LED Lamps InGaN

TLBF1108A(T11

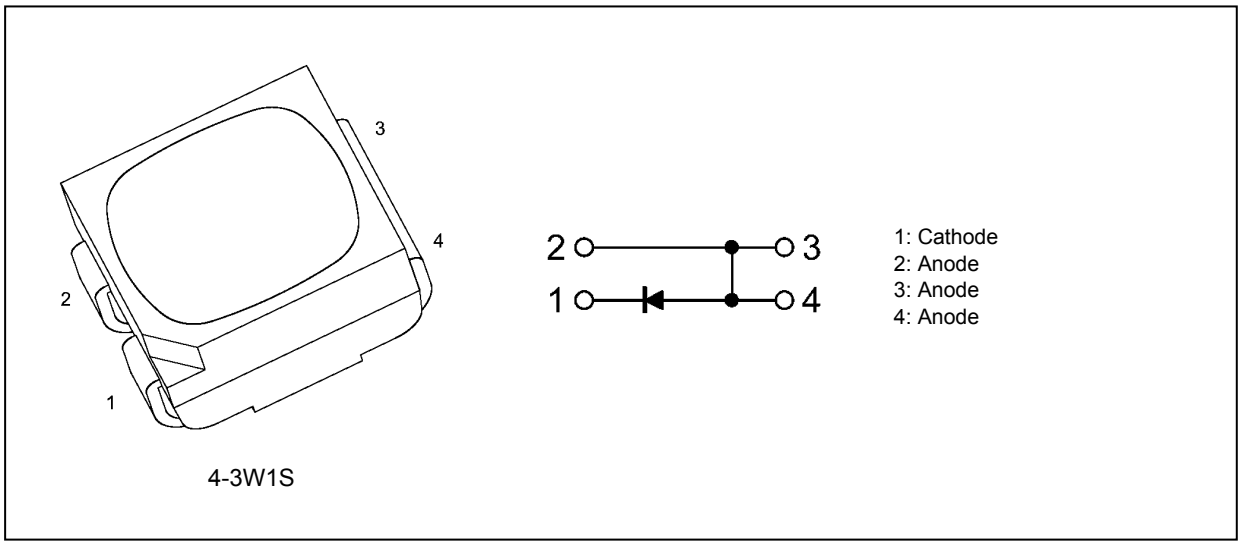
1. Applications

- General Lighting
- Backlighting
- Pilot Lamps

2. Features

(1) Size: 3.2 (L) mm × 2.9 (W) mm × 1.9 (H) mm
(2) Luminous intensity: I_V = 800 mcd (typ.) @I_F = 40 mA
(3) Emitting material: InGaN
(4) Color: Blue
(5) High heat-resistant type: T_{opr}/T_{stg} = -40 to 100°C
(6) High current driving: I_F = 50 mA (max)
(7) Standard embossed tape packing: 4-mm pitch: T11 type (2,000 pcs/reel), 8-mm tape/reel

3. Packaging and Internal Circuit



4. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25°C)

Characteristics	Symbol	Note	Max	Unit
Forward current (DC)	I_F	See Fig. 4.1	50	mA
Reverse voltage	V_R		5	V
Power dissipation	P_D		215	mW
Operating temperature	T_{opr}		-40 to 100	°C
Storage temperature	T_{stg}		-40 to 100	°C

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).

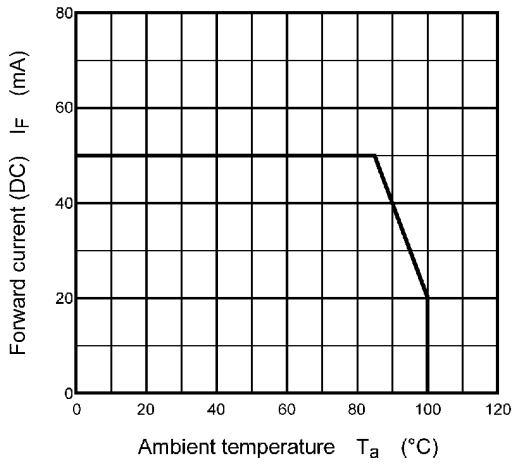


Fig. 4.1 Forward Current Derating, I_F - T_a

5. Handling Precautions

- ESD withstand voltage according to MIL STD 883D, Method 3015.7: ≥ 1000 V
  When handling this LED, take the following measures to prevent the LED from being damaged or otherwise adversely affected.
  1. Use a conductive tablemat and conductive floor mat, and ground the workbench and floor.
  2. Operators handling laser diodes must be grounded via a high resistance (about 1 MΩ). A conductive strap is good for this purpose.
  3. Ground all tools including soldering irons.
- Since this product is intended to be used for display lighting, the measurement standard is based on the spectral sensitivity of the human eye. It is not intended to be used for any applications other than display lighting (e.g., sensors and light communications systems.)

6. Electrical Characteristics (Unless otherwise specified, T_a = 25°C)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V_F		I_F = 40 mA	3.1	3.6	4.3	V
Reverse current	I_R		V_R = 5 V	—	—	10	μA

7. Optical Characteristics (Unless otherwise specified, T_a = 25°C)

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Luminous intensity (on-axis)	I_V	See Table 7.1	I_F = 40 mA	400	800	1600	mcd
Peak emission wavelength	λ_P		I_F = 40 mA	—	468	—	nm
Spectral line half width	$\Delta\lambda$			—	25	—	
Dominant wavelength	λ_d			460	467	474	

Table 7.1 Luminous Intensity Rank (Note)

Rank	Test Condition	Luminous Intensity (Min)	Luminous Intensity (Max)	Unit
UA1	I_F = 40 mA, T_a = 25°C	400	630	mcd
UA2		500	800	
VA1		630	1000	
VA2		800	1250	
WA1		1000	1600	

Note: This LED lamp is sorted into luminous intensity ranks shown above. Each reel includes the same rank LEDs. Let the delivery ratio of each rank be unquestioned.

Rank notations:The luminous intensity ranks are printed on labels as shown below:

Example: UA1
UA1: Luminous intensity rank

8. Characteristics Curves (Note)

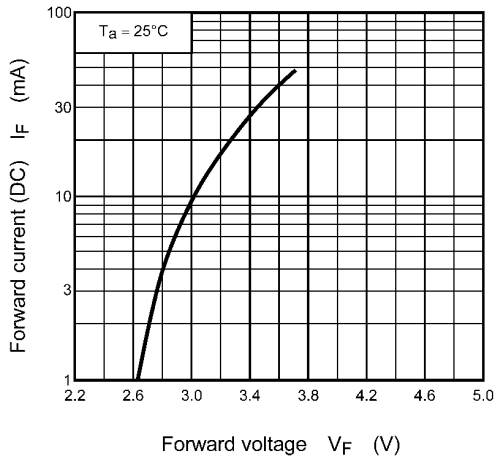


Fig. 8.1 I_F - V_F

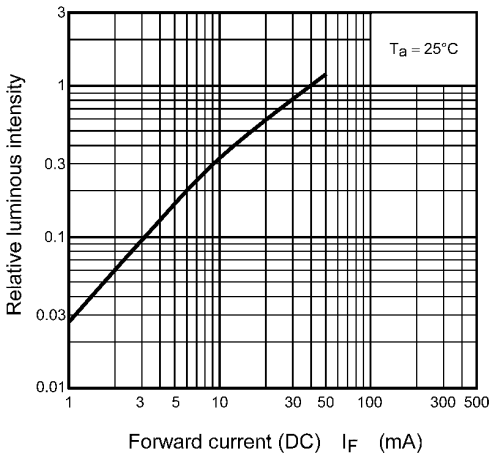


Fig. 8.2 Relative Luminous Intensity - I_F

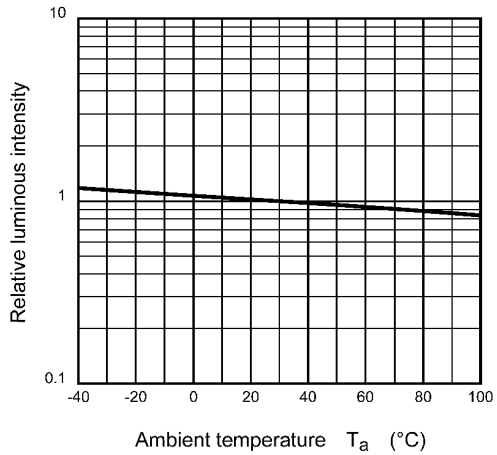


Fig. 8.3 Relative Luminous Intensity - T_a

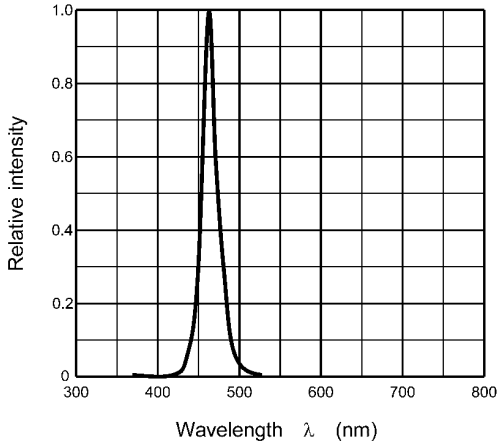


Fig. 8.4 Wavelength Characteristic

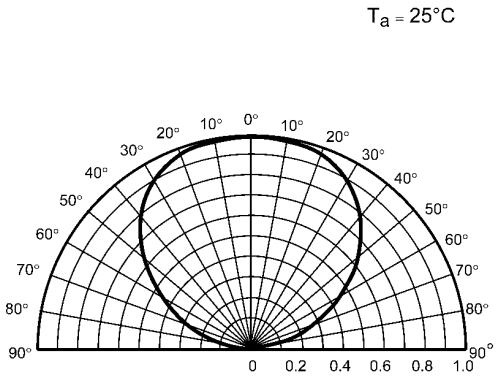


Fig. 8.5 Radiation Pattern

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

9. Packing

9.1. Moisture-Proof Packing

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 device may be affected by exposure to moisture in the air before soldering and the device should therefore be stored under the following conditions:

- This moisture proof bag may be stored unopened within 12 months at the following conditions.
  Temperature: 5℃ to 30℃
  Humidity: 90% (max)
- After opening the moisture proof bag, the device should be assembled within 4 weeks in an environment of 5℃ to 30℃/60% RH or below.
- 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 device should be baked in taping with reel.
  After baking, use the baked device within 72 hours, but perform baking only once.
  Baking conditions: 60±5℃, for 12 to 24 hours.
  Expiration date: 12 months from sealing date, which is imprinted on the label affixed.
- 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.
- If the packing material of laminate would be broken, the hermeticity would deteriorate. Therefore, do not throw or drop the packed devices.

10. Mounting Method

10.1. 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 cmponents.
- For this product, silicone is used as the encapsulated material. Therefore the top surface of this product is soft. Please do not stress on the encapsulated part of LEDs to avoid affecting the reliability of the product. When using the mounting devices, please use the picking up nozzle that does not affect the silicone resin.

10.2. Soldering

Following show examples of reflow soldering.

- Temperature Profile (see following figures.)

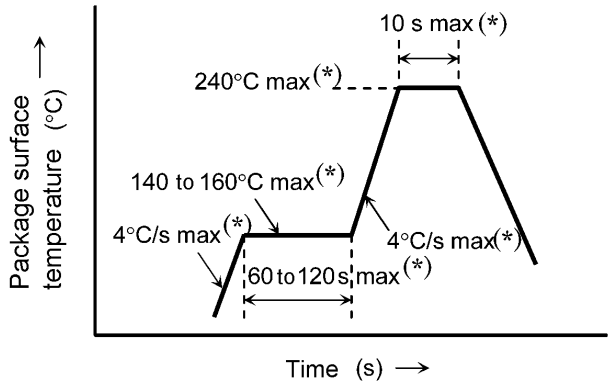


Fig. 10.2.1 Temperature Profile for Pb Soldering (Example)

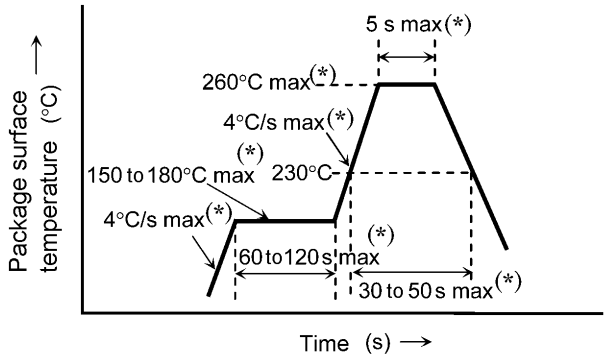


Fig. 10.2.2 Temperature Profile for Lead(Pb)-free Soldering (Example)

- 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 4 weeks of opening the package.
- If a second reflow process is necessary, reflow soldering should be performed within 168 hours of the first reflow under the above conditions. Storage conditions before the second reflow soldering: 30℃, 60% RH (max)
- Do not perform wave soldering.
- Manual soldering with a soldering iron should meet the following conditions:
  Temperature at tip of iron: 300℃ (max)
  Soldering iron capacity: 25 W
  Time: 3 seconds (max) (only once at each soldering point)

10.3. Land Pattern Dimensions for Reference Only

Cu area > 16 mm² (The following Cu area shows an example of the dimensions.)

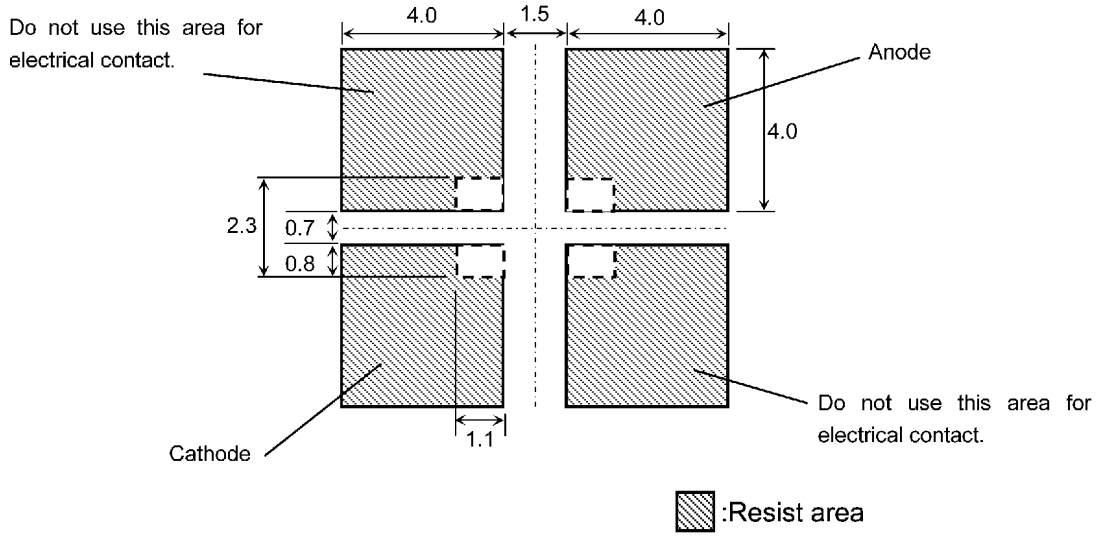


Fig. 10.3.1 Land Pattern Dimensions for Reference Only (Unit: mm)

11. 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.

Recommended cleaning solvents

ASAHI CLEAN AK-225AES: (made by ASAHI GLASS)
KAO CLEANTHROUGH 750HS: (made by KAO)
PINE ALPHA ST-100S: (made by ARAKAWA CHEMICAL)

12. Tape Specifications

12.1. Product number format

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

Example: TLBF1108A(T11
Toshiba part number: TLBF1108A
Tape type: T11(4-mm pitch)

12.2. Tape Dimensions

Table 12.2.1 Tape Dimensions (Unit: mm)

	D	E	P_0	t	F	D_1	P_2	W	P	A_0	B_0	K_0
Dimensions	1.5	1.75	4.0	0.3	3.5	1.5	2.0	8.0	4.0	2.9	3.7	2.3
Tolerance	+0.1/-0	±0.1	±0.1	±0.05	±0.05	±0.1	±0.05	±0.3	±0.1	±0.1	±0.1	±0.1

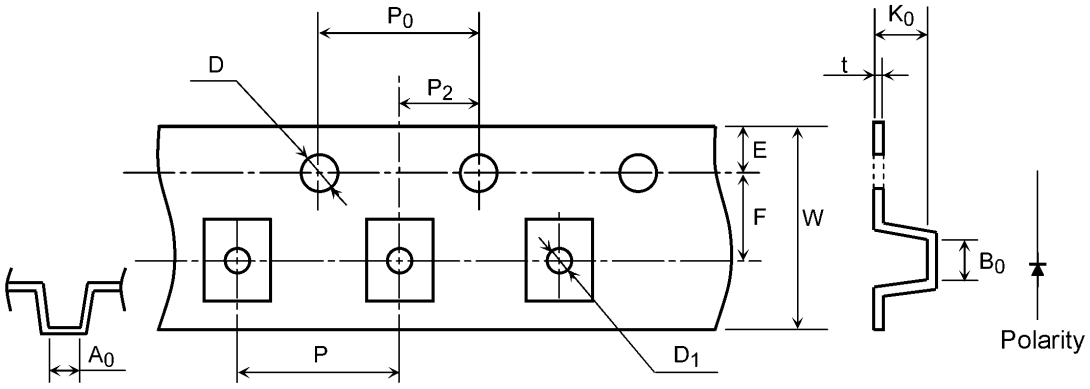


Fig. 12.2.1 Tape Dimensions

12.3. Reel Specification

12.3.1. Reel Dimensions

Unit: mm

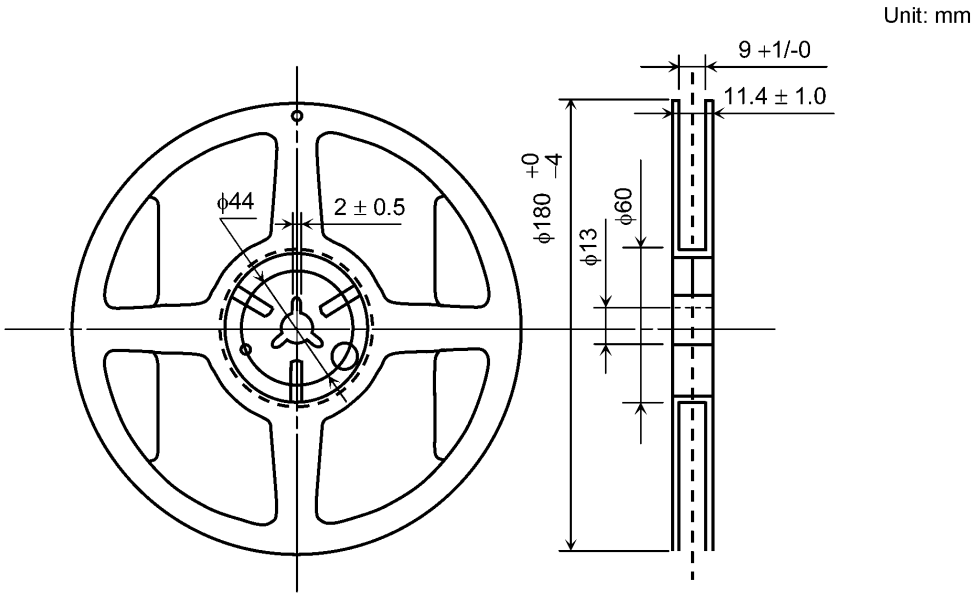


Fig. 12.3.1.1 Reel Dimensions

12.3.2. Tape Leader and Trailer

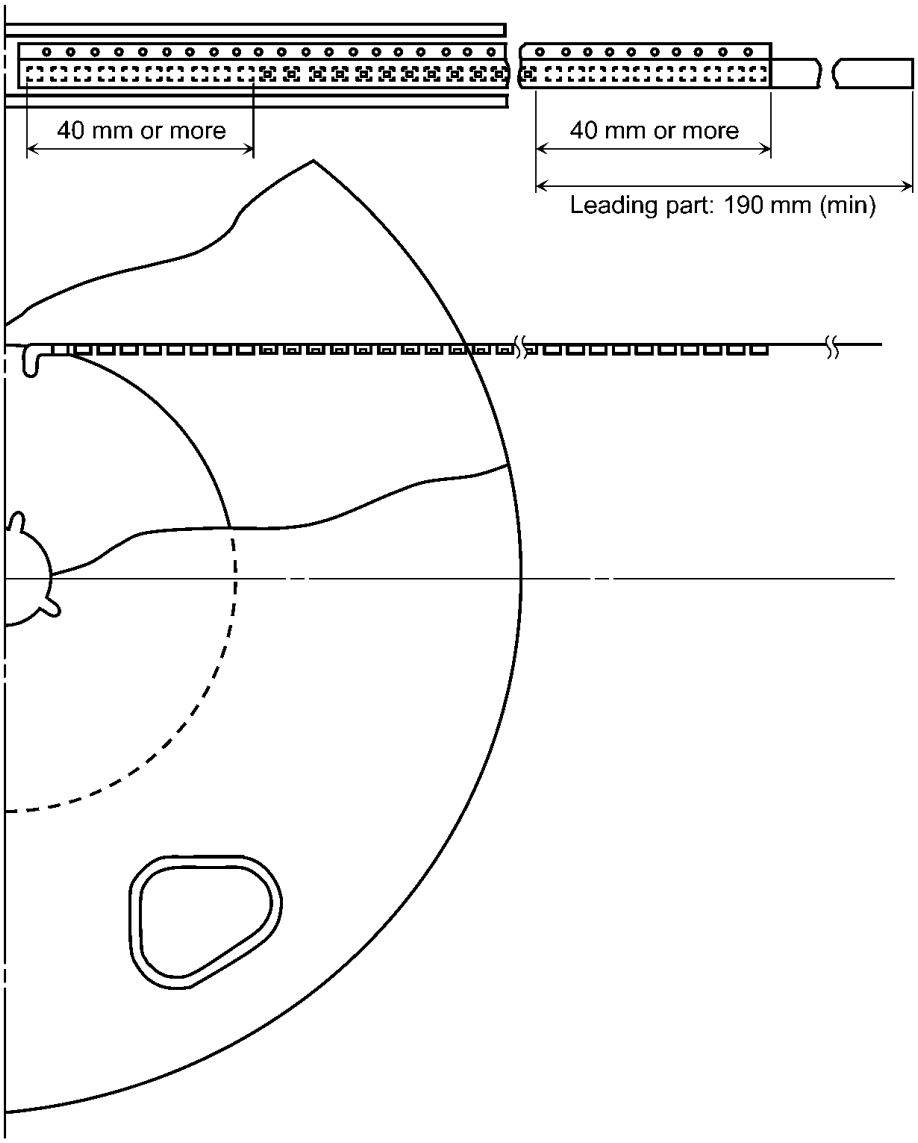


Fig. 12.3.2.1 Tape Leader and Trailer

12.4. Packing Form

Each reel is sealed in an aluminum pack with silica gel. Packing quantity is as shown below.

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

12.5. Label Format

Label example for TLBF1108A(T11 and label location are as shown below.

12.5.1. Label Example

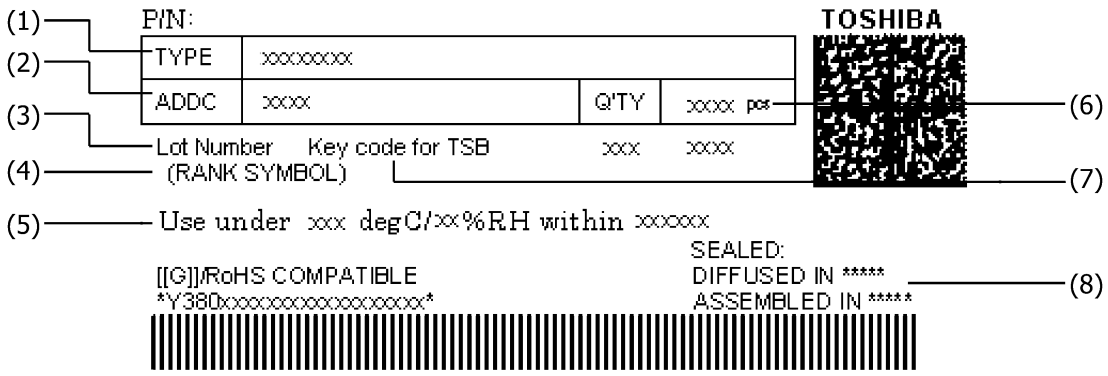


Fig. 12.5.1.1 Label Example

12.5.2. Label Details

No. (# refer to the above label example)	Information for Toshiba Use	Remarks
(1)	Part No.	TLBF1108A(T11
(2)	ADD code	Notation explanation (O Assembled in Japan, sales for domestic and overseas customers (J Assembled in overseas factory, sales for domestic customers (T Assembled in overseas factory, sales for overseas customers
(3)	Lot code	Example: 270xxxxx
(4)	Rank symbol	Example: UA1
(5)	Storage condition after opening	Use under 5 to 30°C/60%RH within 4 weeks
(6)	Packing quantity	Example: 2,000 pcs
(7)	Key code	Example: 12345
(8)	Country of origin	Example: JAPAN

12.5.3. Label Location

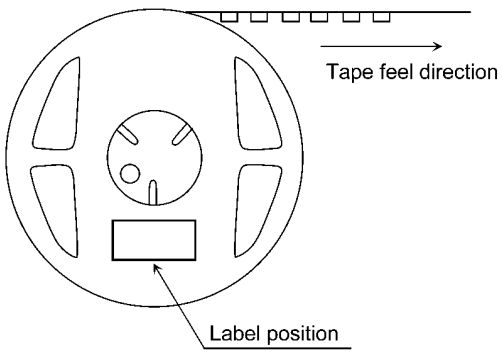


Fig. 12.5.3.1 Label Position on the Reel

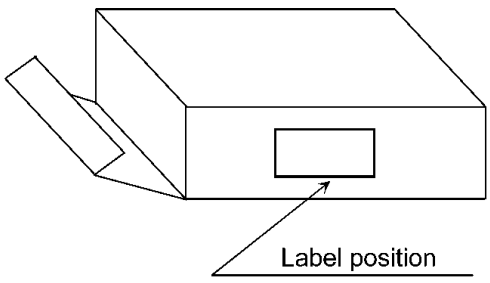
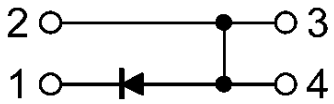


Fig. 12.5.3.2 Label Position on the Carton

Aluminum pack: The aluminum pack in which the reel is supplied also has the label attached to center of one side.

13. Internal Circuit

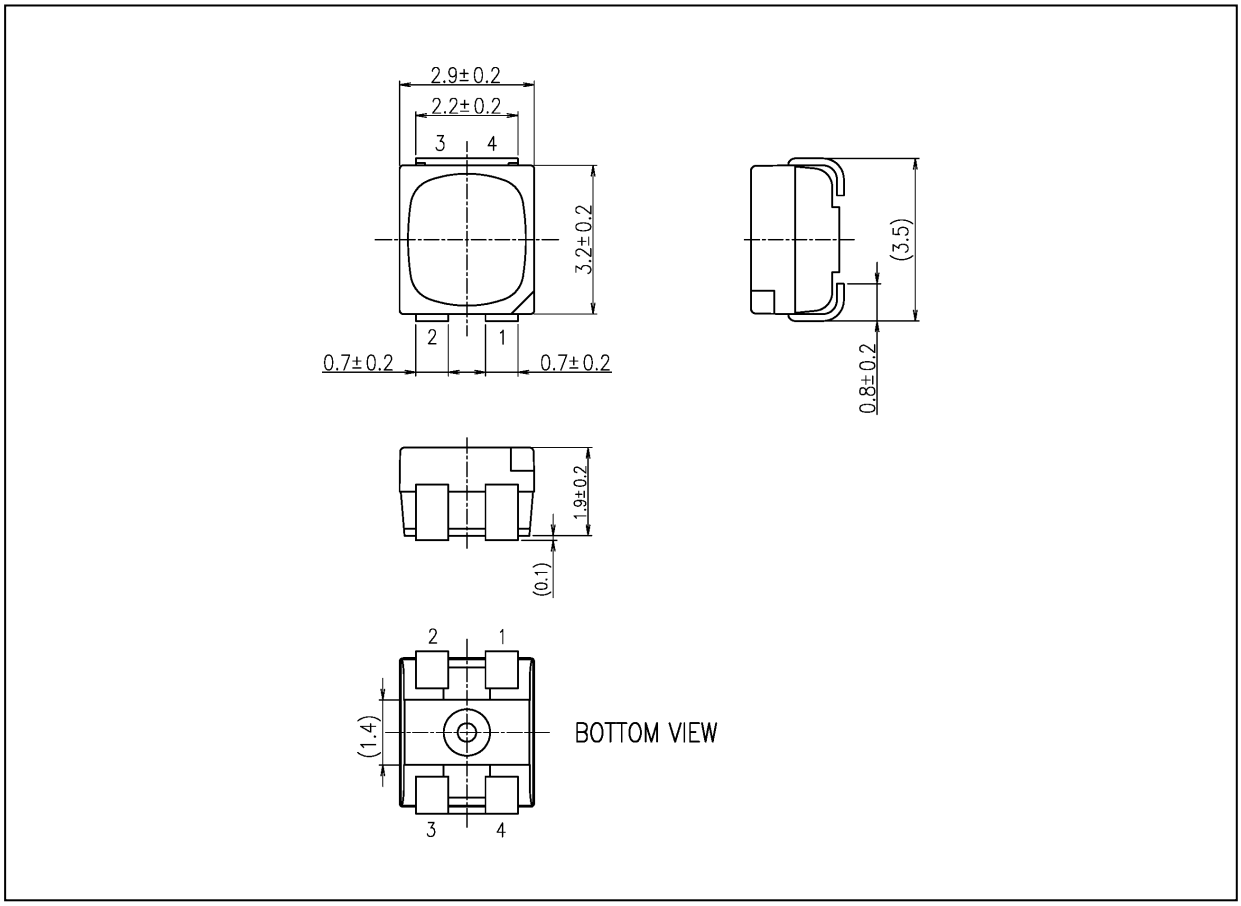


1: Cathode
2: Anode
3: Anode
4: Anode

Fig. 13.1 Internal Circuit

Package Dimensions

Unit: mm



Weight: 0.035 g (typ.)

Package Name(s)
TOSHIBA: 4-3W1S
Nickname: PLCC4

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