

### TOSHIBA LED Lamp

## TLRMF1050(T20), TLSF1050(T20), TLOF1050(T20), TLYF1050(T20), TLGF1050(T20), TLFGF1050(T20), TLPGF1050(T20)

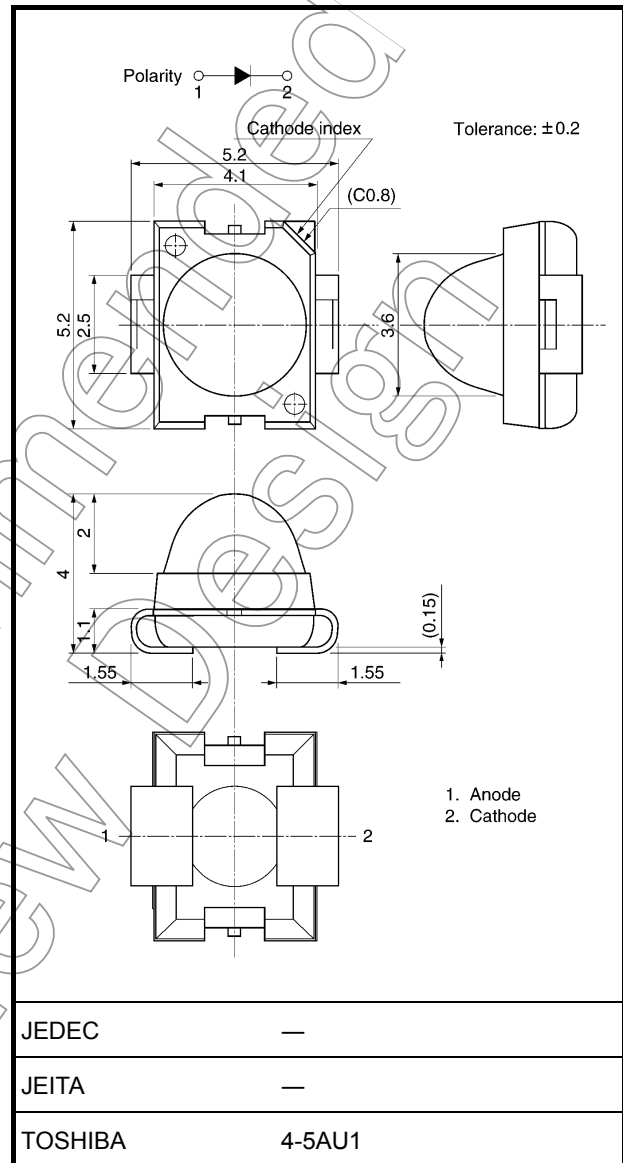
### Panel Circuit Indicator

Unit: mm

- 5.2 (L) × 5.2 (W) × 4.0 (H) mm
- TL□F1050 (T20) Series  
    φ 3.6 mm transparent lens top type
- InGaAlP LEDs
- High luminous intensity and low power consumption.
- Colors: red, orange, yellow, green, pure green
- High operating temperature  
    T<sub>opr</sub>: -40 to 100°C  
    T<sub>stg</sub>: -40 to 110°C
- Surface-mount devices
- Standard embossed tape packing  
    8-mm component pitch: T20 (400 pcs/reel)
- Reflow-soldering is available
- Applications: automotive use, display of interiors, display of air conditioners, car audio, illumination of various switches, etc.

### Color and Material

Part Number	Color	Material
TLRMF1050	Red	InGaAlP
TLSF1050	Red	
TLOF1050	Orange	
TLYF1050	Yellow	
TLGF1050	Green	
TLFGF1050	Green	
TLPGF1050	Pure Green	



Weight: 0.085 g (typ.)

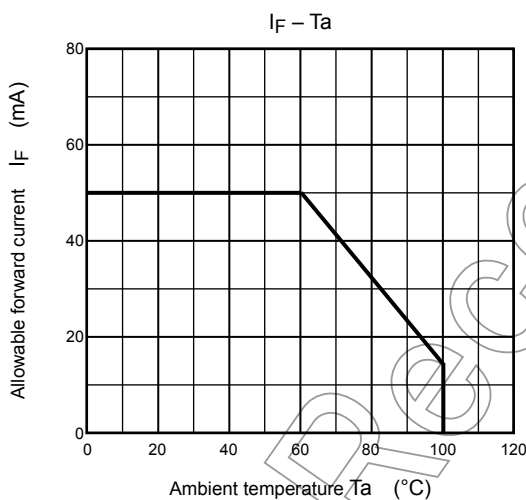
### Absolute Maximum Ratings (Ta = 25°C)

Product Name	Forward Current I <sub>F</sub> (mA)	Reverse Voltage V <sub>R</sub> (V)	Power Dissipation P <sub>D</sub> (mW)	Operating Temperature T <sub>opr</sub> (°C)	Storage Temperature T <sub>stg</sub> (°C)
TLRMF1050	50	4	120	-40 to 100	-40 to 110
TLSF1050					
TLOF1050					
TLYF1050					
TLGF1050					
TLFGF1050					
TLPGF1050					

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 <sub>F</sub>			Reverse Current I <sub>R</sub>	
	Min	Typ.	Max	Max	V <sub>R</sub>
TLRMF1050	1.7	2.0	2.5	20	50
TLSF1050	1.7	2.0	2.5		
TLOF1050	1.7	2.0	2.5		
TLYF1050	1.7	2.1	2.5		
TLGF1050	1.8	2.2	2.6		
TLFGF1050	1.9	2.3	2.6		
TLPGF1050	1.9	2.3	2.6		
Unit	V			mA	μA

## Optical Characteristics-1 (Ta = 25°C)

Product Name	Luminous Intensity I <sub>v</sub>			I <sub>F</sub>	Corresponding brightness rank sign (Note 2)
	Min	Typ	Max		
TLRMF1050	250	700	2000	20	TA / UA / VA / WA
TLSF1050	630	1400	3200		VA / WA / XA
TLOF1050	630	1500	3200		VA / WA / XA
TLYF1050	630	1000	3200		VA / WA / XA
TLGF1050	400	900	2000		UA / VA / WA
TLFGF1050	160	370	800		SA / TA / UA
TLPGF1050	100	180	500		RA / SA / TA
Unit	mcd			mA	

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

Brightness rank		
Rank sign	Min	Max
RA	100	200
SA	160	320
TA	250	500
UA	400	800
VA	630	1250
WA	1000	2000
XA	1600	3200
Unit	mcd	mcd

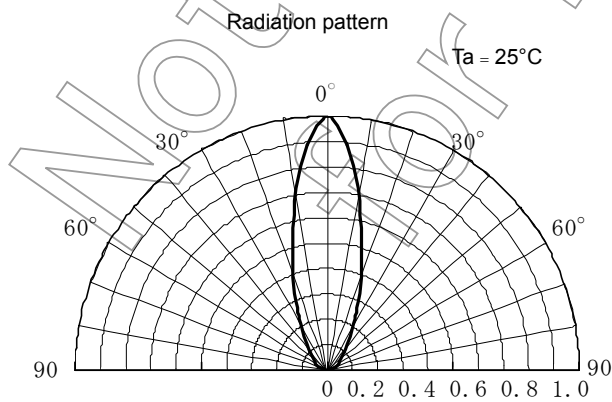
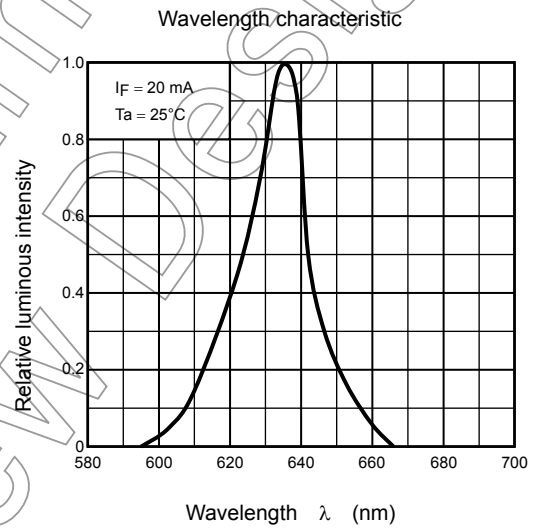
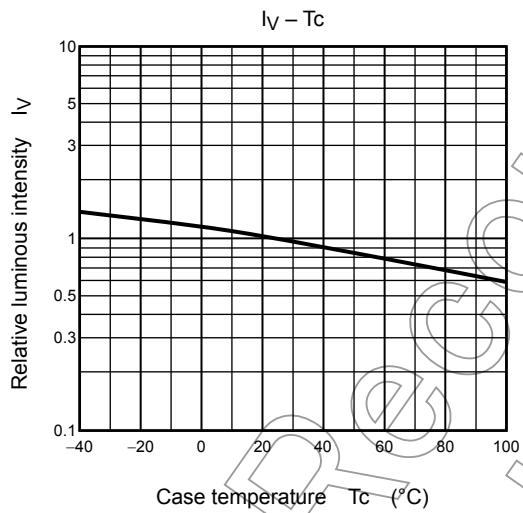
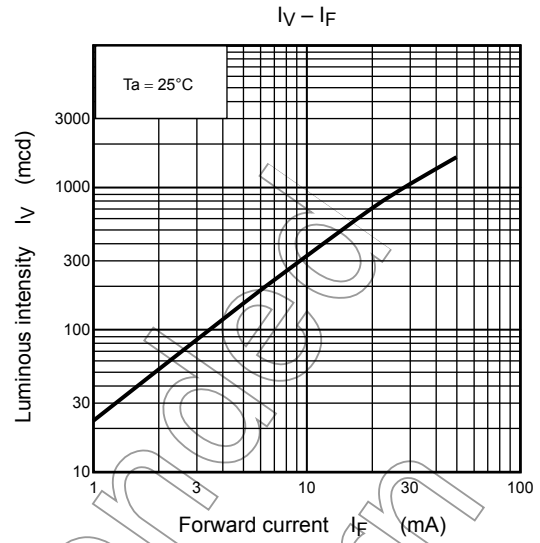
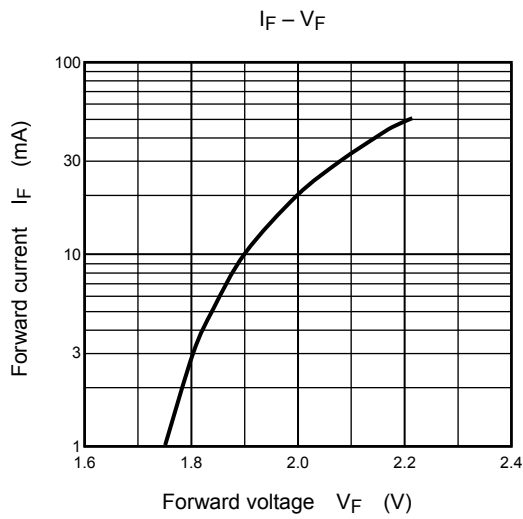
## Optical Characteristics-2 (Ta = 25°C)

Product Name	Emission Spectrum							
	Peak Emission Wavelength λ <sub>p</sub>			Δλ	Dominant Wavelength λ <sub>d</sub>			I <sub>F</sub>
	Min	Typ	Max		Min	Typ	Max	
TLRMF1050	—	636	—	17	620	626	634	20
TLSF1050	—	623	—	17	607	613	621	
TLOF1050	—	612	—	15	599	605	613	
TLYF1050	—	590	—	13	581	587	595	
TLGF1050	—	574	—	11	565	571	576	
TLFGF1050	—	568	—	11	559	565	571	
TLPGF1050	—	562	—	11	555	558	564	
Unit	nm			nm	nm			mA

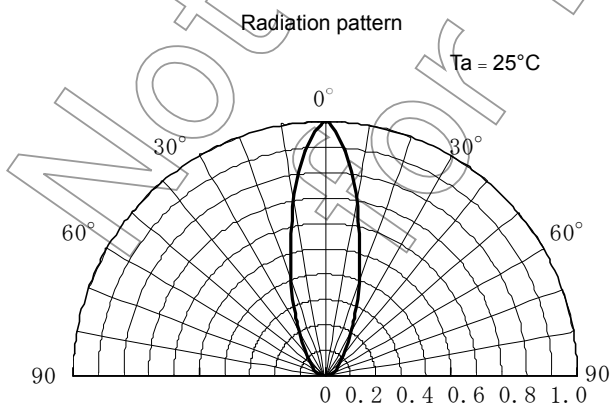
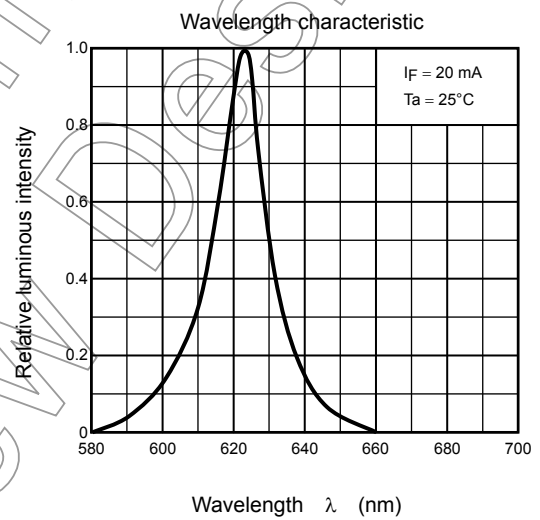
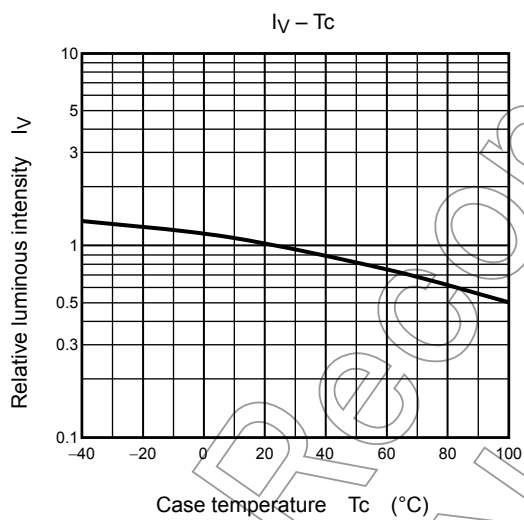
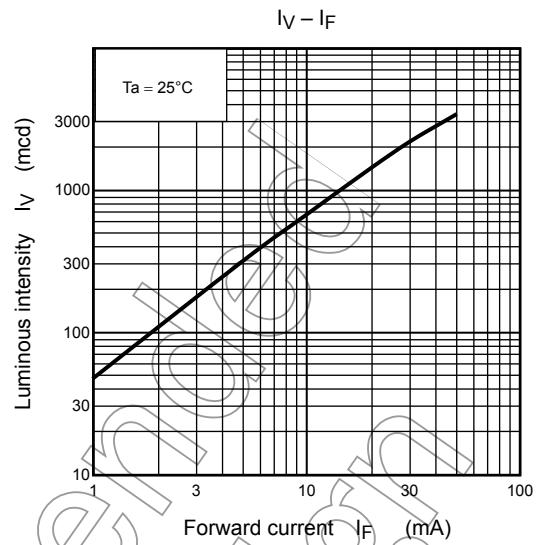
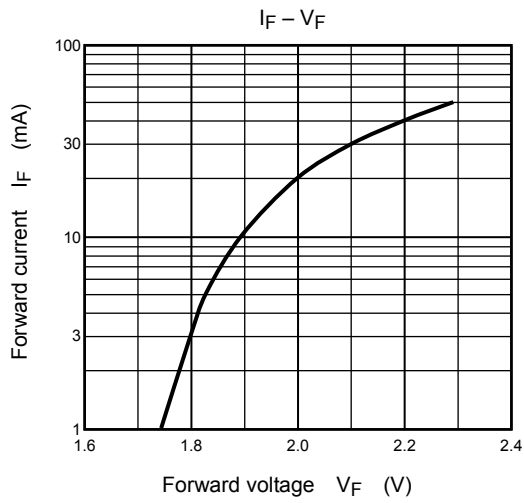
## Cautions

- This LED lamp emits some infrared light in addition to light in the visible spectrum. Ensure that this IR light affects no photosensitive device used near the LED lamp.
- 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, use to functional usages (source of light for the sensor and the communication) other than the source of light for the display is not intended.

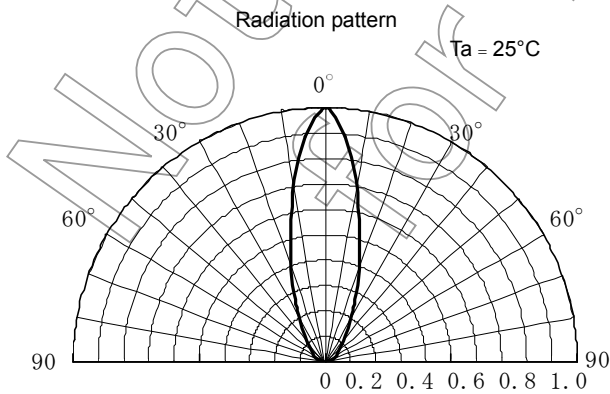
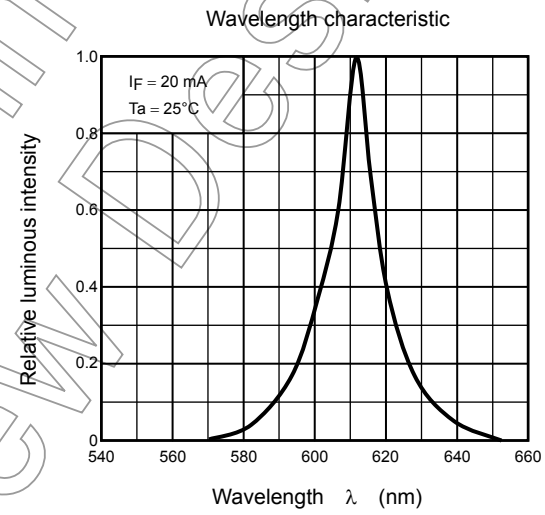
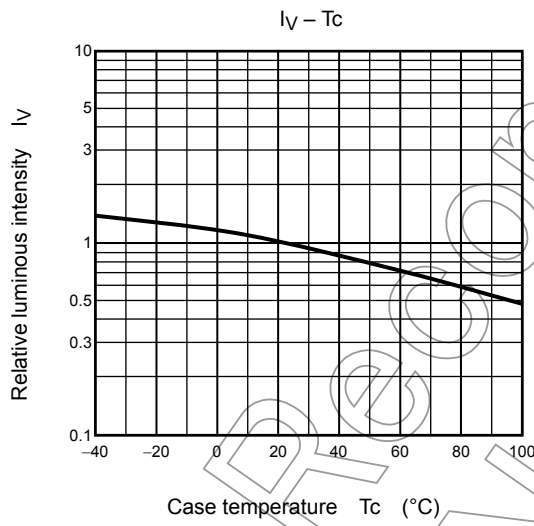
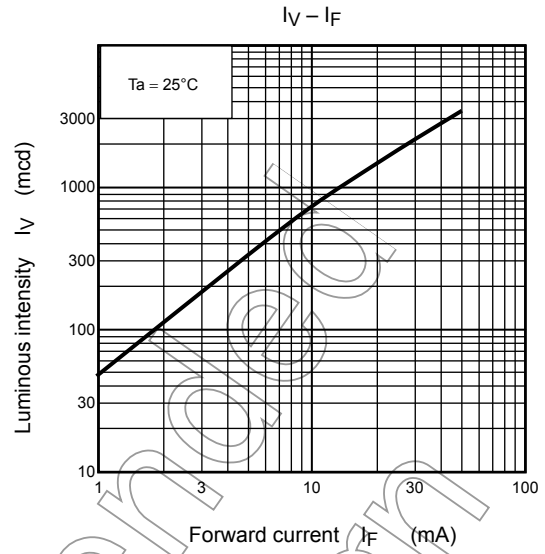
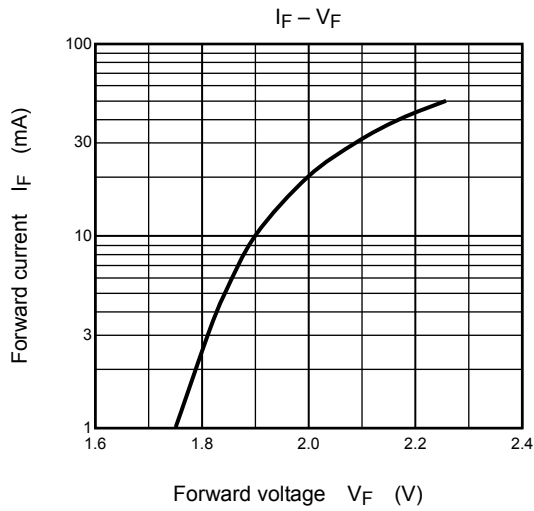
### TLRMF1050



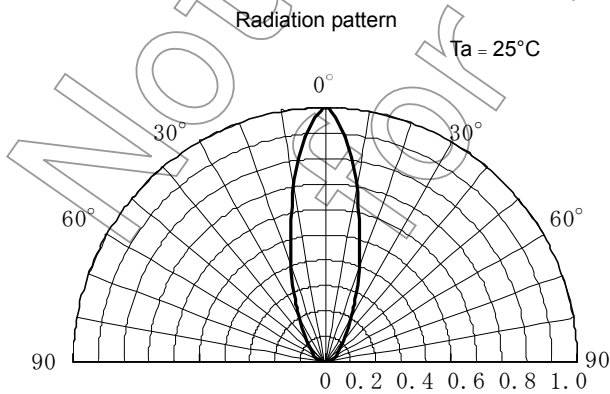
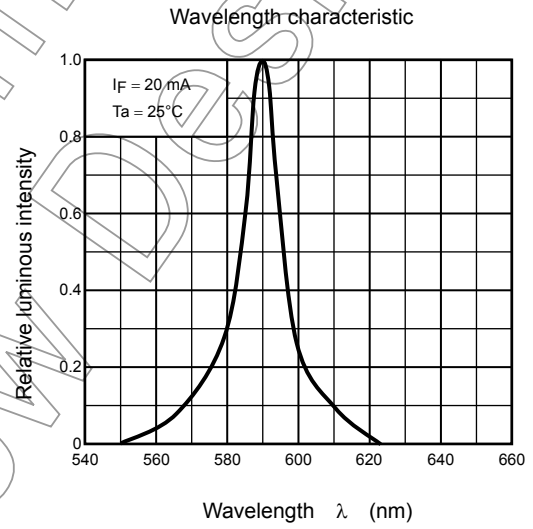
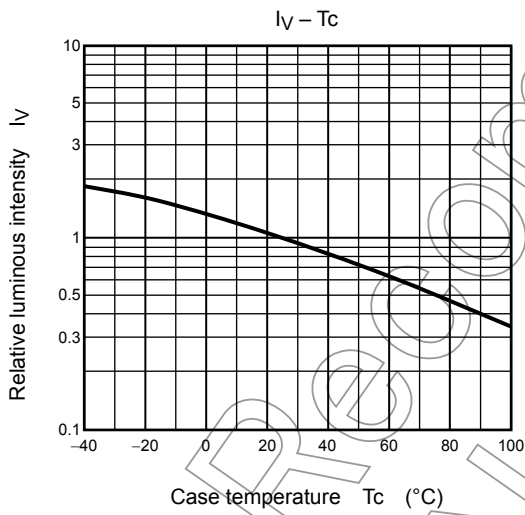
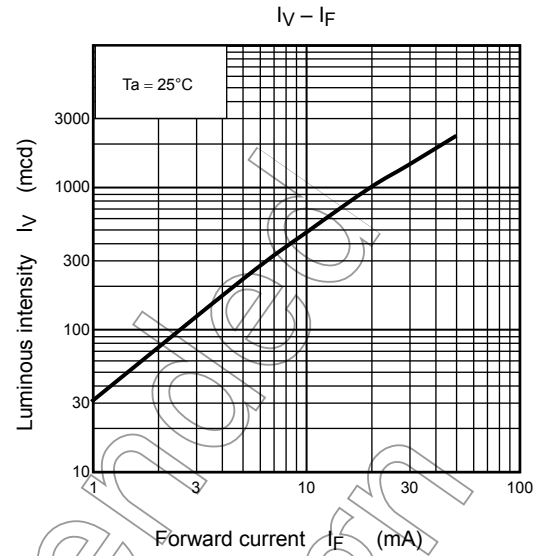
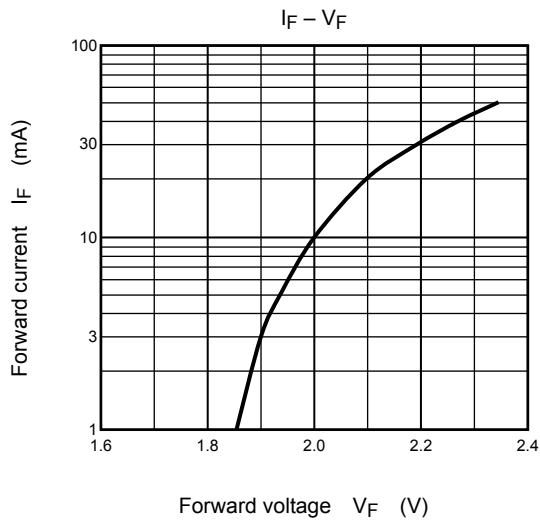
### TLSF1050



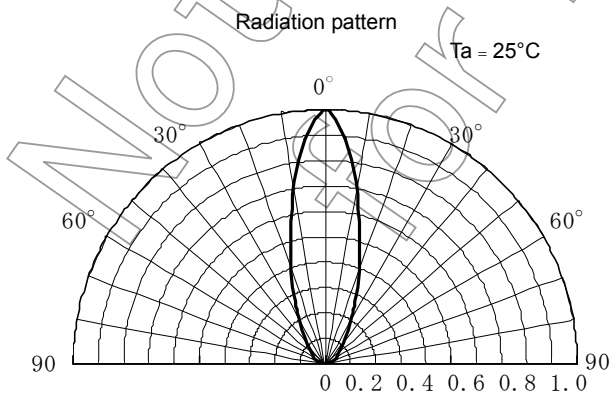
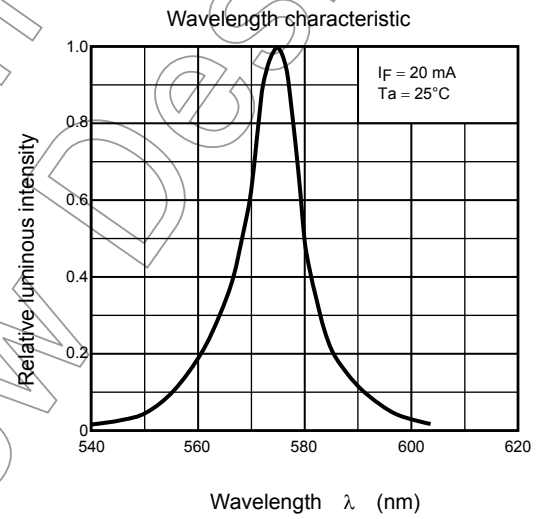
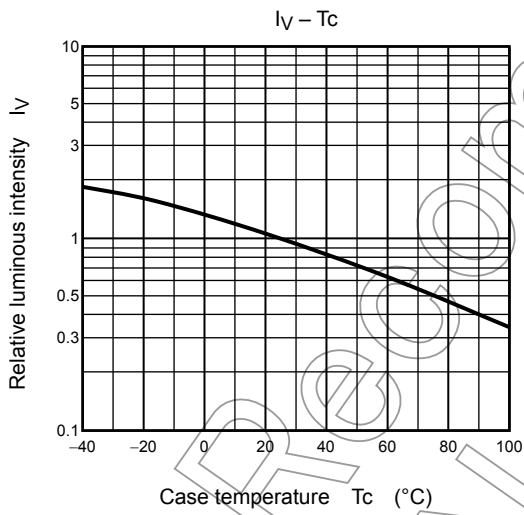
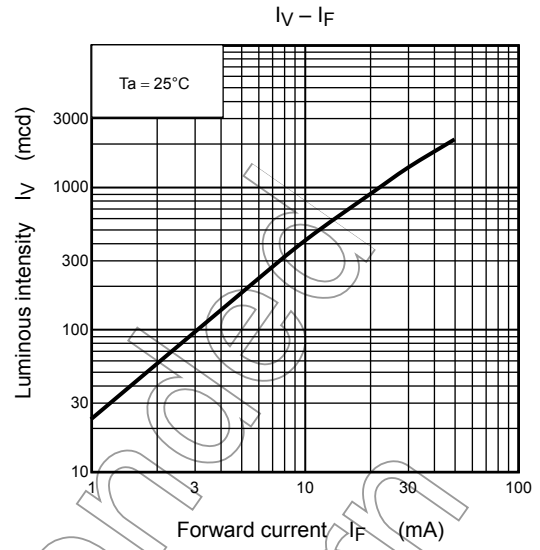
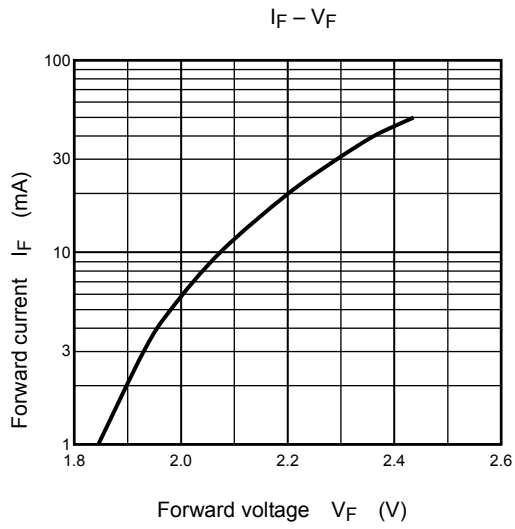
**TLOF1050**



### TLYF1050

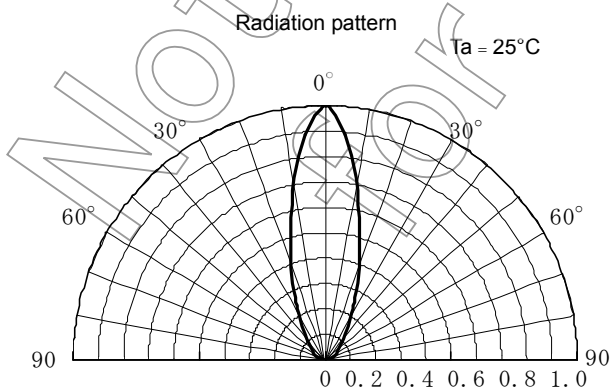
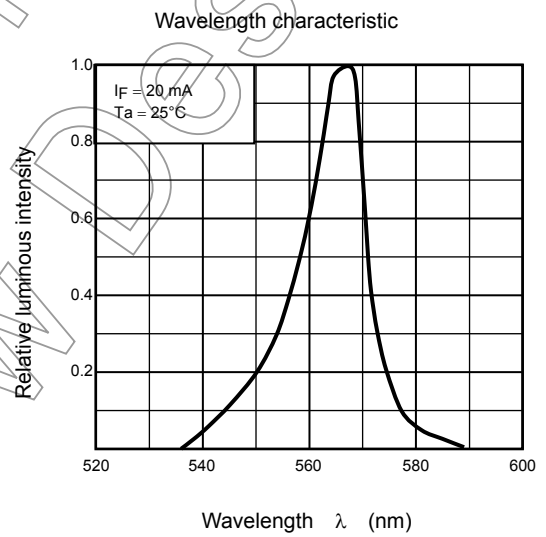
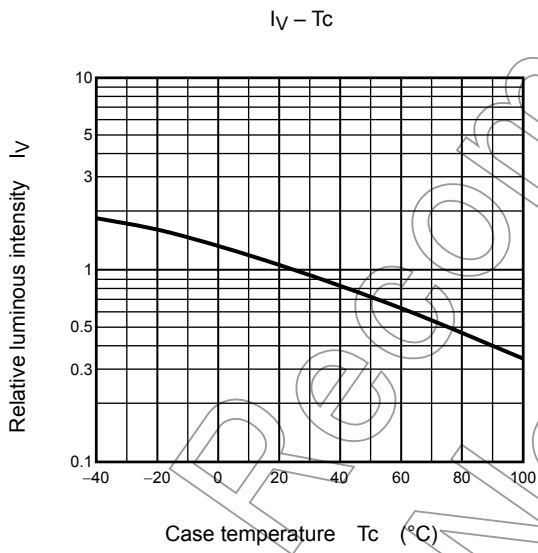
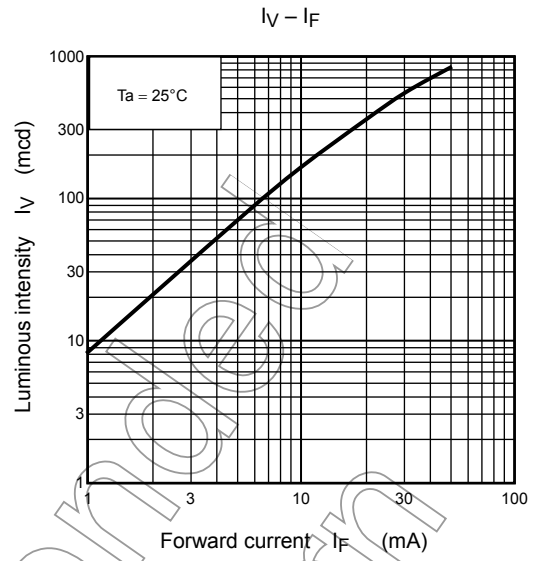
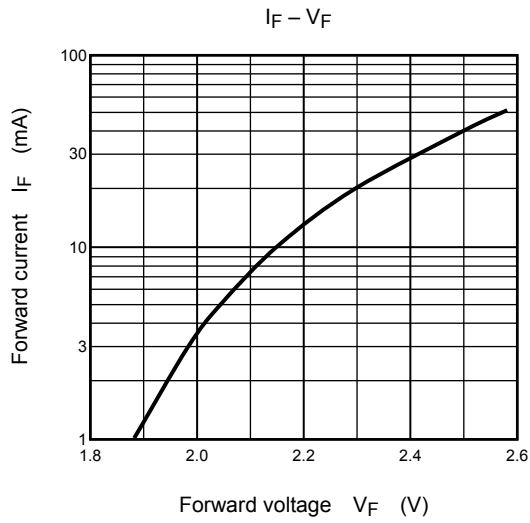


### TLGF1050

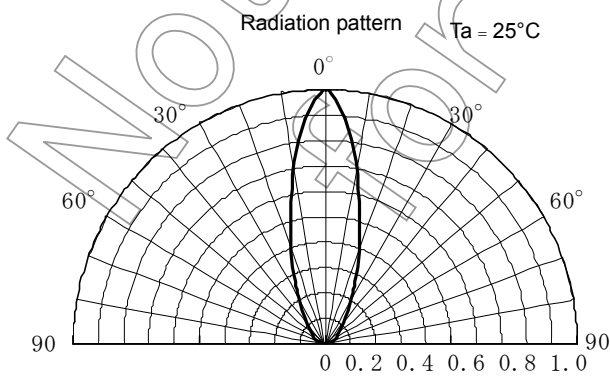
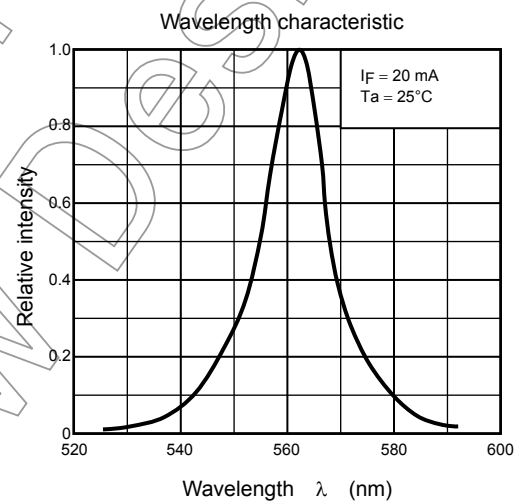
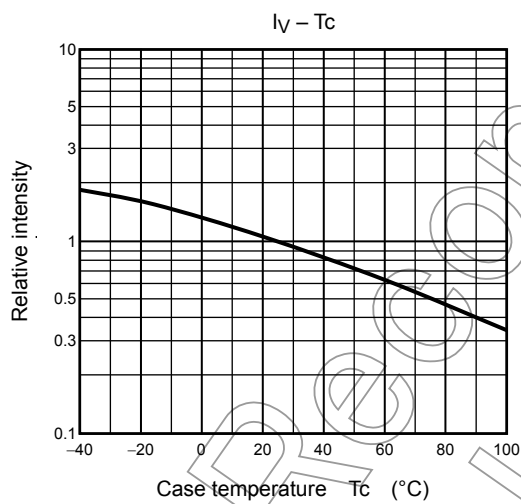
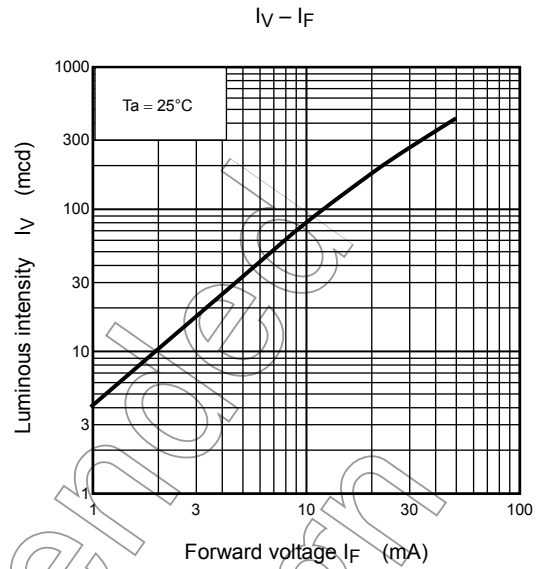
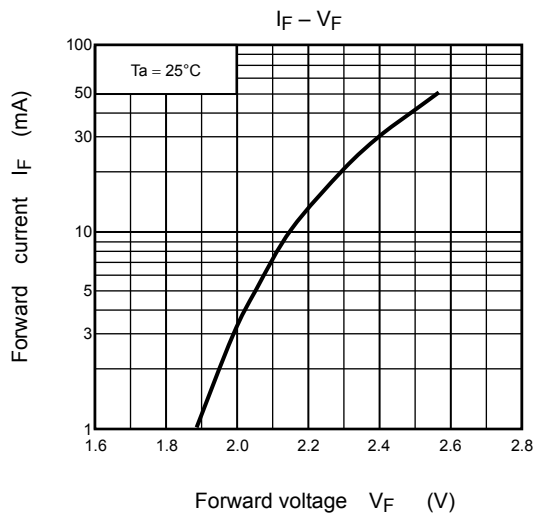




### TLFGF1050



### TLPGF1050



**Packaging**

These LED devices are packed in an aluminum envelope with silica gel and a moisture indicator to prevent 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:

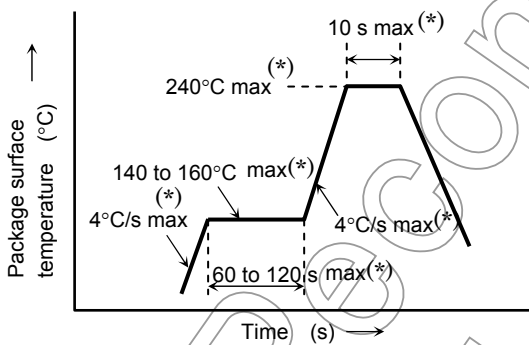
1. This moisture-proof bag may be stored unopened for up to 12 months under the following conditions.  
 Temperature: 5°C to 30°C  
 Humidity: 90% (max)
2. After the moisture-proof bag has been opened, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/70% RH or below.
3. If, upon opening, the moisture indicator card shows humidity of 30% or above (when the indication color changes to pink) or the expiration date has passed, the devices should be baked while packed in the tape 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 the sealing date, which is imprinted on the same side as this label.
4. Repeated baking may cause the peeling strength of the tape to change, leading to trouble in mounting. Also, be sure to prevent damage to the device from static electricity during the baking process.
5. Any breakage in the laminate packing material will cause the hermeticity of the product to deteriorate. Do not toss or drop the packed devices.

**Mounting Method**

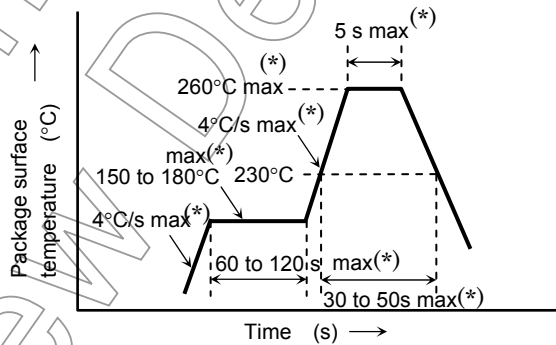
**Soldering**

- Reflow soldering (example)

Temperature profile for Pb soldering (example)

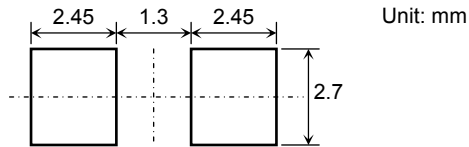


Temperature profile for Pb-free soldering (example)



- The 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.
- Perform the first reflow soldering in accordance with the above temperature profile and within 168 hours of opening the package.
- Second time reflow  
 In case of second reflow soldering should be performed within 168 hours of the first reflow under the above conditions.  
 Storage conditions before the second reflow soldering: 5 to 30°C, 70% RH max
- Do not perform flow soldering and dip soldering.
- Make any necessary soldering corrections manually.  
 (only once at each soldering point)  
 Soldering iron: Less than 25 W  
 Temperature: Less than 350°C or less  
 Time: within 3 s (Up to one time per place)

## Recommended Soldering Pattern



## Cleaning

When cleaning is required after soldering, Toshiba recommends the following cleaning solvents. Our dipping tests (carried out under the recommended conditions) confirm that these solvents have no effect on semiconductor devices. In selecting the cleaning solvent you will actually use, be sure to take into account the cleaning conditions and usage conditions.

### *Cleaning Solvent*

ASAHI CLEAN AK-225AES  
 KAO CLEAN THROUGH 750H  
 PINE ALPHA ST-100S

### *Manufacturer*

ASAHI GLASS  
 KAO  
 ARAKAWA CHEMICAL

## Precautions When Mounting

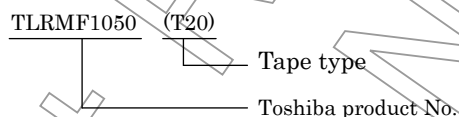
Do not apply force to plastic parts of the LED under high-temperature conditions. The LED plastic is easily scratched. Avoid friction between plastic parts and hard objects or materials. When installing the PCB in a product, ensure that the device does not come into contact with other components. This product doesn't apply mounting that solder flow. Please mount on recommended reflow solder mounting condition.

## 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: T20 (8-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.

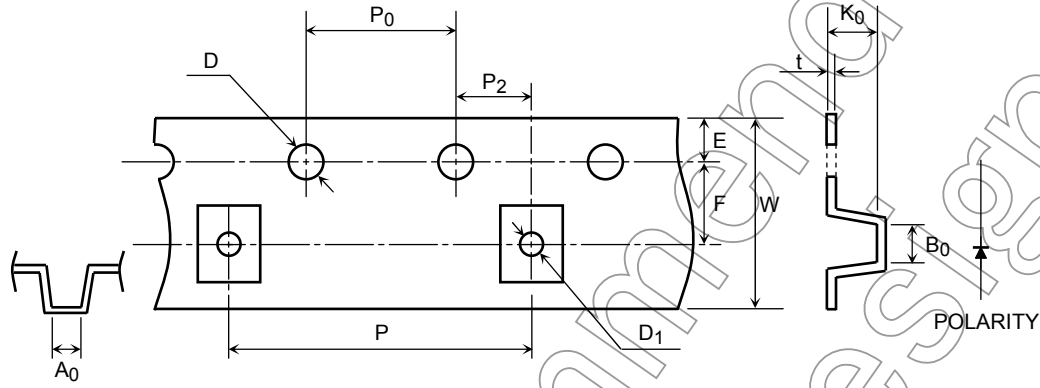
- (a) In process, taping materials may sustain an electrostatic charge, use an ionizer to neutralize the ions.
- (b) For transport and temporary storage of devices, use containers (boxes, jigs, and bags) that are made of anti-static materials or of materials that dissipate electrostatic electricity.

**3. Tape Dimensions**

(Unit: mm)

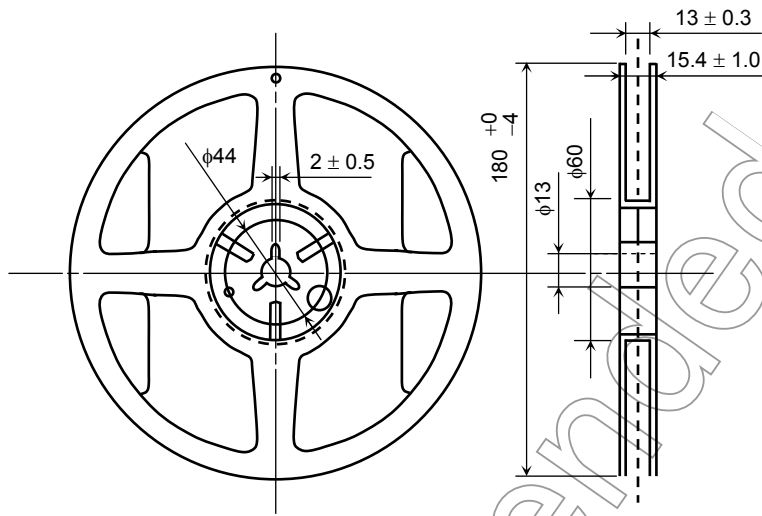
Symbol	Dimension	Tolerance
D	1.5	+0.1/-0
E	1.75	±0.1
P <sub>0</sub>	4.0	±0.1
t	0.4	±0.05
F	5.5	±0.05
D <sub>1</sub>	1.6	±0.1

Symbol	Dimension	Tolerance
P <sub>2</sub>	2.0	±0.05
W	12.0	±0.2
P	8.0	±0.1
A <sub>0</sub>	5.5	±0.1
B <sub>0</sub>	5.5	±0.1
K <sub>0</sub>	4.4	±0.1

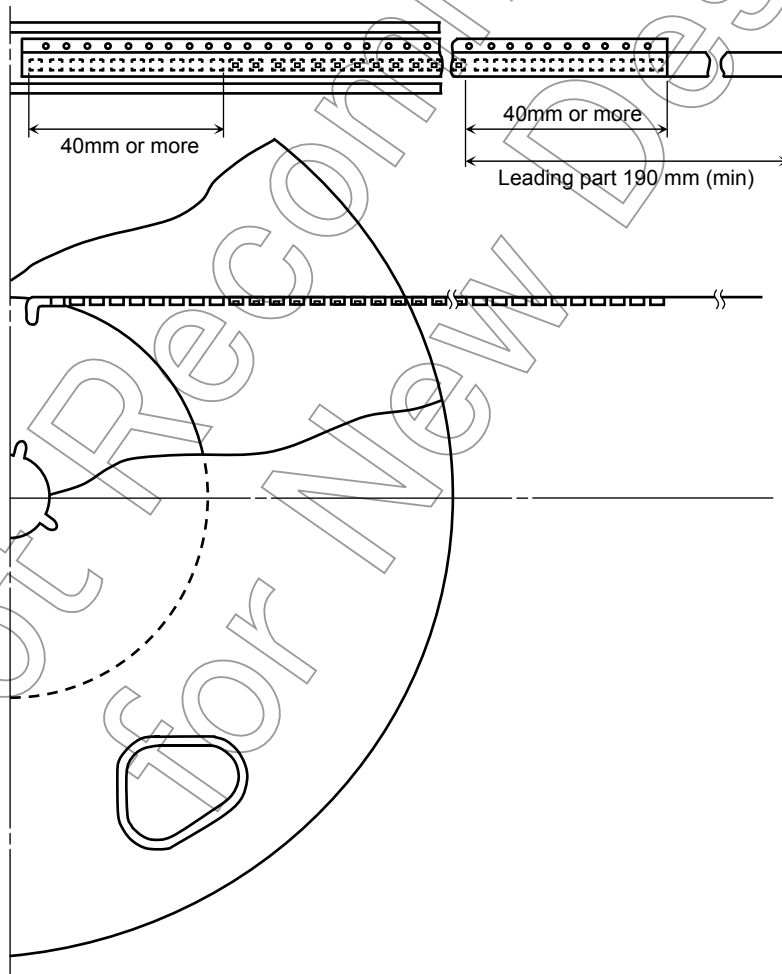


**4. Reel Dimensions**

Unit: mm



**5. Leader and Trailer Section of Tape**



### 6. Packing Form

(1) Packing quantity

Reel	400 pcs
Carton	2,000 pcs

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

### 7. Label Format

(1) Example: TLRMF1050 (T20)

P/N:


TYPE	<b>TLRMF1050</b>		
ADDC	(T20)	Q'TY	400 pcs

Lot Number    Key code for TSB    32C    400  
(RANK SYMBOL)

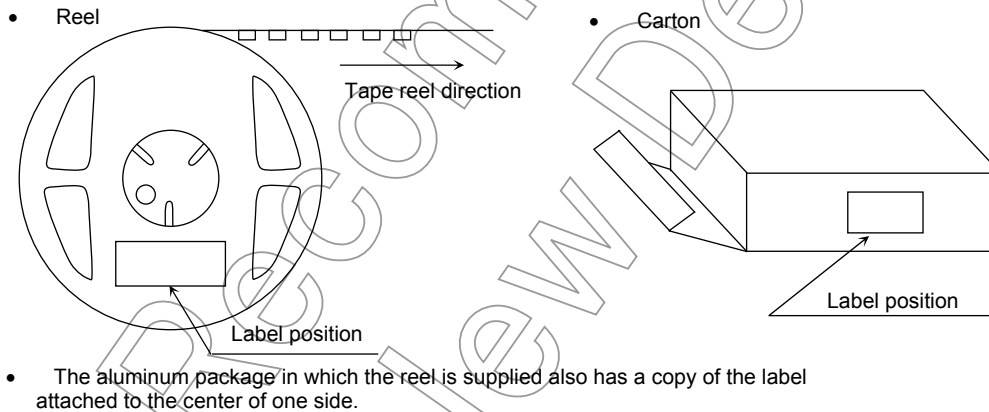
Use under 5-30degC/70%RH within 168h

[[G]]/RoHS COMPATIBLE  
\*Y380xxxxxxxxxxxxxxxxxxxx\*

SEALING INFORMATION: SEALED, DIFFUSED IN \*\*\*\*\*, ASSEMBLED IN \*\*\*\*\*



(2) Label location



\*The Lot Number includes the following information.

Example: 270 8 D 3 B → "Packaged April 22, 2008"

a b c d e

- a: Domestic ID
- b: Last digit of the year (CE): "0" (Y2000), "1" (Y2001), "2" (Y2002) to "9" (Y2009)  
Repeated for each decade
- c: Month: "A" (Jan), "B" (Feb), "C" (Mar) to "L" (Dec)
- d: Decade of the month: "1" (First), "2" (Middle), "3" (Last)
- e: Day in d above: "A" (1st), "B" (2nd), "C" (3rd) to "J" (9th), "K" (10th)  
"L" denotes the 31st of the month  
"I" is not used to denote a day in this date system

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