TOSHIBA Phototransistor Silicon NPN Epitaxial Planar

# TPS611(F)

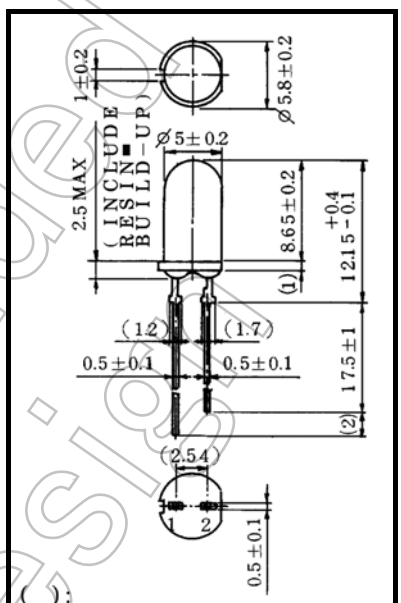
Photoelectric Counter

Various Kinds Of Readers

Position Detection

- φ5mm epoxy resin package(black)
- High sensitivity: $I_L$ = 120μA(typ.)
- Half value angle: θ1/2 = ±8°(typ.)
- Protected from external light by black mold packaging.

Unit in mm




| | |
|---|---|
| TOSHIBA | 0−5C1 |

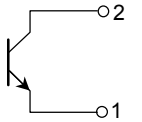
Weight: 0.3 g (typ.)

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

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Collector−emitter voltage | $V_{CEO}$ | 30 | V |
| Emitter−Collector voltage | $V_{ECO}$ | 5 | V |
| Collector current | $I_C$ | 50 | mA |
| Collector power dissipation | $P_C$ | 150 | mW |
| Collector power dissipation derating(Ta>25°C) | $\Delta P_C$ /°C | −2 | mW/°C |
| 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).

## Pin Connection




1. Emitter
2. Collector

## Opto−electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Dark current | | $I_D$ ($I_{CEO}$) | $I_F$ = 24V, E=0 | — | 0.005 | 0.1 | μA |
| Light current | | $I_L$ | $V_{CE}$ = 3V, E=0.1mW/cm$^2$ (Note) | 30 | 120 | — | μA |
| Collector−emitter saturation voltage | | $V_{CE(sat)}$ | $I_C$ = 15μA, E=0.1mW/cm$^2$ (Note) | — | 0.25 | 0.4 | V |
| Switching time | Rise time | $t_r$ | $V_{CC}$ = 5V, $I_C$ = 2mA $R_L$ = 100Ω | — | 6 | — | μs |
| | Fall time | $t_f$ | | — | 6 | — | |
| Peak sensitivity wavelength | | $\lambda_P$ | — | — | 900 | — | nm |
| Half value angle | | $\theta\frac{1}{2}$ | — | — | ±8 | — | ° |

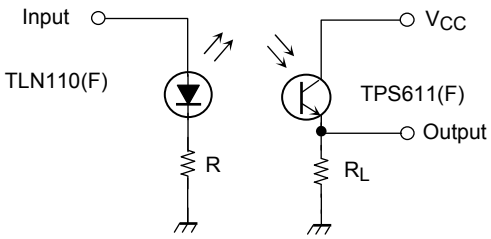
Note: Color temperature = 2870K, standard tungsten lamp

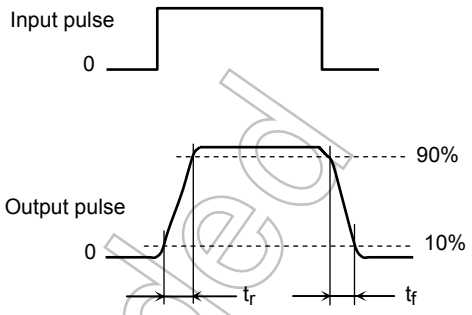
## Precaution

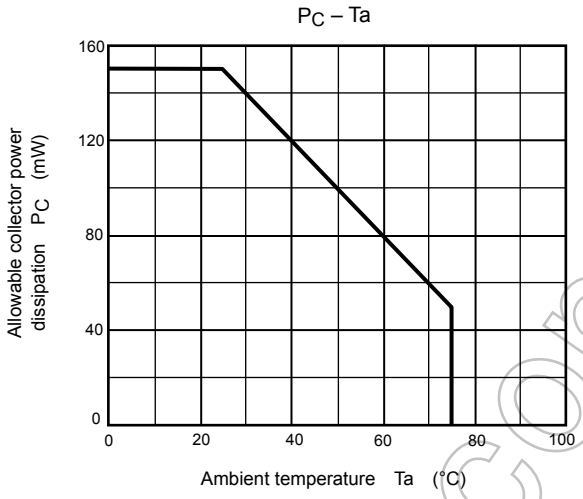
Please be careful of the followings.

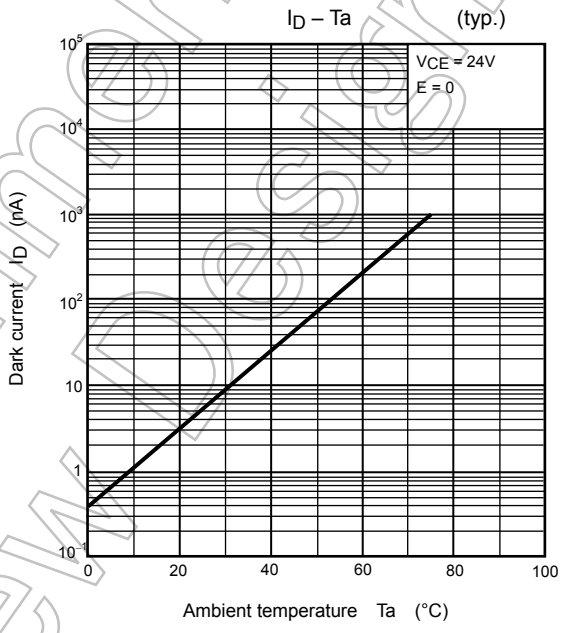
1. Soldering temperature: 260°C max. Soldering time: 5s max.
   (Soldering portion of lead: The top portion from the lead stopper.)
2. When the leads is formed, the lead shall be formed at the top portion of the stopper without leaving forming stress to the body of the device. Soldering shall be performed after lead forming.

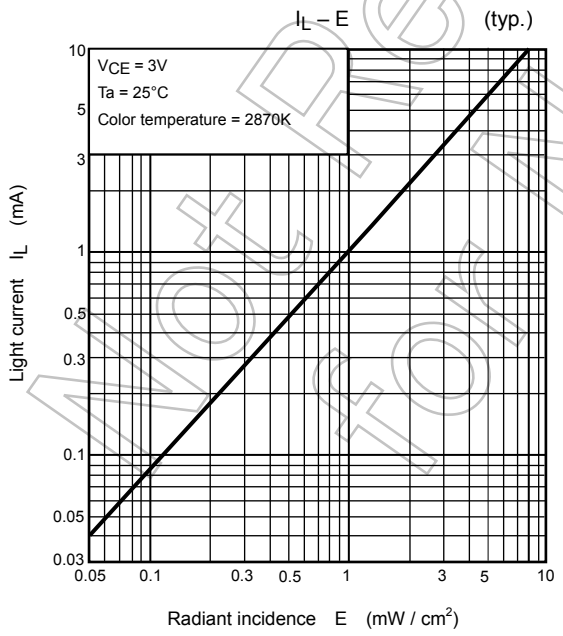
## Fig.1 Switching time test circuit

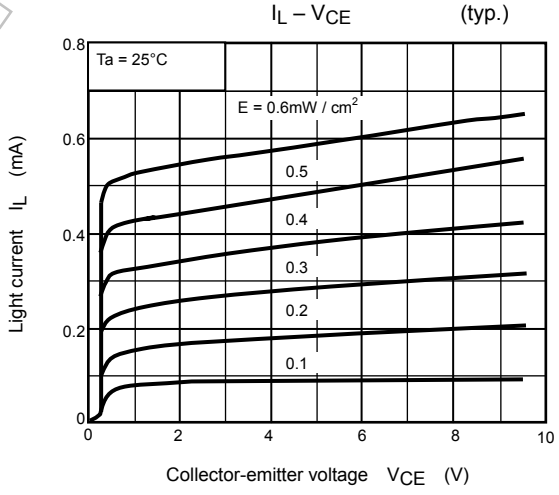


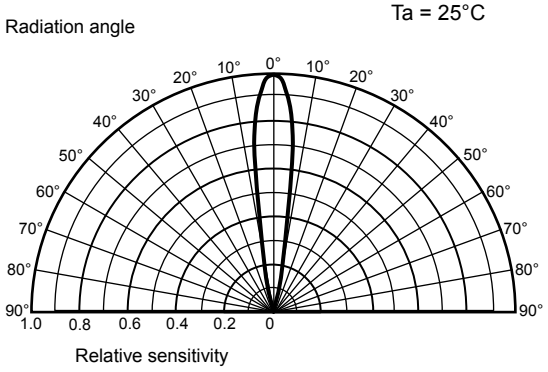



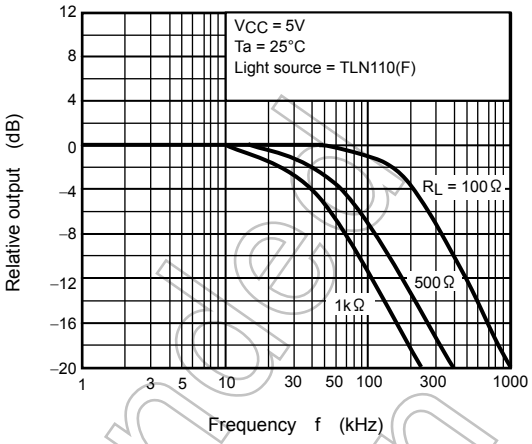



Directional Sensitivity Characteristics
(typ.)

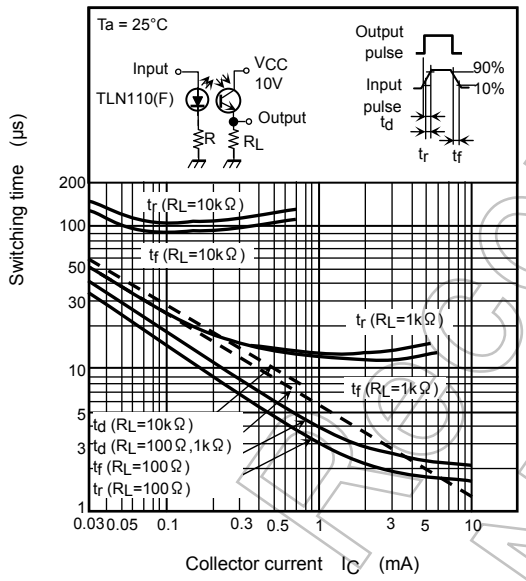
Ta = 25°C



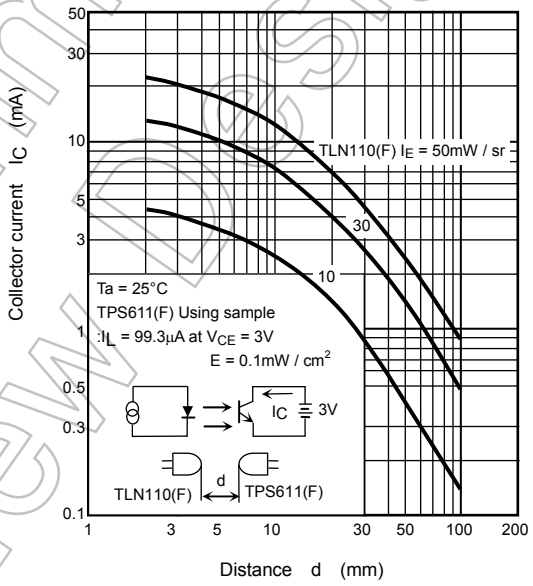

Frequency Characteristics
(typ.)



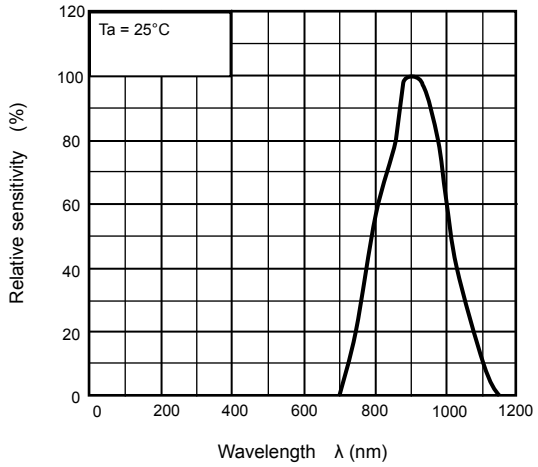

Switching Characteristics
(typ.)




Coupling Characteristics With
TLN110(F)



Spectral Response (typ.)



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