

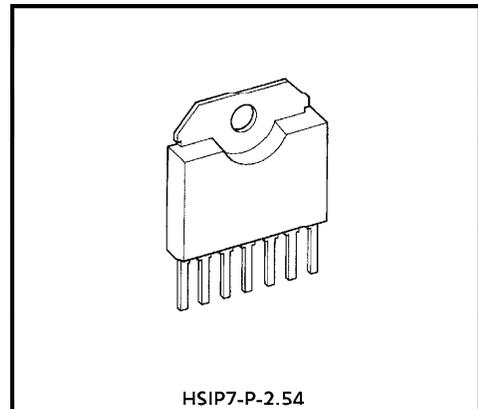
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8428K

1.5A FULL BRIDGE DRIVER

The TA8428K is Full Bridge Driver IC for Brush Motor Rotation Control that has current capability of up to 1.5A (AVE).

Thermal Shutdown and Short Current Protector are provided.

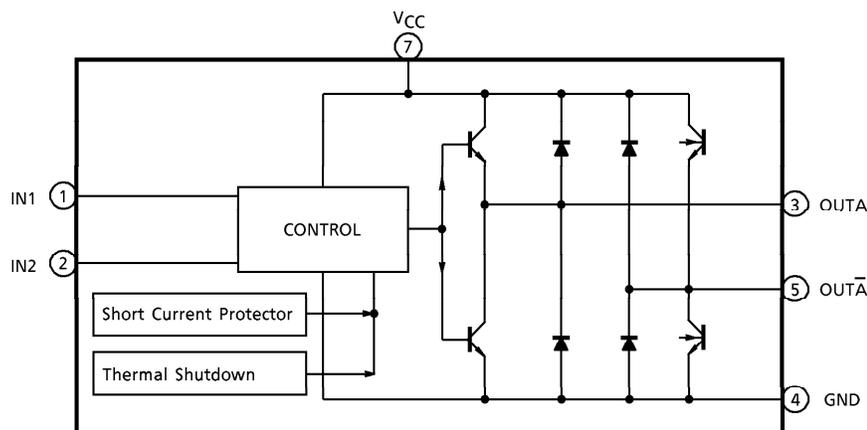


Weight : 1.88g (Typ.)

FEATURES

- 1.5A (AVE.) full bridge driver
- 4 modes (forward / reverse / short brake and stop) are available with 2 TTL compatible inputs control.
- H-SIP 7 compact SIP package sealed.
- Free wheeling diodes are equipped.
- Multi protection system driver (Thermal shutdown and short current protector)

BLOCK DIAGRAM



961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

● The products described in this document are subject to foreign exchange and foreign trade control laws.

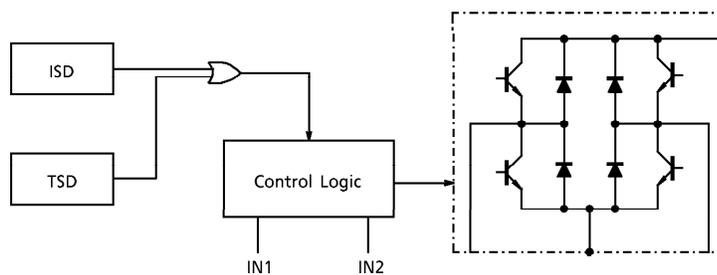
● The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.

● The information contained herein is subject to change without notice.

PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN1	TTL compatible control inputs.
2	IN2	(PNP type low active comparator inputs)
3	OUTA	Output terminals and free wheeling diodes are connected between each output to GND and V_{CC} .
4	GND	GND terminal
5	OUT \bar{A}	Output terminals and free wheeling diodes are connected between each output to GND and V_{CC} .
6	N.C	Non connection
7	V_{CC}	Supply voltage terminal for control and motor drive.

TA8428K has 2 build-in protective functions which work independently. These circuit operations are as follows.



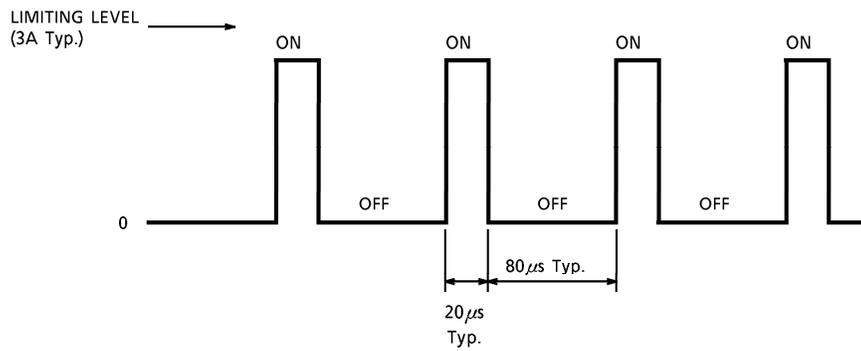
- Thermal shutdown (TSD)

If junction temperature of TA8428K is over the specified temperature (150°C Typ.) by excess power dissipation or abnormal ambient temperature change, thermal Shutdown circuit turn "ON" and output 4 transistors become High impedance. (All transistors turn "OFF")

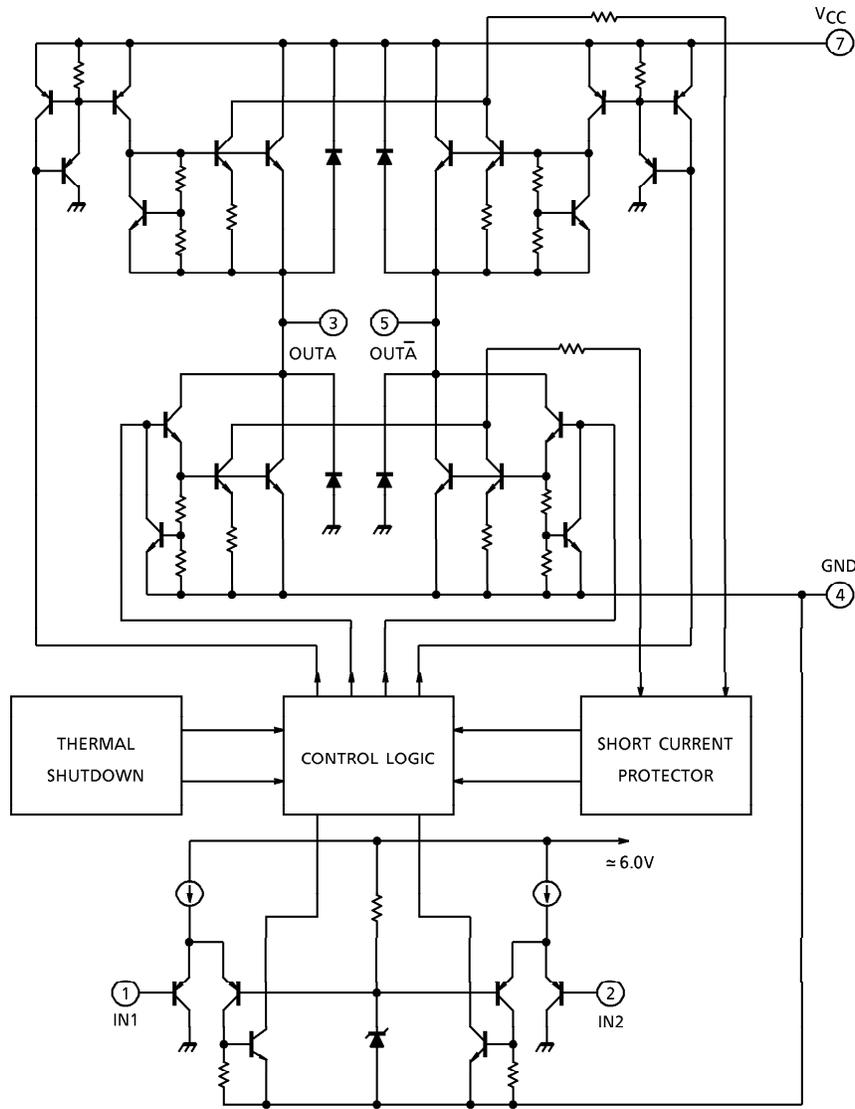
- Short current protector (ISD)

Short current protector circuit senses all output transistor current. If output transistor current is over the specified limiting current value (3A Typ.), short current protector operates and all output transistors periodically turn "OFF" (High Impedance Mode) in a period of approximately 80 μ s.

This state is continued until the release of over current mode.



INTERNAL CIRCUIT



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	30	V
Input Voltage	V _{IN}	- 0.3~V _{CC}	V
Output Current	AVE.	I _O (AVE.)	1.5
	PEAK	I _O (PEAK)	3.0 (Note 1)
Power Dissipation	P _D	1.25 (Note 2)	W
		10.0 (Note 3)	
Operating Temperature	T _{opr}	- 30~85	°C
Storage Temperature	T _{stg}	- 55~150	°C

(Note 1) t = 100ms

(Note 2) No heat sink

(Note 3) T_c = 90°C

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

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I _{CC1}	1	Stop mode	—	8	15	mA
	I _{CC2}		Forward / reverse mode	—	35	85	
	I _{CC3}		Brake mode	—	16	30	
Input Voltage	V _{IL}	2	—	—	—	0.8	V
	V _{IH}		—	2.0	—	—	
Input Current	I _{IL}	2	V _{IN} = GND	—	—	50	μA
	I _{IH}		V _{IN} = V _{CC}	—	—	10	
Output Saturation Voltage	V _{sat} (total)	3	I _O = 1.5A, T _c = 25°C	—	2.2	2.9	V
Output Leakage Current	I _{LU}	4	V _L = 25V	—	—	50	μA
	I _{LL}			—	—	50	
Diode Forward Voltage	V _{FU}	5	I _F = 1.5A	—	2.6	—	V
	V _F L			—	1.5	—	
Limiting Current	I _{SD}	—	—	—	3	—	A
Thermal Shutdown Operating Temperature	T _{SD}	—	—	—	150	—	°C
Propagation Delay Time	t _{pLH}	2	—	—	1	10	μs
	t _{pHL}	2	—	—	1	10	

FUNCTION

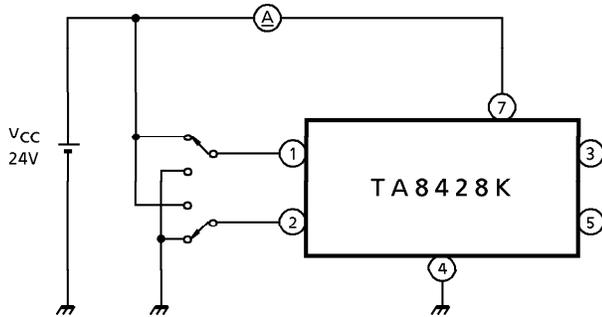
INPUT		OUTPUT		MODE
IN1	IN2	OUTA	OUTĀ	
H	H	L	L	Brake
L	H	L	H	CW / CCW
H	L	H	L	CCW / CW
L	L	OFF (high impedance)		Stop

(Note) PIN ⑥ is non connection.

(Note) Heat fin is connected with GND with low impedance.

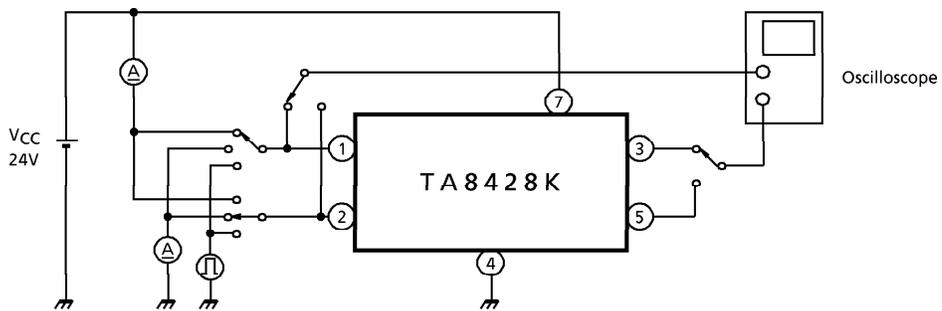
TEST CIRCUIT 1.

I_{CC1} , I_{CC2} , I_{CC3}



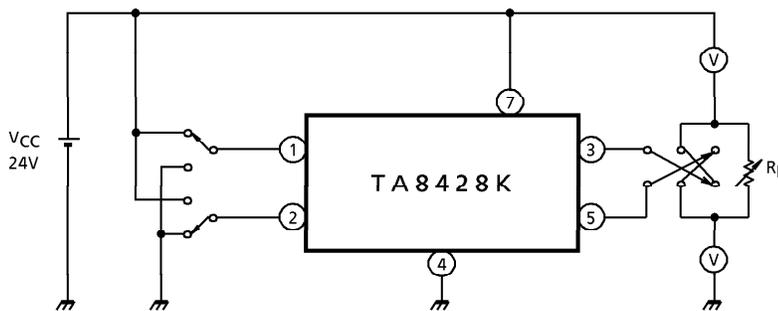
TEST CIRCUIT 2.

V_{IL} , V_{IH} , I_{IL} , I_{IH} , t_{pLH} , t_{pHL}



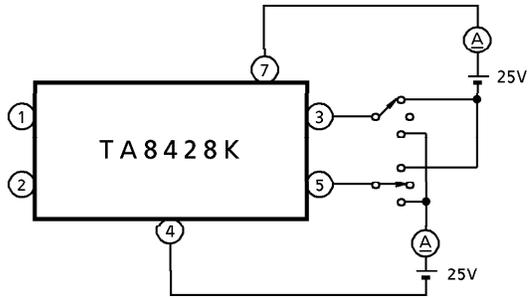
TEST CIRCUIT 3.

V_{sat}



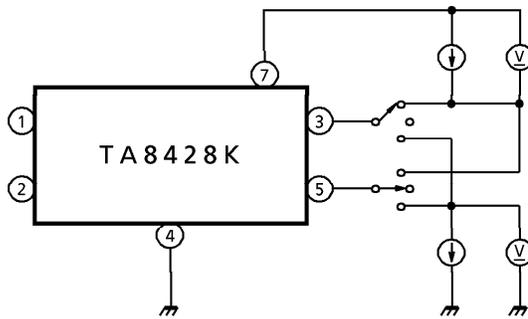
TEST CIRCUIT 4.

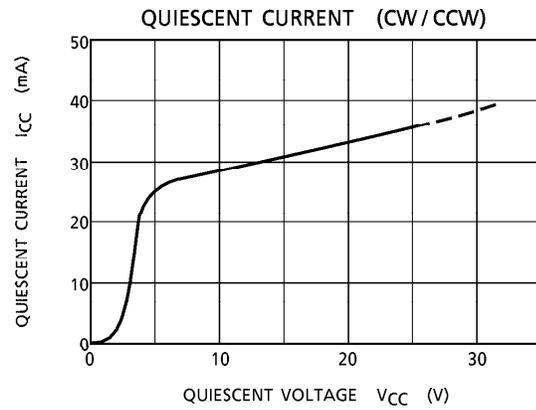
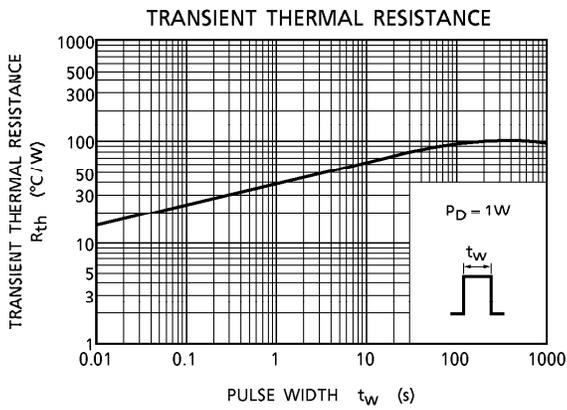
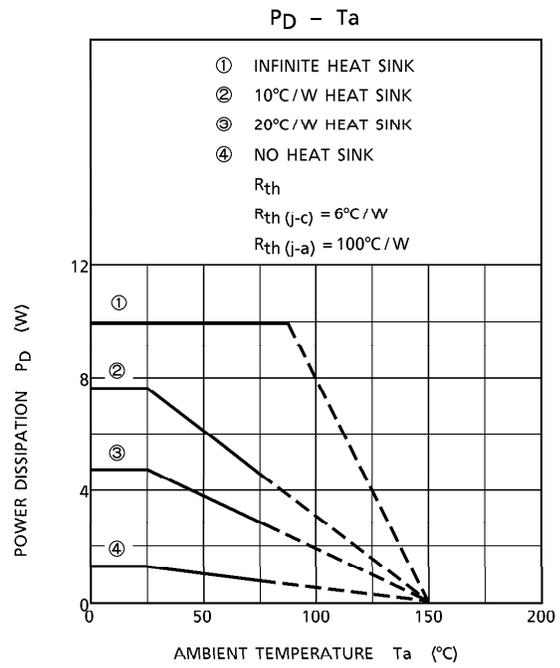
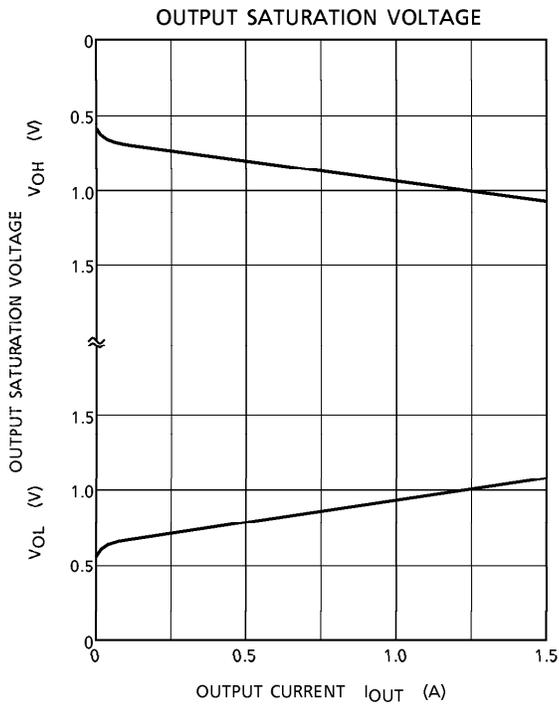
I_{LH} , I_{LL}



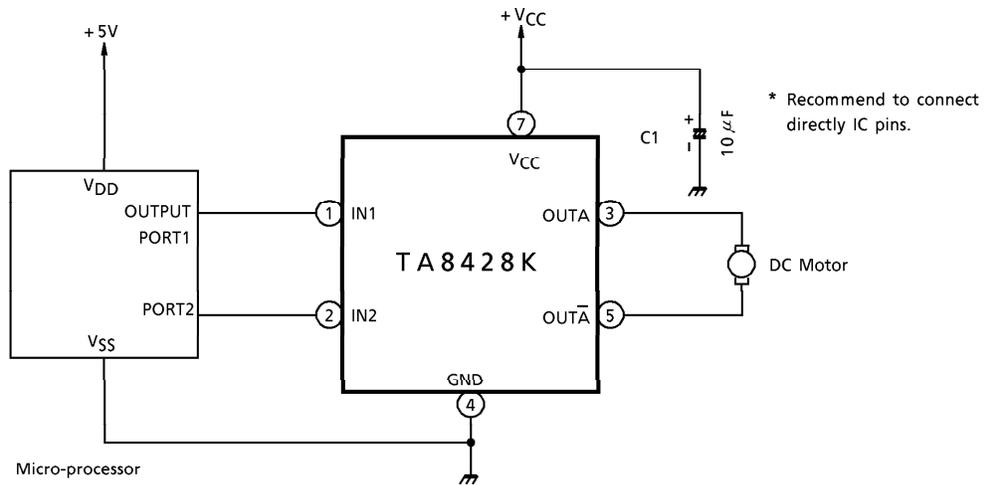
TEST CIRCUIT 5.

V_{FU} , V_{FL}

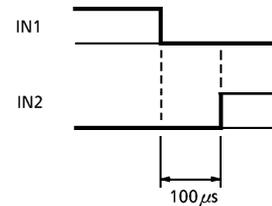




APPLICATION CIRCUIT



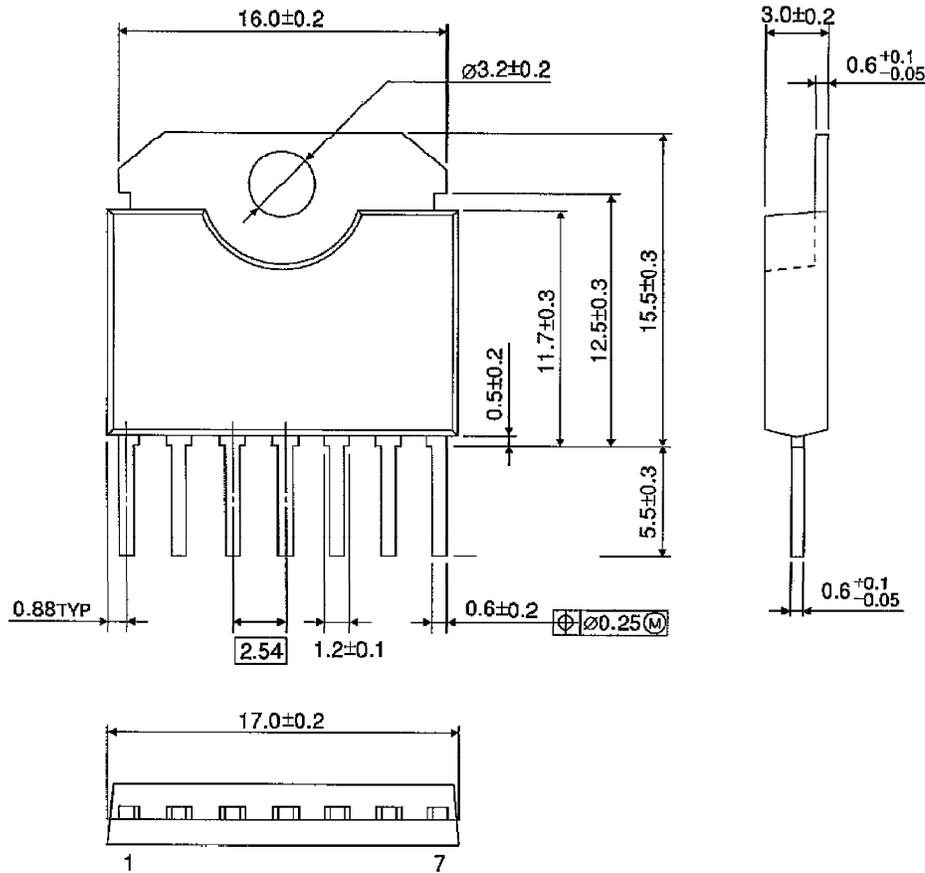
(Note) Recommend to take approximately $100\mu s$ of input dead time for reliable operations.



(Note) Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

OUTLINE DRAWING
HSIP7-P-2.54

Unit : mm



Weight : 1.88g (Typ.)