

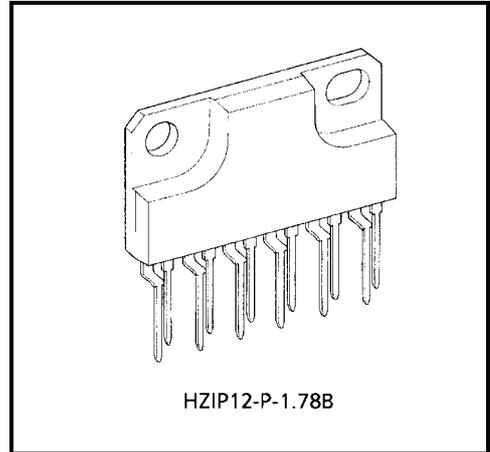
TA8429H

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.

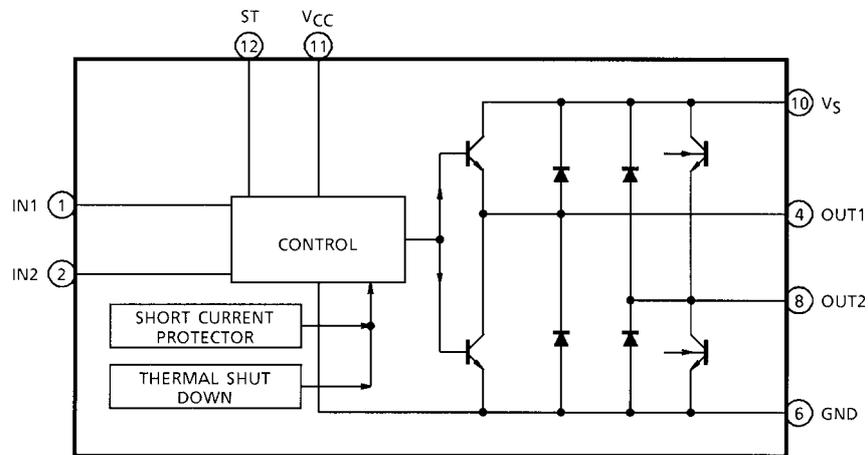
FEATURES

- Output current is as large as 3.0 A (AVE.) and 4.5 A (PEAK.)
- Stand-by mode available: $I_{ST} \leq 100 \mu A$ (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: $V_{CC} = 7\sim 27 V$
 $V_{S(opr.)} = 0\sim 27 V$



Weight : 4.04 g (Typ.)

BLOCK DIAGRAM



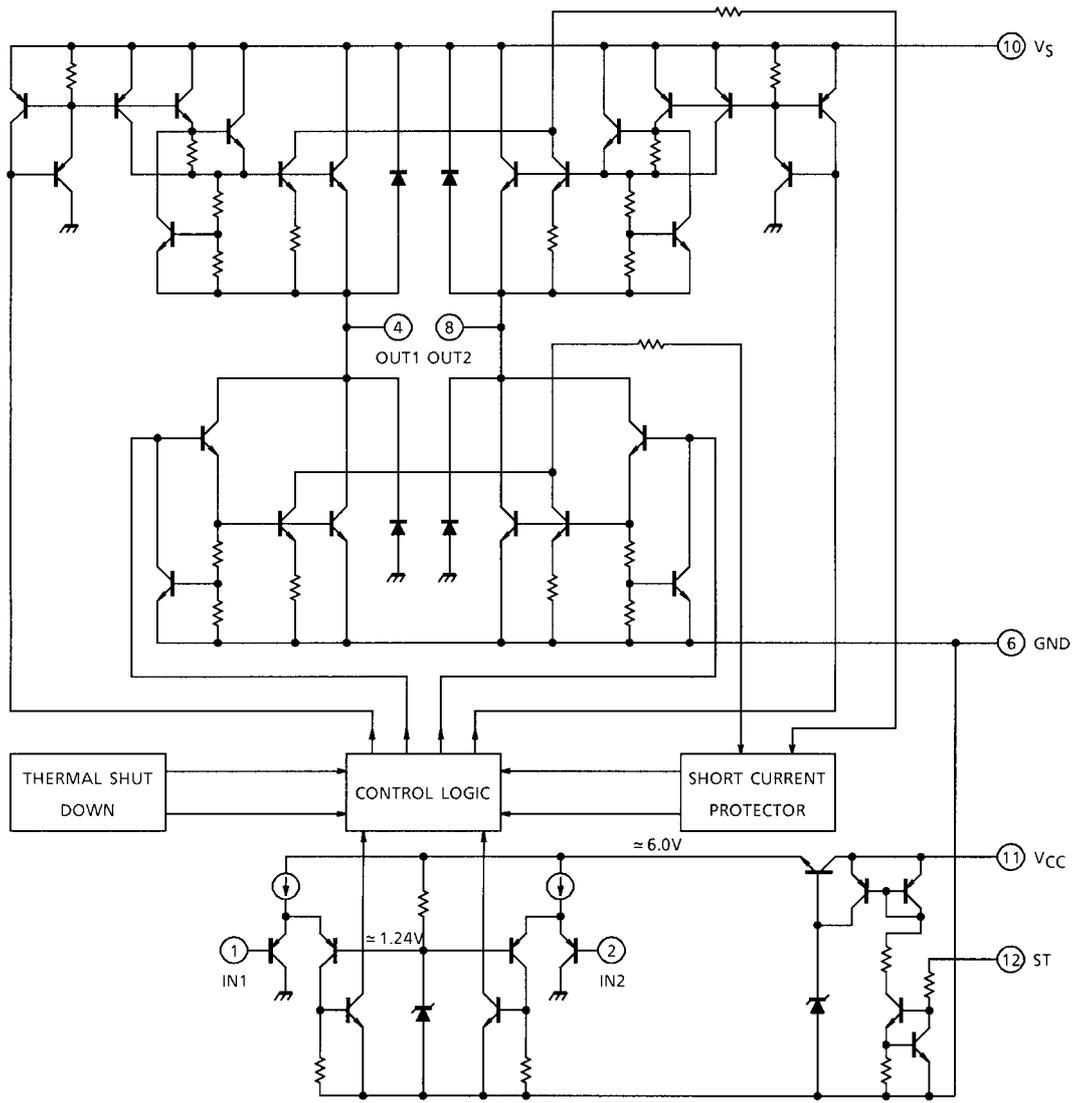
Note 1: Pin (3), (5), (7), and (9) are non connection.

Note 2: Heat fin is connected with GND with low impedance.

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		ST	OUTPUT		MODE
IN1	IN2		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: $T_c = 85^\circ\text{C}$

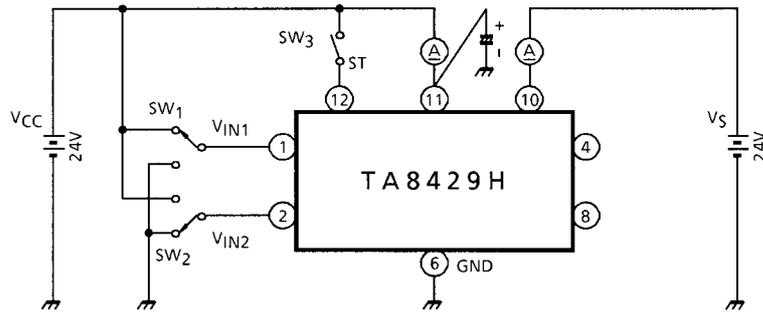
ELECTRICAL CHARACTERISTICS ($V_{CC} = 24$ V, $V_S = 24$ V, $T_a = 25^\circ\text{C}$)

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	$V_{IN} = \text{GND}$	—	—	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

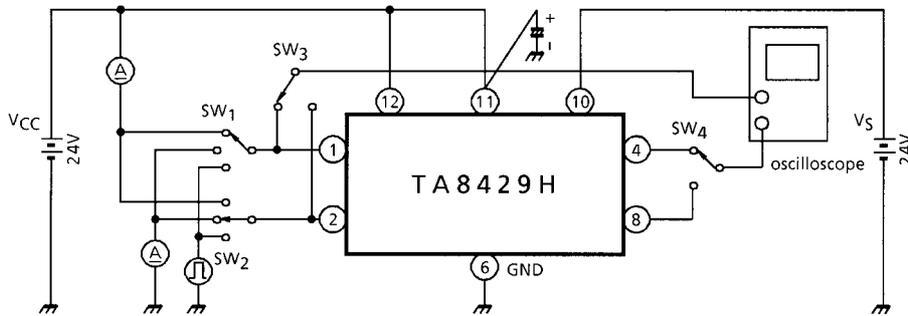
TEST CIRCUIT 1

I_{s1} , I_{s2} , I_{s3} , I_{cc1} , I_{cc2} , I_{cc3} , I_{st}



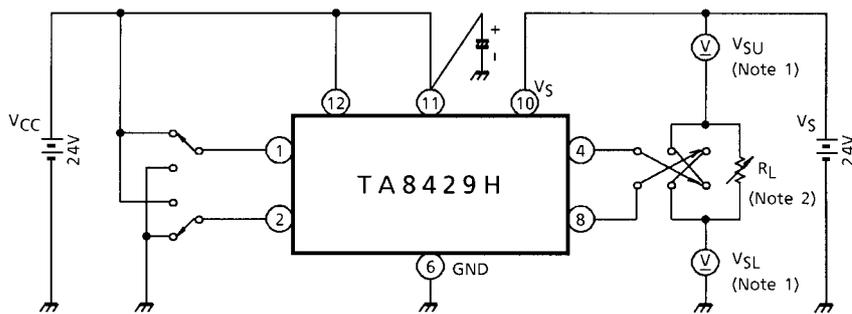
TEST CIRCUIT 2

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



TEST CIRCUIT 3

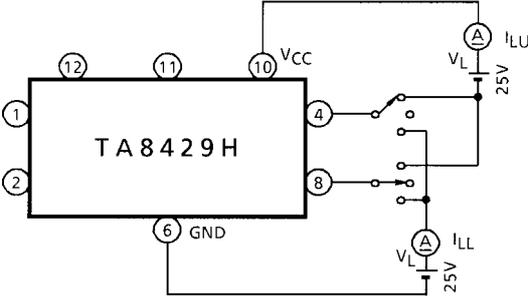
V_{sat}



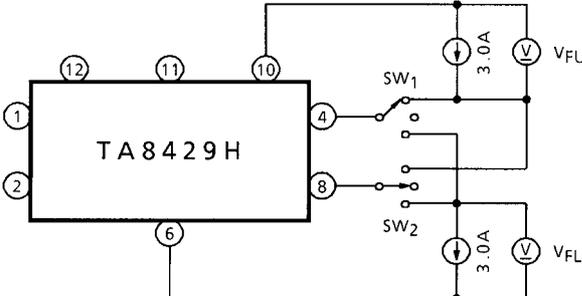
Note 1: $V_{sat} = V_{SU} + V_{SL}$

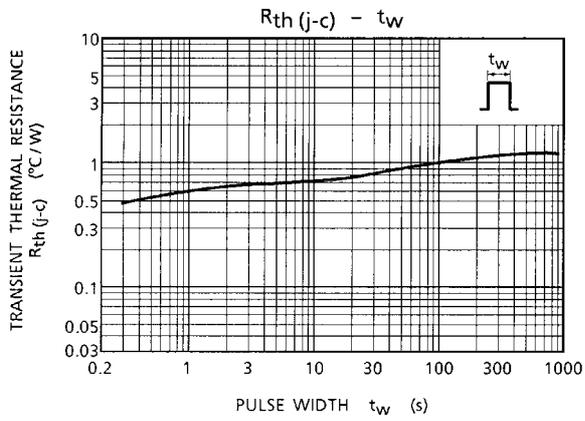
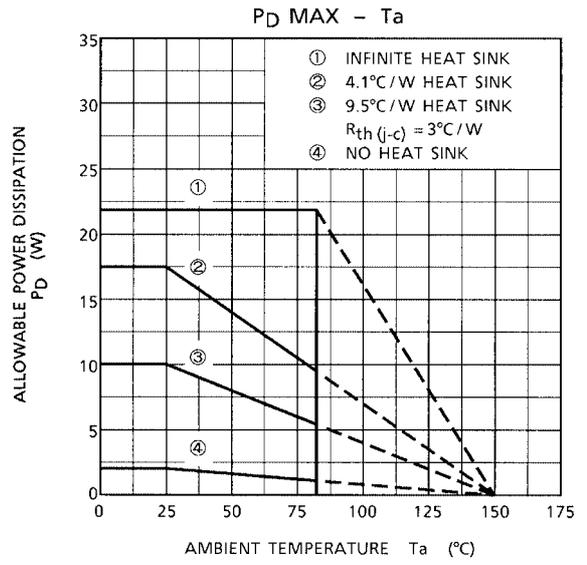
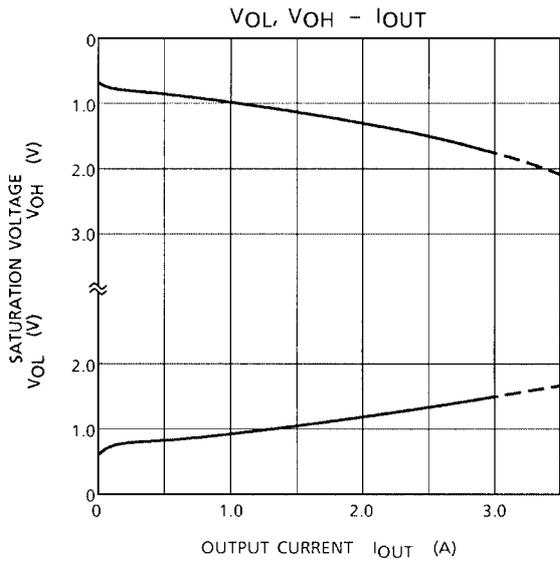
Note 2: Calibrate I_O to 1.5 / 3.0 A by R_L

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

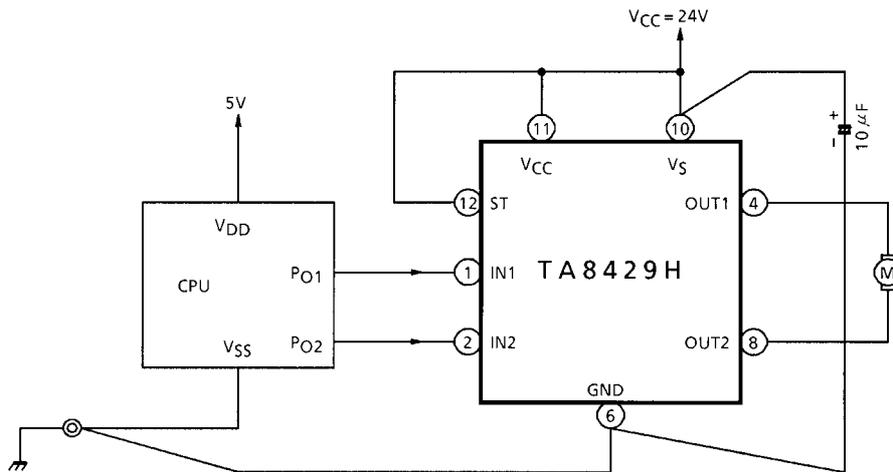


TEST CIRCUIT 5
 V_{FU}, V_{FL}

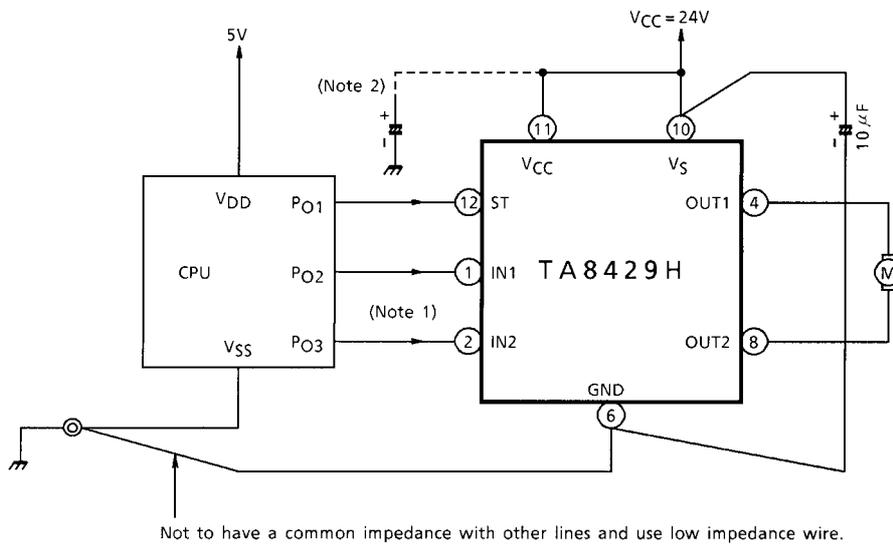




APPLICATION CIRCUIT 1. (Single power supply operation)



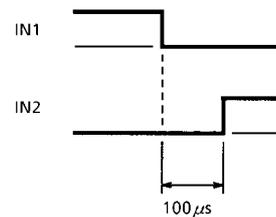
APPLICATION CIRCUIT 2. (Dual power supply (Control and Motor) operation)



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

Note 2: Connect if required.

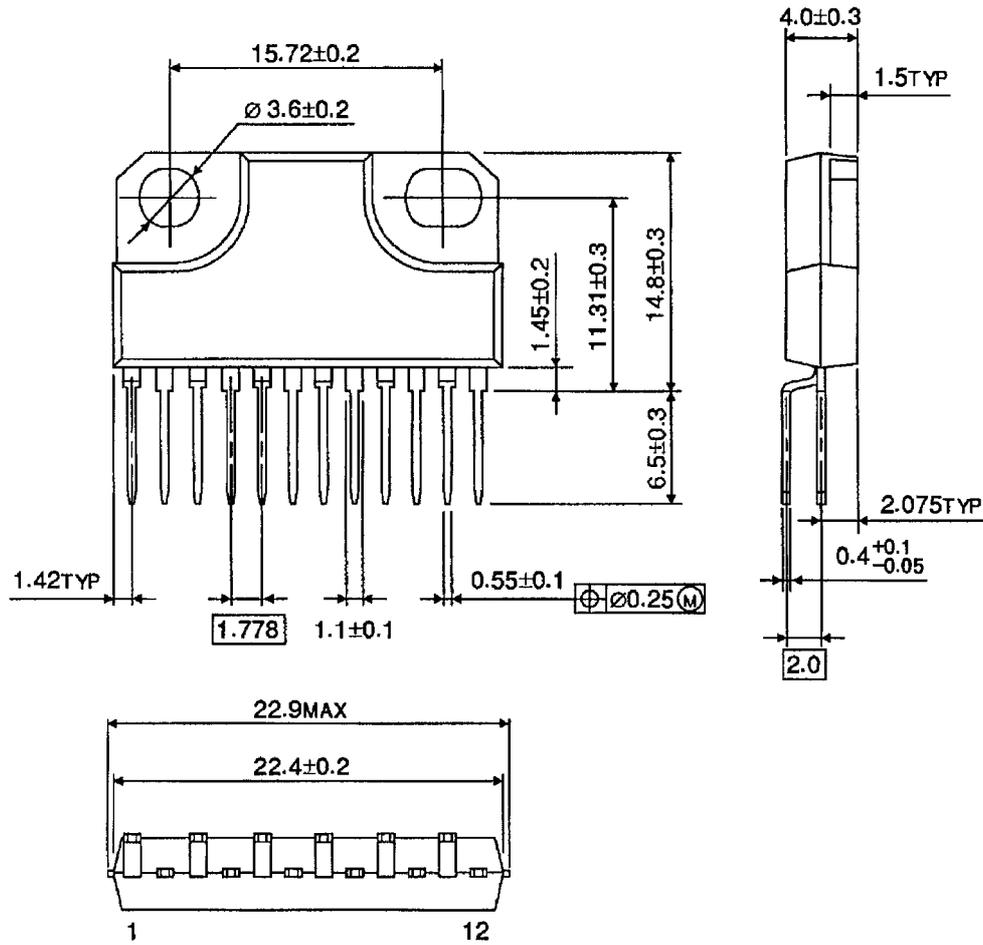
Note 3: Utmost care is necessary in the design of the output line, VS and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



PACKAGE DIMENSIONS

HZIP12-P-1.78B

Unit : mm



Weight : 4.04 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade 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.