

TOSHIBA LED lamps

**TL12W02-D(T30)**

○ Surface-mount devices

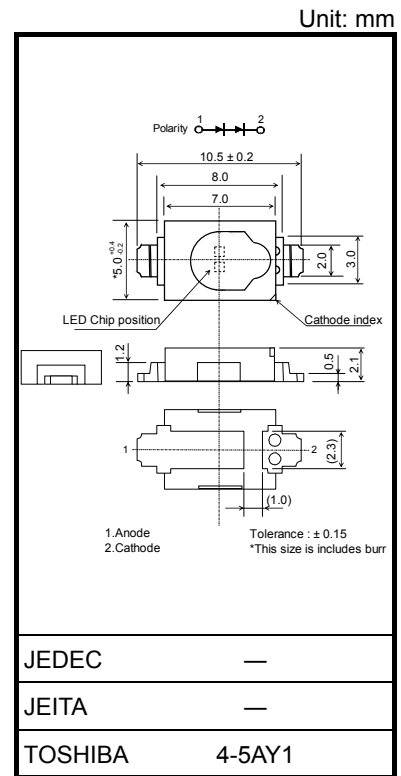
- 10.5 (L) mm × 5.0 (W) mm × 2.1 (H) mm
- High luminous flux: 90 lm(typ.) @250 mA
- Color: white
- Topr / Tstg: -40 to 100°C
- Reflow-solderable
- Standard embossed tape packing: T30 (500 pcs/reel)  
24-mm tape reel
- Applications : general lighting

**Color and Material**

Part Number	Color	Material
TL12W02-D	White	InGaN

**Absolute Maximum Ratings (Ta = 25°C)**

Characteristics	Symbol	Rating	Unit
Forward Current	$I_F$	300	mA
Power Dissipation	$P_D$	2.37	W
Operating Temperature	$T_{opr}$	-40 to 100	°C
Storage Temperature	$T_{stg}$	-40 to 100	°C
Junction Temperature	$T_j$	110	°C

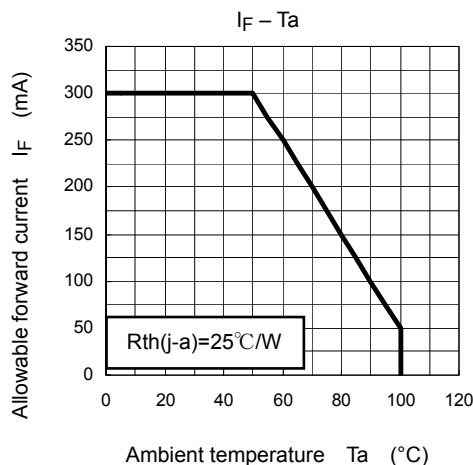


Weight: 0.30 g (typ.)

Note 1: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 2: The junction-to-ambient thermal resistance,  $R_{th(j-a)}$ , should be kept below 25 °C/W so that the TL12W02-D(T30) is not exposed to a condition beyond the absolute maximum ratings.  $R_{th(j-a)}$ : Thermal resistance from the LED junction to ambient temperature



## Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 250 \text{ mA}$	6.3	6.8	7.9	V
Reverse Current	$I_R$	$V_R = 4 \text{ V}$	—	—	40	$\mu\text{A}$
Thermal Resistance	$R_{th(j-s)}$	$I_F = 250 \text{ mA}$	—	10	—	$^{\circ}\text{C/W}$

Note 3:  $V_F$  rank classification

Part Number	Forward Voltage $V_F$			$I_F$
	Min	Typ.	Max	
TL12W02-D(T30)	6.3	6.8	7.9	250
	1	—	7.2	
	2	—	7.9	
Unit	V			mA

The specification on the above table is used for  $V_F$  classification of LEDs in Toshiba facility. Each reel includes the same rank LEDs. Let the delivery ratio of each rank be unquestioned.

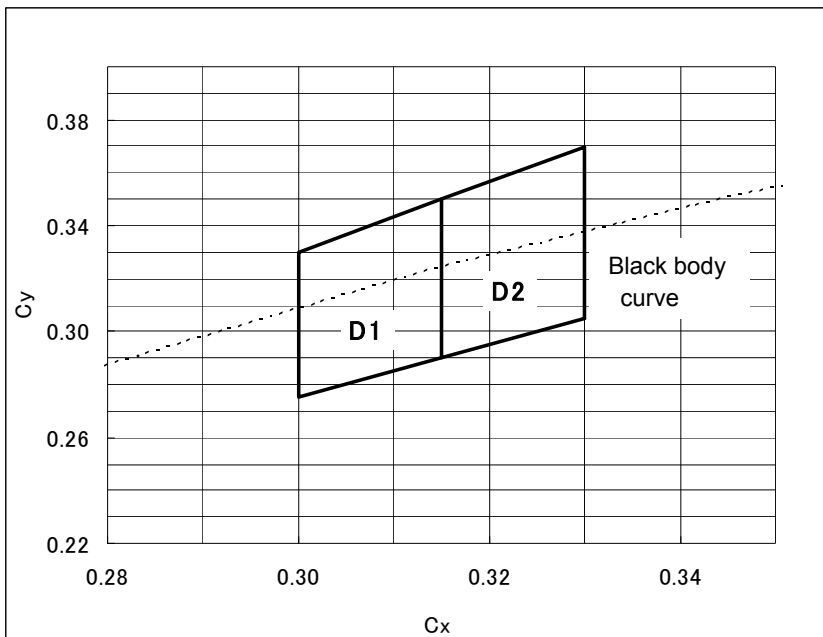
## Optical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test condition	Min	Typ.	Max	Unit
Chromaticity	$C_x$	$I_F = 250 \text{ mA}$	(Note 4)			—
	$C_y$	$I_F = 250 \text{ mA}$	(Note 4)			—
Luminous flux	F	$I_F = 250 \text{ mA}$	40	90	160	lm

Note 4: The product is tested at the following chromaticity coordinate groups.

Test conditions:  $I_F=250 \text{ mA}$ ,  $T_a=25^{\circ}\text{C}$

Accuracy:  $\pm 0.01$



	$C_x$	$C_y$
D1	0.315	0.290
	0.300	0.275
	0.300	0.330
	0.315	0.350
D2	0.330	0.305
	0.315	0.290
	0.315	0.350
	0.330	0.370

Note 5: F rank classification

Ta=25°C

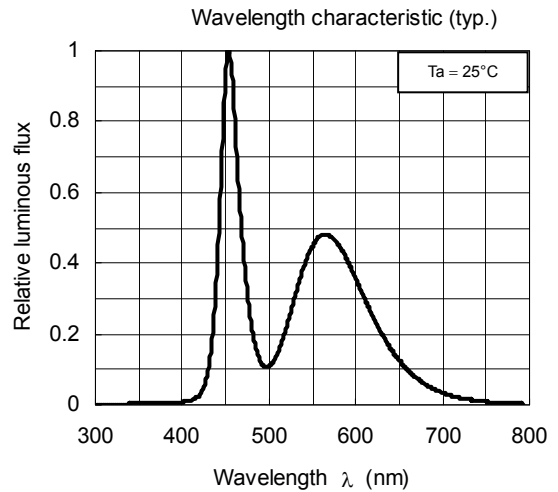
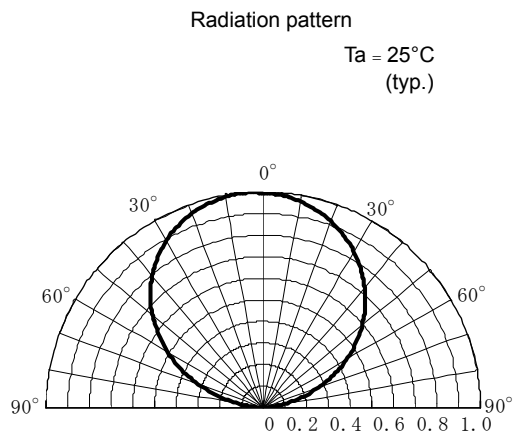
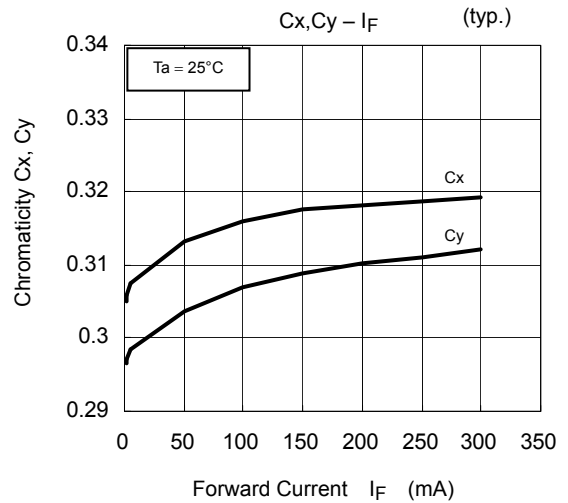
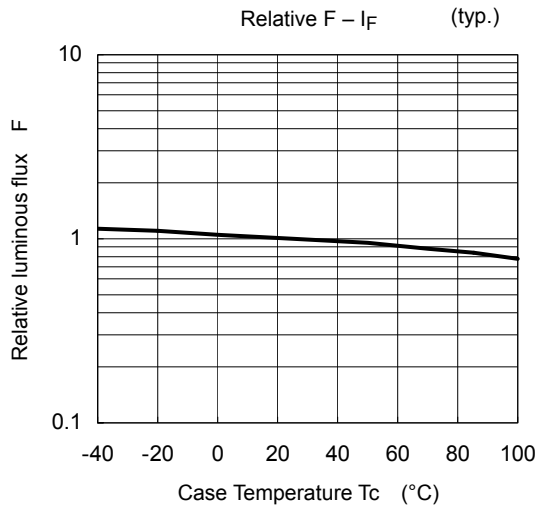
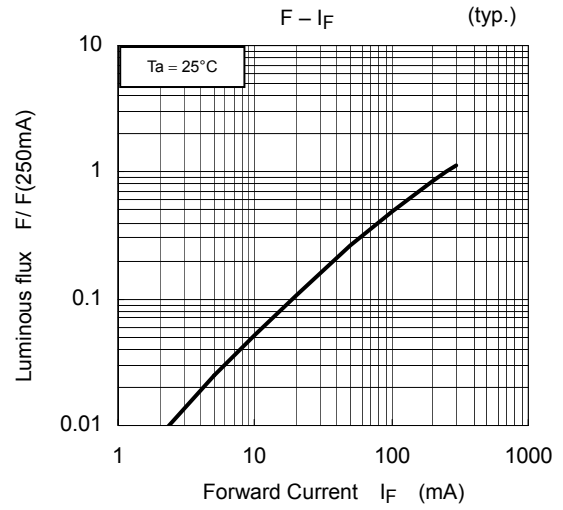
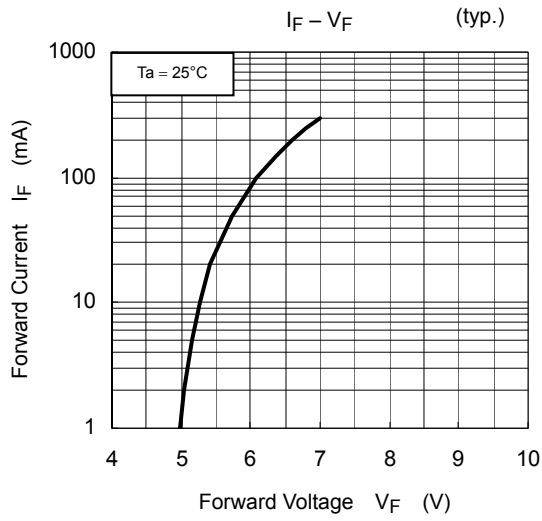
Part Number	Luminous flux F			I <sub>F</sub>
	Min	Typ.	Max	
TL12W02-D(T30)	40	90	160	250
	E	—	80	
	F	—	113	
	G	—	160	
Unit	lm			mA

The specification on the above table is used for F classification of LEDs in Toshiba facility. Each reel includes the same rank LEDs. Let the delivery ratio of each rank be unquestioned.

Note 6: Caution

- The product is sensitive to electrostatic and care must be fully taken when handling products. Particularly in the case that an over-voltage shall be applied, the overflowed energy may cause damage to or possibly result in destruction of the product. Users shall take absolutely secure countermeasures against electrostatic and surge when handling the product.
- This product is designed as a general display light source usage, and it has applied the measurement standard that matched with the sensitivity of human's eyes. Therefore, it is not intended for usage of functional application (ex. Light source for sensor, optical communication and etc) except general display light source.

## TL12W02-D



## Packaging

This LED device is packed in an aluminum envelope with a silica gel and a moisture indicator to avoid moisture absorption. The optical characteristics of the devices may be affected by exposure to moisture in the air before soldering and they should therefore be stored under the following conditions:

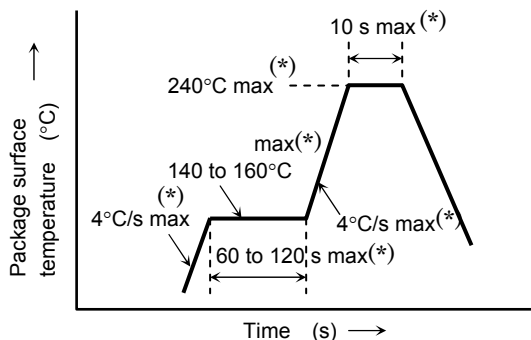
1. This moisture proof bag may be stored unopened within 12 months at the following conditions.  
 Temperature: 5°C to 30°C  
 Humidity: 90% (max)
2. After opening the moisture proof bag, the device should be assembled within 168 hours in an environment of 5°C to 30°C/60% RH or below.
3. If upon opening, the moisture indicator card shows humidity 30% or above (Color of indication changes to pink) or the expiration date has passed, the devices should be baked in taping with reel.  
 After baking, use the baked devices within 72 hours, but perform baking only once.  
 Baking conditions: 60±5°C, for 24 to 48 hours.  
 Expiration date: 12 months from sealing date, which is imprinted on the label affixed.
4. Repeated baking can cause the peeling strength of the taping to change, then leads to trouble in mounting.
5. If the packing material of laminate would be broken, the hermeticity would deteriorate. Therefore, do not throw or drop the packed devices.

## Mounting Method

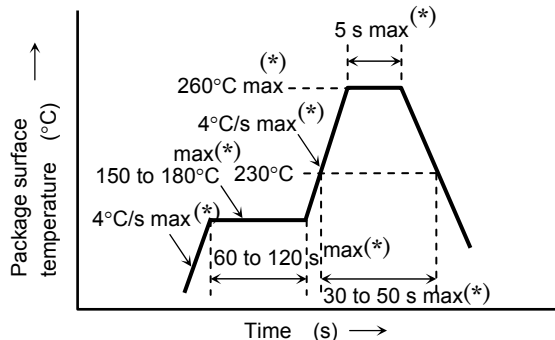
### Soldering

- Reflow soldering (example)

Temperature profile for Pb soldering (example)



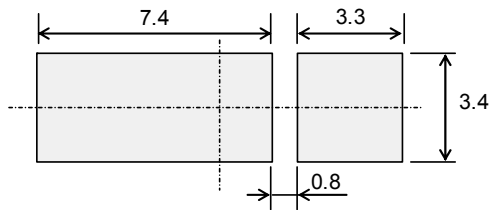
Temperature profile for Pb-free soldering (example)



- The product is evaluated using above reflow soldering conditions. No additional test is performed exceed the condition (i.e. the condition more than (\*)MAX values) as a evaluation. Please perform reflow soldering under the above conditions.
- Please perform the first reflow soldering with reference to the above temperature profile and within 168 h of opening the package.
- Second reflow soldering  
 In case of second reflow soldering should be performed within 168 h of the first reflow under the above conditions.  
 Storage conditions before the second reflow soldering: 30°C, 60% RH (max)
- When any soldering corrections are made manually, a hot-plate should be used .  
 (only once at each soldering point)  
 Temperature of a hot plate: 150°C  
 Soldering iron: 25 W  
 Temperature: 350°C or less  
 Time: within 3 s
- Do not perform wave soldering.

## Recommended soldering pattern

Unit (mm)



## Cleaning

When cleaning is required after soldering, Toshiba recommends the following cleaning solvents. It is confirmed that these solvents have no effect on semiconductor devices in our dipping test (under the recommended conditions). In selecting the one for your actual usage, please perform sufficient review on washing condition, using condition and etc.

ASAHI CLEAN AK-225AES: (made by ASAHI GLASS)

## Precautions when Mounting

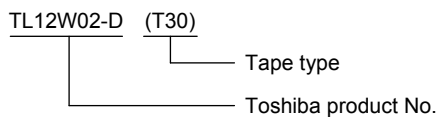
Do not apply force to the plastic part of the LED under high-temperature conditions. To avoid damaging the LED plastic, do not apply friction using a hard material. When installing the PCB in a product, ensure that the device does not come into contact with other components.

## Tape Specifications

### 1. Product number format

The type of package used for shipment is denoted by a symbol suffix after the product number. The method of classification is as below. (this method, however does not apply to products whose electrical characteristics differ from standard Toshiba specifications)

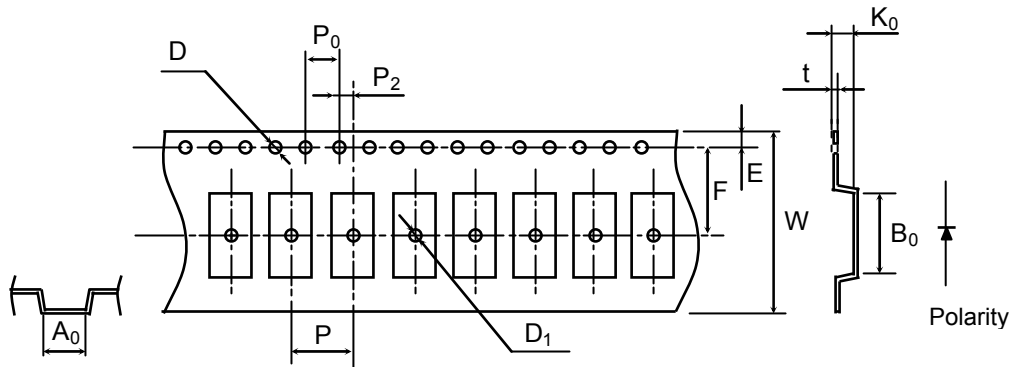
- (1) Tape Type: T30 (8-mm pitch)
- (2) Example



**2. Tape dimensions**

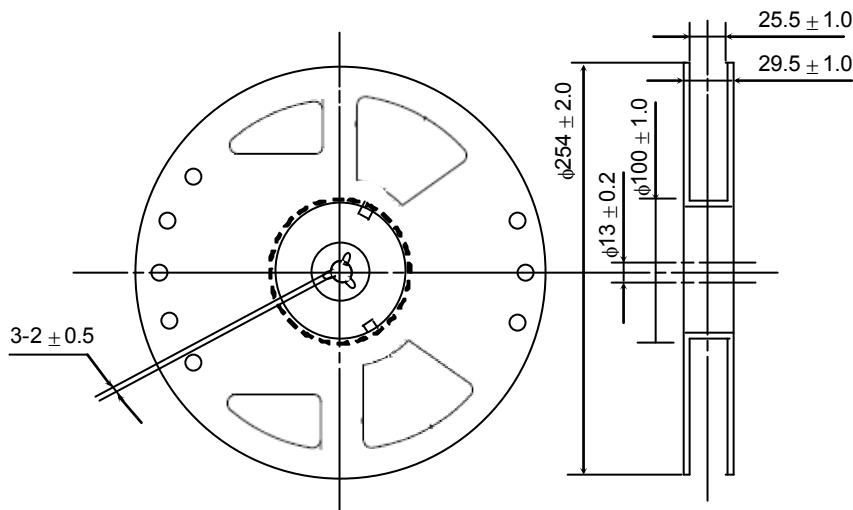
Symbol	Dimension	Tolerance
D	1.5	+0.1/-0
E	1.75	±0.1
P <sub>0</sub>	4.0	±0.1
t	0.3	±0.05
F	11.5	±0.1
D <sub>1</sub>	1.7	±0.1

Symbol	Dimension	Tolerance
P <sub>2</sub>	2.0	±0.1
W	24.0	±0.2
P	8.0	±0.1
A <sub>0</sub>	5.5	±0.1
B <sub>0</sub>	11.0	±0.1
K <sub>0</sub>	2.3	±0.1

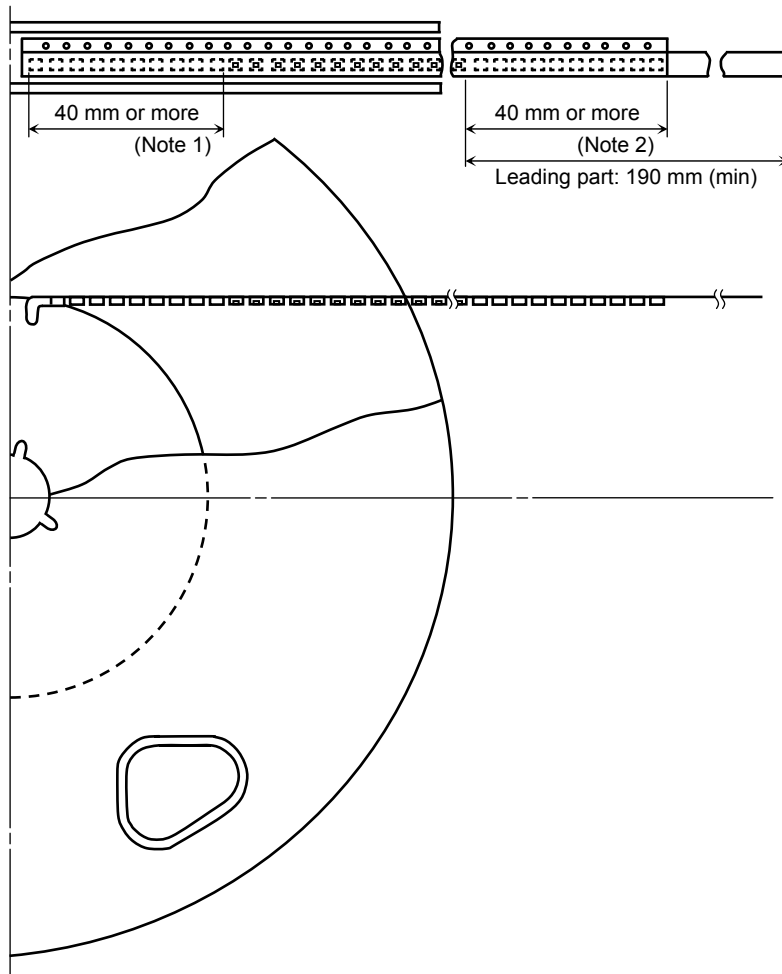


**3. Reel dimensions**

Unit: mm



**4. Leader and trailer sections of tape**



Note 1: Empty trailer section

Note 2: Empty leader section

**5. Packing form**

(1) Packing quantity

Reel	500 pcs
Carton	500 pcs

(2) Packing form: Each reel is sealed in an aluminum pack with silica gel.





**RESTRICTIONS ON PRODUCT USE**

20070701-EN GENERAL

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