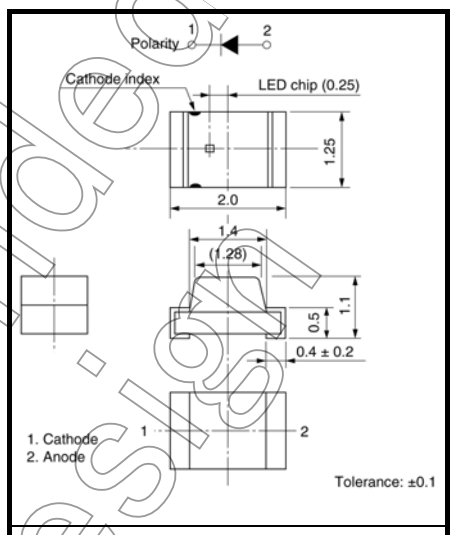
TOSHIBA LED Lamps

TLRE1002A(T02), TLSE1002A(T02) TLOE1002A(T02),TLYE1002A(T02),TLPYE1002A(T02) TLGE1002A(T02),TLFGE1002A(T02),TLPGE1002A(T02)

Panel Circuit Indicators

- Surface-mount devices
- 2.0 (L) × 1.25 (W) × 1.1 (H) mm
- InGaAℓP LEDs
- Replacing standard-intensity LEDs with high-intensity ones helps increase the brightness or reduce the power consumption of end products.
- Colors: red, orange, yellow, pure yellow, green, pure green
- Applications:
  - Backlighting for battery-powered equipment
  - Pilot lamps for mobile handsets
  - Low-power electronic equipment, etc.
- Standard embossed tape packing: T02 (3000 pcs / reel)
  - 8-mm tape reel

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	4-1D1

Weight: 0.002 g (typ.)

Color and Material

Part Number	Color	Material
TLRE1002A	Red	InGaAℓP
TLSE1002A	Red	
TLOE1002A	Orange	
TLYE1002A	Yellow	
TLPYE1002A	Pure Yellow	
TLGE1002A	Green	
TLFGE1002A	Green	
TLPGE1002A	Pure Green	

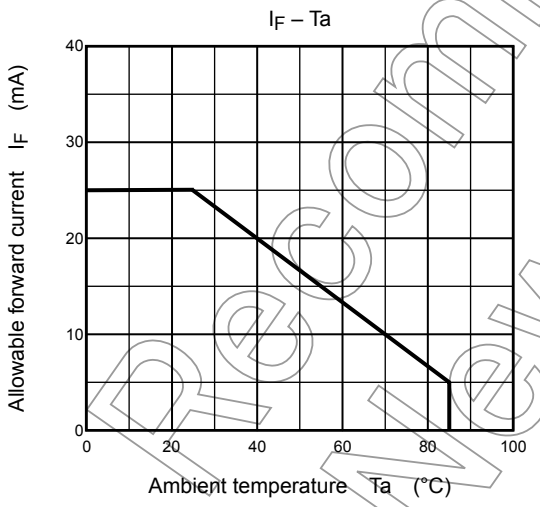
Not Recommended for New Design

Absolute Maximum Ratings (Ta = 25°C)

Part Number	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)
TLRE1002A	25	4	60	−40 to 85	−40 to 100
TLSE1002A					
TLOE1002A					
TLYE1002A					
TLPYE1002A					
TLGE1002A					
TLFGE1002A					
TLPGE1002A					

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)

Part Number	Forward Voltage V_F				Reverse Current I_R	
	Min	Typ.	Min	I_F	Max	V_R
TLRE1002A	1.6	1.9	2.4	20	50	4
TLSE1002A	1.6	1.9	2.4			
TLOE1002A	1.6	2.0	2.4			
TLYE1002A	1.6	2.0	2.4			
TLPYE1002A	1.6	2.0	2.4			
TLGE1002A	1.6	2.0	2.4			
TLFGE1002A	1.6	2.0	2.4			
TLPGE1002A	1.6	2.1	2.4			
Unit	V			mA	μA	V

Not Recommended for New Design

Optical Characteristics–1 (Ta = 25°C)

Part Number	Luminous Intensity I_V				Available Iv rank
	Min	Typ.	Max	I_F	Please see Note 2
TLRE1002A	27.2	70	—	20	L / M / N / P
TLSE1002A	47.6	140	—	20	M / N / P / Q
TLOE1002A	47.6	180	—	20	M / N / P / Q
TLYE1002A	27.2	105	—	20	L / M / N / P
TLPYE1002A	27.2	70	—	20	L / M / N / P
TLGE1002A	27.2	70	—	20	L / M / N / P
TLFGE1002A	8.5	25	—	20	J / K / L / M
TLPGE1002A	4.76	18	—	20	H / J / K / L
Unit	mcd	mcd	mcd	mA	

Note 2: The specification on the above table is used for Iv classification of LEDs in Toshiba facility. Each reel includes the same rank LEDs. Let the delivery ratio of each rank be unquestioned.

Rank	Luminous Intensity I_V	
	Min	Max
H	4.76	12.9
J	8.5	23
K	15.3	41.4
L	27.2	73.6
M	47.6	129
N	85	230
P	153	414
Q	272	736
Unit	mcd	mcd

Optical Characteristics–2 (Ta = 25°C)

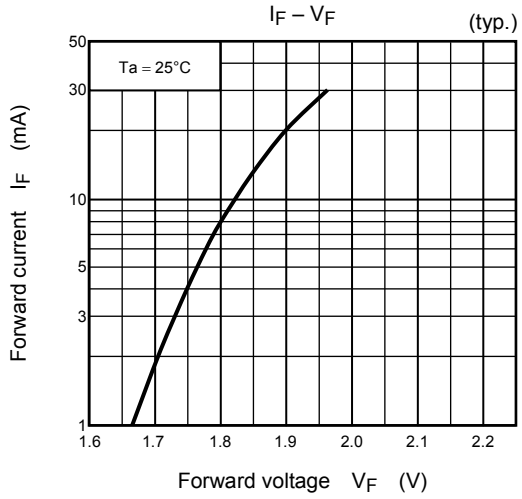
Part Number	Emission Spectrum							I_F
	Peak Emission Wavelength λ_p			$\Delta\lambda$	Dominant Wavelength λ_d			
	Min	Typ.	Max	Typ.	Min	Typ.	Max	
TLRE1002A	—	644	—	18	624	630	638	20
TLSE1002A	—	623	—	17	607	613	621	
TLOE1002A	—	612	—	15	599	605	613	
TLYE1002A	—	590	—	13	581	587	595	
TLPYE1002A	—	583	—	13	574	580	586	
TLGE1002A	—	574	—	11	565	571	576	
TLFGE1002A	—	568	—	11	559	565	571	
TLPGE1002A	—	562	—	11	—	558	564	
Unit	nm			nm	nm			mA

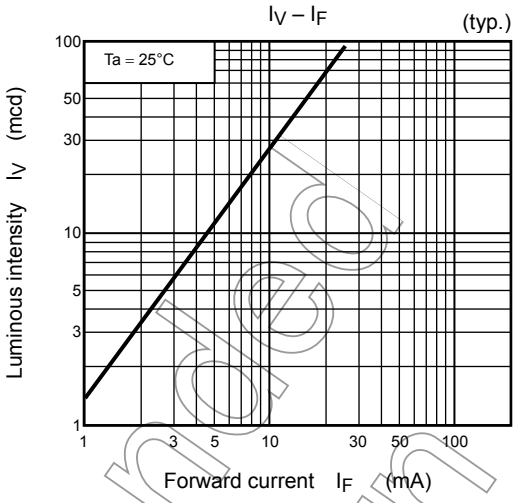
Cautions

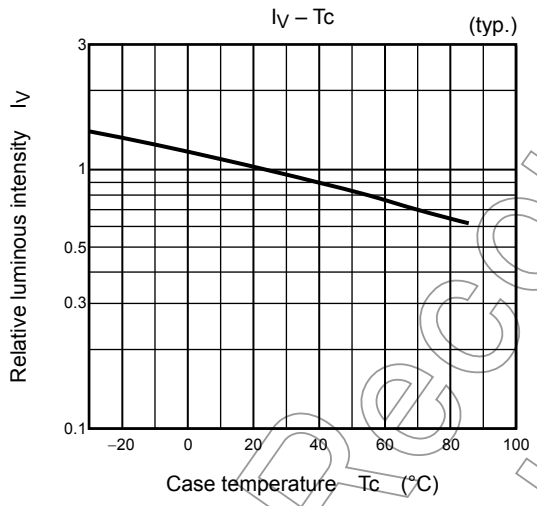
- This visible LED lamp also emits some IR light.
  If a photodetector is located near the LED lamp, please ensure that it will not be affected by the IR light.
- This product is designed as a general display light source usage, and it has applied the measurement standard that matched with the sensitivity 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.

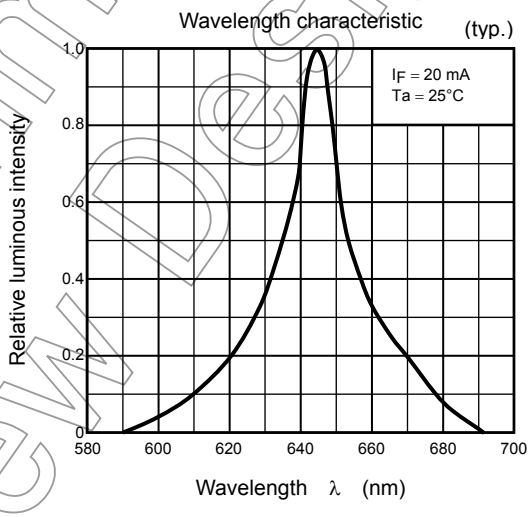
Not Recommended for New Design

TLRE1002A





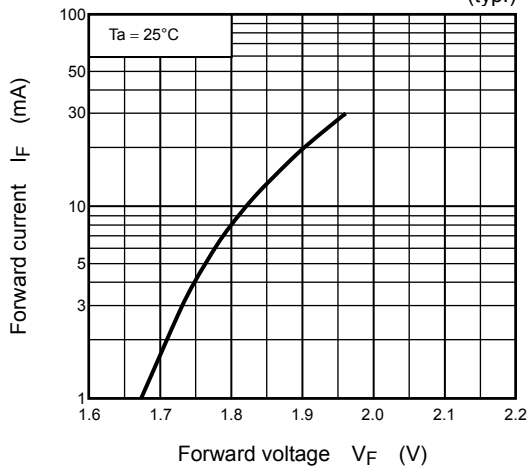




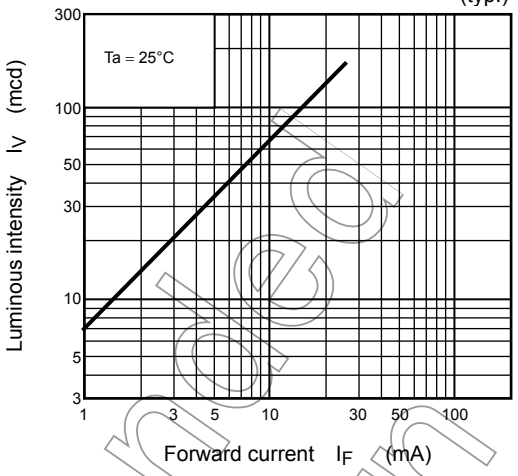
Not Recommended for New Design

TLSE1002A

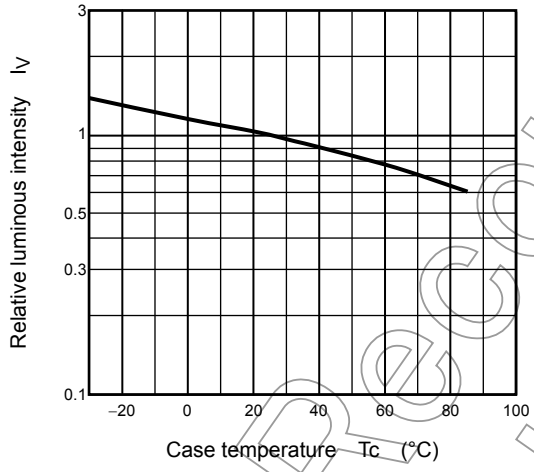
$I_F - V_F$ (typ.)



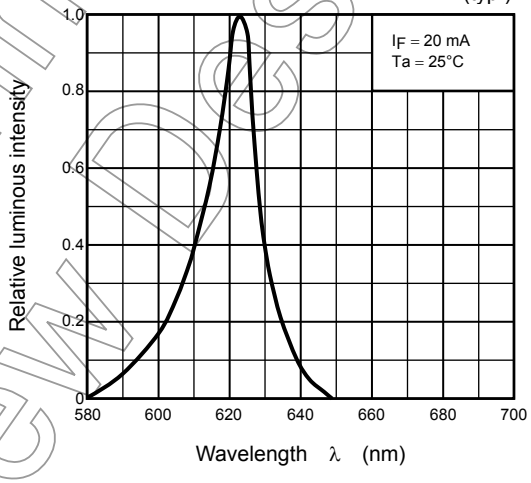
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

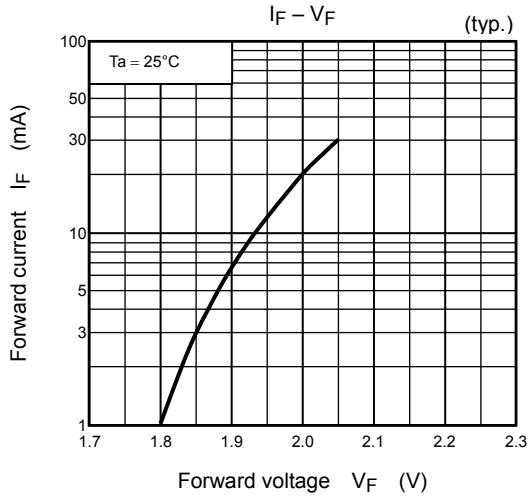


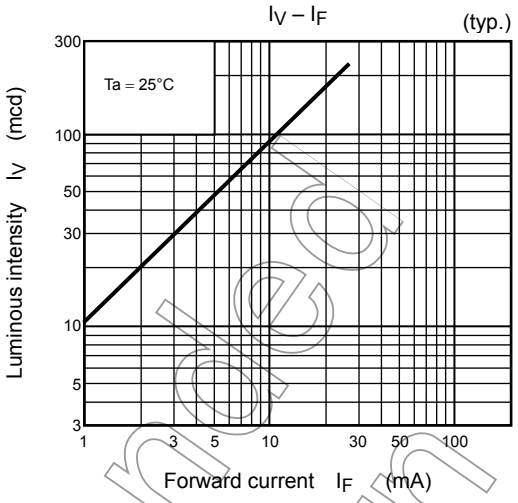
Wavelength characteristic (typ.)

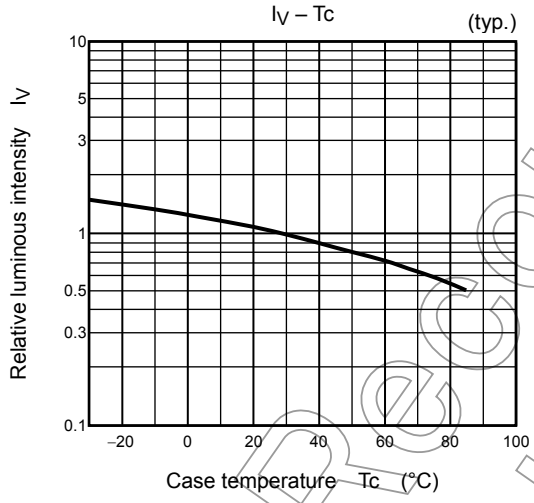


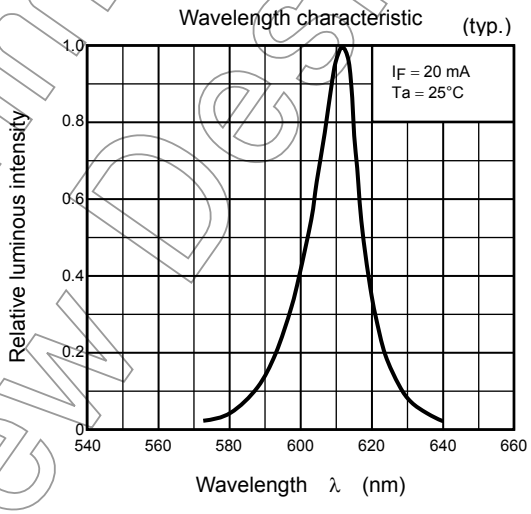
Not Recommended for New Design

TLOE1002A



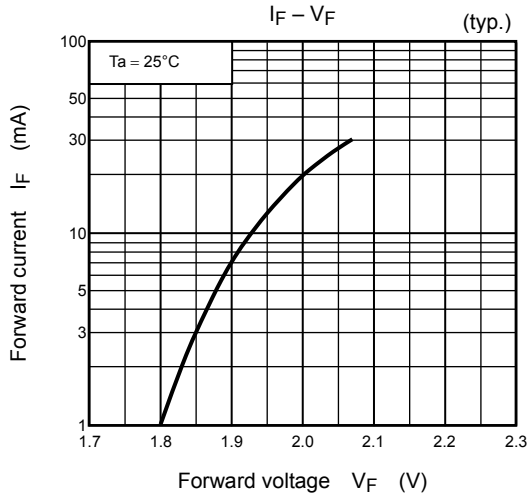


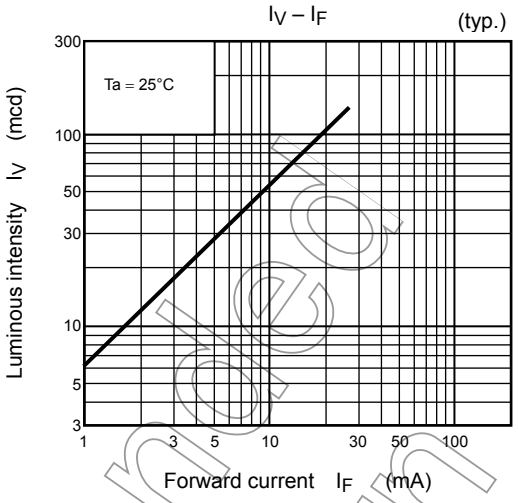


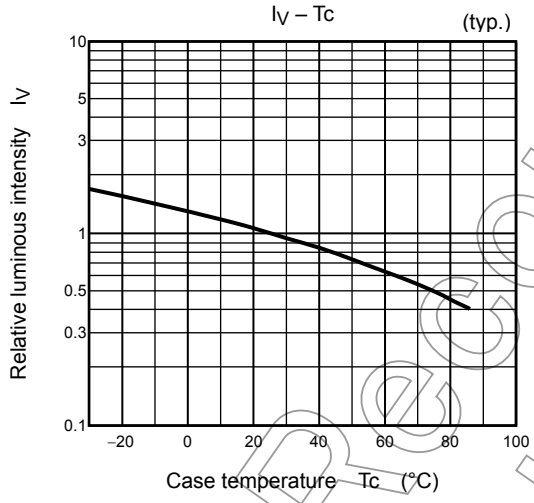


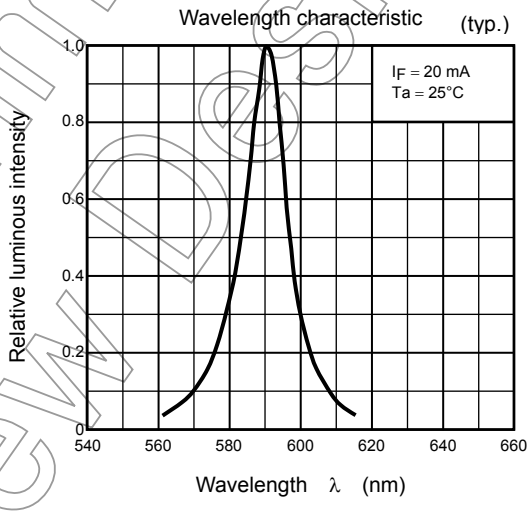
Not Recommended for New Design

TLYE1002A



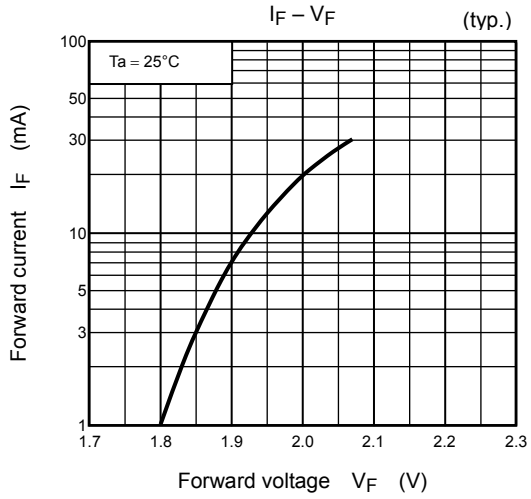


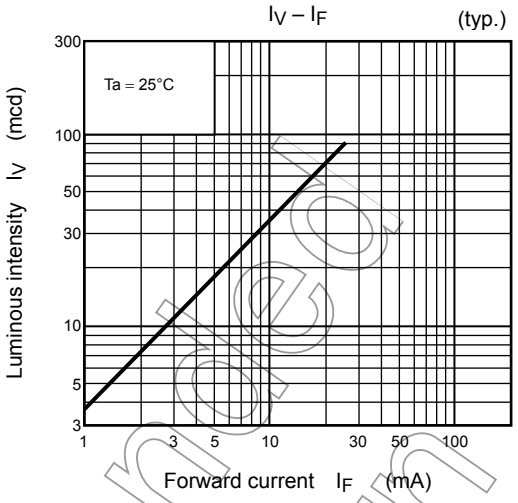


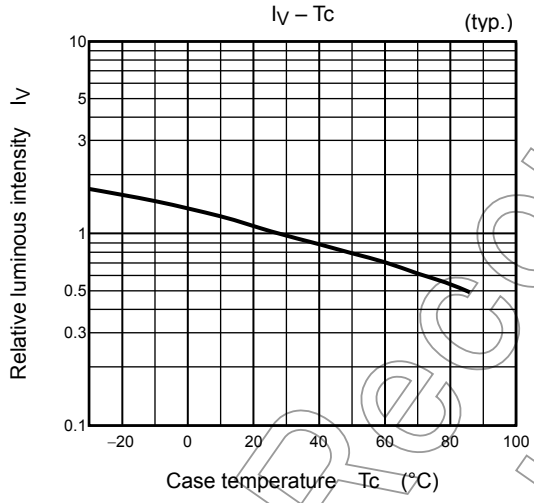


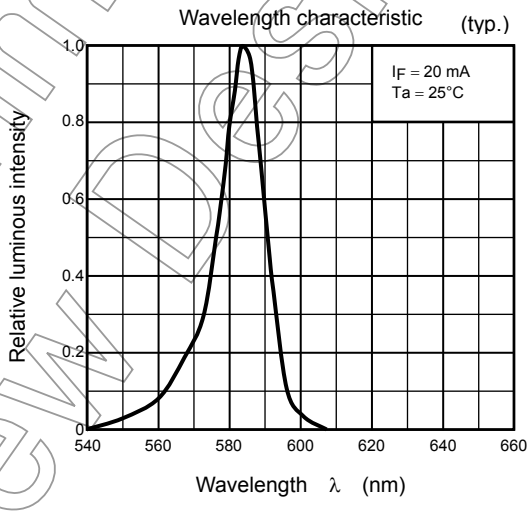
Not Recommended for New Design

TLPYE1002A



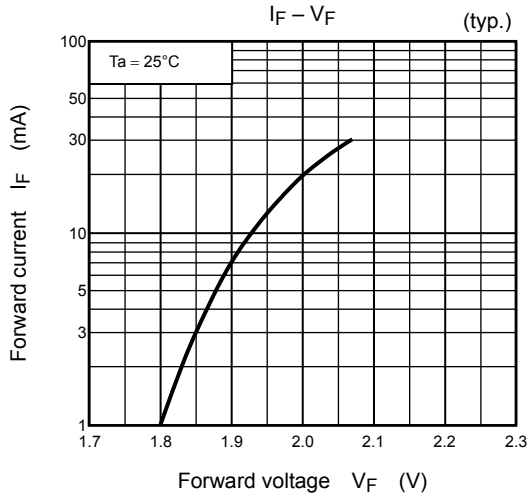


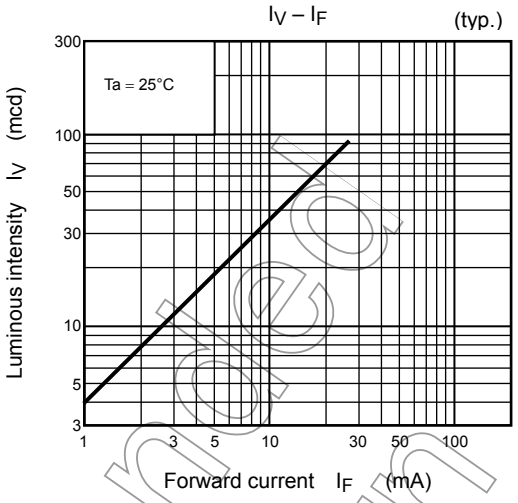


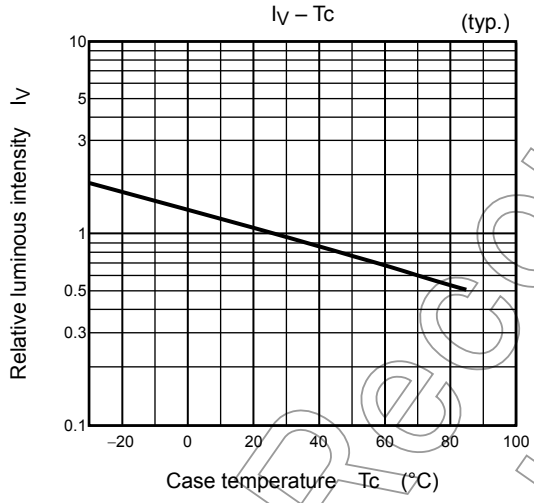


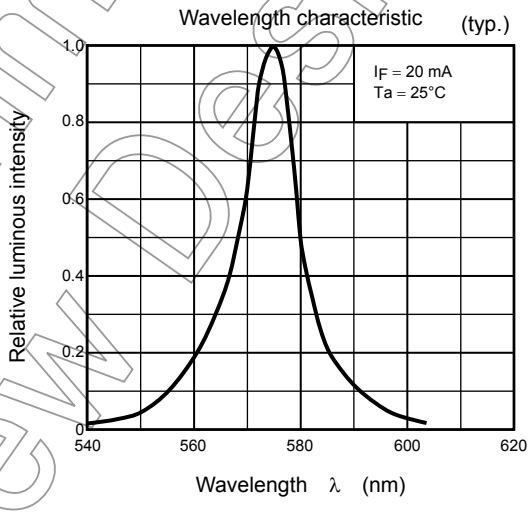
Not Recommended for New Design

TLGE1002A



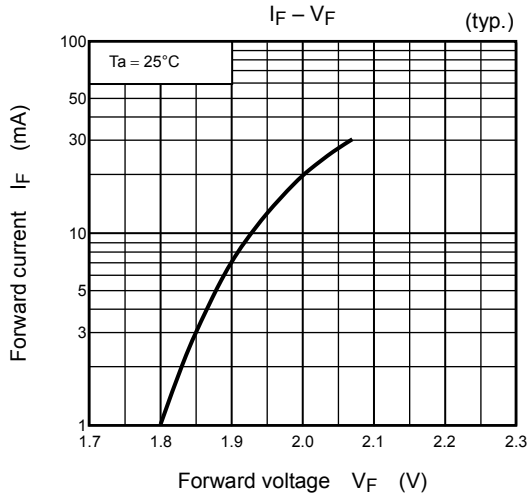


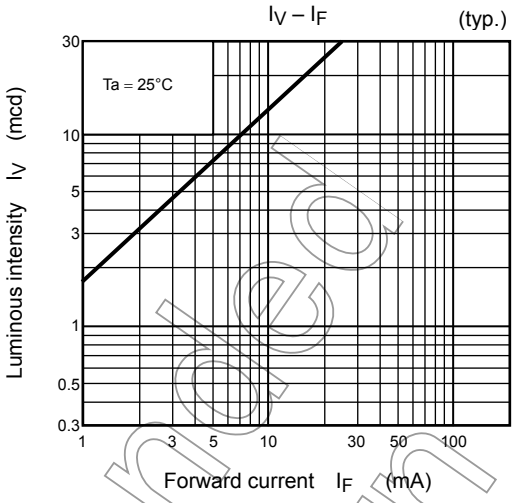


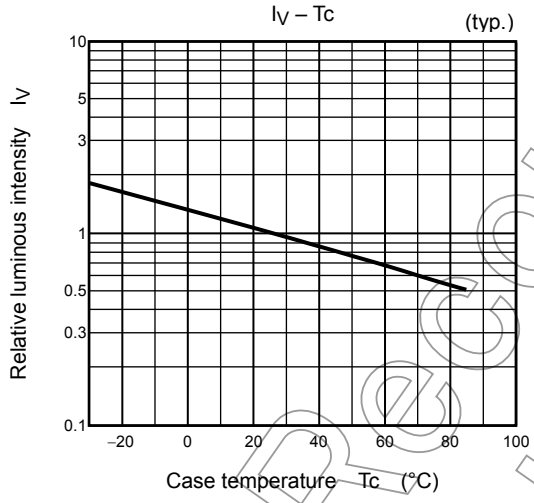


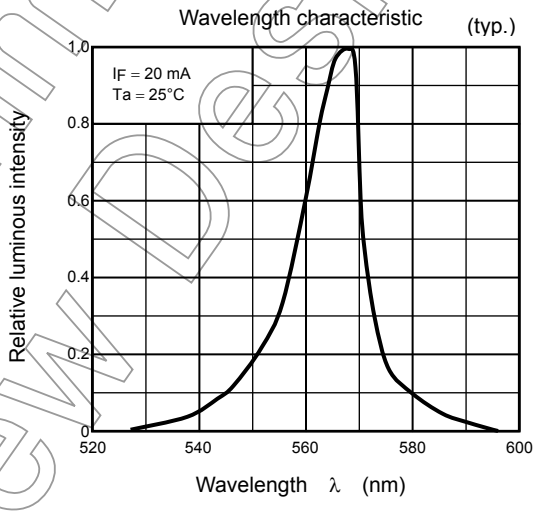
Not Recommended for New Design

TLFGE1002A





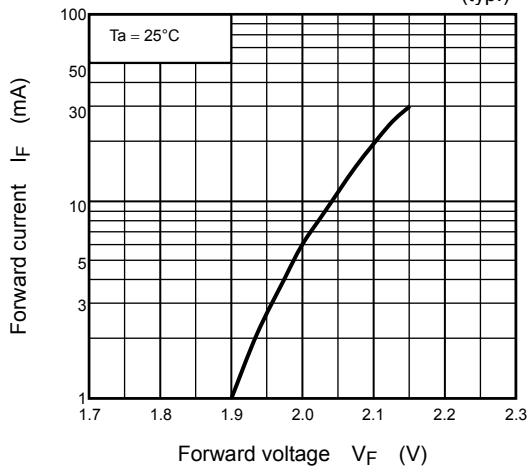




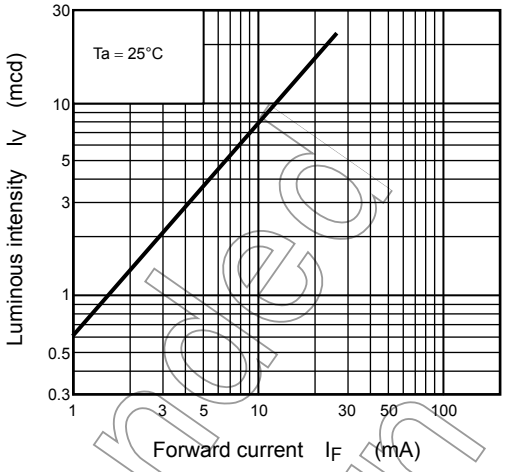
Not Recommended for New Design

TLPGE1002A

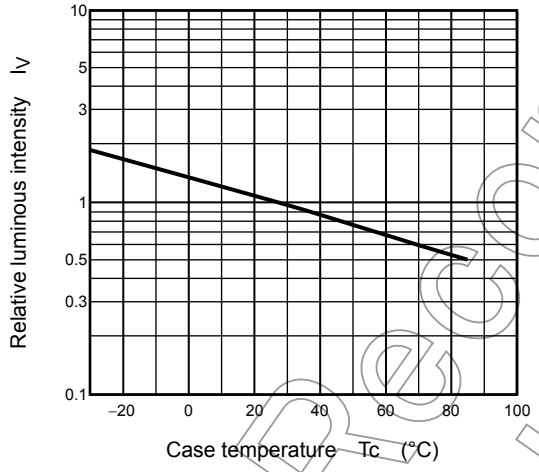
$I_F - V_F$ (typ.)



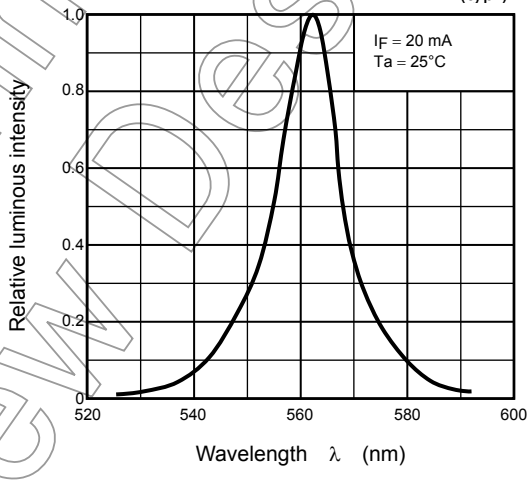
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)



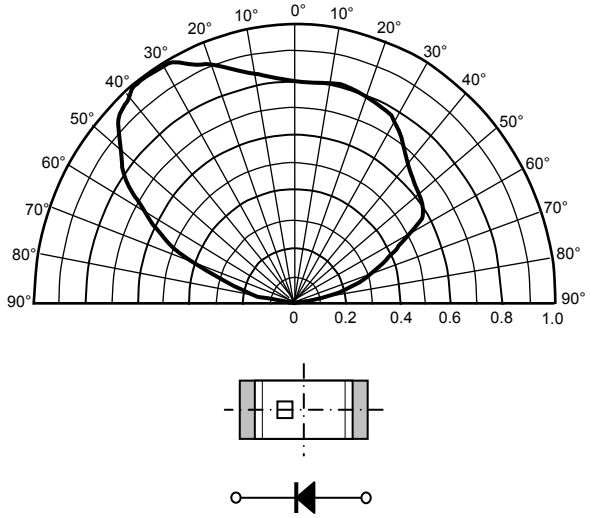
Wavelength characteristic (typ.)



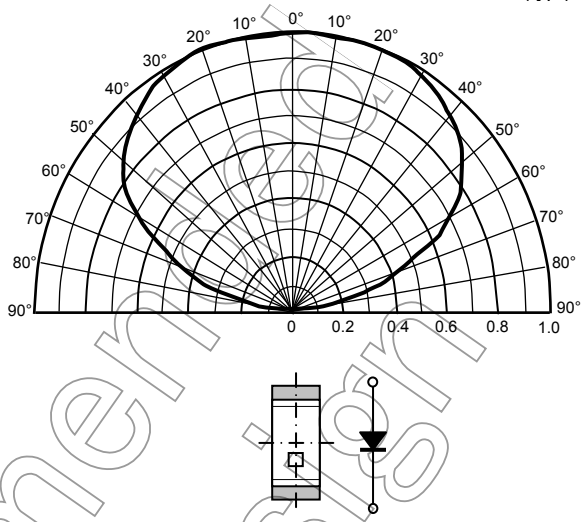
Not Recommended for New Design

Radiation Pattern

Vertical to polarity (typ.)



Horizontal to polarity Ta=25℃ (typ.)



Not Recommended for New Design

Packaging

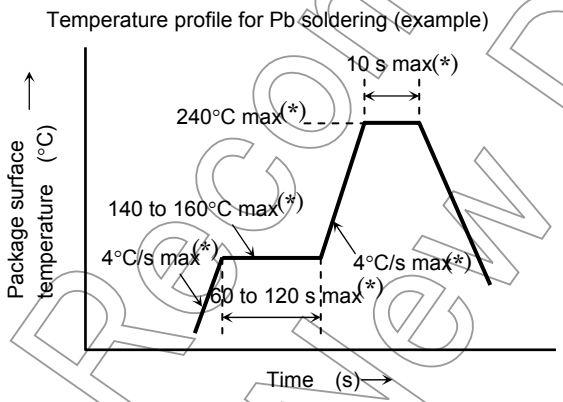
These LED devices are packed in an aluminum envelope with a silica gel and a moisture indicator to avoid moisture absorption. The optical characteristics of the devices may be affected by exposure to moisture in the air before soldering and they should therefore be stored under the following conditions:

1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
   Temperature: 5°C to 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)

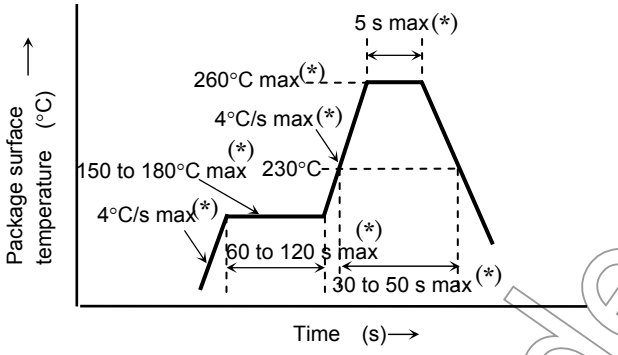


- The products are evaluated using above reflow soldering conditions. No additional test is performed exceed the condition (i.e. the condition more than (*)MAX values) as a evaluation. Please perform reflow soldering under the above conditions.
- Please perform the first reflow soldering with reference 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.

Not Recommended for New Design

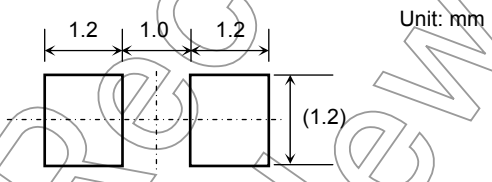
- Reflow soldering (example)

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



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 THROUGH 750H	: (made by KAO)
PINE ALPHA ST-100S	: (made by ARAKAWA CHEMICAL)

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.

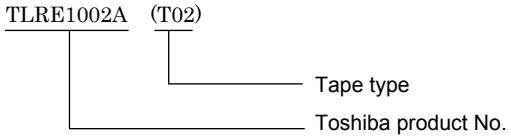
Not Recommended for New Design

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.

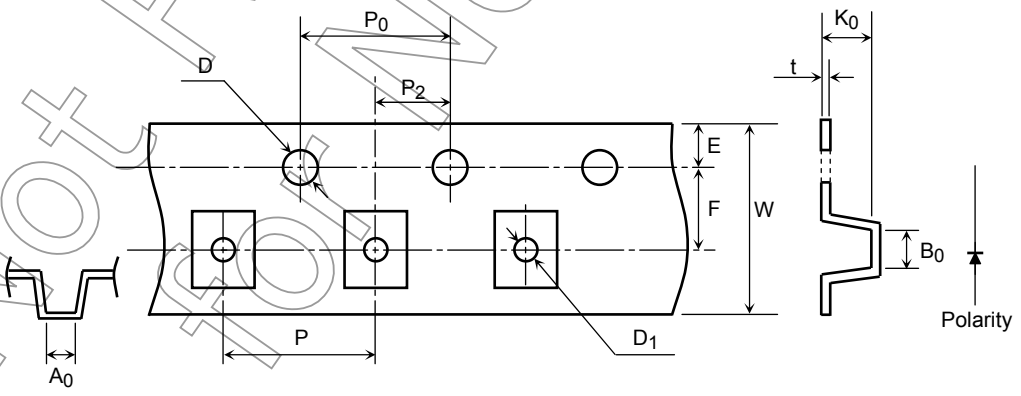
(a) Since tape materials may accumulate an electrostatic charge, use an ionizer to neutralize the ambient air.
(b) For transport and temporary storage of devices, use containers (boxes and bags) and jigs that are made of anti-static materials or of materials which dissipate electrostatic charge.

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

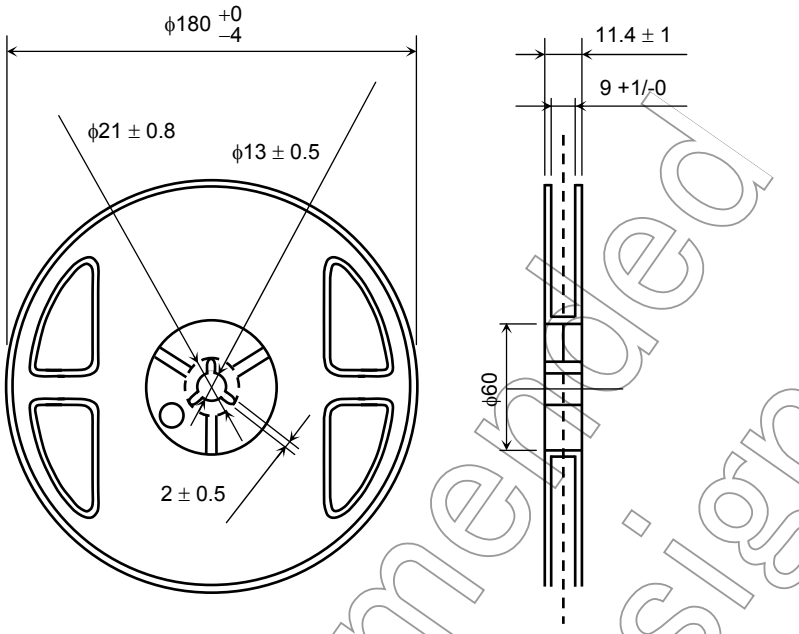
Symbol	Value	Tolerance
P_2	2.00	±0.05
W	8.00	±0.3
P	4.00	±0.1
A_0	1.45	±0.1
B_0	2.25	±0.1
K_0	1.30	±0.05



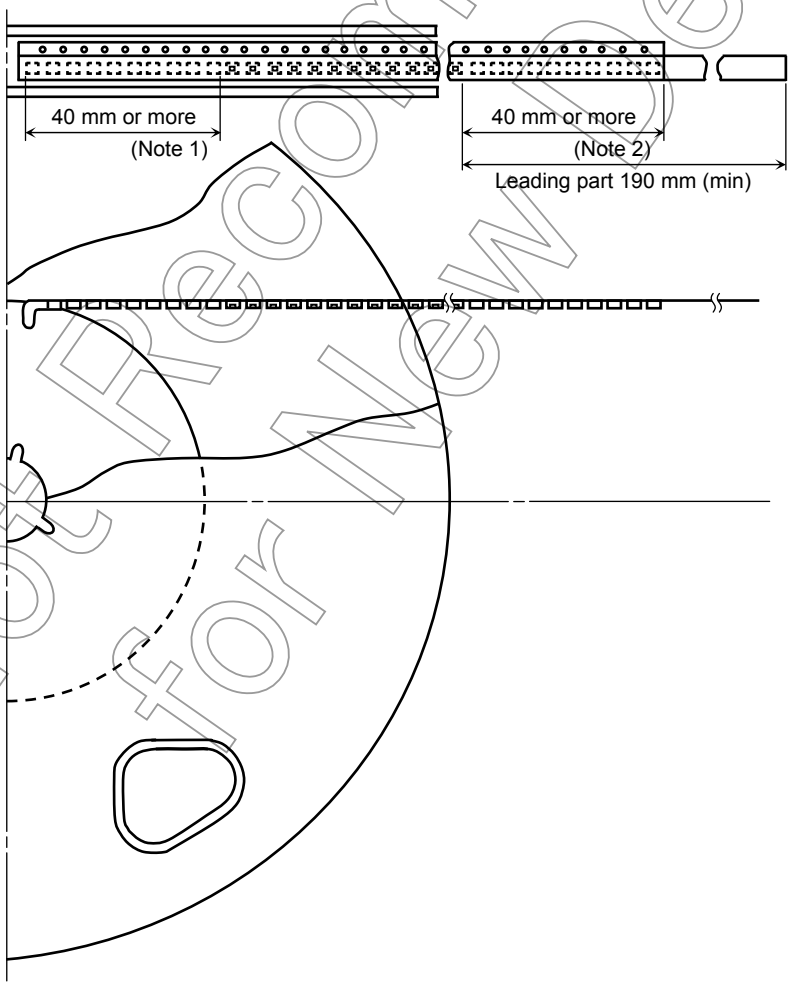
Not Recommended for New Design

4. Reel dimensions

Unit: mm



5. Leader and trailer section of tape



Note 1: Empty trailer section

Note 2: Empty leader section

Not Recommended for New Design

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: TLRE1002A (T02)

P/N:

TOSHIBA

TYPE	**TLRE1002A**		
ADDC	(T02)	Q'TY	3,000 pcs

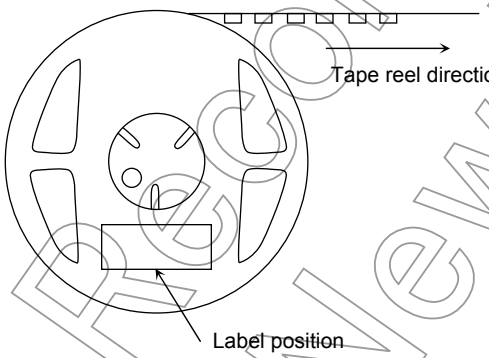
Lot Number (RANK SYMBOL) Key code for TSB 32C 3000

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

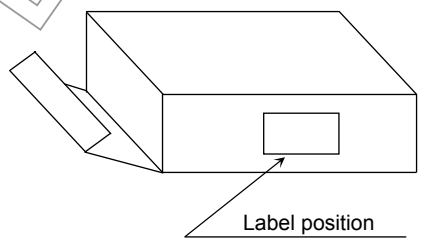
SEALED
[[G]]/RoHS COMPATIBLE DIFFUSED IN *****
Y380xxxxxxxxxxxxxxxxxx ASSEMBLED IN *****

(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.

Not Recommended for New Design

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