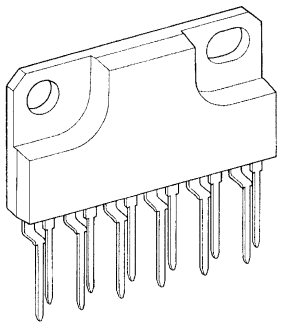
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8429H

3.0A FULL BRIDGE DRIVER

The TA8429H is full bridge driver IC for brush motor rotation control that has current capability of up to 3.0 A (AVE.). Thermal shutdown and short current protector are provided. And also stand−by function available.



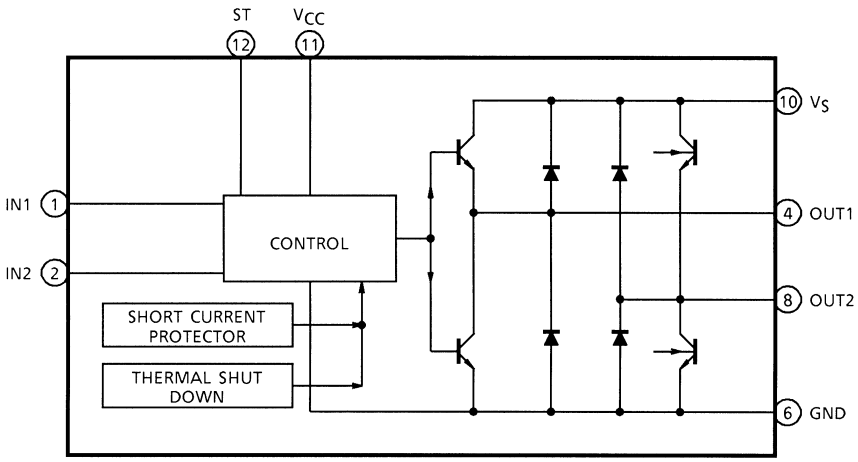
HZIP12-P-1.78B

Weight : 4.04 g (Typ.)

FEATURES

- Output current is as large as 3.0 A (AVE.) and 4.5 A (PEAK.)
- Stand−by mode available: $I_{ST} \leq 100$ μA (MAX.)
- Thermal shutdown and short circuit protector circuit are provided.
- 4 modes (Forward / reverse / short brake and stop) are available with 2 low active TTL compatible inputs control.
- Free wheeling diodes are equipped.
- HZIP power package sealed.
- Wide range of operating voltage: V_{CC} = 7~27 V
  $V_{S\ (opr.)}$ = 0~27 V

BLOCK DIAGRAM



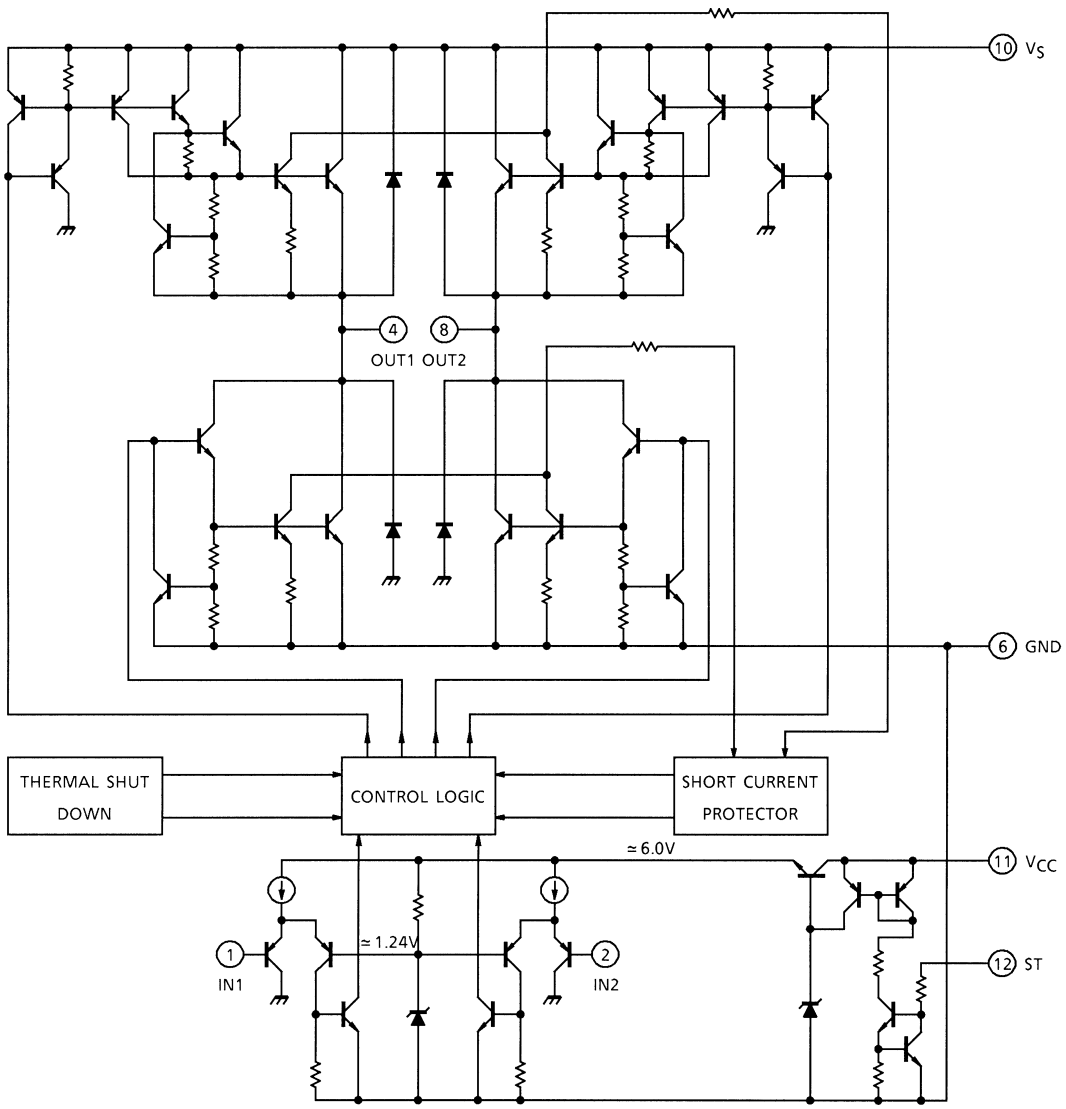
Note 1: Pin (3), (5), (7), and (9) are non connection.
Note 2: Heat fin is connected with GND with low impedance.

961001EBA2

PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN 1	TTL compatible control inputs (PNP type low active comparator inputs)
2	IN 2	
3	N.C	Non connection
4	OUT1	Output terminals, free wheeling diodes are connected between each output with GND and V_S.
5	N.C	Non connection
6	GND	GND terminal
7	N.C	Non connection
8	OUT2	Output terminals, free wheeling diodes are connected between each output with GND and V_S.
9	N.C	Non Connection
10	V_S	Supply voltage terminal for Motor Drive
11	V_{CC}	Supply voltage terminal for control circuit
12	ST	Stand−by terminal. Stand−by state is obtained with this terminal connected with GND (or Open).

INTERNAL CIRCUIT



FUNCTION

INPUT			OUTPUT		MODE
IN1	IN2	ST	OUT1	OUT2	MOTOR
H	H	H	L	L	Short brake
L	H	H	L	H	CW / CCW
H	L	H	H	L	CCW / CW
L	L	H	OFF (high impedance)		Stop
H / L	H / L	L	OFF (high impedance)		Stand−by

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}, V_S	30	V
Input Voltage		V_{IN}	−0.3~V_{CC}	V
Output Current	AVE.	$I_{O\ (AVE.)}$	3.0	A
	PEAK	$I_{O\ (PEAK)}$	4.5 (Note 1)	
Power Dissipation		P_D	2.25 (Note 2)	W
			21.6 (Note 3)	
Operating Temperature		T_{opr}	−30~85	°C
Storage Temperature		T_{stg}	−55~150	°C

Note 1: t = 100 ms
Note 2: No heat sink
Note 3: Tc = 85°C

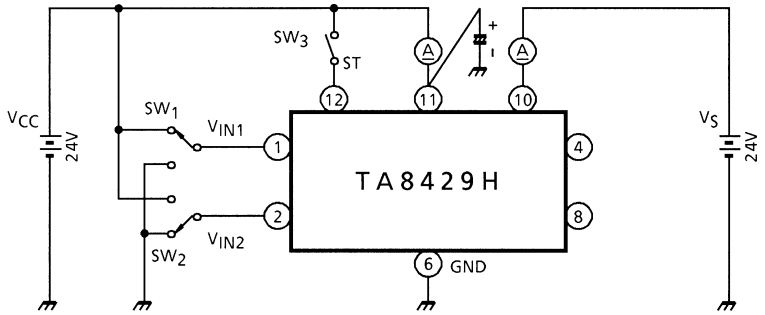
ELECTRICAL CHARACTERISTICS (V_{CC} = 24 V, V_S = 24 V, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Quiescent Current (I) (V_{CC} Line)	I_{CC1}	1	Stop mode	—	6	12	mA
	I_{CC2}		Forward / reverse mode	—	20	40	
	I_{CC3}		Brake mode	—	20	40	
Quiescent Current (II) (V_S Line)	I_{S1}	1	Stop mode	—	3	8	mA
	I_{S2}		Forward / reverse mode	—	16	40	
	I_{S3}		Brake mode	—	3	8	
Input Voltage	V_{INL}	2	—	—	—	0.8	V
	V_{INH}		—	2.0	—	—	
Input Current	I_{INL}	2	V_{IN} = GND	—	—	12	μA
	I_{INH}		V_{IN} = V_{CC}	—	—	10	
Output Saturation Voltage (Note)	V_{sat1}	3	I_O = 1.5 A	—	2.1	2.8	V
	V_{sat2}		I_O = 3.0 A	—	3.3	4.1	
Output Leakage Current	I_{LU}	4	V_L = 25 V	—	—	50	μA
	I_{LL}		V_L = 25 V	—	—	50	
Diode Forward Voltage	V_{FU}	5	I_F = 3.0 A	—	5.0	—	V
	V_{FL}		I_F = 3.0 A	—	1.5	—	
Limiting Current	I_{SD}	—	—	—	5	—	A
Thermal Shutdown Circuit Operating Temperature	T_{SD}	—	—	—	150	—	°C
Stand-by Current	I_{ST}	1	—	—	—	100	μA
Propagation Delay Time	t_{pLH}	2	—	—	1	10	μs
	t_{pHL}	2	—	—	1	10	

Note: Upper and lower side total

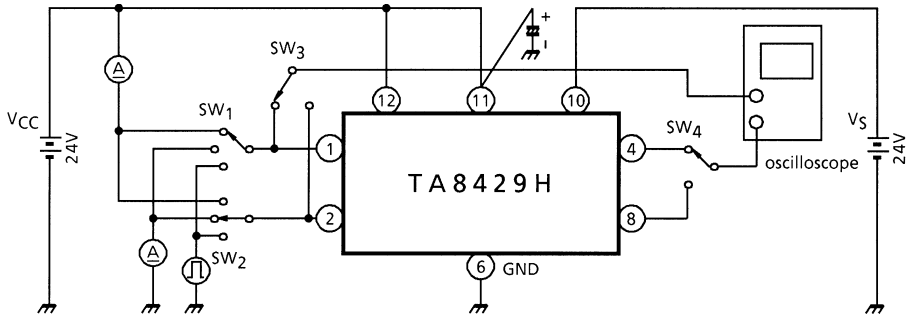
TEST CIRCUIT 1

I_{S1}, I_{S2}, I_{S3}, I_{CC1}, I_{CC2}, I_{CC3}, I_{ST}



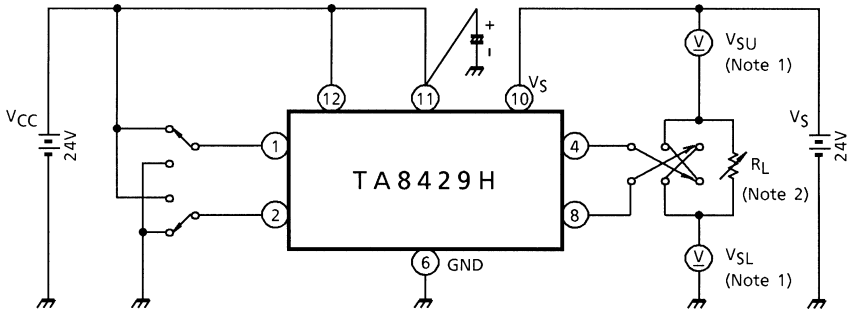
TEST CIRCUIT 2

V_{INH}, V_{INL}, I_{INH}, I_{INL}, t_{pHL}, t_{pLH}



TEST CIRCUIT 3

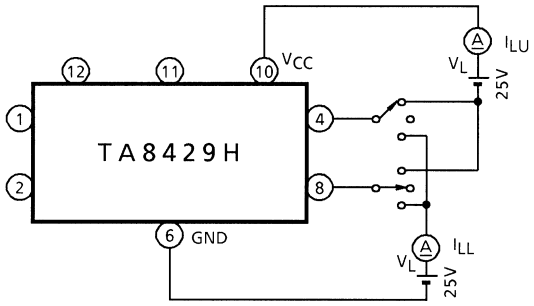
V_{sat}



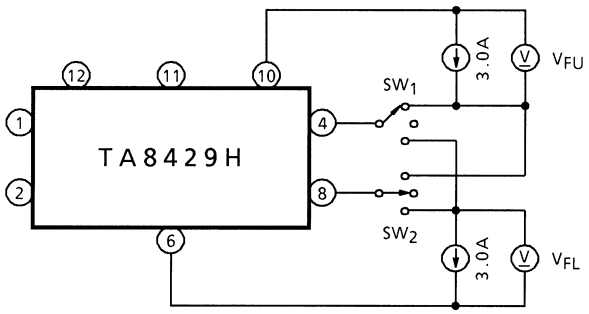
Note 1: $V_{sat} = V_{SU} + V_{SL}$

Note 2: Calibrate I_O to 1.5 / 3.0 A by R_L

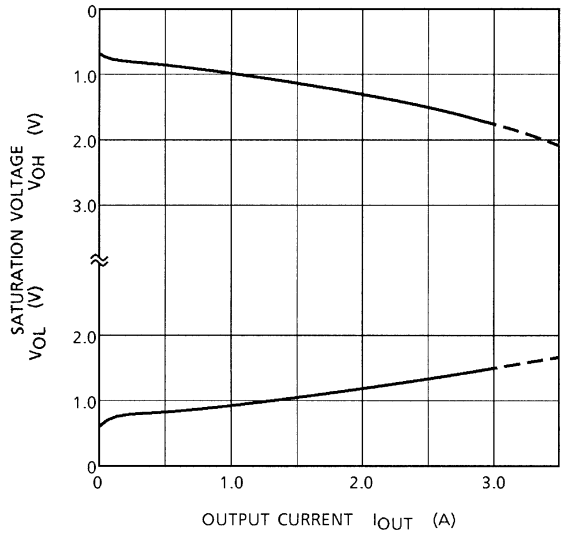
TEST CIRCUIT 4
I_{LU}, I_{LL}



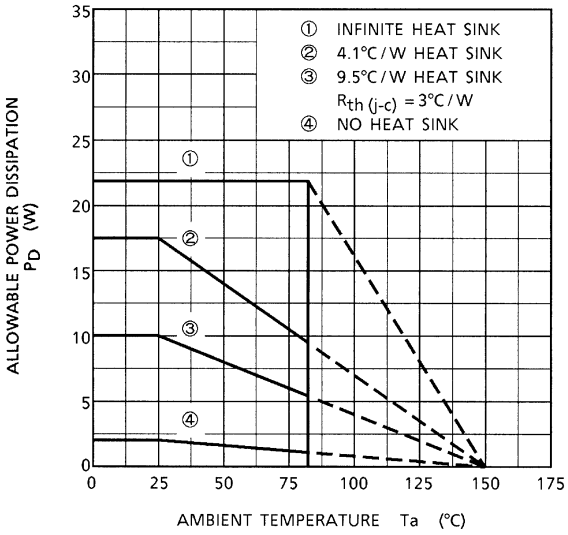
TEST CIRCUIT 5
V_{FU}, V_{FL}



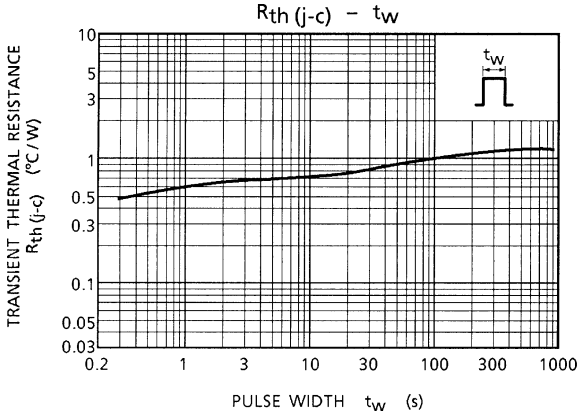
V_{OL}, V_{OH} – I_{OUT}



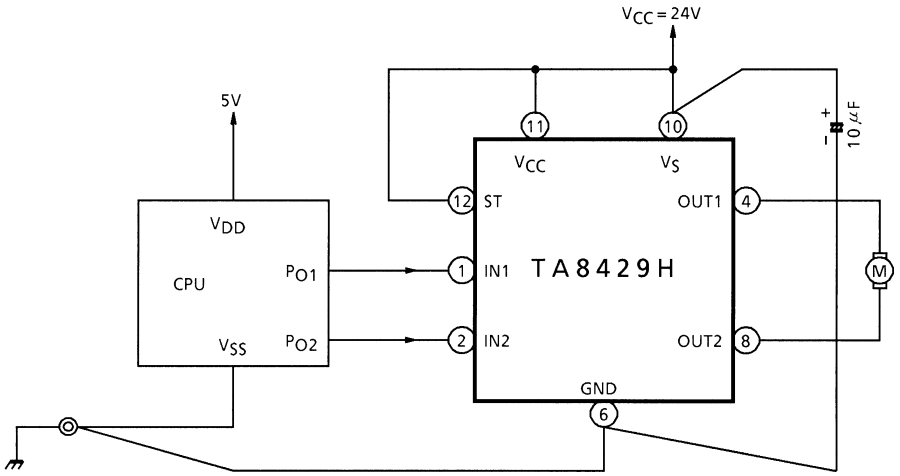
P_D MAX – Ta



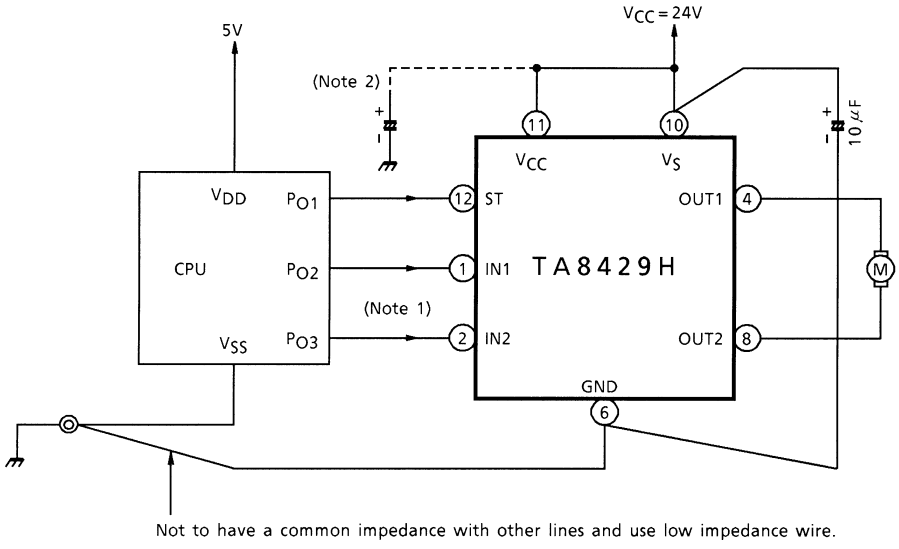
$R_{th\ (j-c)}$ – t_W



APPLICATION CIRCUIT 1. (Single power supply operation)



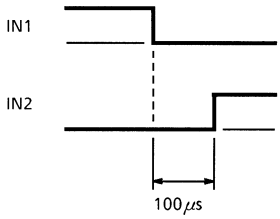
APPLICATION CIRCUIT 2. (Dual power supply (Control and Motor) operation)



Note 1: Recommend to take approximately 100 μs of input dead time for reliable operations.

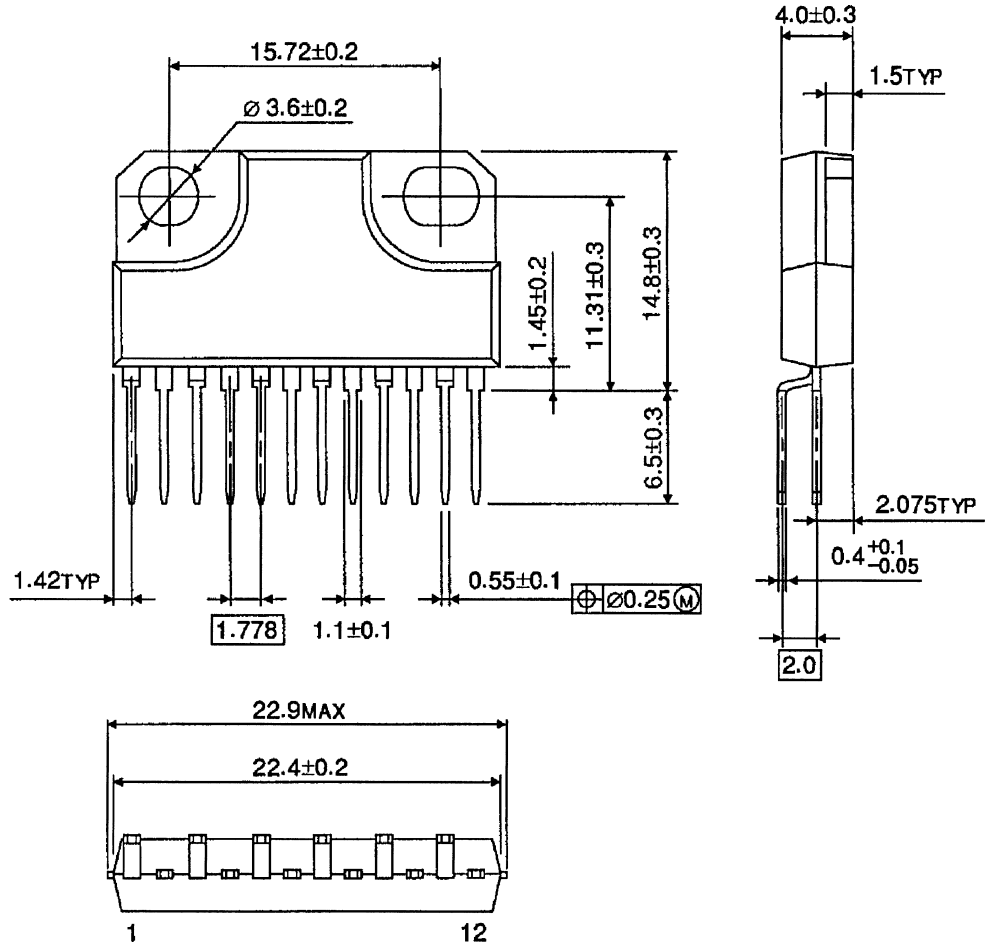
Note 2: Connect if required.

Note 3: 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



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