{A}$	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}	—	$I_{OUT} = 1.5\text{A}$	—	3.5	—	V	
	Under Side	V_{F-L1}			—	1.3	—		
Output Leakage Current	Upper Side	I_{OH}	4	$V_S = 30\text{V}$	—	—	200	μA	
	Under Side	I_{OL}			—	—	100		
Shut Down Temperature		T_{SD}	—	—	—	170	—	$^\circ\text{C}$	
Transfer Time		t_{pLH}	—	IN-OUT	—	2.7	—	μs	
		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}		$\overline{\text{BRAKE}}$ -OUT	—	45	—		
		t_{pHL}			—	45	—		

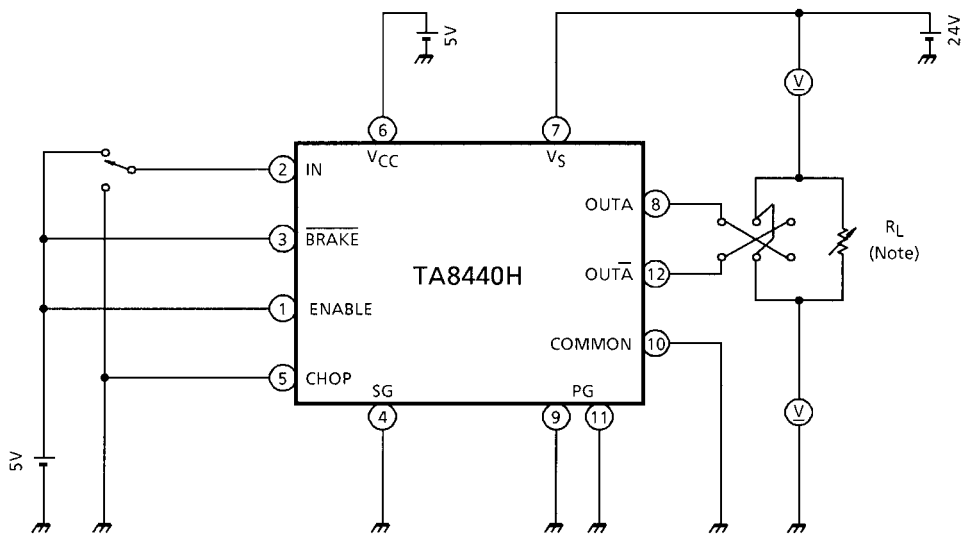
TEST CIRCUIT 1. $V_{IN} (H), V_{IN} (L), I_{IN} (H), I_{IN} (L)$



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

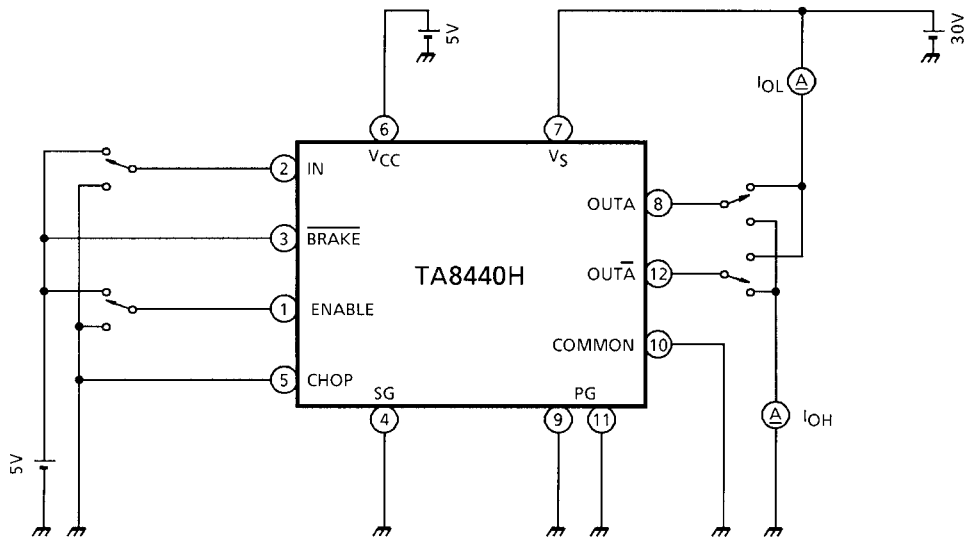


TEST CIRCUIT 3. V_{sat-L} , V_{sat-U}

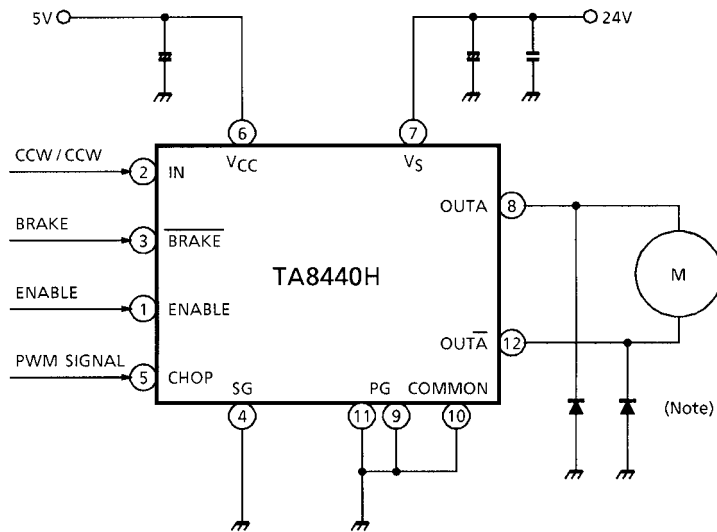


Note: Calibrate I_{OUT} to 1.5 / 3.0 A by R_L .

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



APPLICATION CIRCUIT



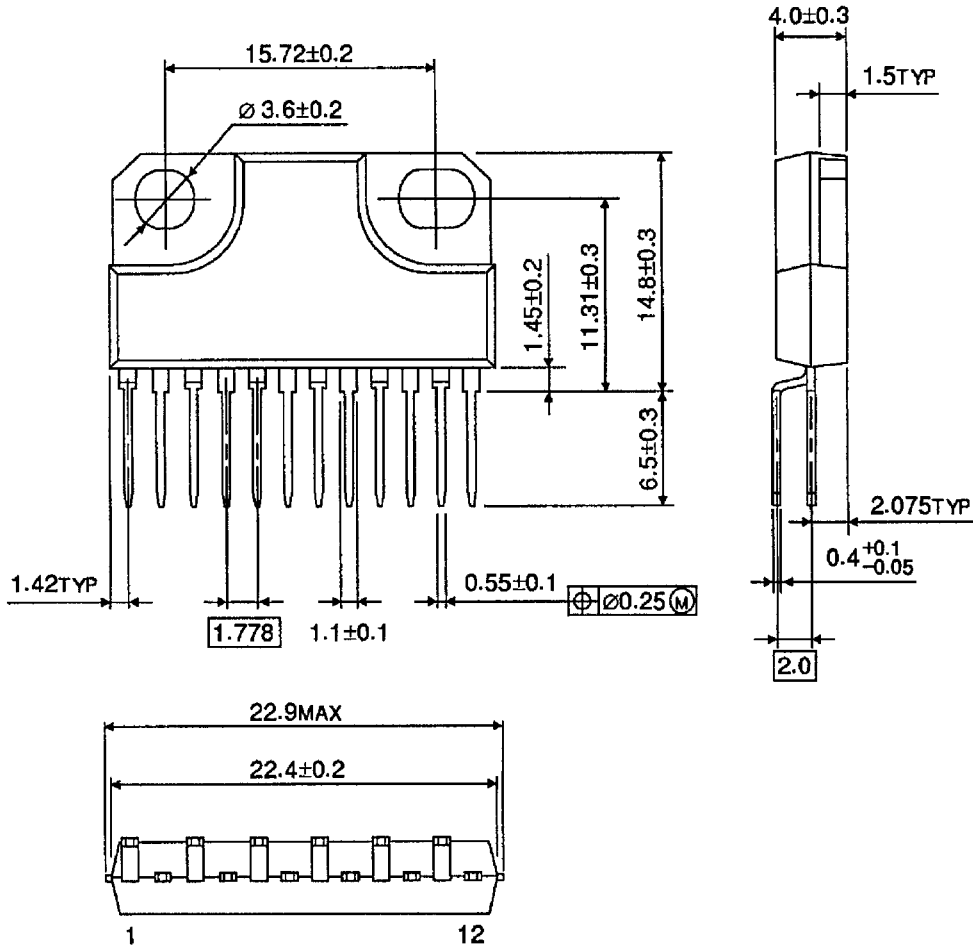
Note 1: Schottky diode (2GWJ42) to be connected additionally between each output (pin 16 / 19 / 20 / 23) and GND for preventing Punch-Through Current.

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.

PACKAGE DIMENSIONS

HZIP12-P-1.78B

Unit: mm

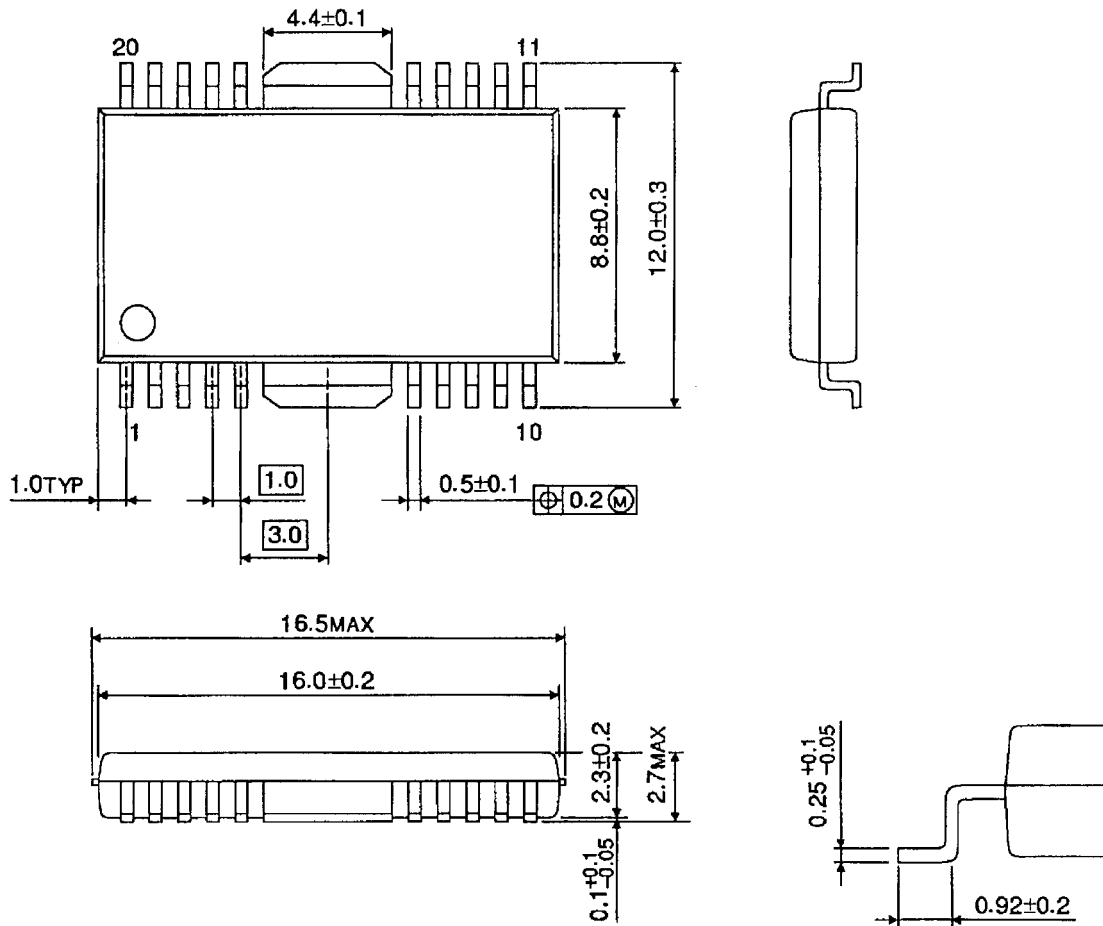


Weight: 4.04 g (Typ.)

PACKAGE DIMENSIONS

HSOP20-P-450-1.00

Unit : mm



Weight: 0.79 g (Typ.)

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000707EBA

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