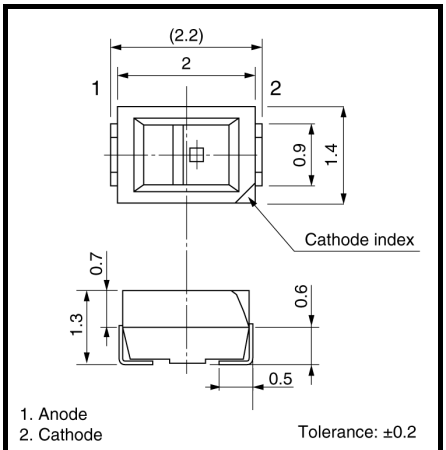
TOSHIBA LED Lamps

TLRM1060(T18),TLRMM1060(T18),TLSM1060(T18) TLOM1060(T18),TLYM1060(T18)

Panel Circuit Indicators

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	4-2F1

Weight: 0.01 g (typ.)

- Surface-mount devices
- 2.2 (L) mm × 1.4 (W) mm × 1.3 (H) mm
- Flat-top type
- InGaAℓP LEDs
- High luminous intensity
- Low drive current, high-intensity light emission
- Colors: red, orange, yellow
- High heat resistance: T_{opr} / T_{stg} = −40 to 100°C
- Applications: Instrumental panel in Automotive equipment, message signboards, Amusement, etc.
- Standard embossed tape packing: T18 (3000 pcs / reel)
  4-mm pitch tape reel

Color and Material

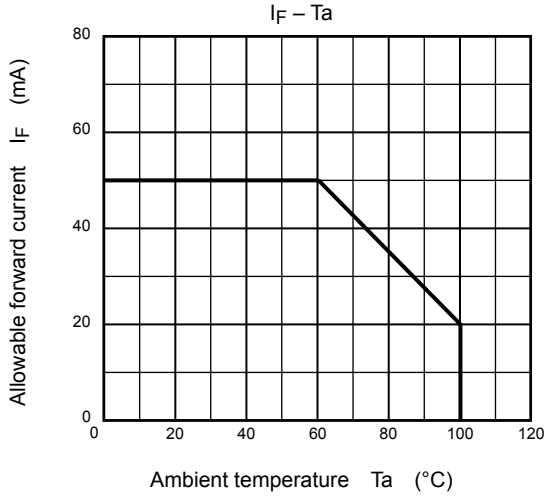
Part Number	Color	Material
TLRM1060	Red	InGaAℓP
TLRMM1060	Red	
TLSM1060	Red	
TLOM1060	Orange	
TLYM1060	Yellow	

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)
TLRM1060	50	4	125	−40 to 100	−40 to 100
TLRMM1060					
TLSM1060					
TLOM1060					
TLYM1060					

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.	Max	I_F	Max	V_R
TLRM1060	1.8	2.1	2.5	20	10	4
TLRMM1060	1.8	2.1	2.5			
TLSM1060	1.8	2.1	2.5			
TLOM1060	1.8	2.2	2.5			
TLYM1060	1.8	2.2	2.5			
Unit	V			mA	μA	V

Optical Characteristics–1 (Ta = 25°C)

Part Number	Luminous Intensity I_V				Available Iv rank
	Min	Typ.	Max	I_F	Please see Note 2
TLRM1060	160	350	800	20	SA / TA / UA
TLRMM1060	160	450	800		SA / TA / UA
TLSM1060	250	650	1250		TA / UA / VA
TLOM1060	250	650	1250		TA / UA / VA
TLYM1060	250	600	1250		TA / UA / VA
Unit	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
SA	160	320
TA	250	500
UA	400	800
VA	630	1250
Unit	mcd	mcd

Optical Characteristics–2 (Ta = 25°C)

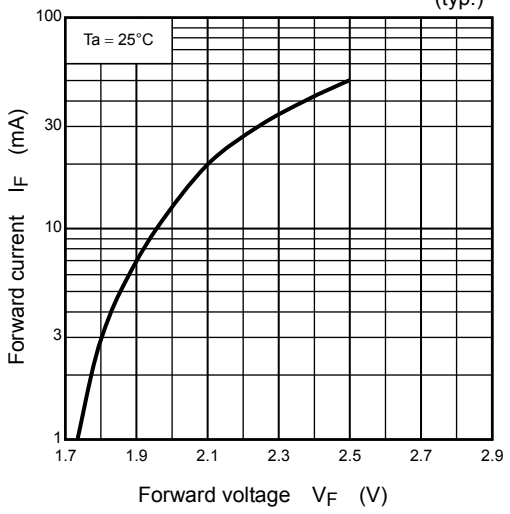
Part Number	Emission Spectrum							
	Peak Emission Wavelength λ_p			$\Delta\lambda$	Dominant Wavelength λ_d			I_F
	Min	Typ.	Max	Typ.	Min	Typ.	Max	
TLRM1060	—	644	—	14	624	630	638	20
TLRMM1060	—	636	—	14	620	626	634	
TLSM1060	—	623	—	14	607	613	621	
TLOM1060	—	612	—	14	599	605	613	
TLYM1060	—	592	—	13	583	590	595	
Unit	nm			nm	nm			mA

Handling precautions

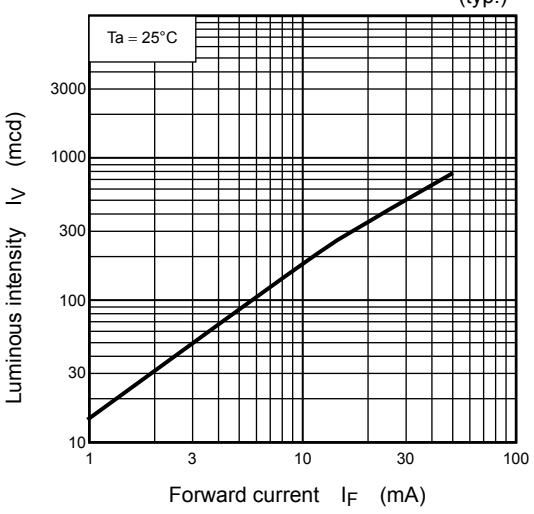
- This product is a product developed as a display source of light usage, and the measurement standard matched to the sensitivity of human eyes is applied.
  Therefore, functional usages (source of light for the sensor and the communication) other than the source of light for the display are not intended.

TLRM1060

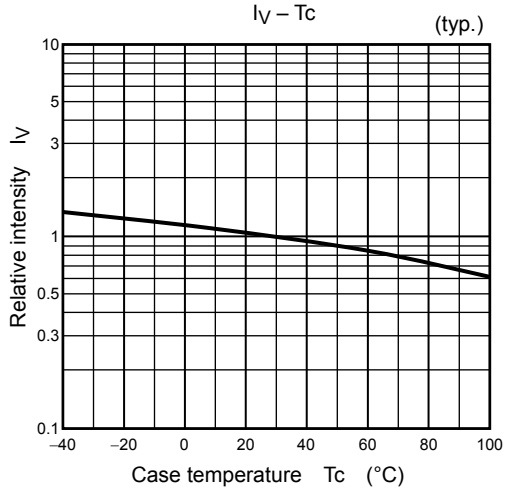
$I_F - V_F$ (typ.)



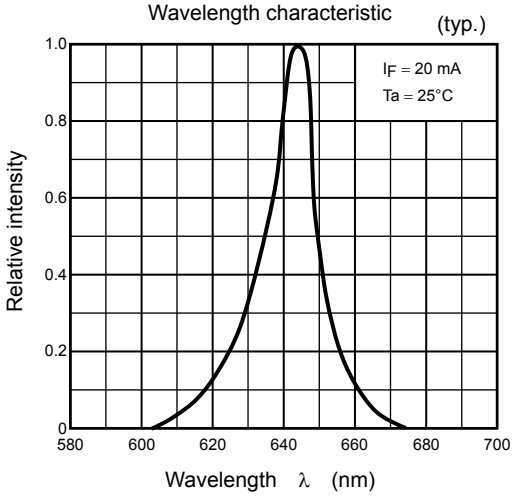
$I_V - I_F$ (typ.)



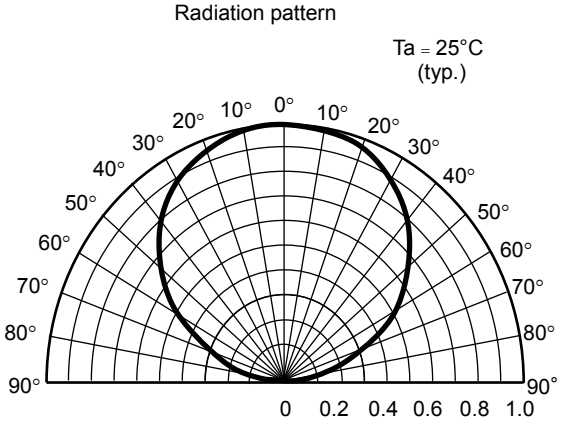
$I_V - Tc$ (typ.)



Wavelength characteristic (typ.)

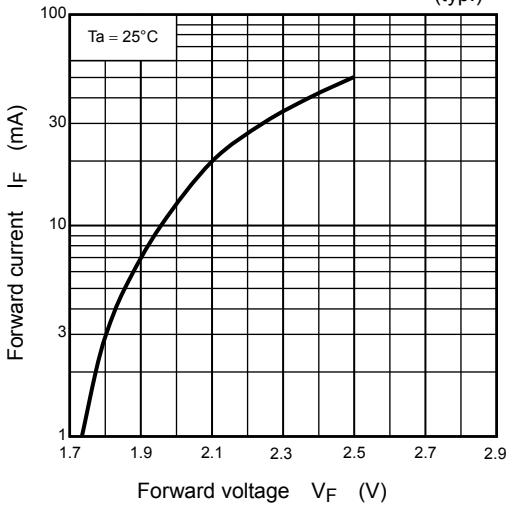


Radiation pattern

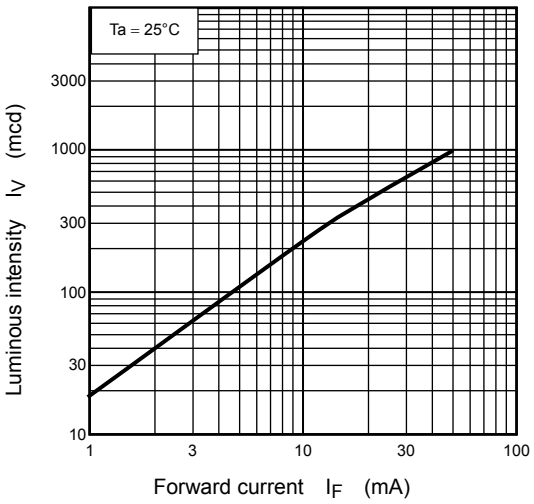


TLRMM1060

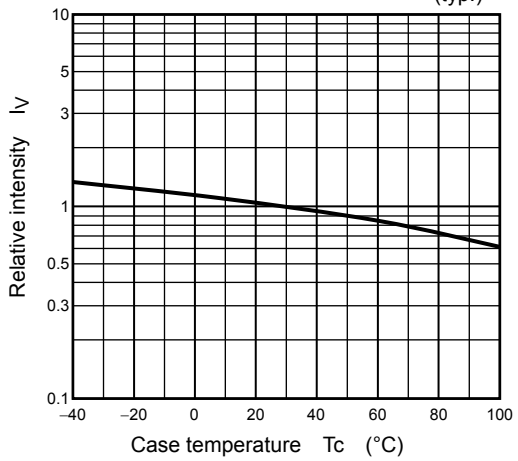
$I_F - V_F$ (typ.)



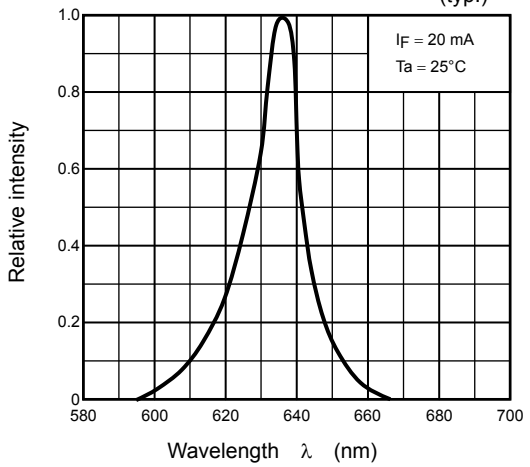
$I_V - I_F$ (typ.)



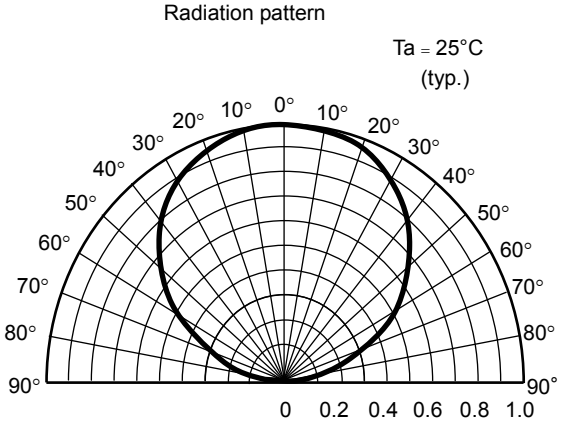
$I_V - Tc$ (typ.)



Wavelength characteristic (typ.)

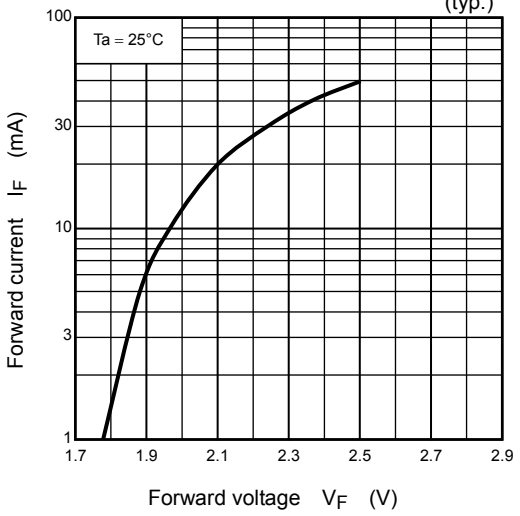


Radiation pattern

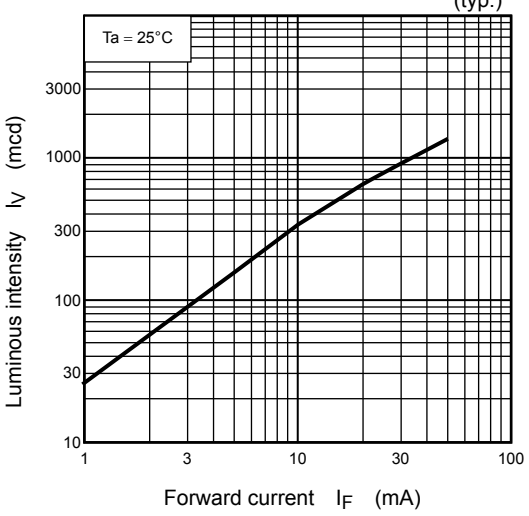


TLSM1060

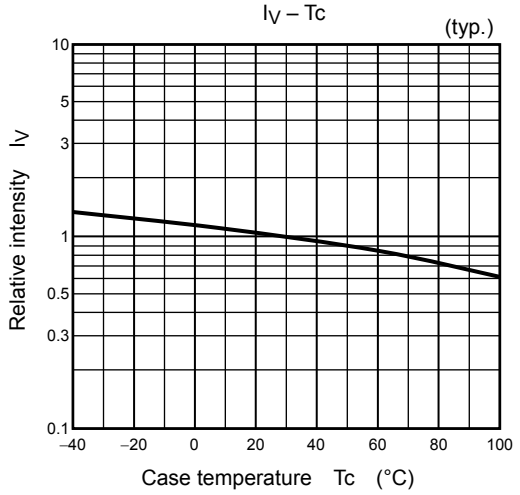
$I_F - V_F$ (typ.)



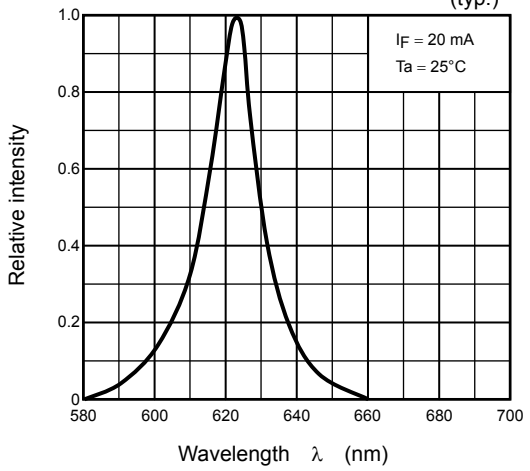
$I_V - I_F$ (typ.)



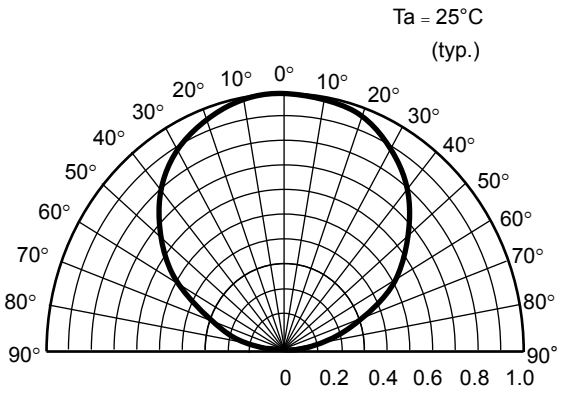
$I_V - Tc$ (typ.)



Wavelength characteristic (typ.)

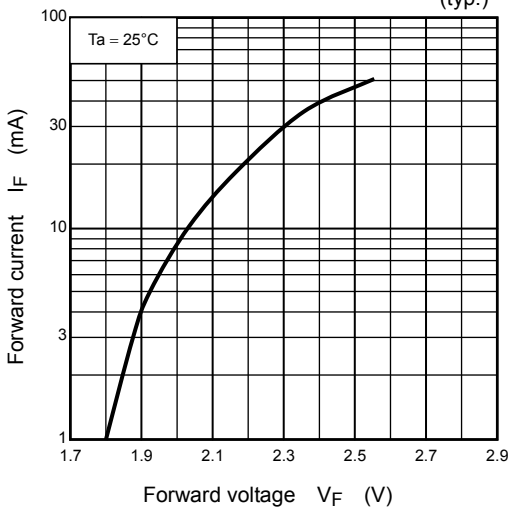


Radiation pattern

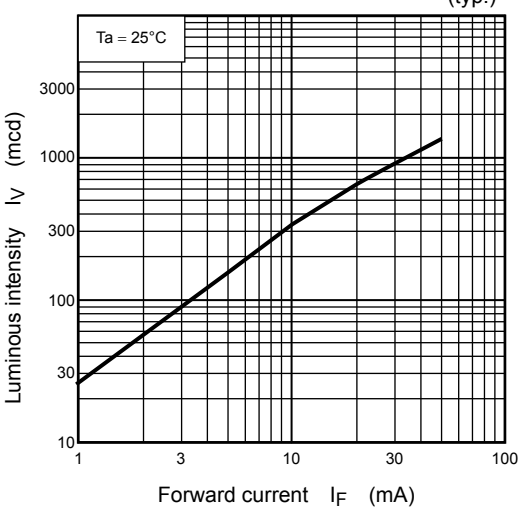


TLOM1060

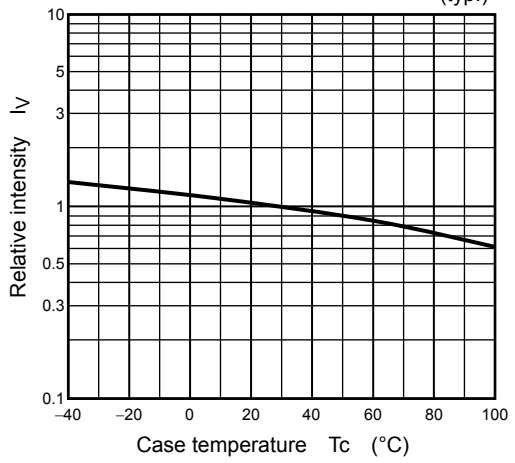
$I_F - V_F$ (typ.)



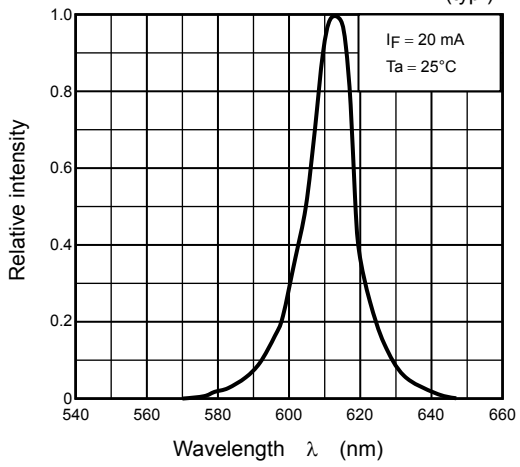
$I_V - I_F$ (typ.)



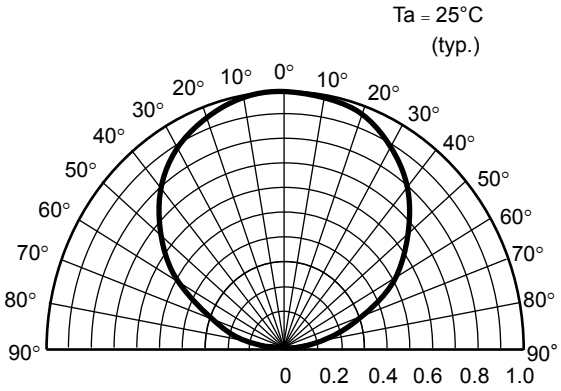
$I_V - Tc$ (typ.)



Wavelength characteristic (typ.)

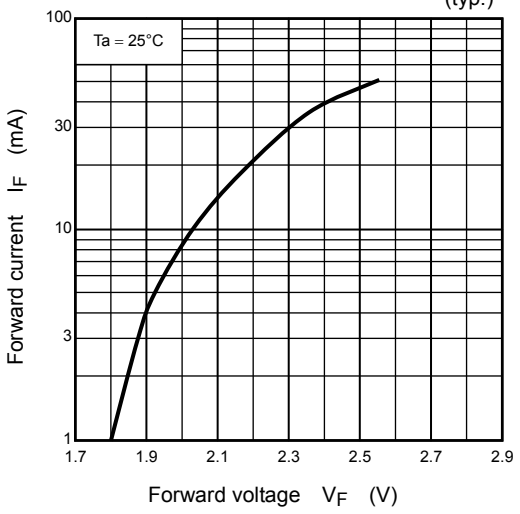


Radiation pattern

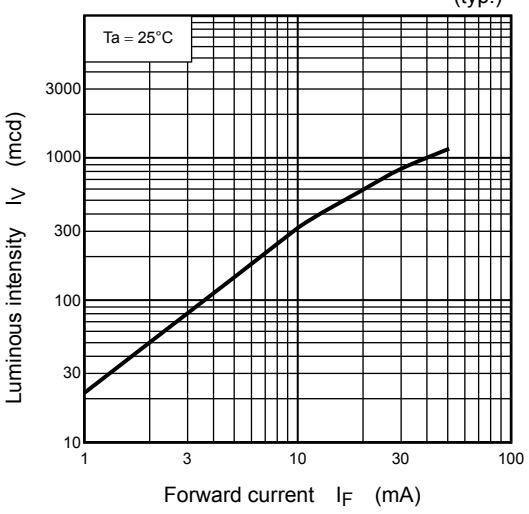


TLYM1060

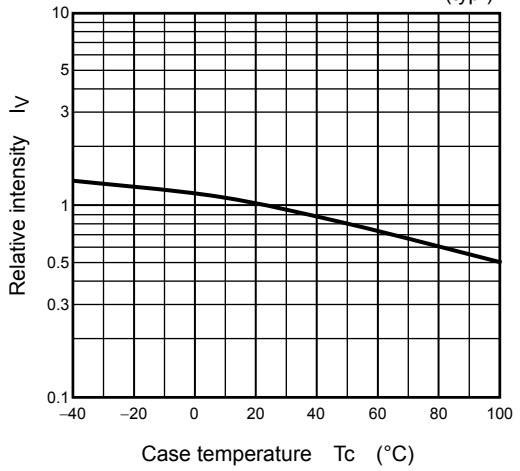
$I_F - V_F$ (typ.)



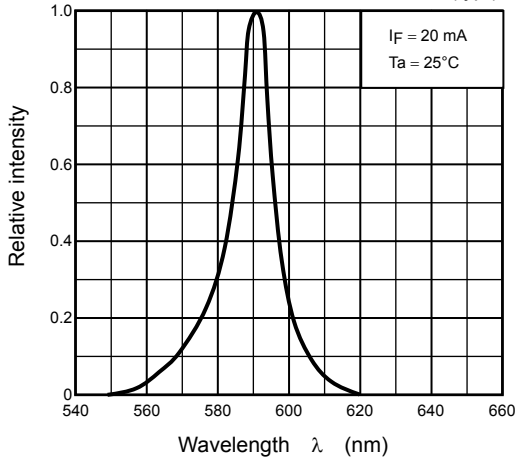
$I_V - I_F$ (typ.)



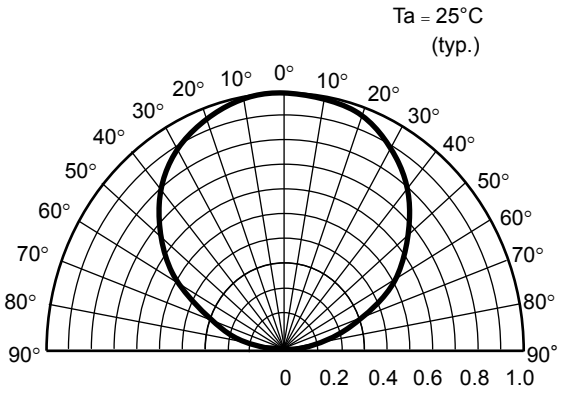
$I_V - Tc$ (typ.)



Wavelength characteristic (typ.)



Radiation pattern



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:

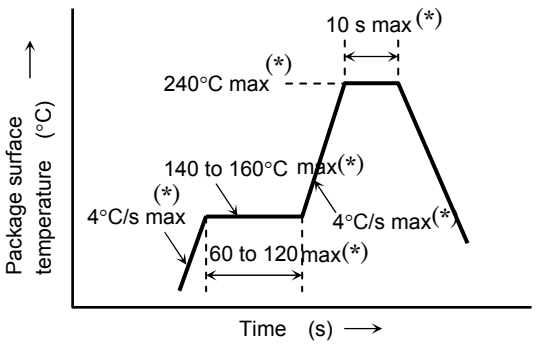
1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
   Temperature: 5°C to 30°C
   Humidity: 90% (max)
2. After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/60% RH or below.
3. If upon opening, 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±5°C, for 12 to 24 hours.
   Expiration date: 12 months from sealing date, which is imprinted on the label.
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

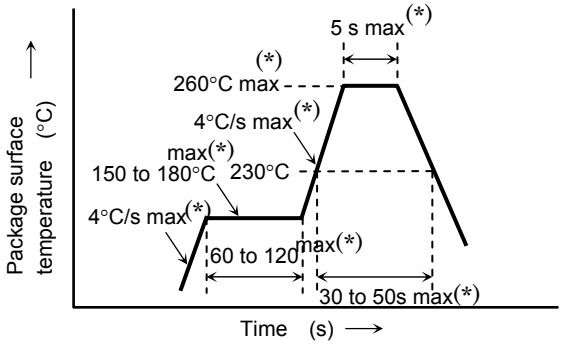
Soldering

- Reflow soldering

Temperature profile for Pb soldering (example)



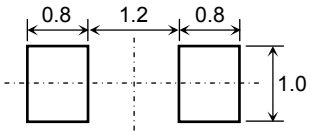
Temperature profile for Pb-free soldering (example)



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

Precautions when Mounting

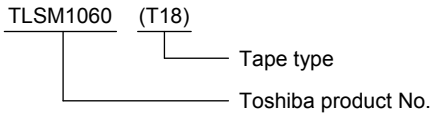
Do not apply force to the plastic part of the LED under high-temperature conditions.
To avoid damaging the LED plastic, do not apply friction using a hard material.
When installing the PCB in a product, ensure that the device does not come into contact with other cmponents.

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

(1) Tape Type: T18 (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.

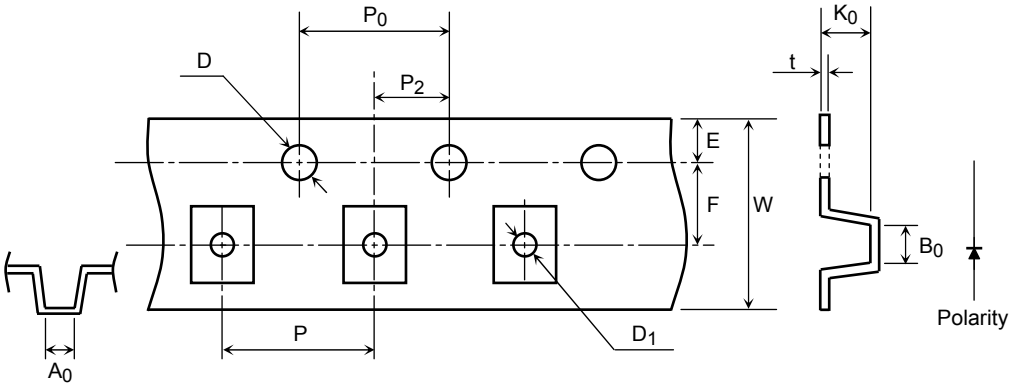
(a) In process, taping materials may sustain an electrostatic charge, use an ionizer to neutralize the ions.
(b) For transport and temporary storage of devices, use containers(boxes, jigs, and bags) that are made of anti-static materials or of materials that dissipate electrostatic electricity.

3. Tape dimensions

Unit: mm

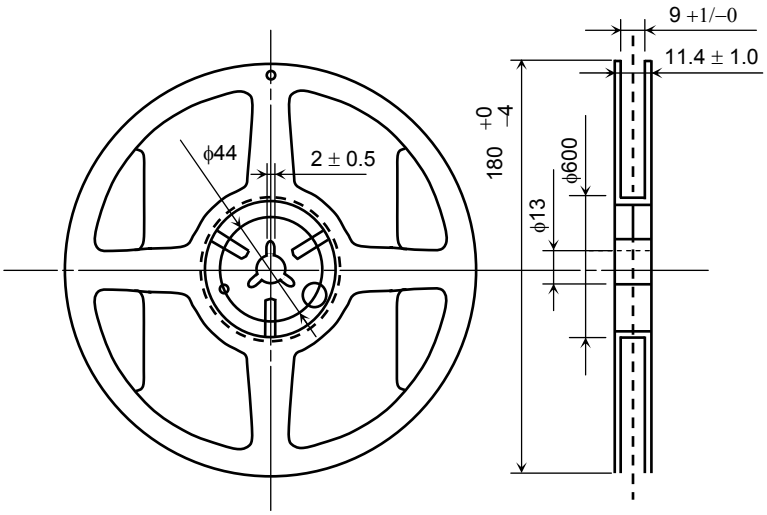
Symbol	Dimension	Tolerance
D	1.5	+0.1/−0
E	1.75	±0.1
P_0	4.0	±0.1
t	0.2	±0.05
F	3.5	±0.05
D_1	1.1	±0.1

Symbol	Dimension	Tolerance
P_2	2.0	±0.05
W	8.0	±0.2
P	4.0	±0.1
A_0	1.5	±0.1
B_0	2.5	±0.1
K_0	1.5	±0.1

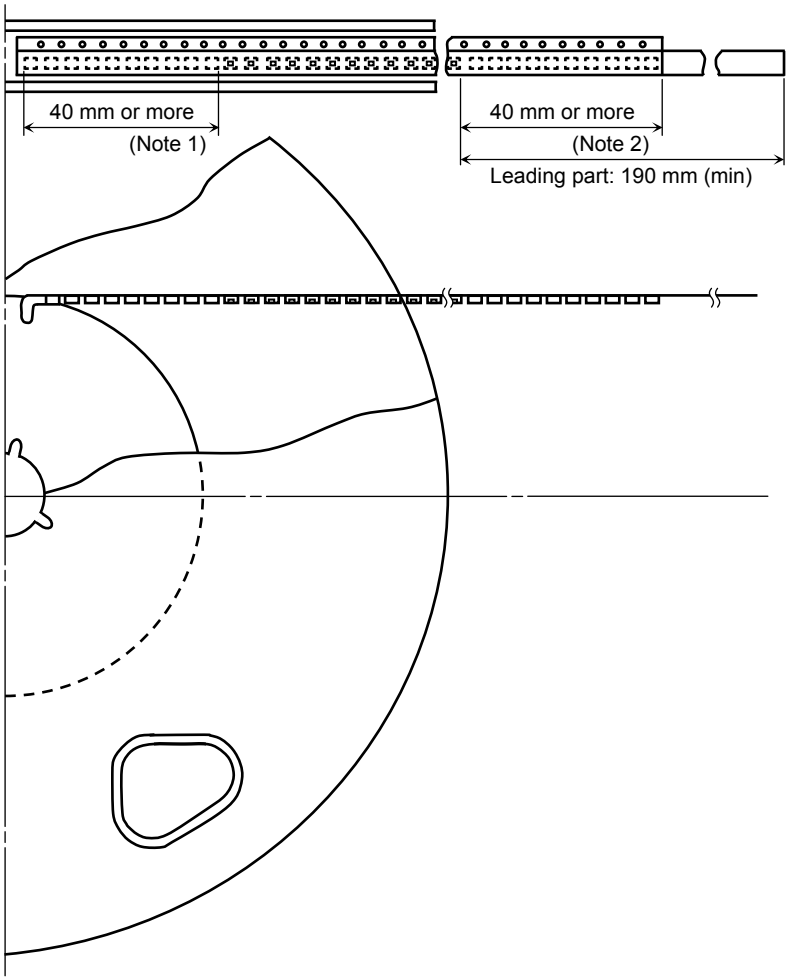


4. Reel dimensions

Unit: mm



5. Leader and trailer sections 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) Packing form: Each reel is sealed in an aluminum pack with silica gel.

7. Label format

(1) Example: TLSM1060 (T18)

P/N:

TYPE	**TLSM1060**		
ADDC	(T18)	Q'TY	3,000 pcs

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

TOSHIBA

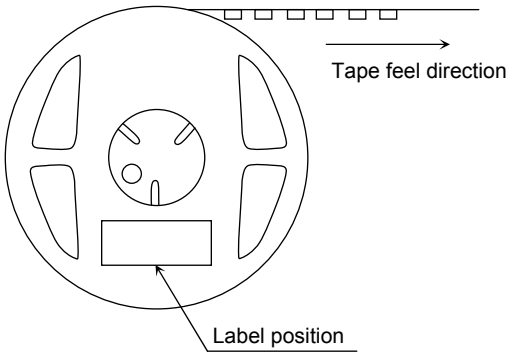
Use under 5-30degC/60%RH within 168h

[[G]]/RoHS COMPATIBLE
Y380xxxxxxxxxxxxxxxxx

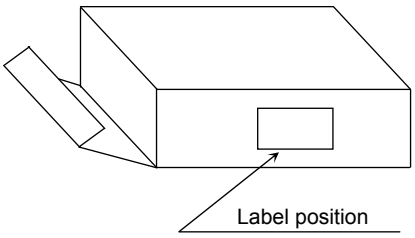
SEALED
DIFFUSED IN *****
ASSEMBLED IN *****

(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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