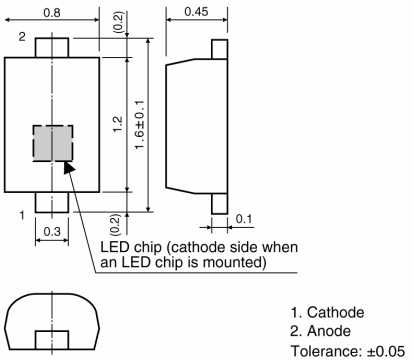
TOSHIBA LED Lamps

TLRH1032(T15,F), TLRMH1032(T15,F), TLSH1032(T15,F), TLOH1032(T15,F), TLYH1032(T15,F), TLGH1032(T15,F), TLFGH1032(T15,F)

Panel Circuit Indicator

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	4-1A1

Weight: 0.001 g (typ.)

- Surface-mount devices
- 1.6 (L) × 0.8 (W) × 0.45 (H) mm (including lead length)
- InGaAℓP LEDs
- High luminous intensity and low power consumption
- Colors: red, orange, yellow, green, pure green
- Lead(Pb)-free reflow soldering is possible
- Applications: Backlighting for LCDs and switches for automotive applications.
- Standard embossed tape packing: T15 (8000/reel)
  2-mm pitch

Color and Material

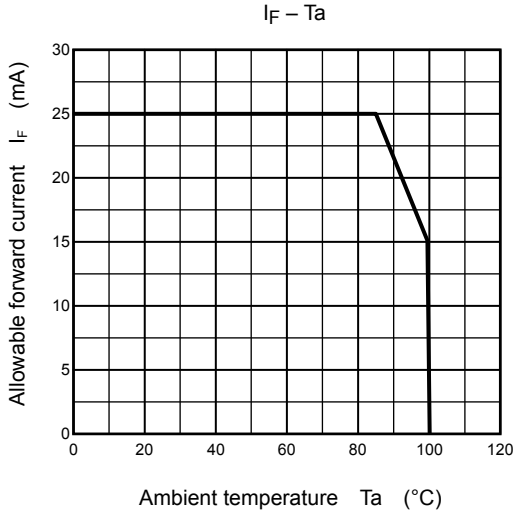
Product Name	Color	Material
TLRH1032	Red	InGaAℓP
TLRMH1032	Red	
TLSH1032	Red	
TLOH1032	Orange	
TLYH1032	Yellow	
TLGH1032	Green	
TLFGH1032	Fresh Green	

Absolute Maximum Ratings (Ta = 25°C)

Product Name	Forward Current I_F (mA) Please see Note 1	Reverse Voltage V_R (V)	Power Dissipation P_D (mW)	Operating Temperature T_{opr} (°C)	Storage Temperature T_{stg} (°C)
TLRH1032	25	4	60	−40~100	−40~100
TLRMH1032					
TLSH1032					
TLOH1032					
TLYH1032					
TLGH1032			62.5		
TLFGH1032					

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_F				Reverse Current I_R	
	Min	Typ.	Max	I_F	Max	V_R
TLRH1032	1.7	2.0	2.4	20	10	4
TLRMH1032	1.7	2.0	2.4			
TLSH1032	1.7	2.0	2.4			
TLOH1032	1.7	2.0	2.4			
TLYH1032	1.7	2.0	2.4			
TLGH1032	1.8	2.1	2.5			
TLFGH1032	1.9	2.2	2.5			
Unit	V			mA	μA	V

Optical Characteristics–1 (Ta = 25°C)

Product Name	Luminous Intensity I_V				Available Iv rank
	Min	Typ.	Max	I_F	Please see Note 2
TLRH1032	25	56	125	20	NA / PA / QA
TLRMH1032	40	85	200		PA / QA / RA
TLSH1032	63	160	320		QA / RA / SA
TLOH1032	100	200	500		RA / SA / TA
TLYH1032	40	100	200		PA / QA / RA
TLGH1032	25	60	125		NA / PA / QA
TLFGH1032	10	25	50		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 I_V	
	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)

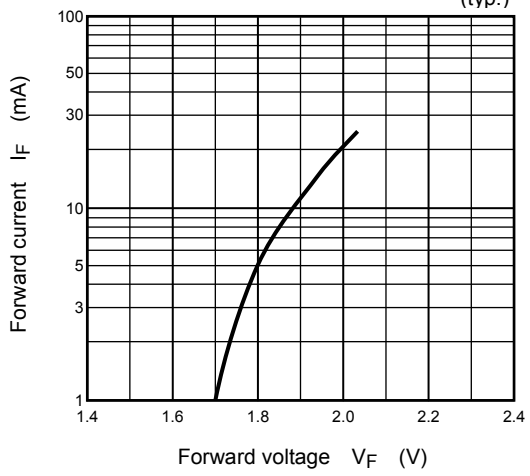
Product Name	Emission Spectrum							I_F
	Peak Emission Wavelength λ_p			$\Delta\lambda$	Dominant Wavelength λ_d			
	Min	Typ.	Max	Typ.	Min	Typ.	Max	
TLRH1032	—	644	—	17	624	630	638	20
TLRMH1032	—	636	—	17	620	626	634	
TLSH1032	—	623	—	17	607	613	621	
TLOH1032	—	612	—	17	599	605	613	
TLYH1032	—	590	—	13	581	587	595	
TLGH1032	—	574	—	13	565	571	576	
TLFGH1032	—	568	—	11	560	565	571	
Unit	nm			nm	nm			mA

The cautions

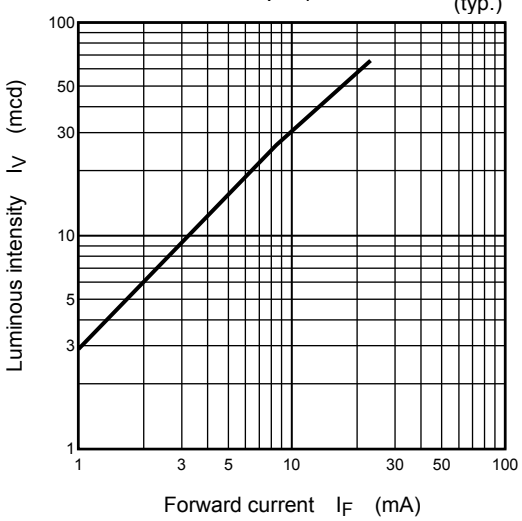
- This visible LED lamp also emits some IR light.
  If a photodetector is located near the LED lamp, please ensure that it will not be affected by the IR light.
- This product is designed as a general display light source usage, and it has applied the measurement standard that matched with the sensitivity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

TLRH1032

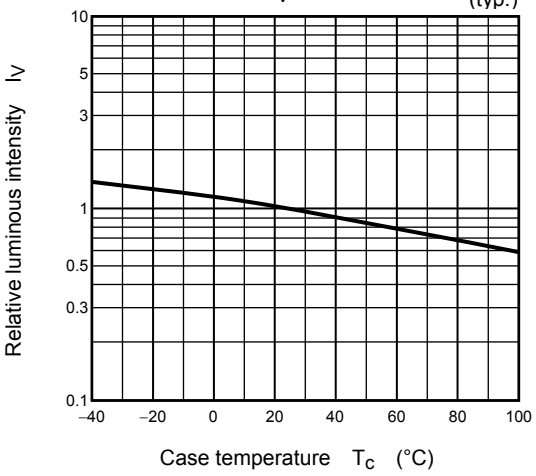
$I_F - V_F$ (typ.)



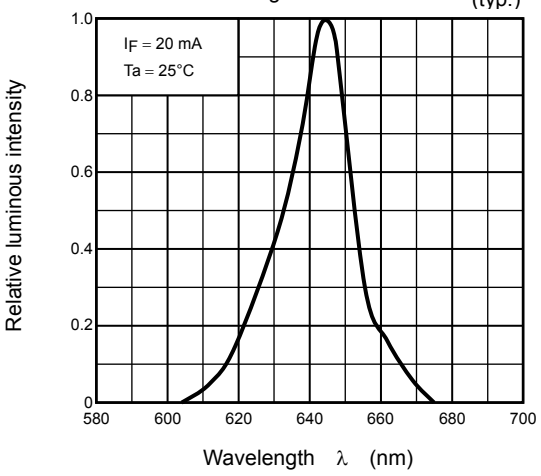
$I_V - I_F$ (typ.)



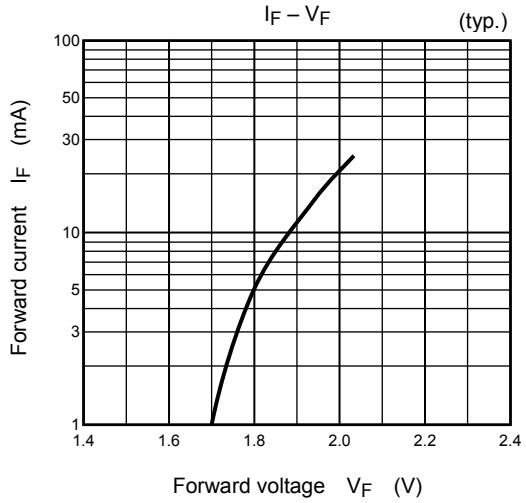
$I_V - Tc$ (typ.)

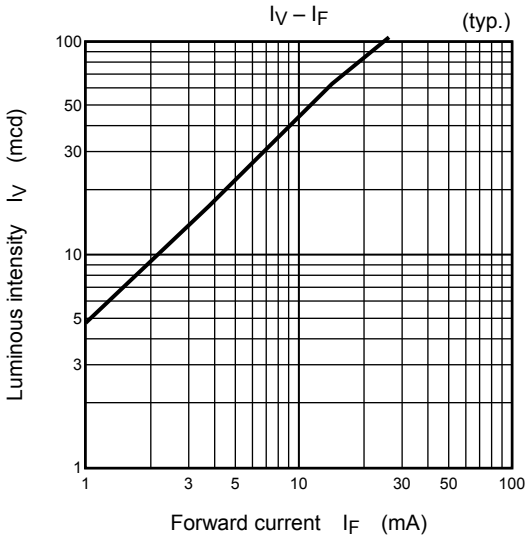


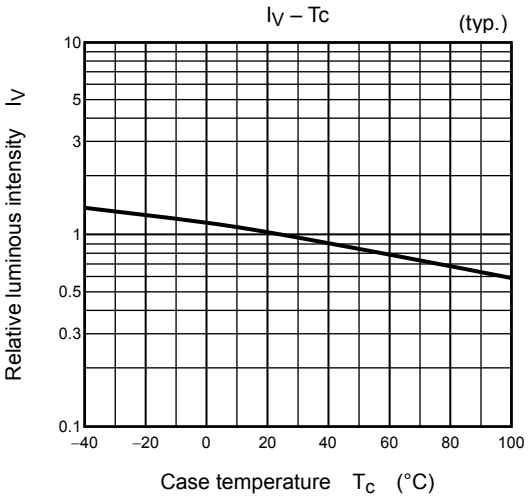
Wavelength characteristic (typ.)

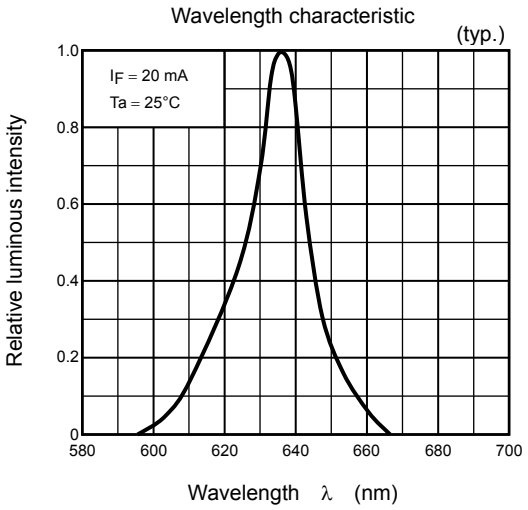


TLRMH1032


$I_F - V_F$ (typ.)
Forward current I_F (mA)
100
50
30
10
5
3
1
1.4
1.6
1.8
2.0
2.2
2.4
Forward voltage V_F (V)

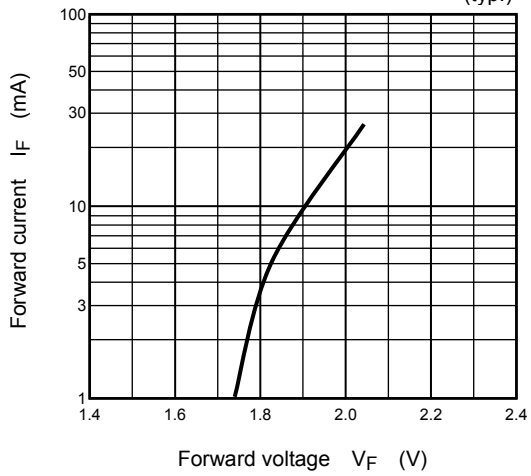

$I_V - I_F$ (typ.)
Luminous intensity I_V (mcd)
100
50
30
10
5
3
1
1
3
5
10
30
50
100
Forward current I_F (mA)


$I_V - Tc$ (typ.)
Relative luminous intensity I_V
10
5
3
1
0.5
0.3
0.1
−40
−20
0
20
40
60
80
100
Case temperature T_C (°C)

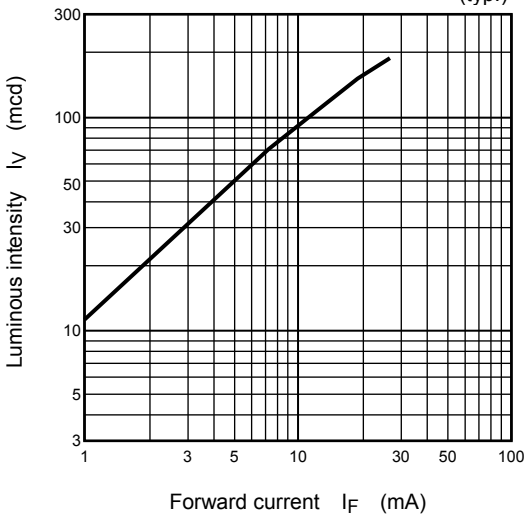

Wavelength characteristic
(typ.)
I_F = 20 mA
Ta = 25°C
Relative luminous intensity
1.0
0.8
0.6
0.4
0.2
0
580
600
620
640
660
680
700
Wavelength λ (nm)

TLSH1032

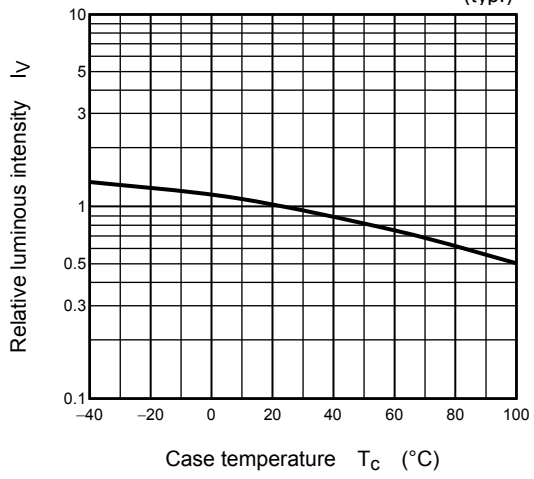
$I_F - V_F$ (typ.)



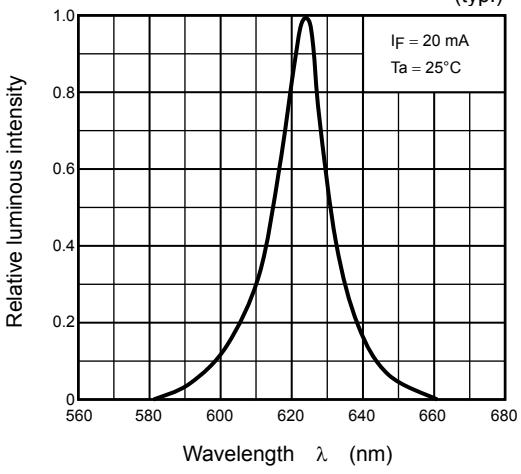
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

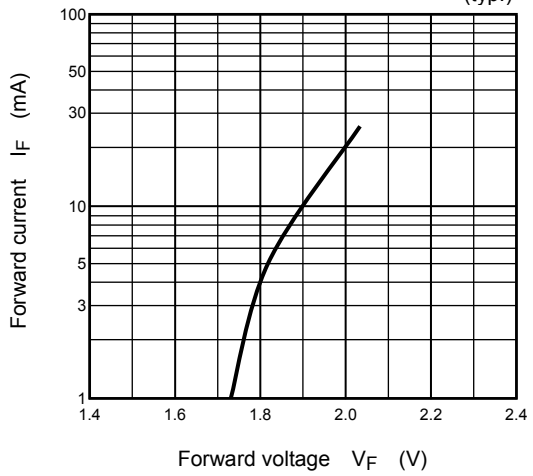


Wavelength characteristic (typ.)

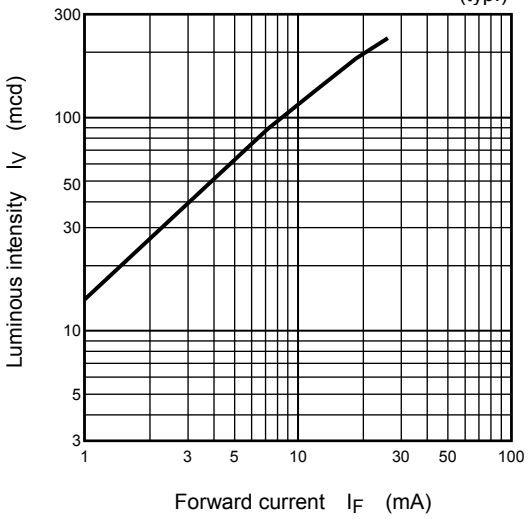


TLOH1032

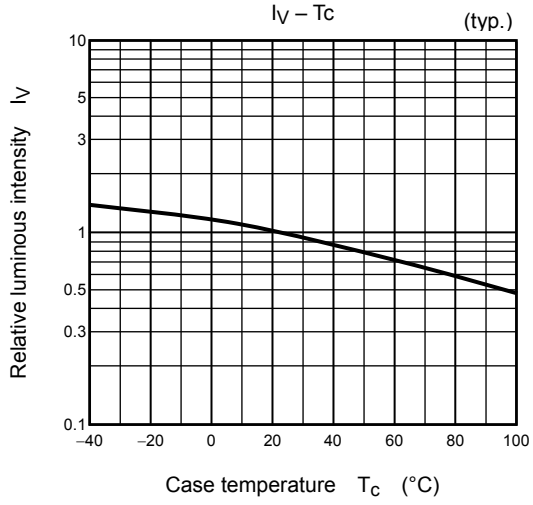
$I_F - V_F$ (typ.)



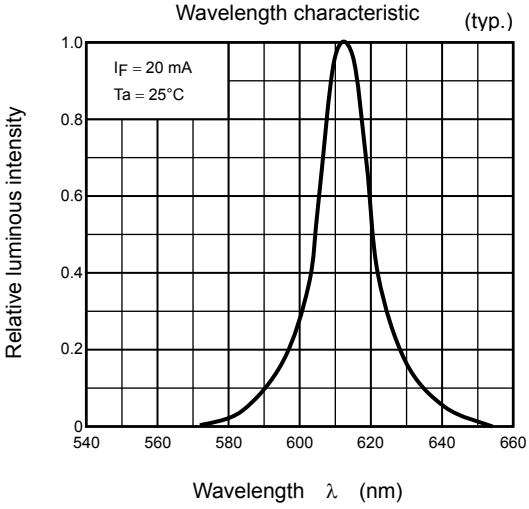
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

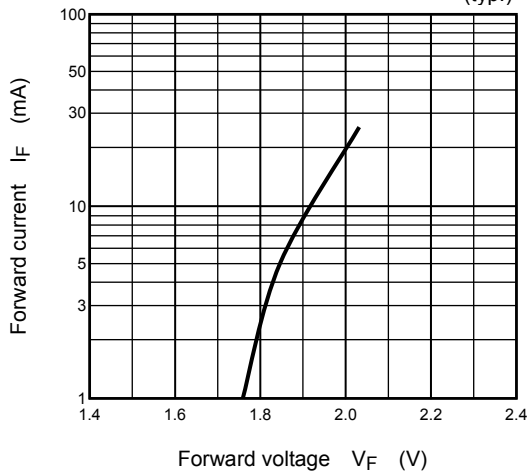


Wavelength characteristic (typ.)

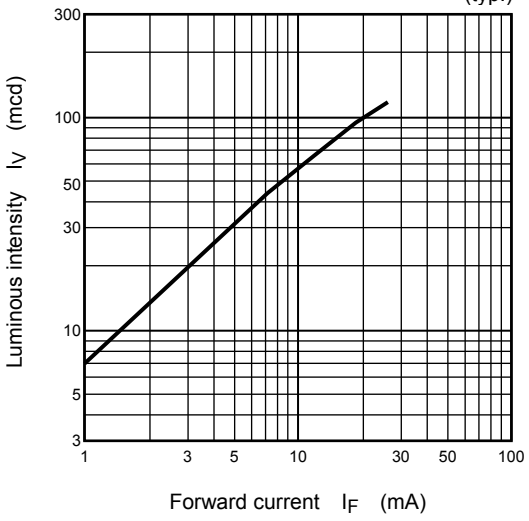


TLYH1032

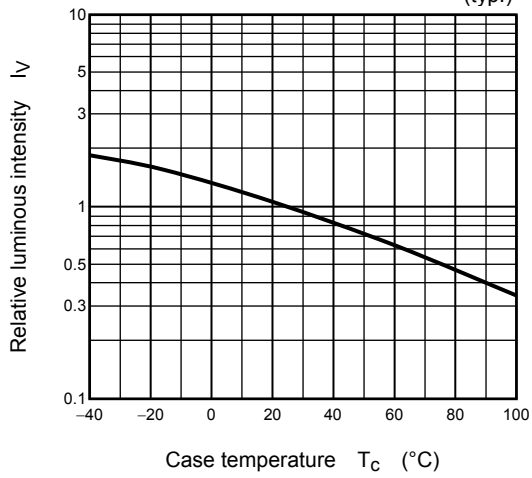
$I_F - V_F$ (typ.)



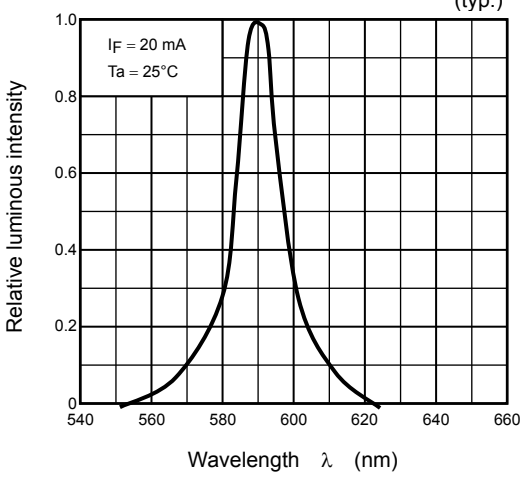
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

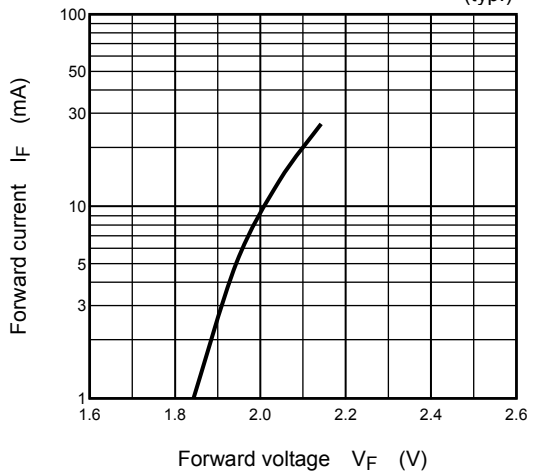


Wavelength characteristic (typ.)

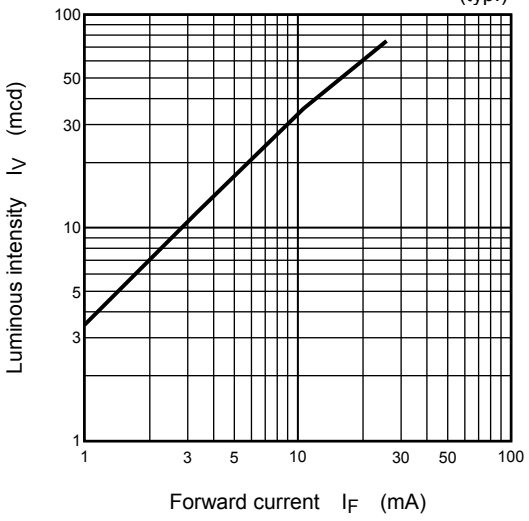


TLGH1032

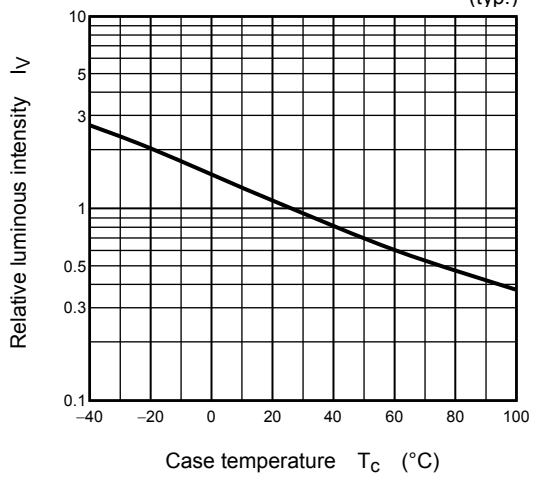
$I_F - V_F$ (typ.)



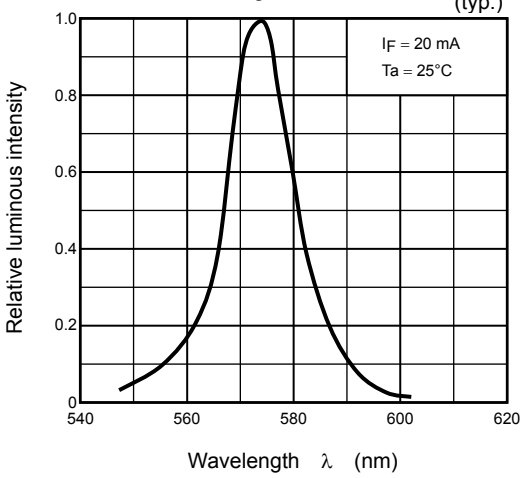
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

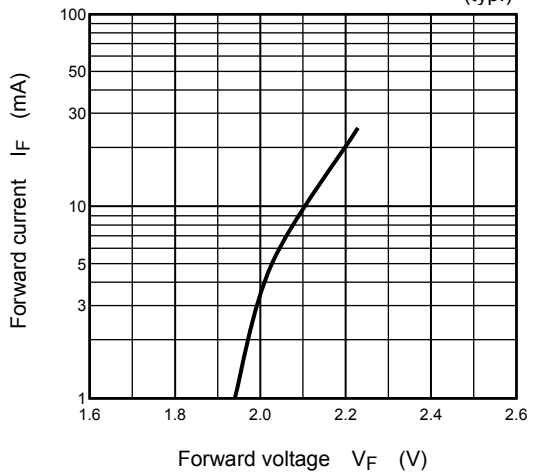


Wavelength characteristic (typ.)

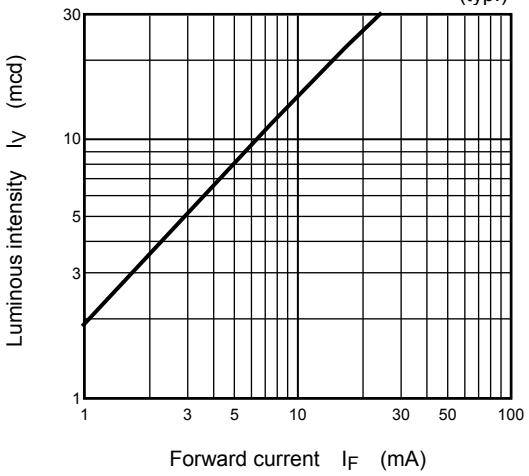


TLFGH1032

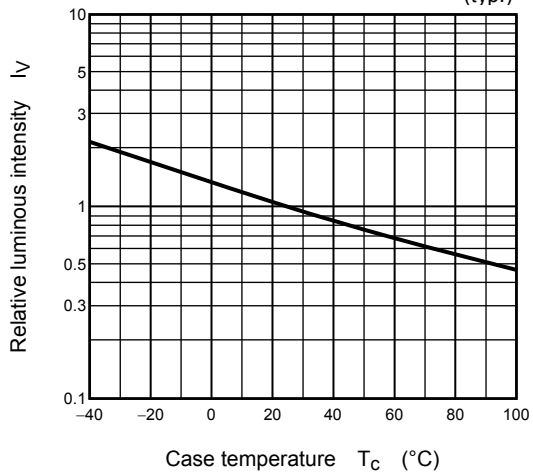
$I_F - V_F$ (typ.)



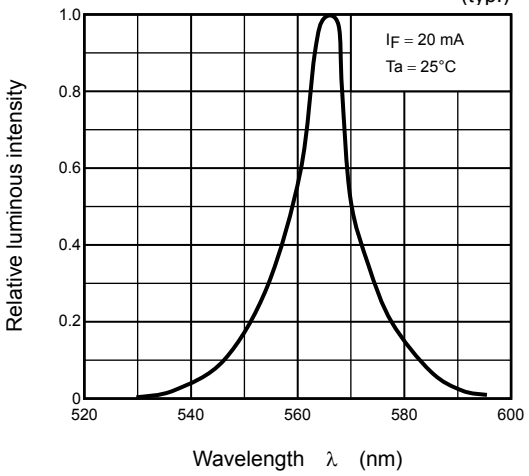
$I_V - I_F$ (typ.)



$I_V - Tc$ (typ.)

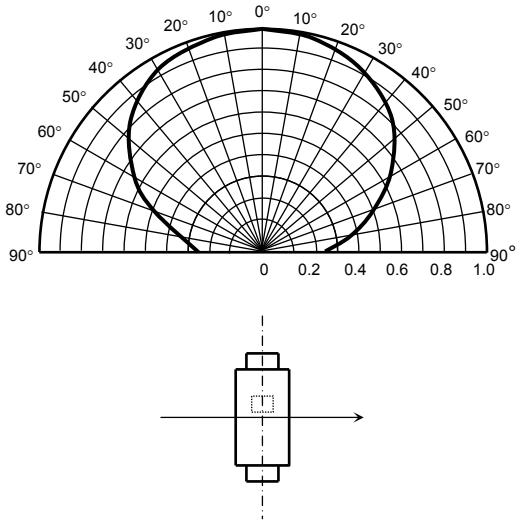


Wavelength characteristic (typ.)

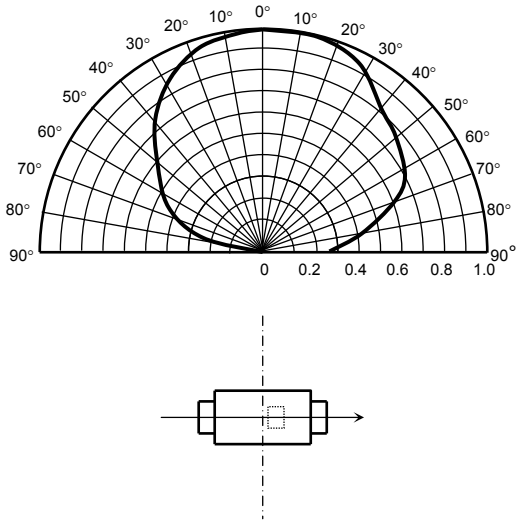


Radiation Pattern

Vertical to polarity (typ.)



Horizontal to polarity (typ.)



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:

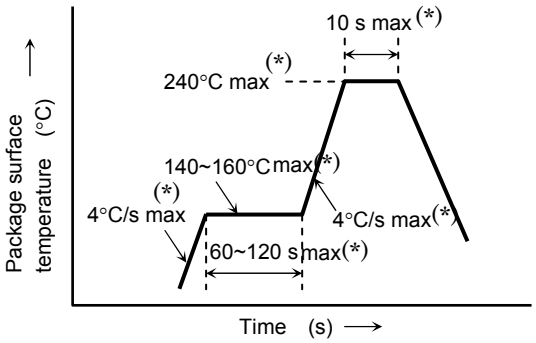
1. This moisture proof bag may be stored unopened within 12 months at the following conditions.
   Temperature: 5°C~30°C
   Humidity: 90% (max)
2. After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C/70% RH or below.
3. If upon opening, 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

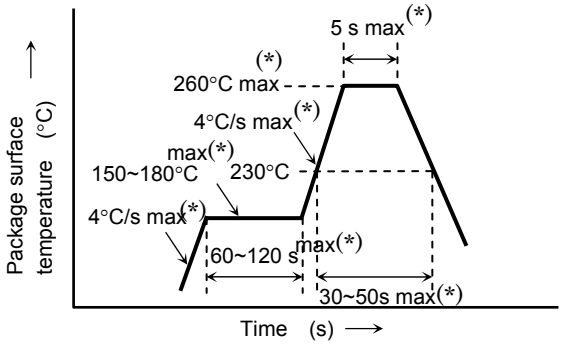
Soldering

- Reflow soldering (example)

Temperature profile for Pb soldering (example)



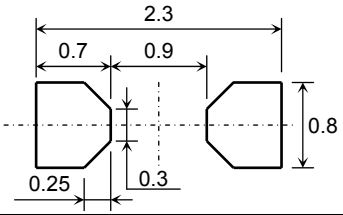
Temperature profile for Pb-free soldering (example)



- 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, 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
- 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	: (made by ASAHI GLASS)
KAO CLEAN TROUGH 750H	: (made by KAO)
PINE ALPHA ST-100S	: (made by ARAKAWA CHEMICAL)
TOSHIBA TECHNOCARE (FRW-17, FRW-1, FRV-100)	: (made by GE TOSHIBA SILICONES)

Precaution when mounting

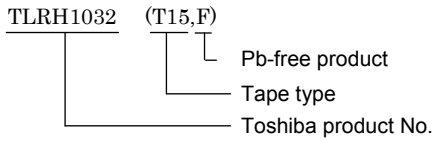
Do not apply force to the plastic part of the LED under high-temperature conditions.
To avoid damaging the LED plastic, do not apply friction using a hard material.
When installing the PCB in a product, ensure that the device does not come into contact with other cmponents.

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: T15 (2-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.

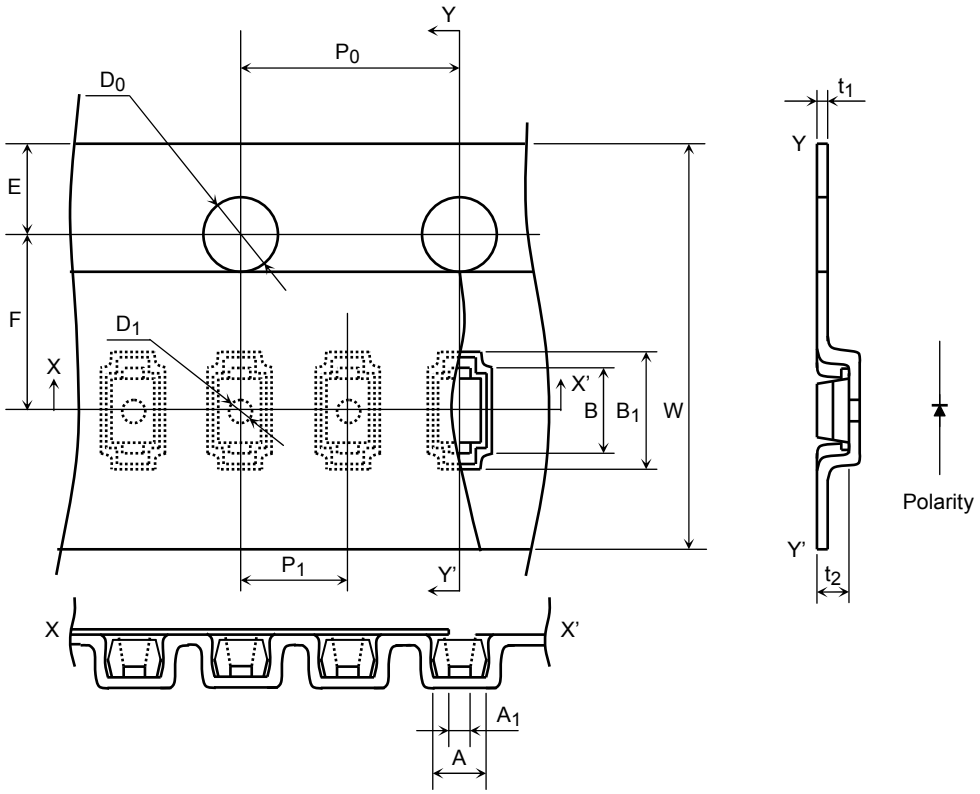
(a) Since tape materials may accumulate an electrostatic charge, use an ionizer to neutralize the ambient air.
(b) For transport and temporary storage of devices, use containers (boxes and bags) and jigs that are made of anti-static materials or of materials which dissipate electrostatic charge.

3. Tape dimensions

Unit: mm

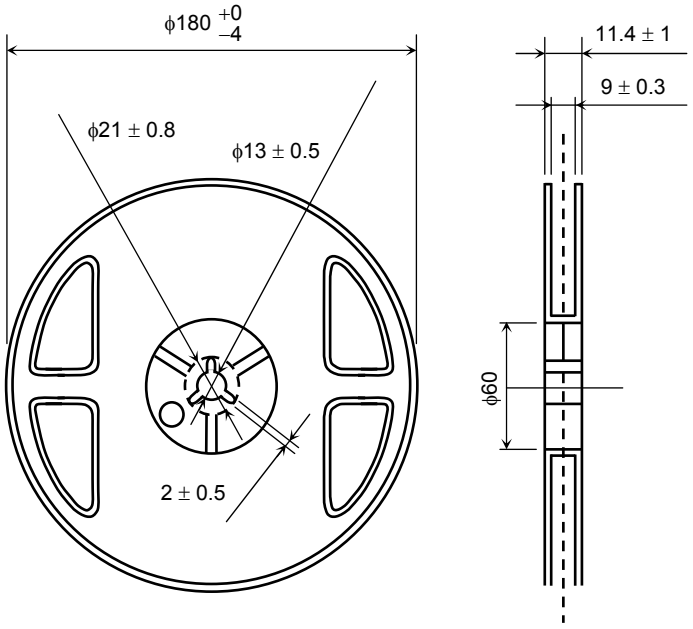
Item		Symbol	Value	Tolerance
Carrier tape	Width	W	8.0	±0.2
	Thickness	t_1	0.2	±0.05
Feed hole	Diameter	D_0	1.5	±0.1
	Pitch	P_0	4.0	±0.1
	Position	E	1.75	±0.1
Distance form center line	Vertical Direction	P_1	2.0	±0.1
	Horizontal Direction	F	3.5	±0.1

Item		Symbol	Value	Tolerance
Cavity	Length	B_1	1.85	±0.05
		B	1.3	±0.05
	Width	A	0.9	±0.05
		A_1	0.37	±0.05
	Depth	t_2	0.65	±0.05
	Diameter of mark hole	D_1	0.5	±0.05

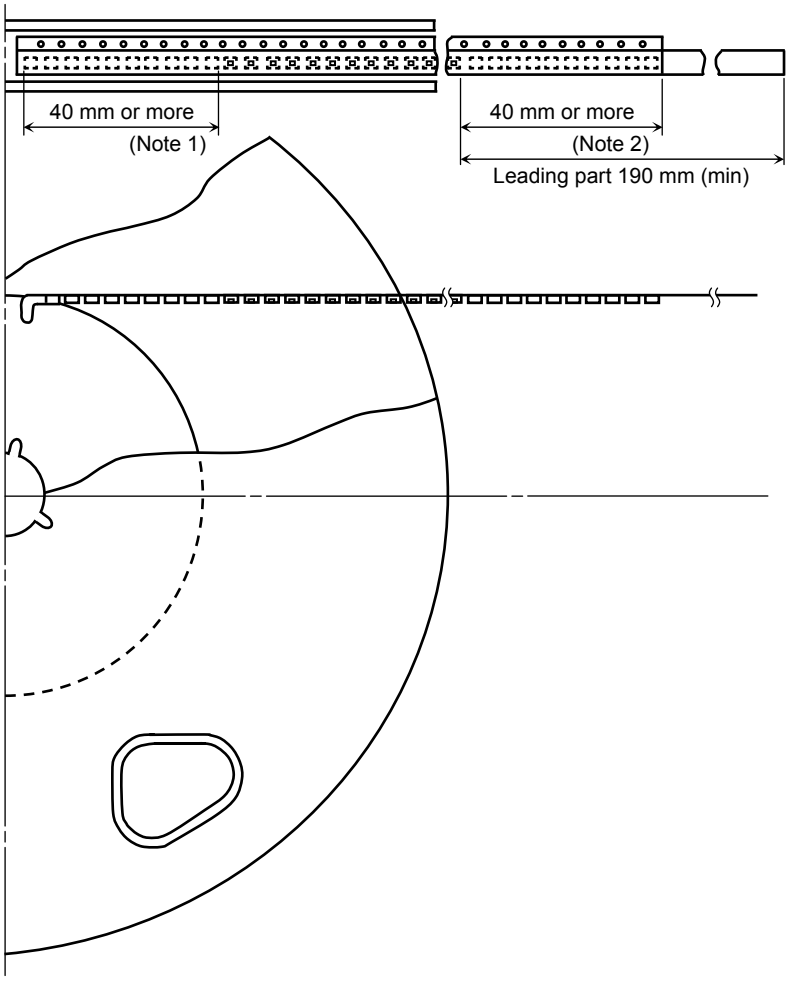


4. Reel dimensions

Unit: mm



5. Leader and trailer section of tape



Note 1: Empty trailer section

Note 2: Empty leader section

6. Packing display

(1) Packing quantity

Reel	8,000 pcs
Carton	40,000 pcs

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

7. Label format

(1) Example: TLRH1032 (T15,F)

P/N:

TYPE	**TLRH1032**		
ADDC	(T15,F)	Q'TY	8,000 pcs

Lot Number Key code for TSB 32C 8000
(RANK SYMBOL)

TOSHIBA

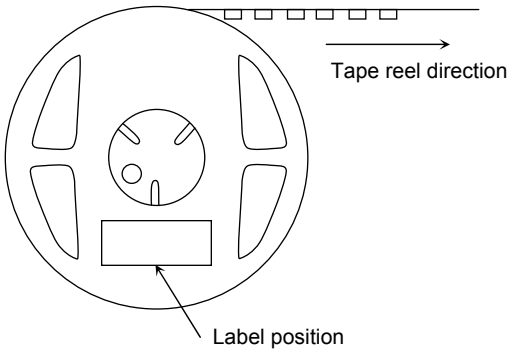
Use under 5-30degC/70%RH within 168h

[[G]]/RoHS COMPATIBLE
Y3804xxxxxxxxxxxxxxxx

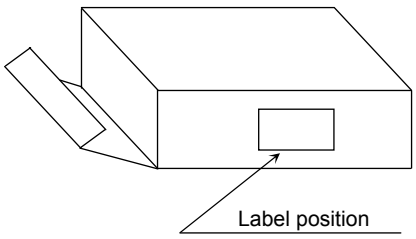
SEAL DATE:
DIFFUSED IN *****
ASSEMBLED IN *****

(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.

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20070701-EN

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