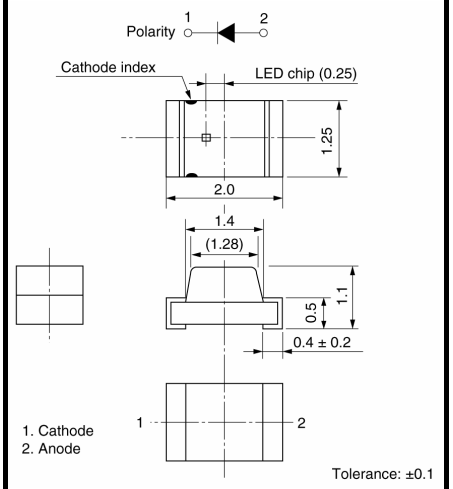
TOSHIBA LED Lamps

TLBC1002(T02), TLEGC1002(T02)

Panel Circuit Indicator

- Surface-mount devices
- 2.0 (L) × 1.25 (W) × 1.1 (H) mm
- InGaN LEDs
- High luminous intensity
- Low drive current, high-intensity light emission
- Colors: Blue λd=472nm (typ)
  Green λd=535nm (typ)
- Pb-free reflow soldering is possible
- ESD withstand voltage according to MIL STD 883D, Method 3015.7 : ≧800V
- Applications: message signboards, backlighting etc.
- Standard embossed tape packing: T02 (3000/reel)
  8-mm tape reel

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	4-1D1

Weight: 0.002g (typ.)

Color and Material

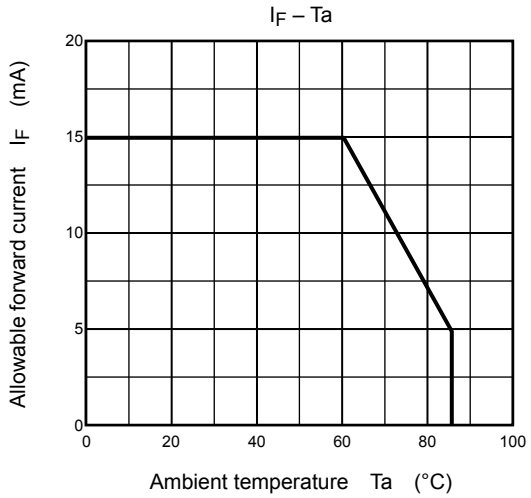
Product Name	Color	Material
TLBC1002	Blue	InGaN
TLEGC1002	Green	

Absolute Maximum Ratings (Ta = 25°C)

Product Name	Forward Current I_F (mA) Please see Note 1	Reverse Voltage V_R (V)	Power Dissipation P_D (mW)	Operation Temperature T_{opr} (°C)	Storage Temperature T_{stg} (°C)
TLBC1002	15	4	63	-40~85	-40~100
TLEGC1002					

Note: 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 1: Forward current derating



Electrical Characteristics (Ta = 25°C)

Product Name	Forward Voltage V_F				Reverse Current I_R	
	Min	Typ.	Max	I_F	Max	V_R
TLBC1002	—	3.3	4.2	10	10	4
TLEGC1002	—	3.3	4.2			
Unit	V			mA	μA	V

Optical Characteristics–1 (Ta = 25°C)

Product Name	Luminous Intensity I_V			
	Min	Typ.	Max	I_F
TLBC1002	16	45	—	10
TLEGC1002	40	120	—	
Unit	mcd			mA

Optical Characteristics–2 (Ta = 25°C)

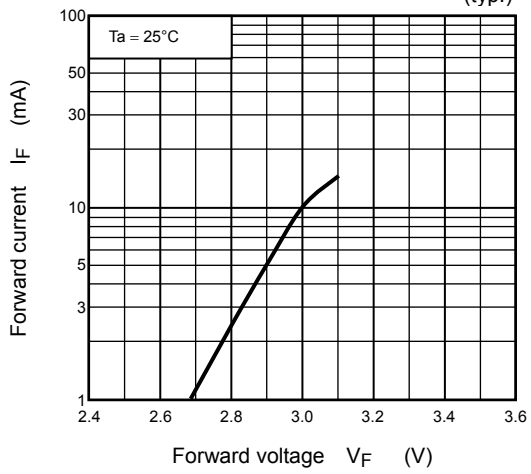
Product Name	Emission Spectrum							I_F
	Peak Emission Wavelength λ_p			$\Delta\lambda$	Dominant Wavelength λ_d			
	Min	Typ.	Max	Typ.	Min	Typ.	Max	
TLBC1002	—	470	—	25	463	472	480	10
TLEGC1002	—	520	—	35	523	535	547	
Unit	nm			nm	nm			mA

Note: Caution

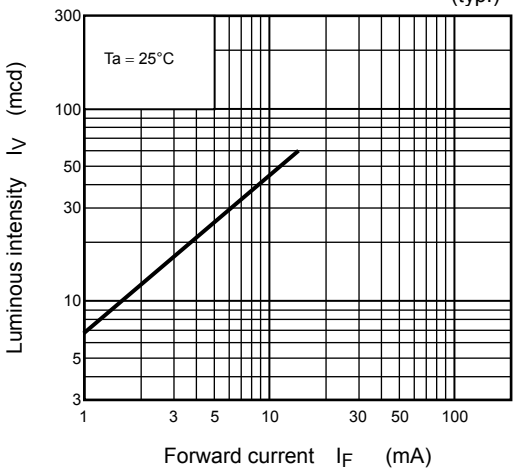
- This product is designed as a general display light source usage, and it has applied the measurement standard that matched with the sensitivity of human's eyes. Therefore, it is not intended for usage of functional application (ex. Light source for sensor, optical communication and etc) except general display light source.

TLBC1002

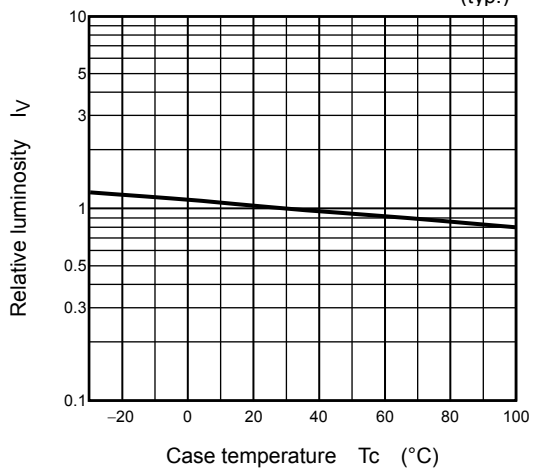
$I_F - V_F$ (typ.)



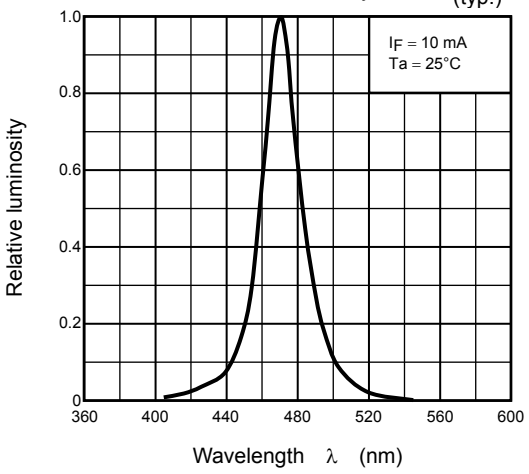
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

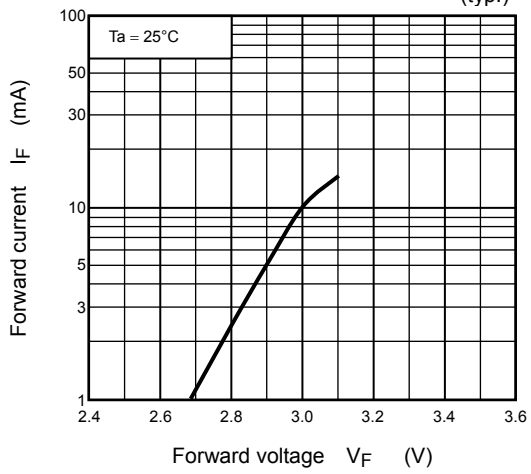


Relative luminosity - λ (typ.)

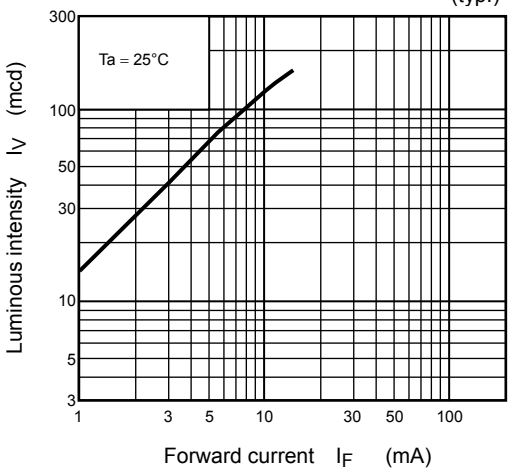


TLEGC1002

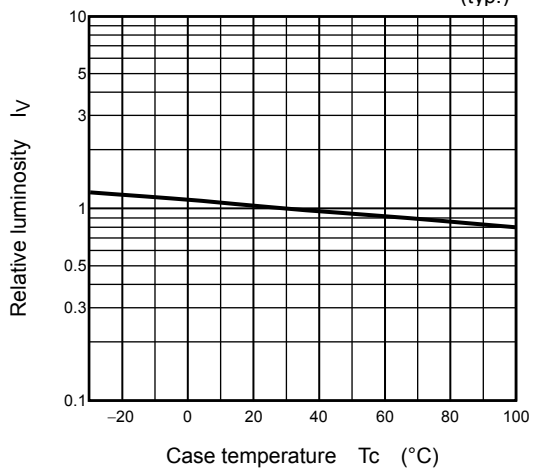
$I_F - V_F$ (typ.)



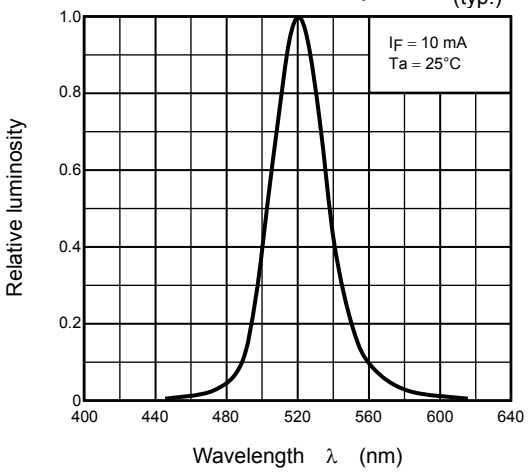
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)



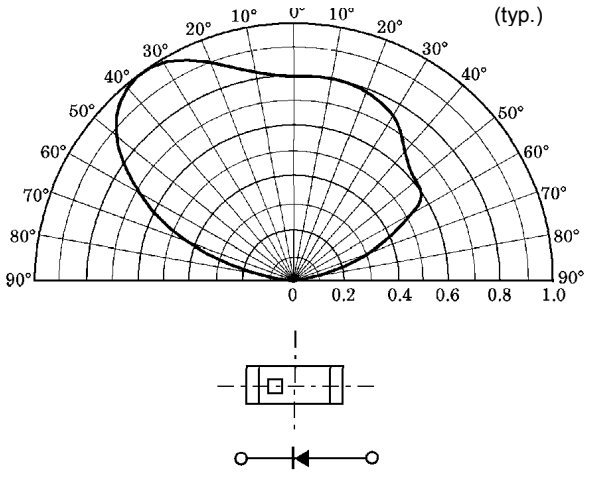
Relative luminosity - λ (typ.)



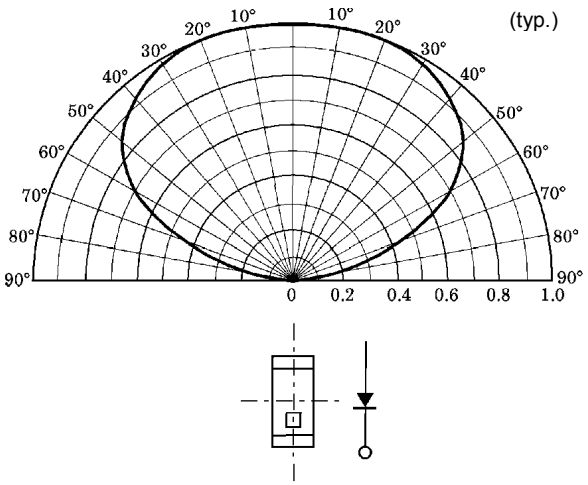
Radiation pattern

Ta=25˚C

Vertical to polarity (typ.)



Horizontal to polarity (typ.)



Packaging

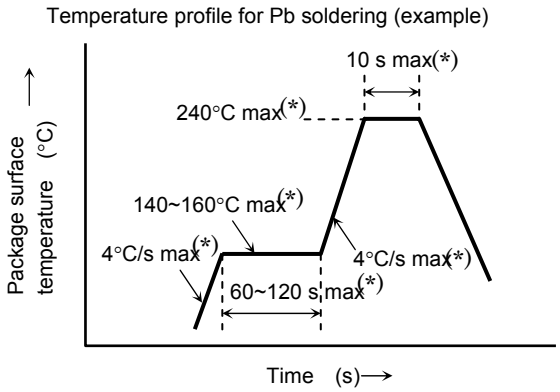
These LED devices are packed in an aluminum envelope with a silica gel and a moisture indicator to avoid moisture absorption. The optical characteristics of the devices may be affected by exposure to moisture in the air before soldering and they should therefore be stored under the following conditions:

1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
   Temperature: 5°C~30°C
   Humidity: 90% (max)
2. After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/70% RH or below.
   When performing lead(Pb)-free soldering, the devices should be assembled within 72 hours in an environment of 5°C to 30°C/70% 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 12 to 24 hours.
   Expiration date: 12 months from sealing date, which is imprinted on the same side as this label affixed.
4. Repeated baking can cause the peeling strength of the taping to change, then leads to trouble in mounting. Furthermore, prevent the devices from being destructed against static electricity for baking of it.
5. If the packing material of laminate would be broken, the air tightness would deteriorate. Therefore, do not throw or drop the packed devices.

Mounting Method

Soldering

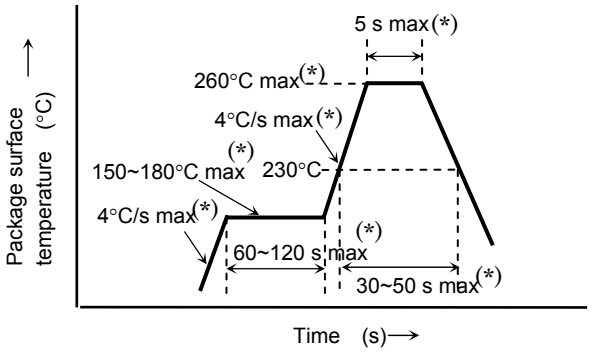
- Reflow soldering (example)



- The products are 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, 70% RH (max)
- Make any necessary soldering corrections manually.
  (only once at each soldering point)
  Soldering iron: 25 W
  Temperature : 300°C or less
  Time : within 3 s
- Do not perform wave soldering.

- Reflow soldering (example)

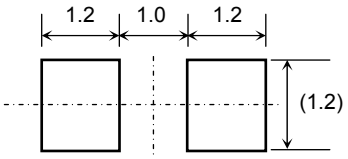
Temperature profile for Pb-free soldering (example)



- The products are 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 72 h of opening the package.
- Second reflow soldering
  In case of second reflow soldering should be performed within 72 h of the first reflow under the above conditions.
  Storage conditions before the second reflow soldering: 30°C, 70% RH (max)
- Make any necessary soldering corrections manually.
  (only once at each soldering point)
  Soldering iron: 25 W
  Temperature : 300°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)
KAO CLEAN TROUGH 750H	: (made by KAO)
PINE ALPHA ST-100S	: (made by ARAKAWA CHEMICAL)
TOSHIBA TECHNOCARE (FRW-17, FRW-1, FRV-100)	: (made by GE TOSHIBA SILICONES)

Precaution when mounting

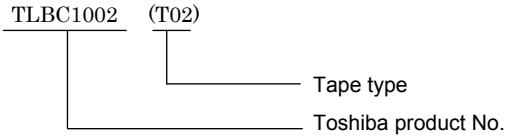
Do not apply force to the plastic part of the LED under high-temperature conditions.
To avoid damaging the LED plastic, do not apply friction using a hard material.
When installing the PCB in a product, ensure that the device does not come into contact with other cmponents.

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. (However, this method does not apply to products whose electrical/optical characteristics differ from standard Toshiba specifications)

(1) Tape Type: T02 (4-mm pitch)
(2) Example



2. Handling precautions

Tape material protected against static electricity. However, static electricity may occur depending on quantity of charged static electricity and a device may attach to a tape, or a device may be unstable when peeling a tape cover.

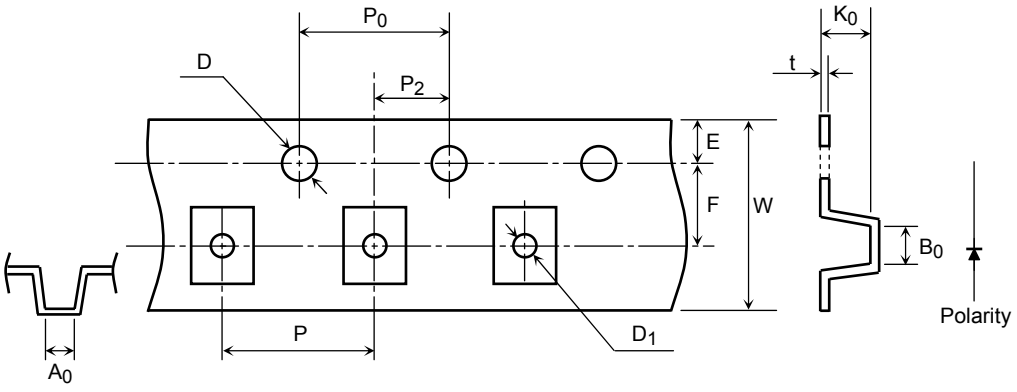
(a) Since tape materials may accumulate an electrostatic charge, use an ionizer to neutralize the ambient air.
(b) For transport and temporary storage of devices, use containers (boxes and bags) and jigs that are made of anti-static materials or of materials which dissipate electrostatic charge.

3. Tape dimensions

Unit: mm

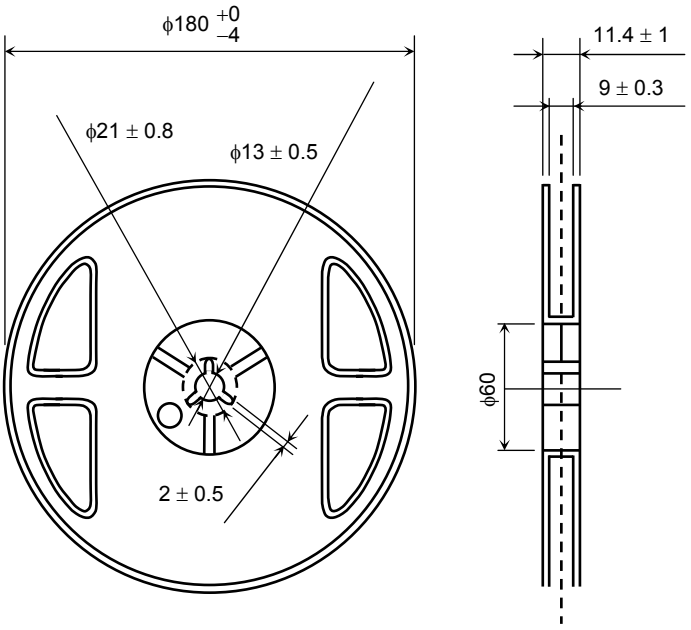
Symbol	Value	Tolerance
D	1.50	+0.1/–0
E	1.75	±0.1
P_0	4.00	±0.1
t	0.20	±0.05
F	3.50	±0.05
D_1	1.10	±0.1

Symbol	Value	Tolerance
P_2	2.00	±0.05
W	8.00	±0.3
P	4.00	±0.1
A_0	1.45	±0.1
B_0	2.25	±0.1
K_0	1.30	±0.05

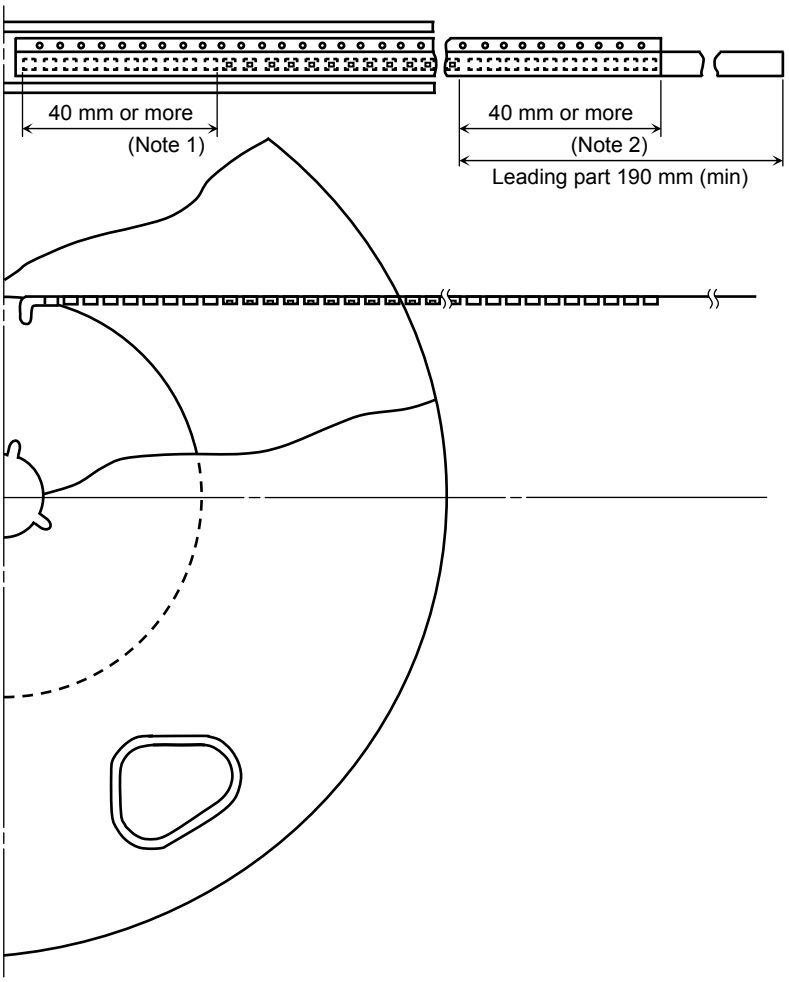


4. Reel dimensions

Unit: mm



5. Leader and trailer section of tape



Note 1: Empty trailer section

Note 2: Empty leader section

6. Packing display

(1) Packing quantity

Reel	3,000 pcs
Carton	15,000 pcs

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

7. Label format

(1) Example: TLBC1002 (T02)

P/N:

TOSHIBA

TYPE	**TLBC1002**		
ADDC	(T02)	Q'TY	3,000 pcs

Lot Number (RANK SYMBOL) Key code for TSB 32C 3000

Use under 5-30degC/70%RH within 72h

SEAL DATE:

[[G]]/RoHS COMPATIBLE

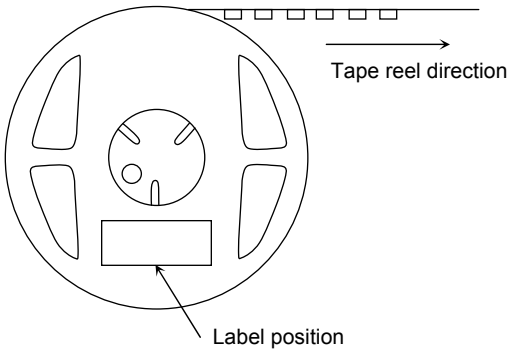
DIFFUSED IN *****

Y3804xxxxxxxxxxxxxxxx

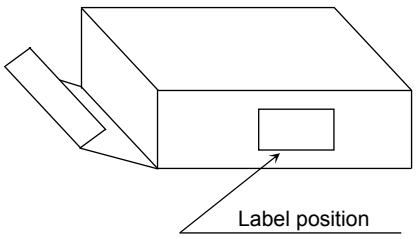
ASSEMBLED IN *****

(2) Label location

- Reel



- Carton



- The aluminum package in which the reel is supplied also has a copy of the label attached to center of one side.

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 his document shall be made at the customer’s own risk.
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