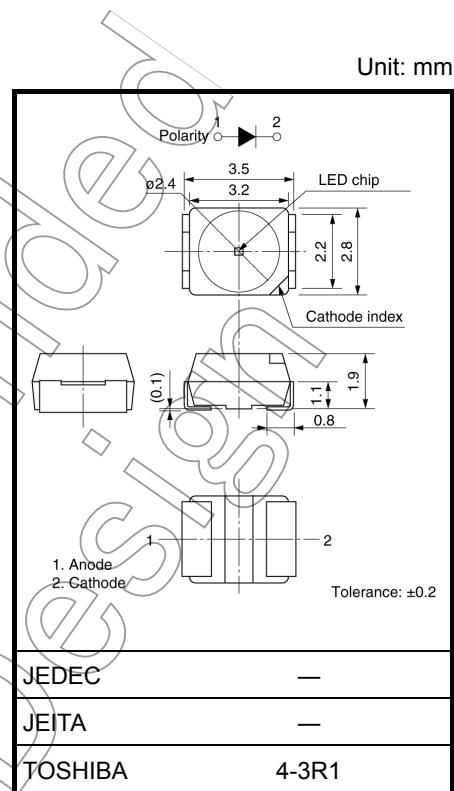


**TLRE1100B(T11), TLSE1100B(T11), TLOE1100B(T11)
TLYE1100B(T11), TLGE1100B(T11), TLFGE1100B(T11)
TLPGE1100B(T11)****Panel Circuit Indicators**

- Surface-mount devices
- 3.2 (L) mm × 2.8 (W) mm × 1.9 (H) mm
- Flat-top type
- InGaAlP LEDs
- High luminous intensity
- Low drive current, high-intensity light emission
- Colors: red, orange, yellow, green, pure green
- Applications: automotive use, message signboards, backlighting, etc.
- Standard embossed tape packing: T11 (2000 pcs / reel)
8-mm tape reel

**Color and Material**

| Part Number | Color | Material |
|-------------|------------|----------|
| TLRE1100B | Red | InGaAlP |
| TLSE1100B | Red | |
| TLOE1100B | Orange | |
| TLYE1100B | Yellow | |
| TLGE1100B | Green | |
| TLFGE1100B | Green | |
| TLPGE1100B | Pure Green | |

Weight: 0.035 g (typ.)

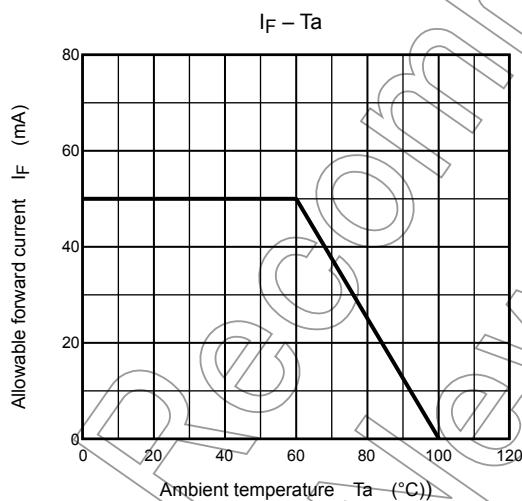
Absolute Maximum Ratings (Ta = 25°C)

| Part Number | Forward Current If (mA) See Note 1 | Reverse Voltage VR (V) | Power Dissipation PD (mW) | Operation Temperature Topr (°C) | Storage Temperature Tstg (°C) |
|-------------|--|---------------------------|------------------------------|---------------------------------------|-------------------------------------|
| TLRE1100B | | | | | |
| TLSE1100B | | | | | |
| TLOE1100B | | | | | |
| TLYE1100B | 50 | 4 | 120 | -40 to 100 | -40 to 100 |
| TLGE1100B | | | | | |
| TLFGE1100B | | | | | |
| TLPGE1100B | | | | | |

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 VF | | | Reverse Current IR | | |
|-------------|--------------------|------|-----|-----------------------|-----|----|
| | Min | Typ. | Max | If | Max | VR |
| TLRE1100B | 1.6 | 1.9 | 2.4 | 20 | 10 | 4 |
| TLSE1100B | 1.6 | 1.9 | 2.4 | | | |
| TLOE1100B | 1.6 | 2.0 | 2.4 | | | |
| TLYE1100B | 1.6 | 2.0 | 2.4 | | | |
| TLGE1100B | 1.6 | 2.0 | 2.4 | | | |
| TLFGE1100B | 1.6 | 2.0 | 2.4 | | | |
| TLPGE1100B | 1.6 | 2.1 | 2.4 | | | |
| Unit | V | | | mA | µA | V |

Optical Characteristics-1 (Ta = 25°C)

| Part Number | Luminous Intensity Iv | | | | Available Iv rank Please see Note 2 |
|-------------|-----------------------|------|-----|----------------|--|
| | Min | Typ. | Max | I _F | |
| TLRE1100B | 40 | 100 | 320 | 20 | PA / QA / RA / SA |
| TLSE1100B | 63 | 180 | 500 | 20 | QA / RA / SA / TA |
| TLOE1100B | 63 | 150 | 500 | 20 | QA / RA / SA / TA |
| TLYE1100B | 63 | 150 | 500 | 20 | QA / RA / SA / TA |
| TLGE1100B | 40 | 100 | 320 | 20 | PA / QA / RA / SA |
| TLFGE1100B | 25 | 45 | 125 | 20 | NA / PA / QA |
| TLPGE1100B | 10 | 25 | 50 | 20 | LA / MA / NA |
| 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 Iv | |
|------|-----------------------|-----|
| | Min | Max |
| LA | 10 | 20 |
| MA | 16 | 32 |
| NA | 25 | 50 |
| PA | 40 | 80 |
| QA | 63 | 125 |
| RA | 100 | 200 |
| SA | 160 | 320 |
| TA | 250 | 500 |
| Unit | mcd | mcd |

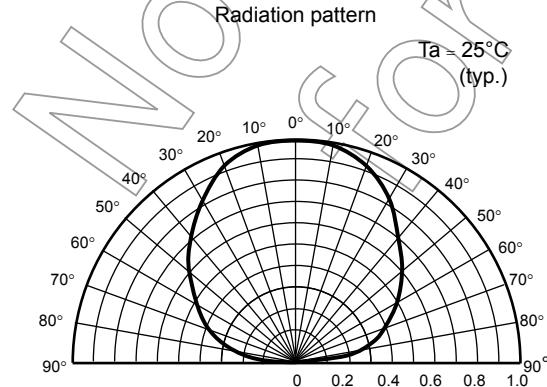
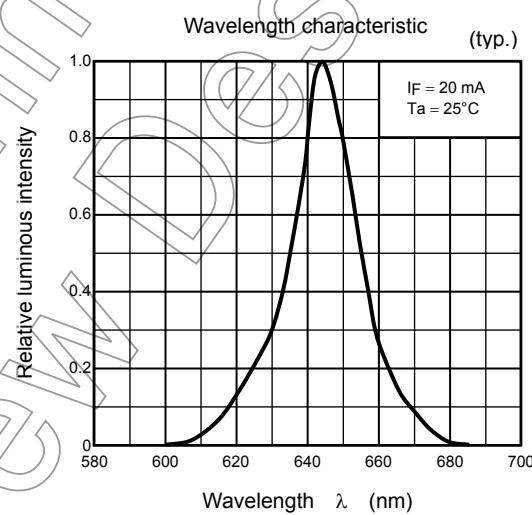
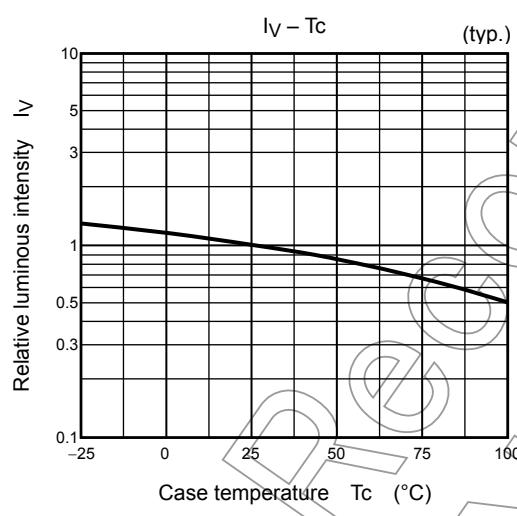
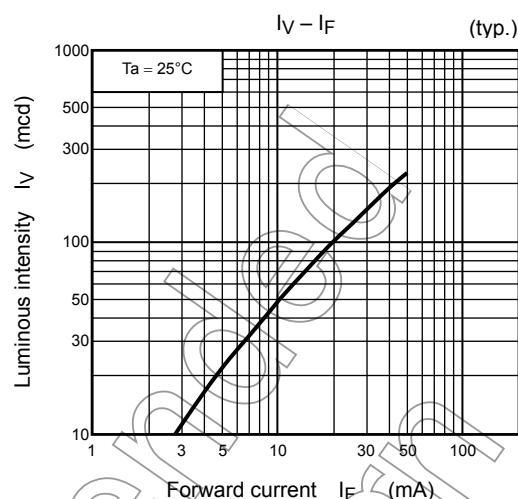
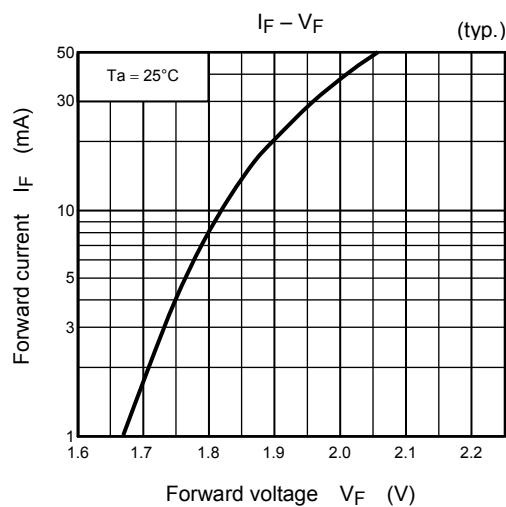
Optical Characteristics-2 (Ta = 25°C)

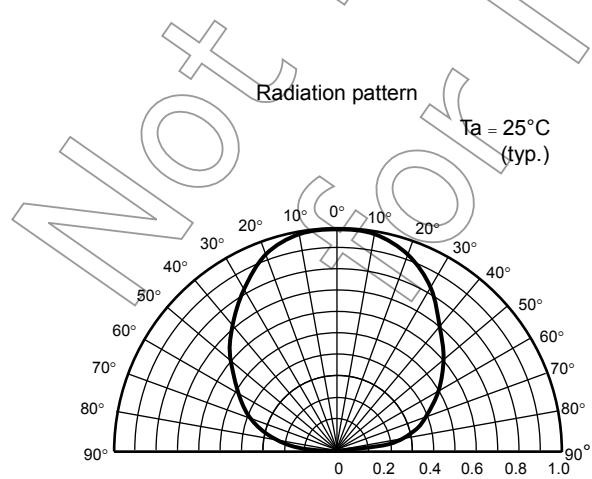
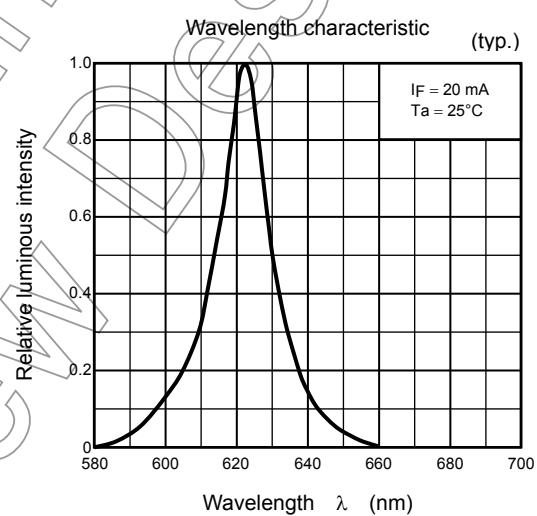
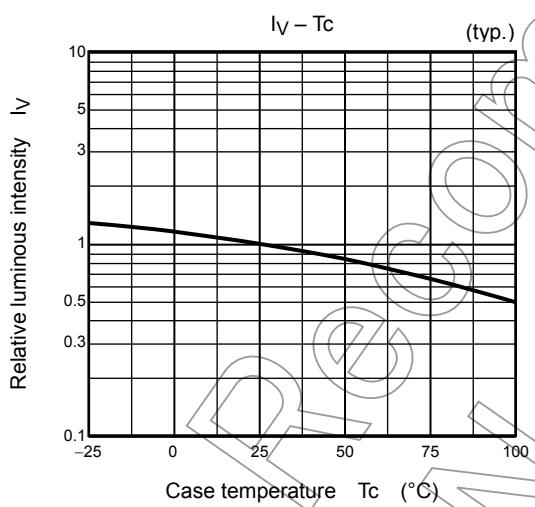
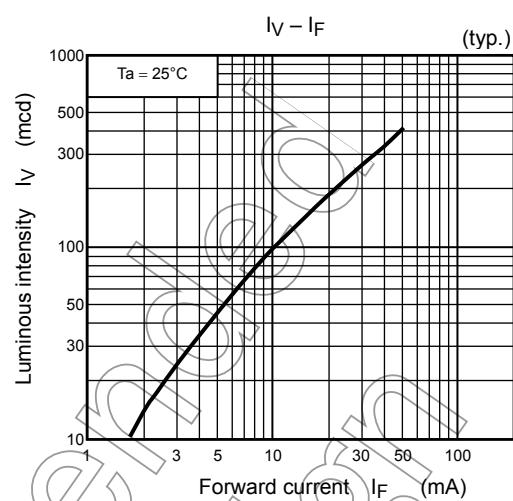
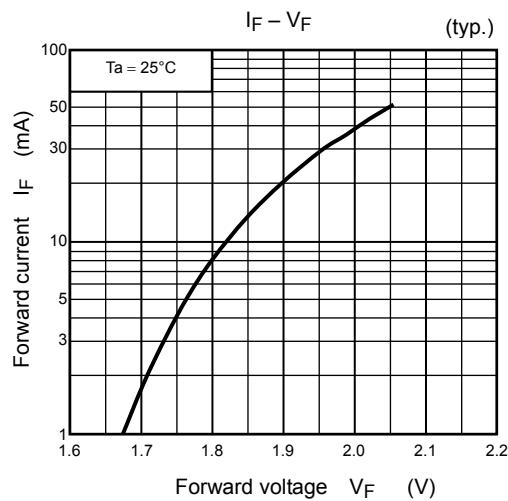
| Part Number | Emission Spectrum | | | | | | | |
|-------------|--------------------------------------|------|-----|-----------------|---------------------------------|-----|------|----------------|
| | Peak Emission Wavelength λ_p | | | $\Delta\lambda$ | Dominant Wavelength λ_d | | | I _F |
| | Min | Typ. | Max | | Typ. | Min | Typ. | |
| TLRE1100B | — | 644 | — | 18 | 624 | 630 | 638 | 20 |
| TLSE1100B | — | 623 | — | 15 | 607 | 613 | 621 | |
| TLOE1100B | — | 612 | — | 15 | 599 | 605 | 613 | |
| TLYE1100B | — | 590 | — | 15 | 581 | 587 | 595 | |
| TLGE1100B | — | 574 | — | 13 | 565 | 571 | 576 | |
| TLFGE1100B | — | 568 | — | 11 | 561 | 565 | 569 | |
| TLPGE1100B | — | 562 | — | 11 | 555 | 558 | 564 | |
| Unit | nm | | | nm | nm | | | mA |

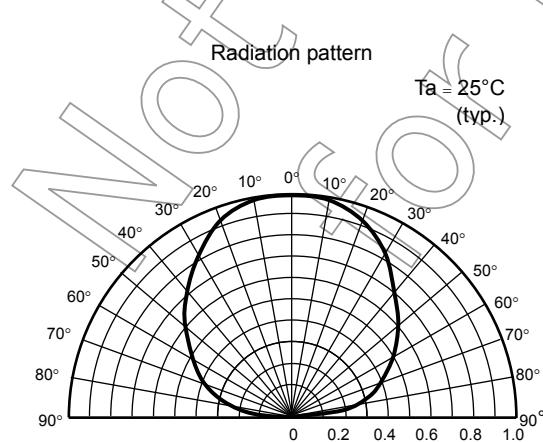
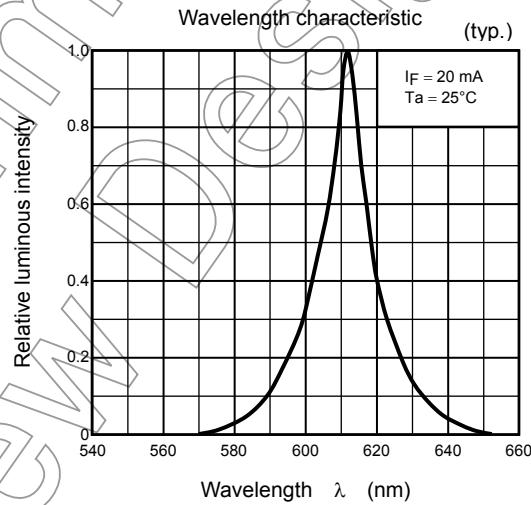
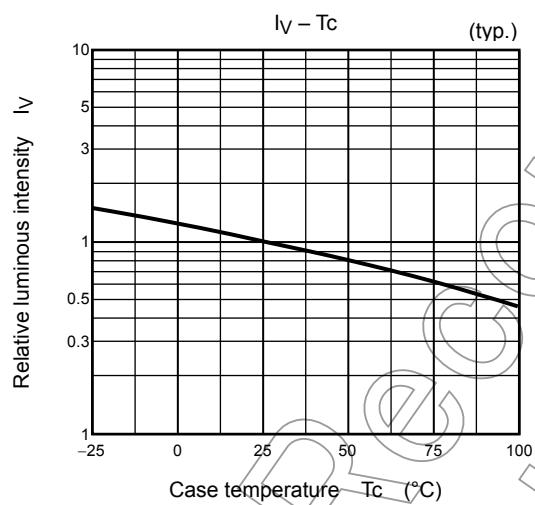
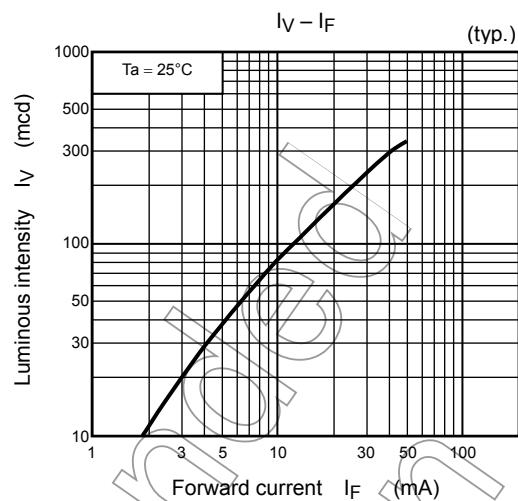
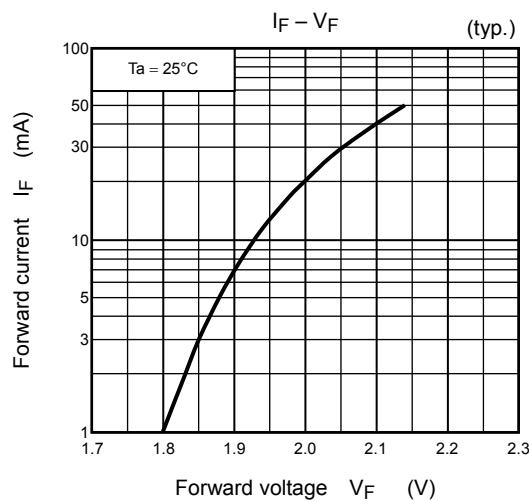
The cautions

- 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.

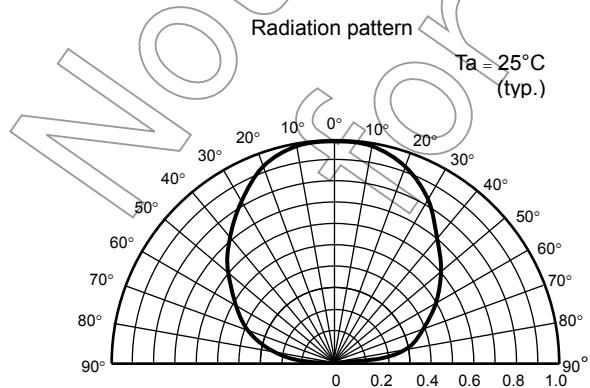
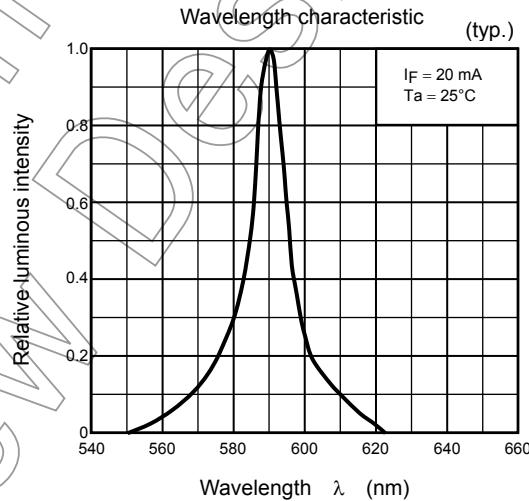
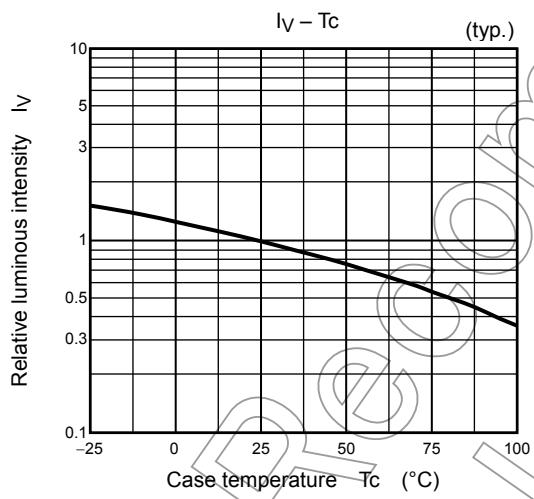
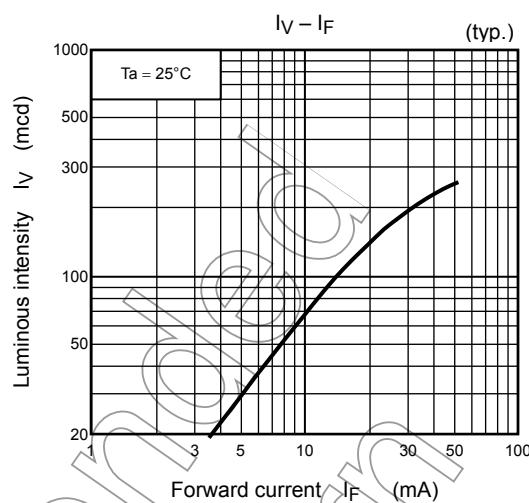
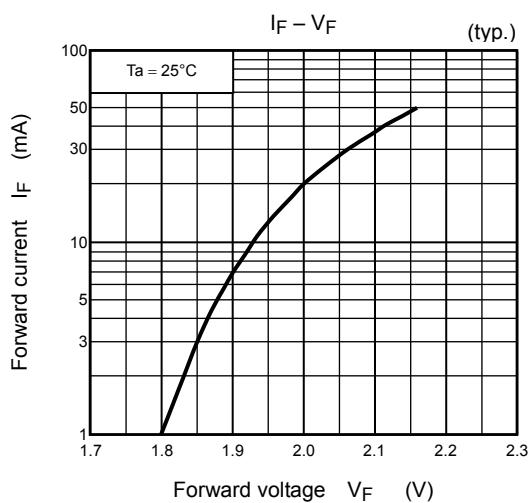
TLRE1100B



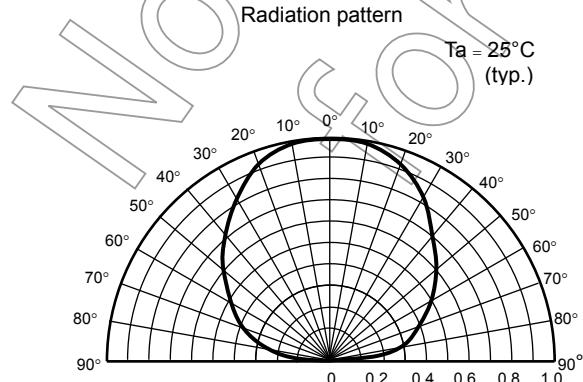
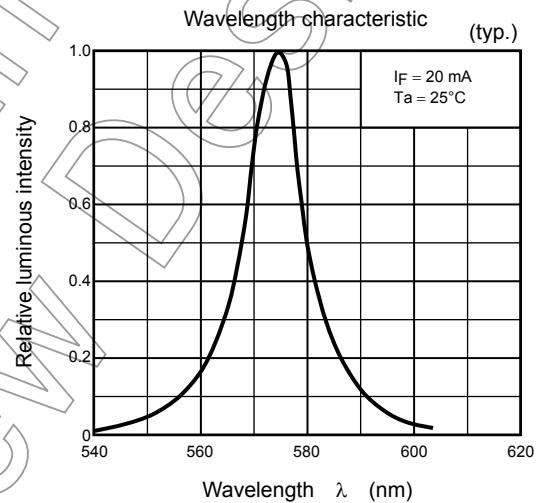
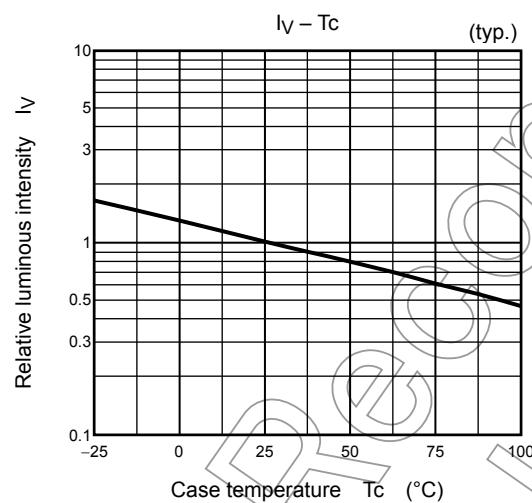
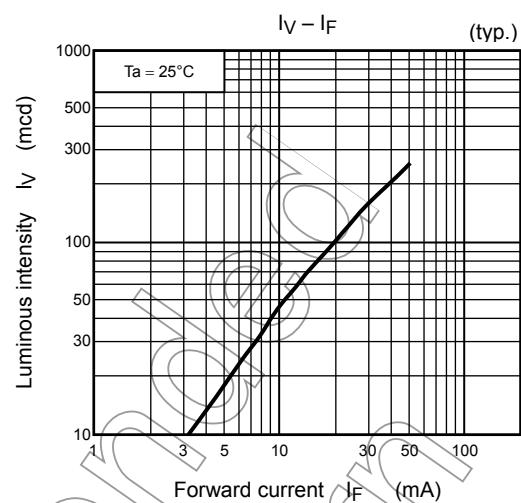
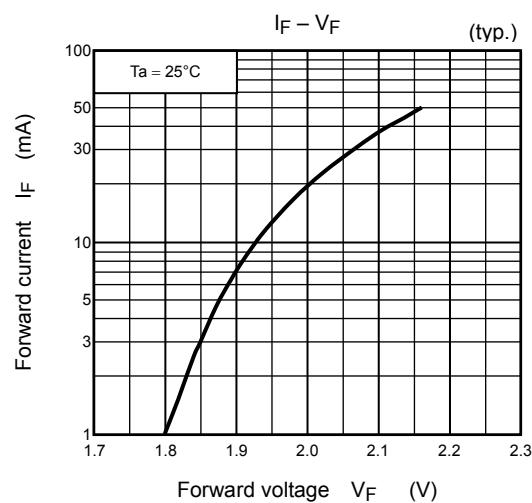


TLOE1100B

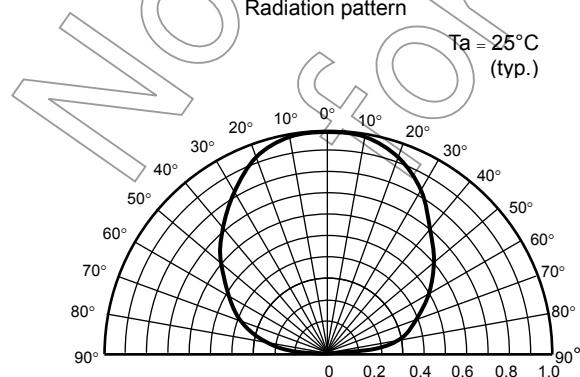
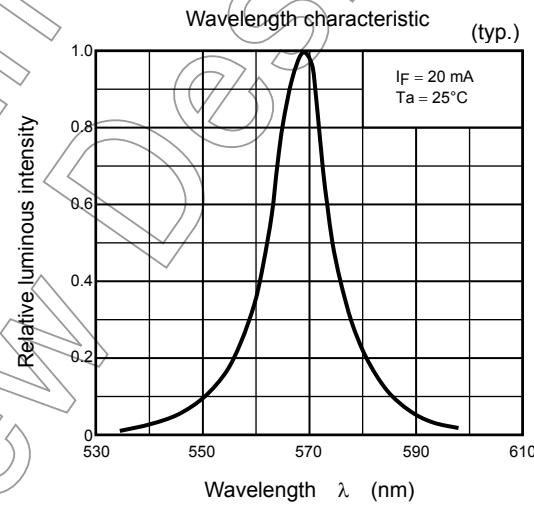
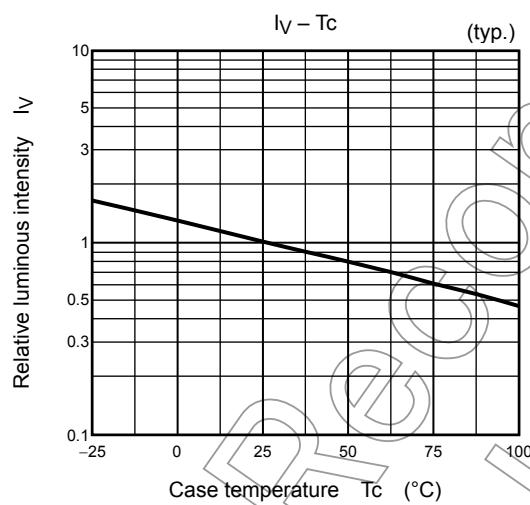
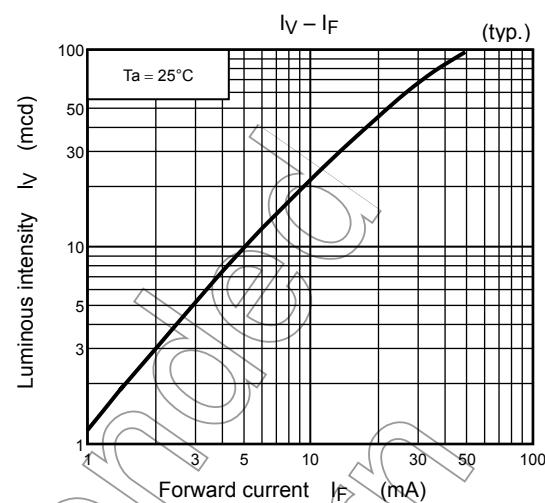
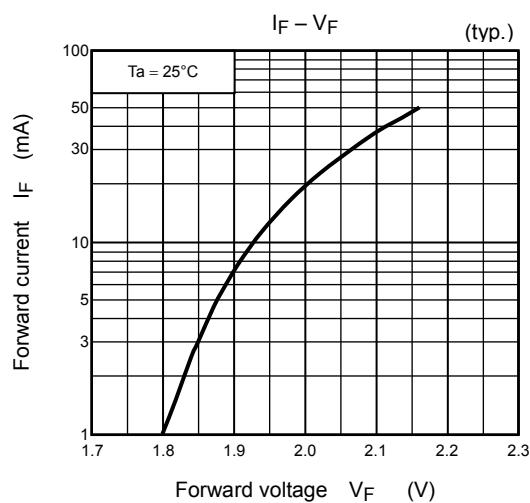
TLYE1100B



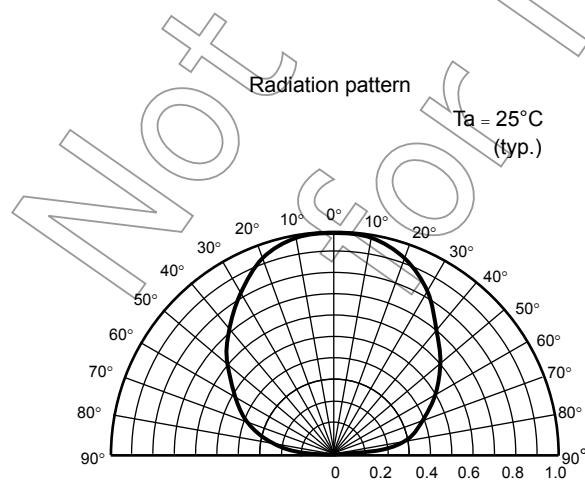
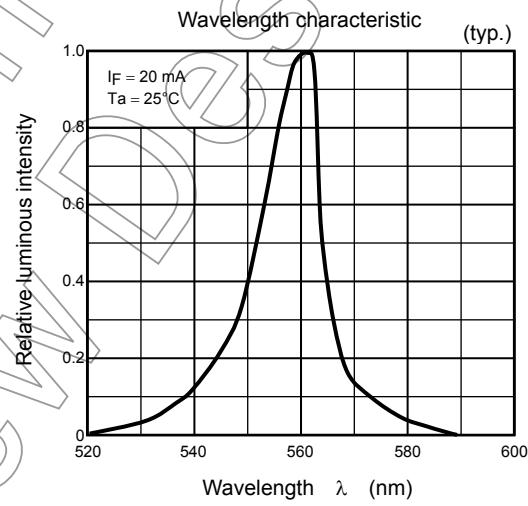
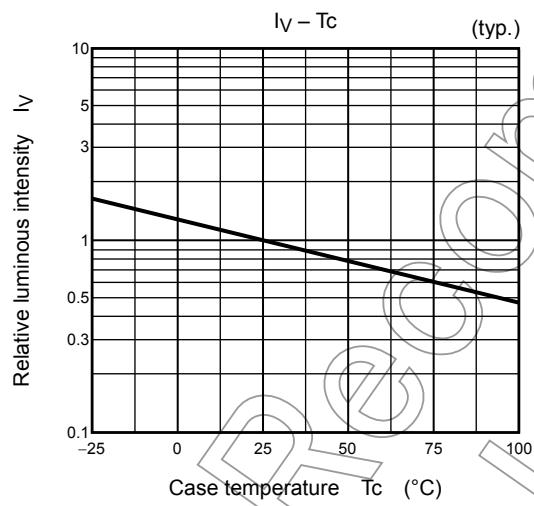
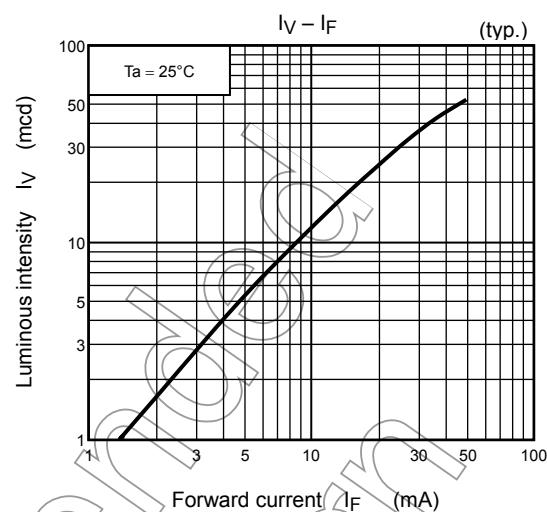
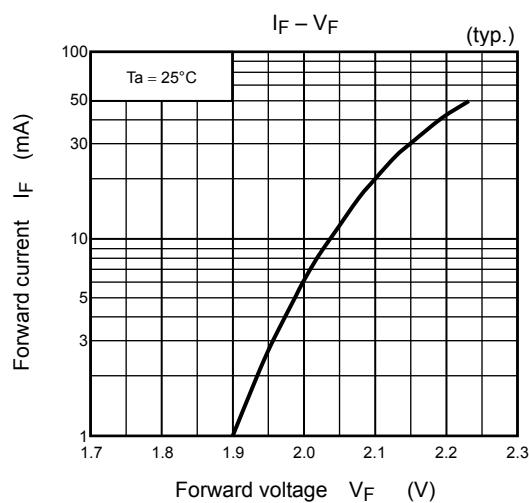
TLGE1100B



TLFGE1100B



TLPGE1100B



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:

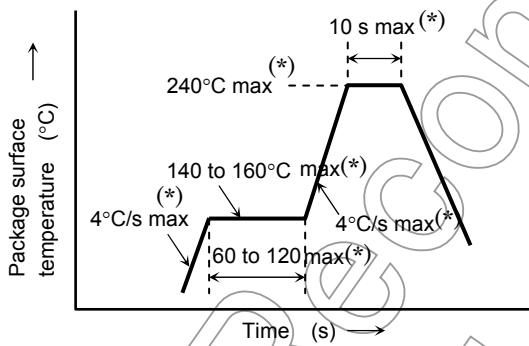
1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
Temperature: 5°C to 30°C
Humidity: 90% (max)
2. After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/60% RH or below.
3. If upon opening, 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: $60\pm5^\circ\text{C}$, 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 hermeticity would deteriorate. Therefore, do not throw or drop the packed devices.

Mounting Method

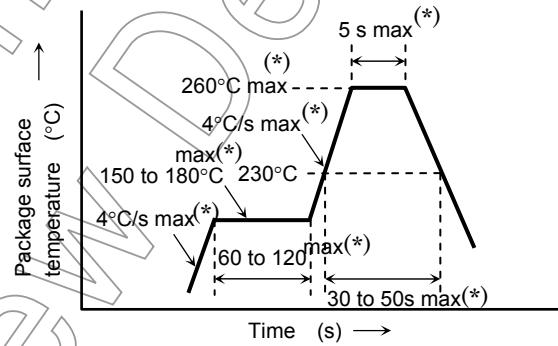
Soldering

- Reflow soldering (example)

Temperature profile for Pb soldering (example)



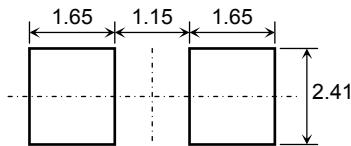
Temperature profile for Pb-free soldering (example)



- The 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, 60% 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
- If the products need to be performed by other soldering method (ex. wave soldering), please contact Toshiba sales representative.

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:
KAO CLEAN THROUGH 750H:
PINE ALPHA ST-100S:

(made by ASAHI GLASS)
(made by KAO)
(made by ARAKAWA CHEMICAL)

Precautions when Mounting

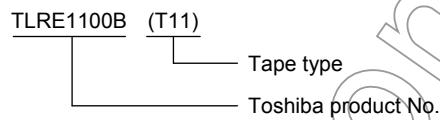
Do not apply force to the plastic part of the LED under high-temperature conditions.
To avoid damaging the LED plastic, do not apply friction using a hard material.
When installing the PCB in a product, ensure that the device does not come into contact with other components.

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: T14 (4-mm pitch)
- (2) Example

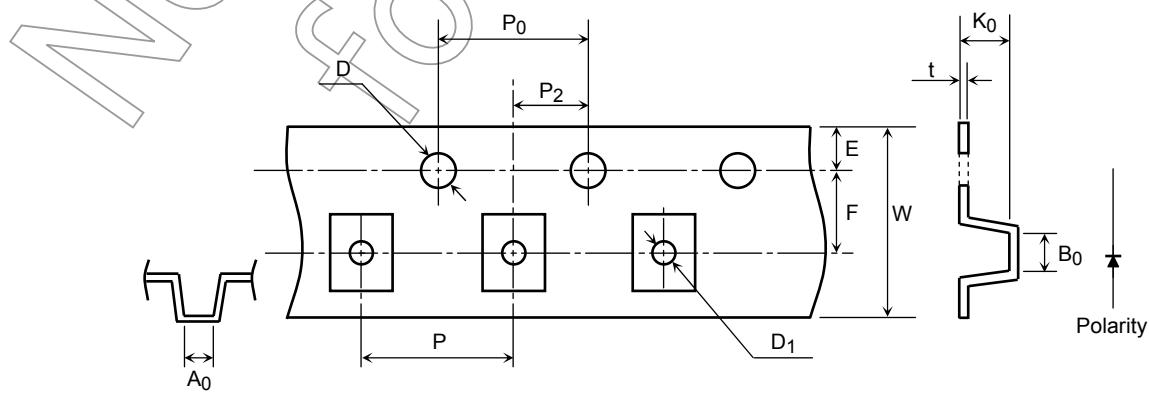


2. Tape dimensions

Unit: mm

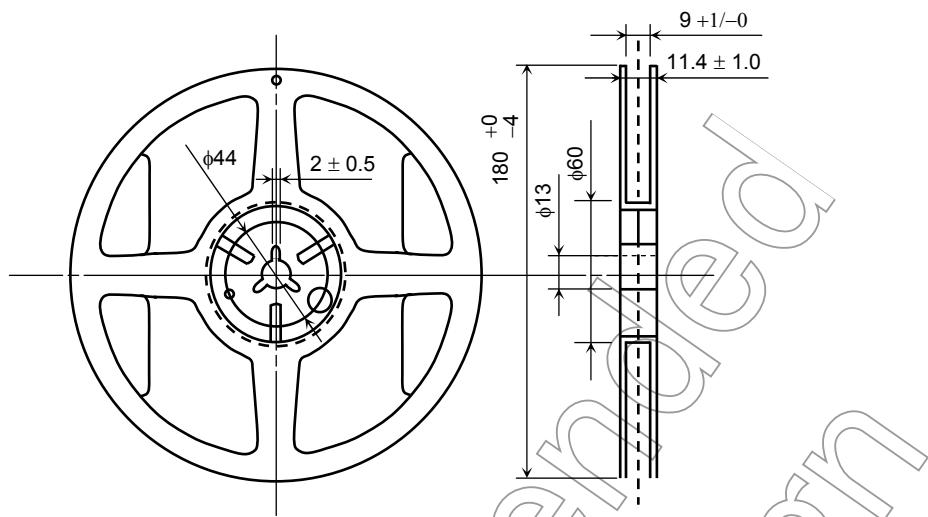
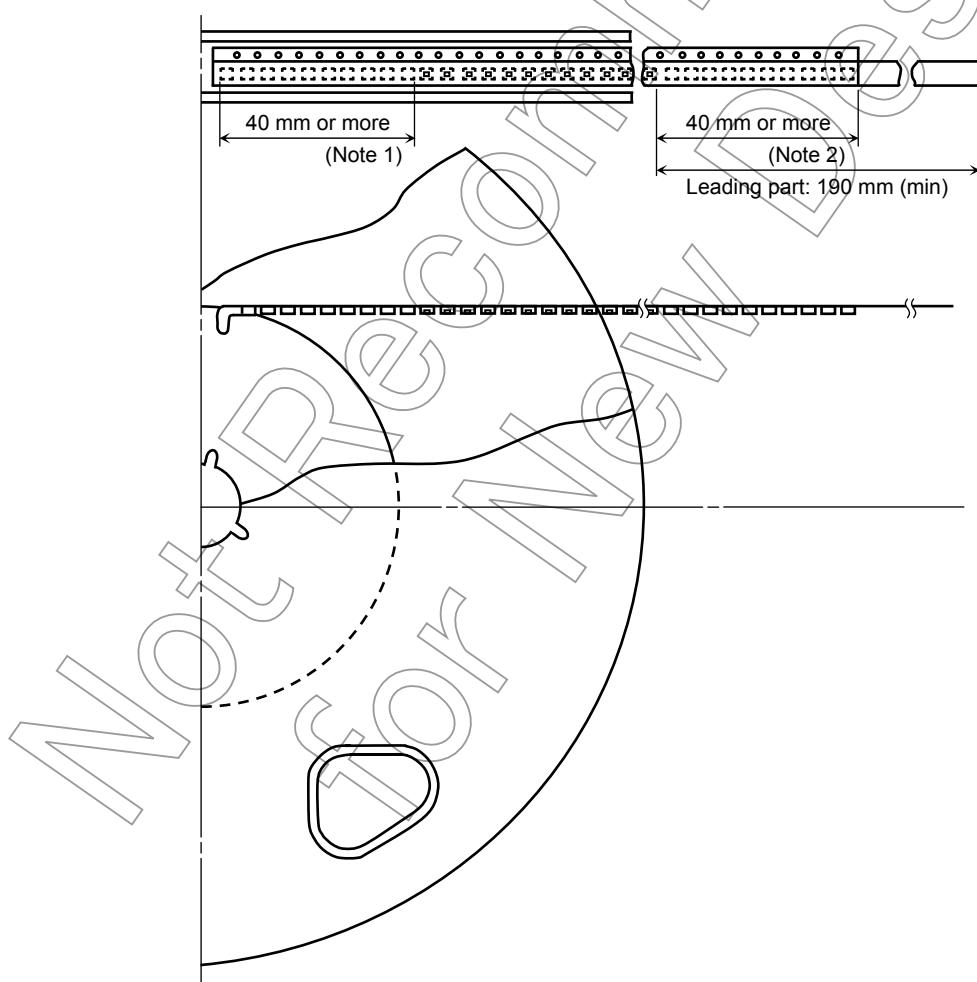
| Symbol | Dimension | Tolerance |
|----------------|-----------|-----------|
| D | 1.5 | +0.1/-0 |
| E | 1.75 | ±0.1 |
| P ₀ | 4.0 | ±0.1 |
| t | 0.3 | ±0.05 |
| F | 3.5 | ±0.05 |
| D ₁ | 1.5 | ±0.1 |

| Symbol | Dimension | Tolerance |
|----------------|-----------|-----------|
| P ₂ | 2.0 | ±0.05 |
| W | 8.0 | ±0.3 |
| P | 4.0 | ±0.1 |
| A ₀ | 2.9 | ±0.1 |
| B ₀ | 3.7 | ±0.1 |
| K ₀ | 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

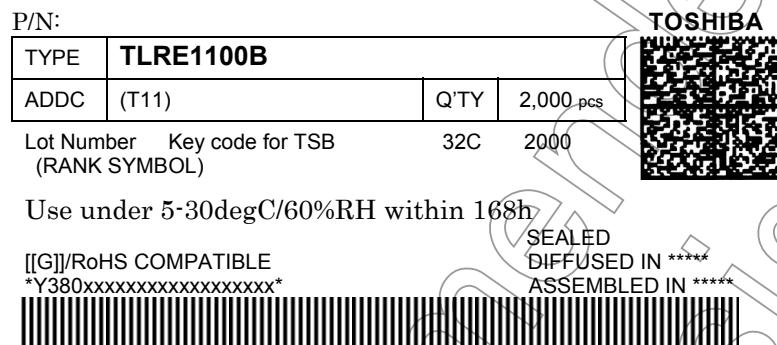
(1) Packing quantity

| | |
|--------|------------|
| Reel | 2,000 pcs |
| Carton | 10,000 pcs |

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

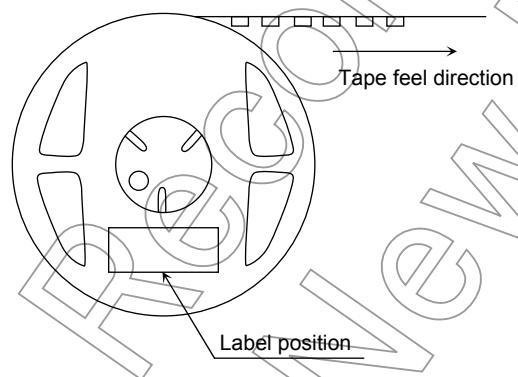
6. Label format

(1) Example: TLRE1100B (T11)

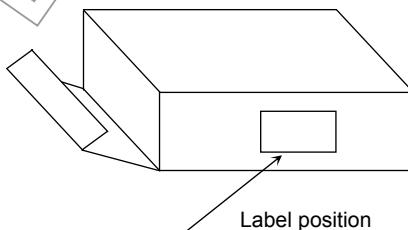


(2) Label location

• Reel



• Carton



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

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- GaAs (Gallium Arsenide) is used in Product. GaAs is harmful to humans if consumed or absorbed, whether in the form of dust or vapor. Handle with care and do not break, cut, crush, grind, dissolve chemically or otherwise expose GaAs in Product.
- 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.