

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62107PG, TD62107FG

4ch High-current Darlington Sink Driver

The TD62107PG/FG are high-voltage, high-current darlington drivers and enable inputs which can gate the outputs. All units feature integral clamp diodes for switching inductive loads.

The TD62107PG/FG have a wide supply voltage range and all input are compatible with TTL and 5-V CMOS.

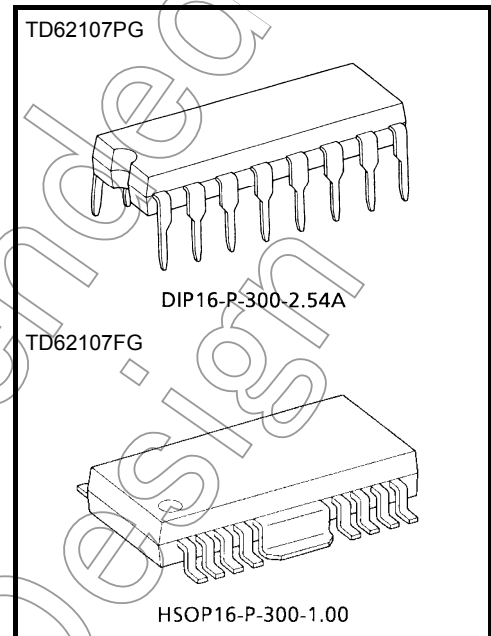
Application include relay, hammer, lamp and stepping moter drivers.

Please observe the thermal condition for using.

The suffix (G) appended to the part number represents a RoHS-compatible product.

Features

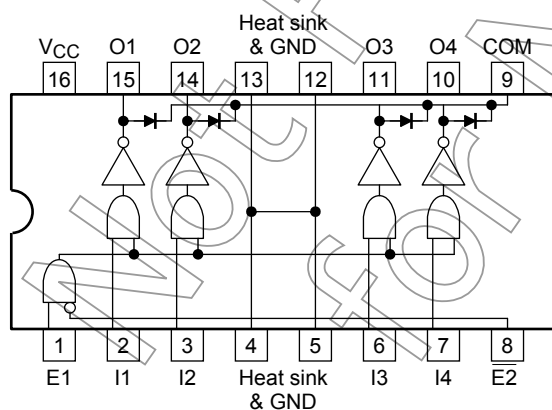
- Output current (single output) 750 mA (max)
- High sustaining voltage output: 45 V min (TD62107PG)
35 V min (TD62107FG)
- Output clamp diodes
- Enable inputs E1, E2
- Wide supply voltage range $V_{CC} = 4.75$ to 7 V
- Input compatible with TTL and 5-V CMOS
- GND terminal = heat sink
- Package type-PG: DIP-16pin
- Package type-FG: HSOP-16pin



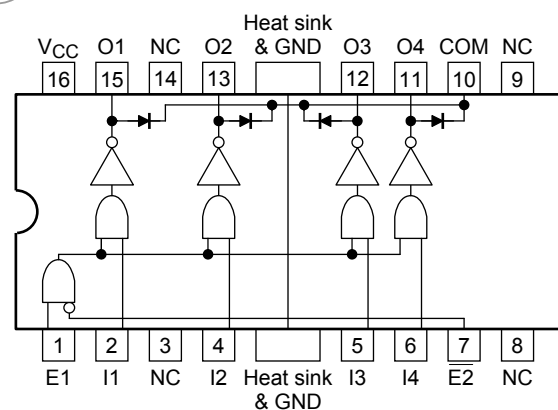
Weight
 DIP16-P-300-2.54A: 1.11 g (typ.)
 HSOP16-P-300-1.00: 0.50 g (typ.)

Pin Assignment (top-view)

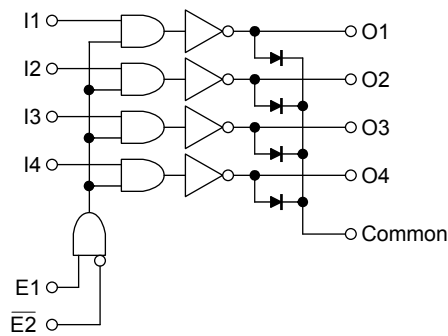
TD62107PG



TD62107FG



Schematics (each driver)

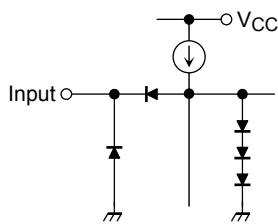


Truth Table

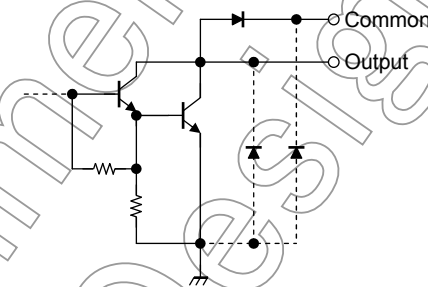
E1	$\overline{E2}$	I1 to I4	O1 to O4
L	L	L or H	Disable OFF
L	H	L or H	Disable OFF
H	L	L or H	Enable In
H	H	L or H	Disable OFF

In = I1 to I4

Input Equivalent Circuit



Output Equivalent Circuit



Note: The input and output parasitic diodes cannot be used as clamp diodes.

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5 to 17	V
Output sustaining voltage	PG	-0.5 to 45	V
	FG	-0.5 to 35	
Output current	I_{OUT}	750	mA
Input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
Clamp diode reverse voltage	PG	45	V
	FG	35	
Clamp diode forward current	I_F	500	mA
Power dissipation	PG	2.7 (Note 1)	W
	FG	1.4 (Note 2)	
Operating temperature	T_{opr}	-40 to 85	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to 150	$^\circ\text{C}$

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Operating Conditions (Ta = -40 to 85°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Supply voltage		V _{CC}	—	4.75	—	15	V
Output sustaining voltage	PG	V _{CE (SUS)}	—	0	—	45	V
	FG			0	—	35	
Output current	PG	I _{OUT}	T _{pw} = 25 ms, Duty = 75%, 1 Circuit	0	—	500	mA
				T _{pw} = 25 ms, 4 Circuit	Duty = 30%	0	
	Duty = 40%		—		—	300	
			FG	—	—	—	
Input voltage		V _{IN}	—	0	—	V _{CC}	V
Clamp diode reverse voltage	PG	V _R	—	—	—	45	V
	FG			—	—	35	
Clamp diode forward current		I _F	—	—	—	500	mA
Power dissipation	PG	P _D	—	—	—	1.0	W
	FG			Ta = 85°C (Note 1)	—	—	

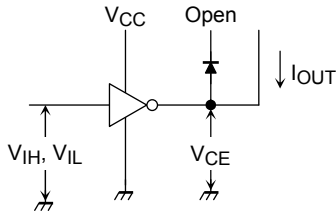
Note1: On Glass Epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C)

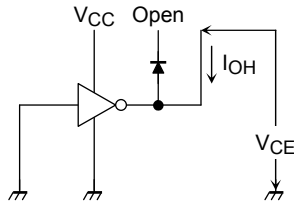
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input voltage	High level	V _{IH}	1	—	2.0	—	V _{CC}	V
	Low level	V _{IL}	—		—	—	0.8	
Output current	High level	PG	2	V _{CE} = 45 V, Ta = 75°C	—	—	100	μA
					FG	V _{CE} = 35 V, Ta = 85°C	—	
Output voltage	Low level	V _{OL}	3	I _{OUT} = 50 mA	—	—	1.3	V
					I _{OUT} = 750 mA	—	—	
Input current	High level	I _{IH}	4	V _{IN} = 13 V	—	—	100	μA
	Low level	I _{IL}	5	V _{IN} = 0.4 V	—	—	-0.3	mA
Clamp diode reverse current	PG	I _R	6	V _R = 45 V	—	—	100	μA
	FG				V _R = 35 V	—	—	
Clamp diode forward voltage		V _F	7	I _F = 500 mA	—	—	2.0	V
Supply current	Output high	I _{CC}	4	V _{CC} = 13 V, V _{IN} = 0 V Output open	—	—	13	mA
	Output low				5	V _{CC} = 13 V, V _{IN} = 5 V Output open	—	
Turn-on delay	PG	t _{ON}	8	V _{CC} = 5 V, R _L = 90 Ω C _L = 15 pF, V _{OUT} = 45 V	—	5	—	μs
	FG				V _{CC} = 5 V, R _L = 70 Ω C _L = 15 pF, V _{OUT} = 35 V	—	5	
Turn-off delay	PG	t _{OFF}	8	V _{CC} = 5 V, R _L = 90 Ω C _L = 15 pF, V _{OUT} = 45 V	—	5	—	μs
	FG				V _{CC} = 5 V, R _L = 70 Ω C _L = 15 pF, V _{OUT} = 35 V	—	5	

Test Circuit

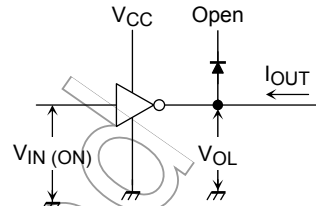
1. V_{IH} , V_{IL}



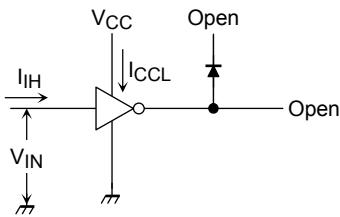
2. I_{OH}



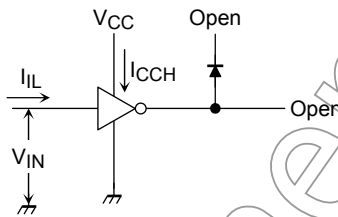
3. V_{OL}



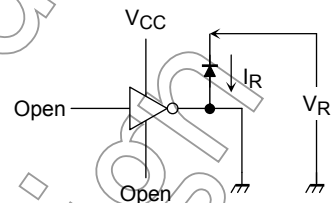
4. I_{IH} , I_{CCL}



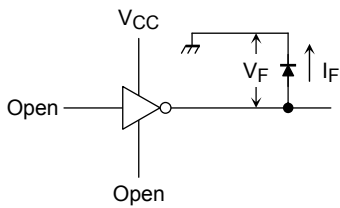
5. I_{IL} , I_{CCH}



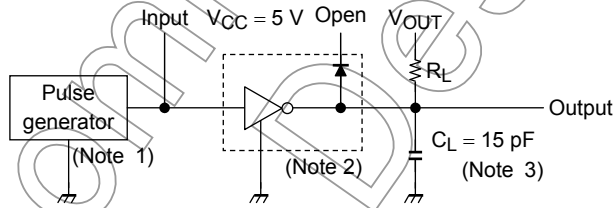
6. I_R



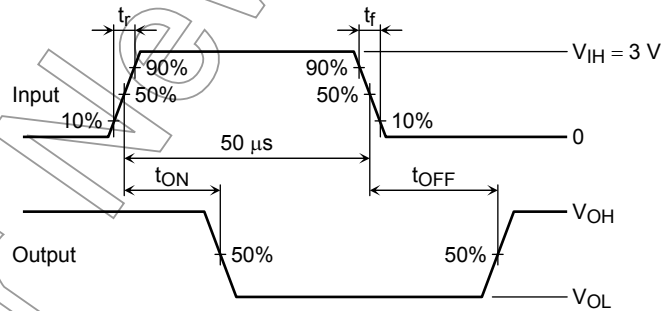
7. V_F



8. t_{ON} , t_{OFF}



Input Condition



Note 1: Pulse width 50 μ s, duty cycle 10%
Output Impedance 50 Ω , $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: $V_{IH} = 3$ V, $E1 = V_{IH}$, $\bar{E}2 = \text{GND}$, $V_{CC} = 5$ V

Note 3: C_L includes probe and jig capacitance

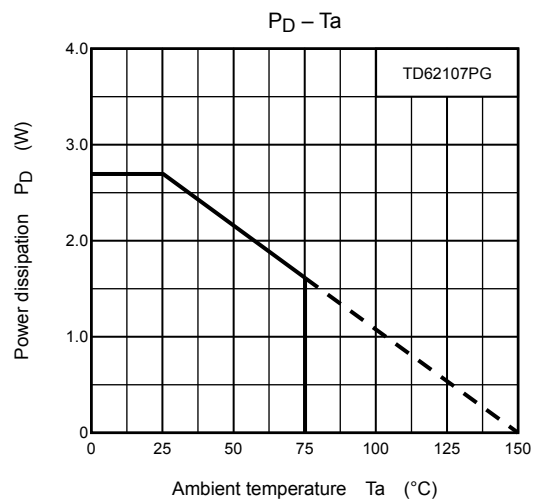
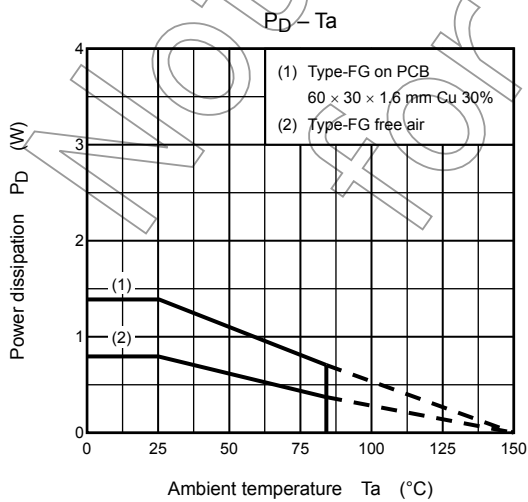
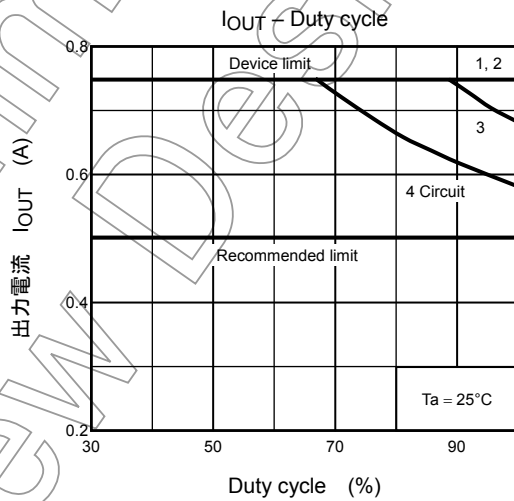
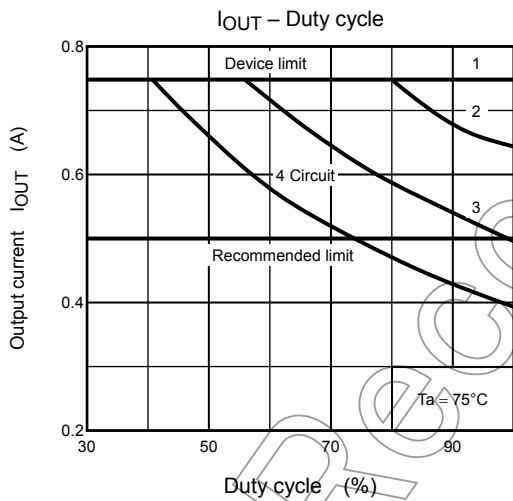
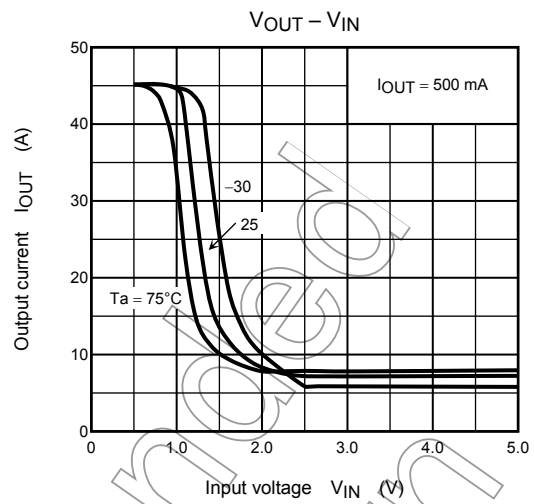
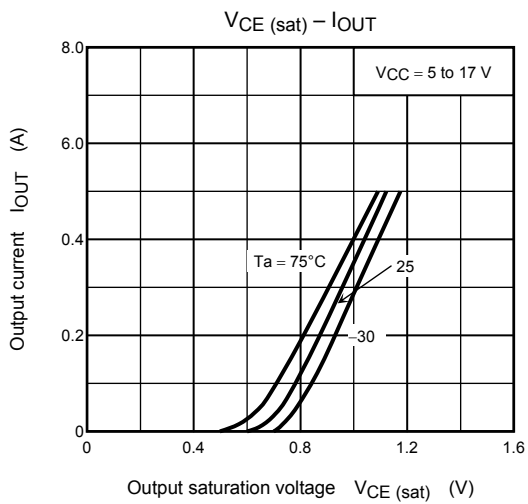
Precautions for Using

This IC does not include built-in protection circuits for excess current or overvoltage.

If this IC is subjected to excess current or overvoltage, it may be destroyed.

Hence, the utmost care must be taken when systems which incorporate this IC are designed.

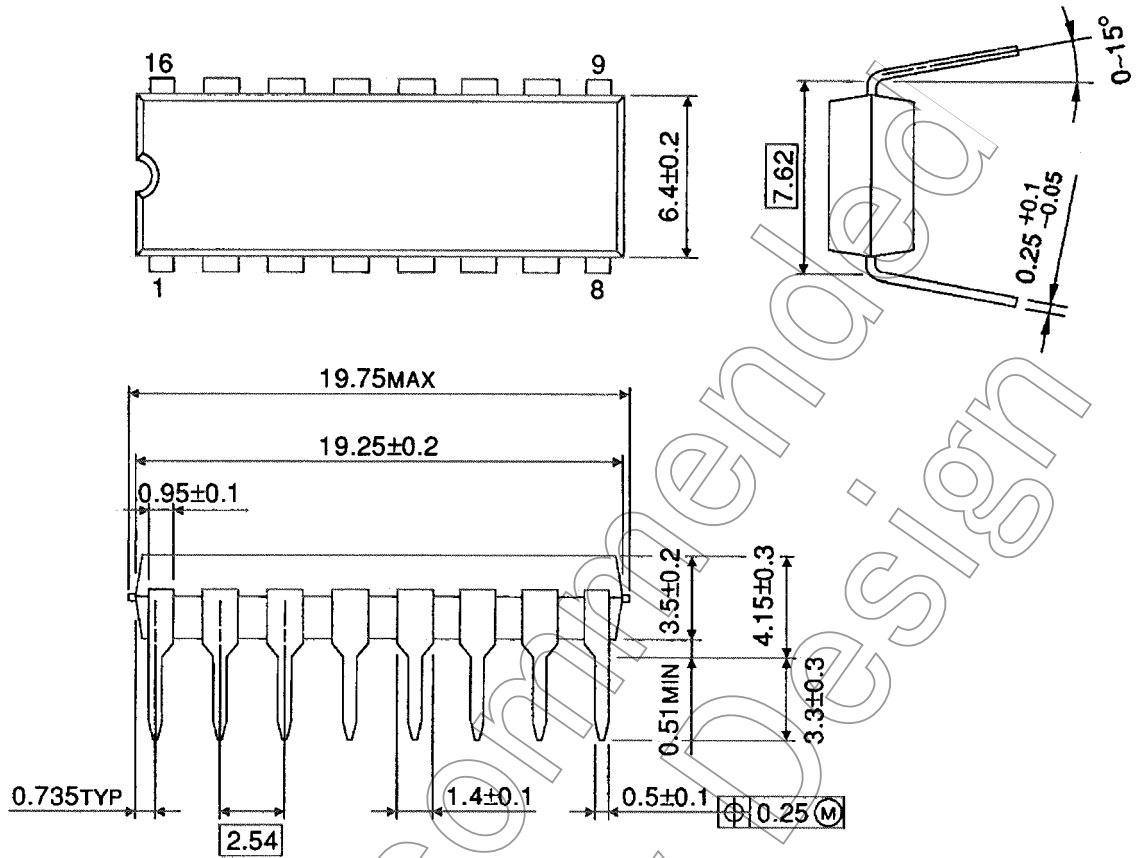
Utmost care is necessary in the design of the output line, VCC, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



Package Dimensions

DIP16-P-300-2.54A

Unit : mm



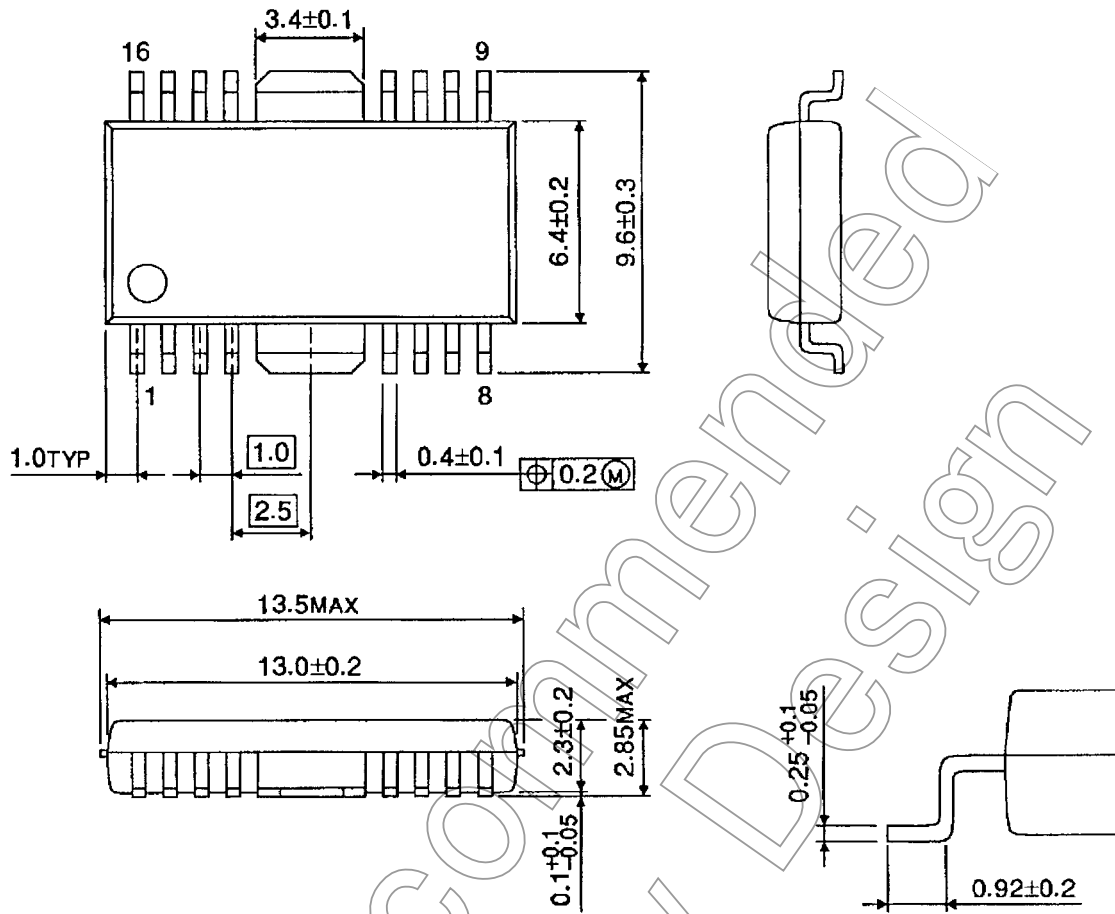
Weight: 1.11 g (typ.)

Not Recommended for New Design

Package Dimensions

HSOP16-P-300-1.00

Unit : mm



Weight: 0.50 g (typ.)

Not Recommended for New Design

RESTRICTIONS ON PRODUCT USE

- Toshiba Corporation, and its subsidiaries and affiliates (collectively "TOSHIBA"), reserve the right to make changes to the information in this document, and related hardware, software and systems (collectively "Product") without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before creating and producing designs and using, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application that Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- Product is intended for use in general electronics applications (e.g., computers, personal equipment, office equipment, measuring equipment, industrial robots and home electronics appliances) or for specific applications as expressly stated in this document. Product is neither intended nor warranted for use in equipment or systems that require extraordinarily high levels of quality and/or reliability and/or a malfunction or failure of which may cause loss of human life, bodily injury, serious property damage or serious public impact ("Unintended Use"). Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, devices related to electric power, and equipment used in finance-related fields. Do not use Product for Unintended Use unless specifically permitted in this document.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. TOSHIBA assumes no liability for damages or losses occurring as a result of noncompliance with applicable laws and regulations.