TOSHIBA Infrared LED GaAs Infrared Emitter

# TLN110(F)

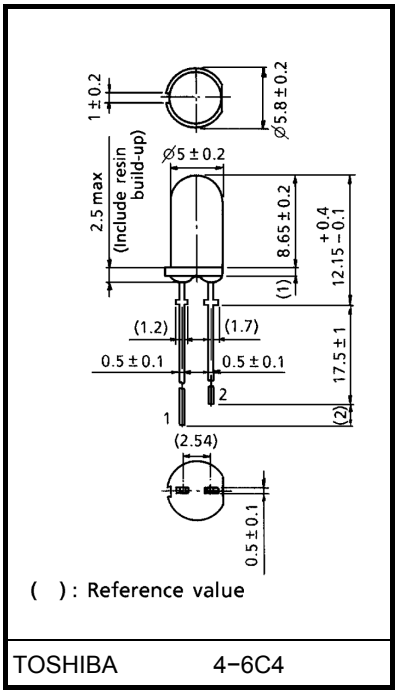
Lead(Pb)-Free

Remote−control Systems

Opto−electronic Switches

- High radiant intensity: $I_E$ = 30mW / sr (typ.)
- Excellent radiant−intensity linearity. Modulation by pulse operation and high frequency is possible.
- TPS703(F) PIN photodiode with resin to screen out visible light available as detector for remote control

Unit: mm




| | |
|---|---|
| TOSHIBA | 4−6C4 |

Weight: 0.32 g (typ.)

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

| Characteristic | Symbol | Rating | Unit |
|---|---|---|---|
| Forward current | $I_F$ | 100 | mA |
| Forward current derating (Ta > 25°C) | $\Delta I_F$ / °C | −1.33 | mA / °C |
| Pulse forward current | $I_{FP}$ (Note 1) | 1 | A |
| Reverse voltage | $V_R$ | 5 | V |
| Power dissipation | $P_D$ | 150 | mW |
| Operating temperature range | $T_{opr}$ | −20~75 | °C |
| Storage temperature range | $T_{stg}$ | −30~100 | °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).

Note 1: Pulse width ≤ 100μs, repetitive frequency = 100 Hz

## Pin Connection




1. Anode
2. Cathode

## Optical And Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Forward voltage | $V_F$ | $I_F$ = 100mA | — | 1.35 | 1.5 | V |
| Reverse current | $I_R$ | $V_R$ = 5V | — | — | 10 | μA |
| Radiant intensity | $I_E$ | $I_F$ = 50mA | 15 | 30 | — | mW / sr |
| Radiant power | $P_O$ | $I_F$ = 50mA | — | 9 | — | mW |
| Capacitance | $C_T$ | $V_R$ = 0, f = 1MHz | — | 20 | — | pF |
| Peak emission wavelength | $\lambda_P$ | $I_F$ = 50mA | — | 940 | — | nm |
| Spectral line half width | $\Delta\lambda$ | $I_F$ = 50mA | — | 45 | — | nm |
| Half value angle | $\theta\frac{1}{2}$ | $I_F$ = 50mA | — | ±8 | — | ° |

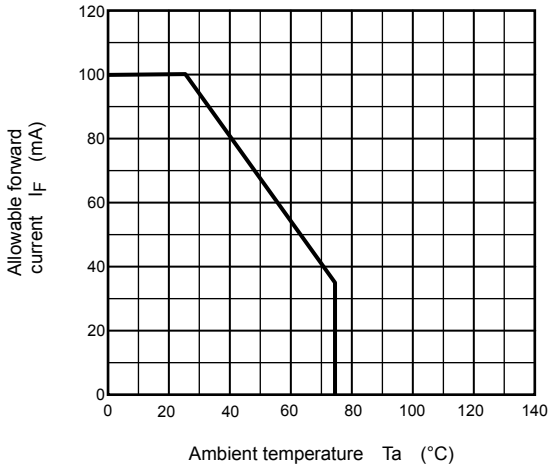
## Precautions

Please be careful of the followings.

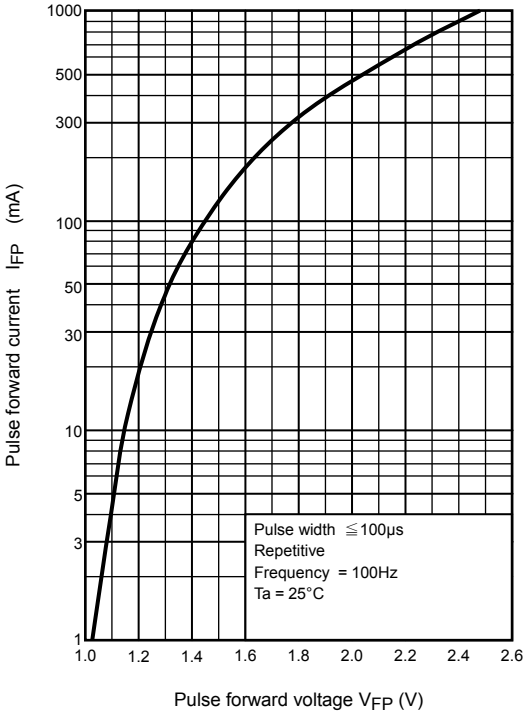
1. Soldering temperature : 260°C max
   Soldering time : 5s max
   (Soldering must be performed under the stopper.)
2. When forming the leads, bend each lead under the 2mm from the body of the device. Soldering must be performed after the leads have been formed.
3. Radiant intensity falls over time due to the current which flows in the infrared LED. When designing a circuit, take into account this change in radiant power over time. The ratio of fluctuation in radiation intensity to fluctuation in optical output is 1 : 1.

$$\frac{I_E(t)}{I_E(0)} = \frac{P_O(t)}{P_O(0)}$$

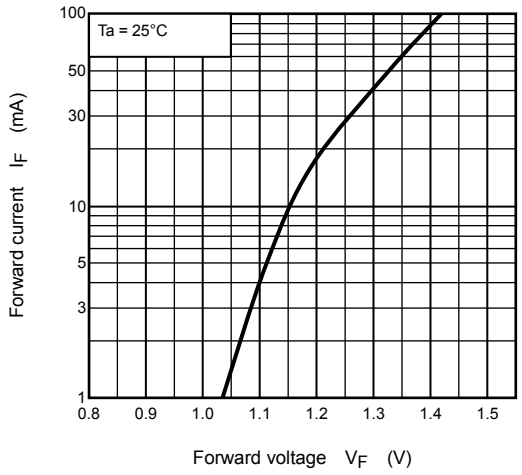
$I_F$ – Ta



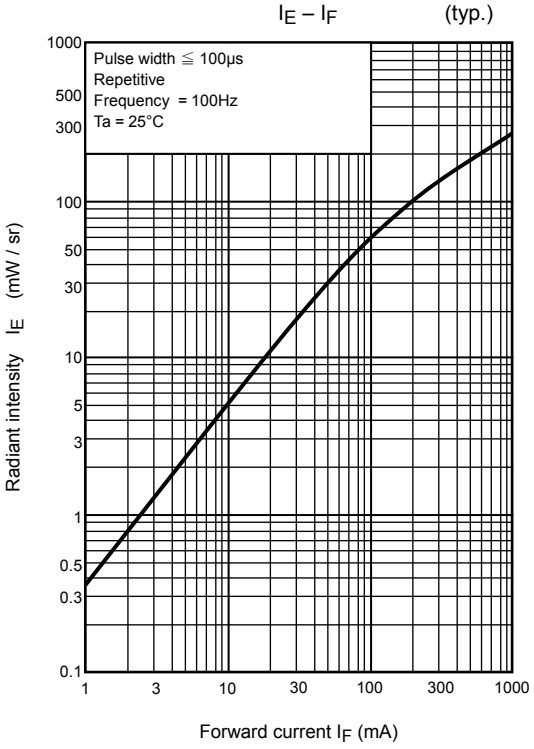

$I_{FP}$ – $V_{FP}$ (typ.)



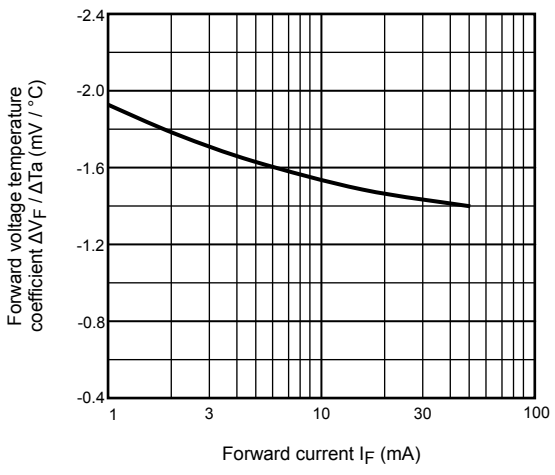

$I_F$ – $V_F$ (typ.)



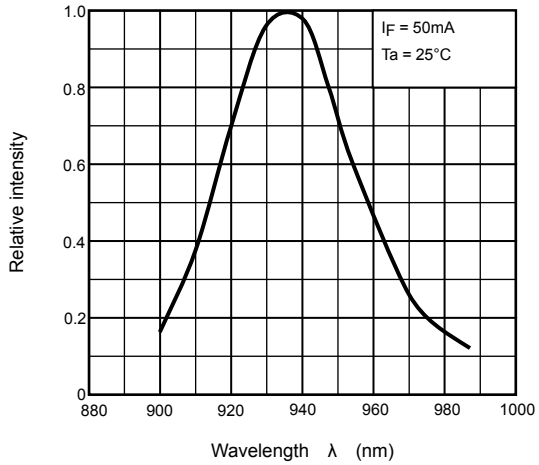

$I_E$ – $I_F$ (typ.)



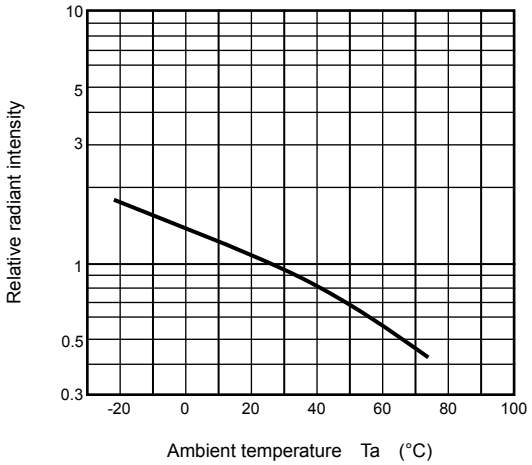

$\Delta V_F / \Delta Ta$ – $I_F$



Wavelength Characteristic (typ.)

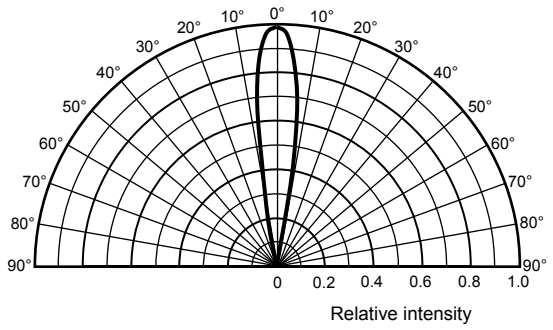



Relative $I_E$ – Ta (typ.)

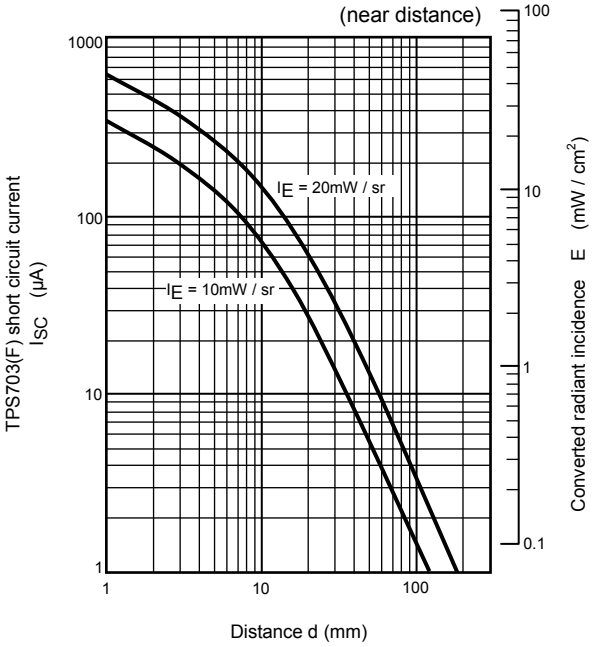



Radiation Pattern (typ.)

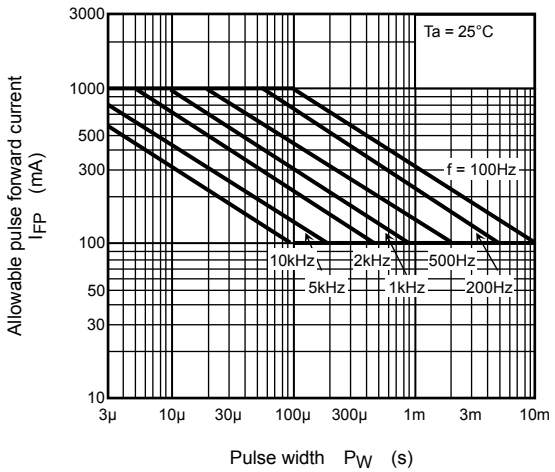
(Ta = 25°C)

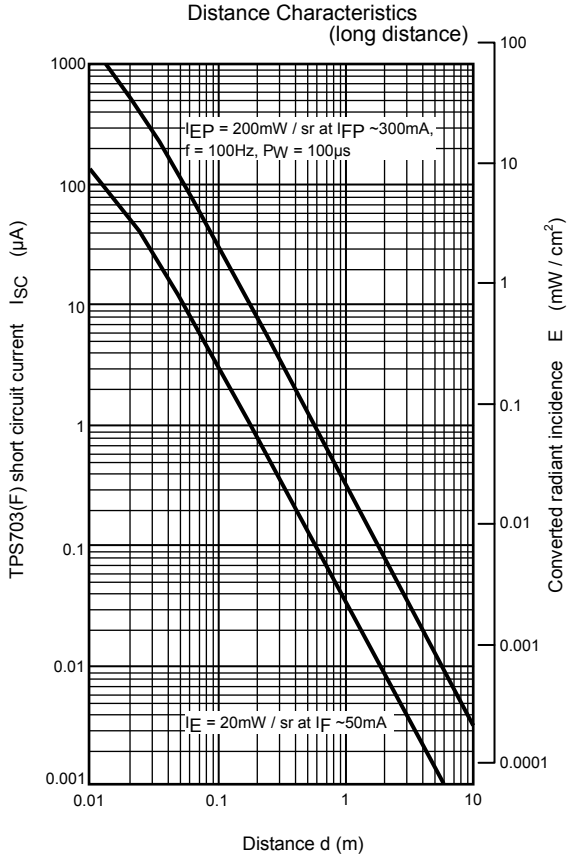



Distance Characteristics (near distance)




$I_{FP}$ – $P_W$




Distance Characteristics
(long distance)
IEP = 200mW / sr at IFP ~300mA,
f = 100Hz, PW = 100μs
IE = 20mW / sr at IF ~50mA
TPS703(F) short circuit current ISC (μA)
Converted radiant incidence E (mW / cm2)
Distance d (m)
1000
100
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100
10
1
0.1
0.01
0.001
0.0001

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20070701-EN

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