TOSHIBA Photo-interrupter Infrared LED+Phototransistor

TLP844

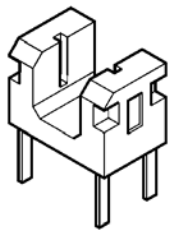
Still Camera and Digital Still Camera

Video Camera

Personal Equipment and Small-sized OA Equipment

The TLP844 is photointerrupter which consists of a GaAs infrared LED and an Si phototransistor.
It is an ultra compact package and has a wide gap width.

- Ultra compact package: 4×2.6×2.9mm
- Gap width：2mm
- High resolution: Slit width = 0.3 mm
- High current transfer ratio: I_C/I_F = 3.5% (min)
- Material of the package: Polybutylene terephthalate (UL94V-0)
- Lead-free product



TOSHIBA	11-4J1

Weight: 0.037 g (typ.)

Maximum Ratings (Ta = 25°C)

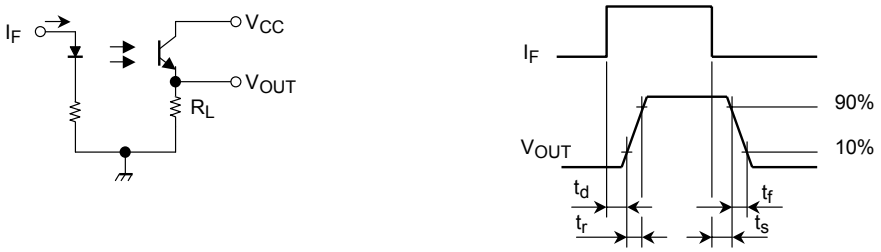
Characteristics		Symbol	Rating	Unit
LED	Forward current	I_F	30	mA
	Forward current derating (Ta>25°C)	ΔI_F/°C	−0.33	mA/°C
	Reverse voltage	V_R	5	V
Detector	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	5	V
	Collector power dissipation	P_C	75	mW
	Collector power dissipation derating (Ta>25°C)	ΔP_C/°C	−1	mW/°C
	Collector current	I_C	50	mA
Operating temperature range		T_{opr}	−30 to 85	°C
Storage temperature range		T_{stg}	−40 to 100	°C
Soldering temperature (5s) (Note 1)		T_{sol}	260	°C

Note 1 : At least 1mm from body

Optical and Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test conditions	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.10	1.23	1.40	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Peak emission wavelength	λ_P	I_F = 10 mA	—	940	—	nm
Detector	Dark current	I_D (I_{CEO})	V_{CE} = 24 V, I_F = 0	—	—	0.1	μA
	Peak sensitivity wavelength	λ_P	—	—	820	—	nm
Coupled	Current transfer ratio	I_C/I_F	V_{CE} = 2 V, I_F = 5 mA	3.5	—	35	%
	Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_F = 10 mA, I_C = 0.175 mA	—	0.1	0.4	V
	Rise time	t_r	V_{CC} = 5 V, I_C = 1 mA	—	15	50	μs
	Fall time	t_f	R_L = 1k Ω (Note 2)	—	15	50	

Note 2 : Switching time measurement circuit and waveform



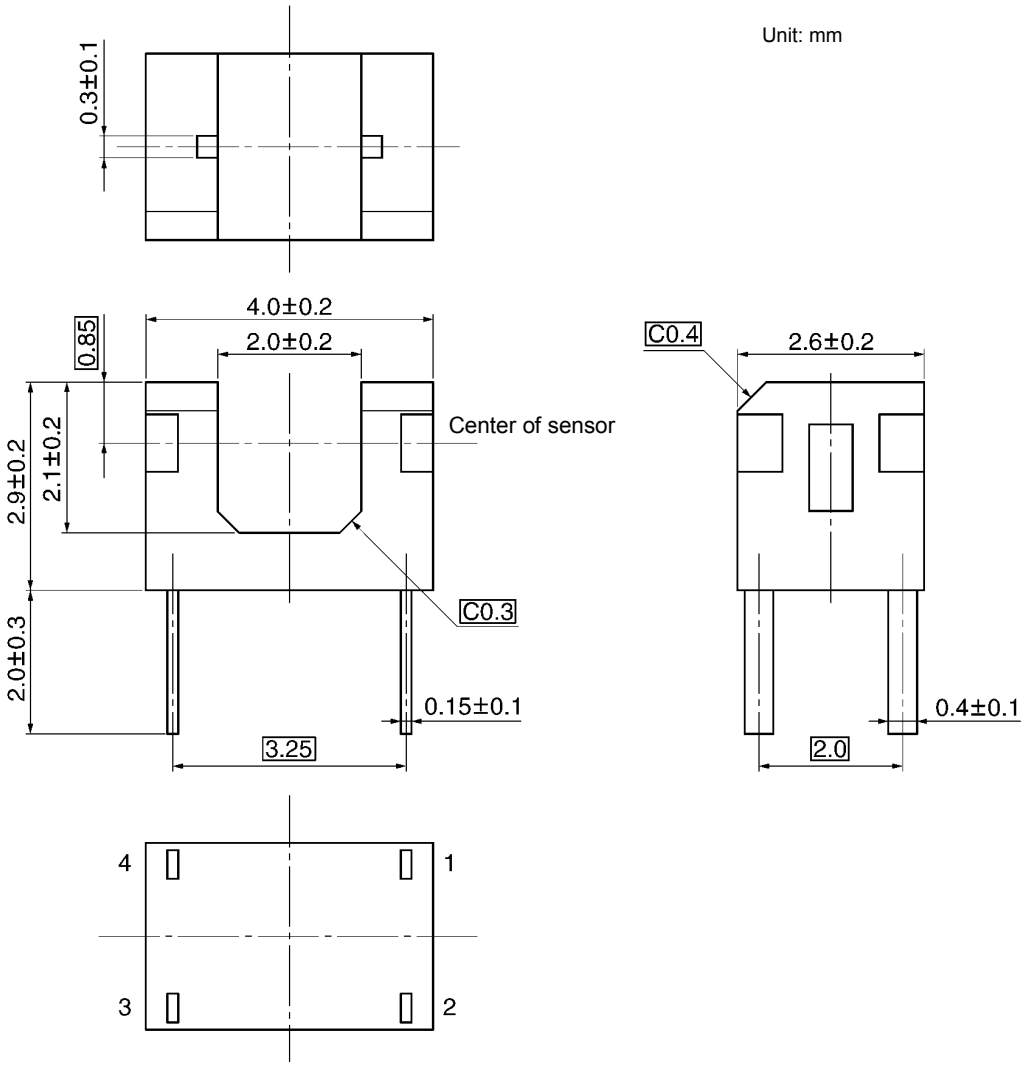
Precautions

- When removing flux with chemicals after soldering, clean only the leads on the soldering side; do not dip the whole package for cleaning.
  Chemicals remaining on an LED or photo transistor light emitter or receiver, if any, would have a bad influence to the optical characteristics and it may severely lower the conversion efficiency.
- Protect the device from ambient light interference. If it gets strong ambient light (sunlight of high illumination, incandescent light with many infrared light ingredients, etc.) directly, it may cause malfunction. Please thoroughly evaluate the equipment in which the device is used.
- Care must be taken in relation to the environment in which the device is to be installed. Oil or chemicals may cause the package to melt or crack.
- The device should be mounted on an unwarped surface.
- Conversion efficiency falls over time due to the current which flows in the infrared LED. When designing a circuit, take into account this change in conversion efficiency over time. The ratio of fluctuation in conversion efficiency to fluctuation in infrared LED optical output is 1:1.

$$\frac{I_C/I_F\ (t)}{I_C/I_F\ (0)} = \frac{P_o\ (t)}{P_o\ (0)}$$

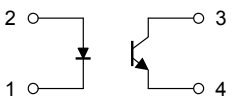
Package Dimensions: TOSHIBA 11-4J1

Unit: mm



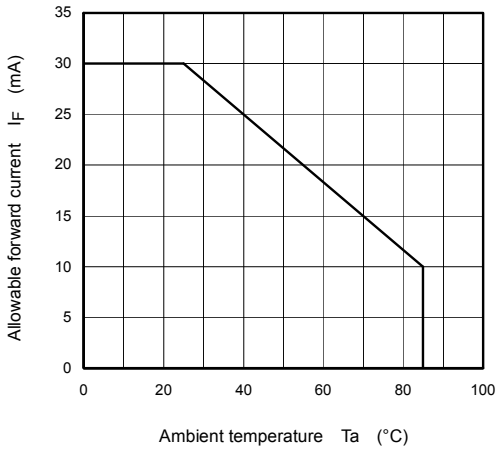
Weight: 0.037 g (typ.)

Pin Connection

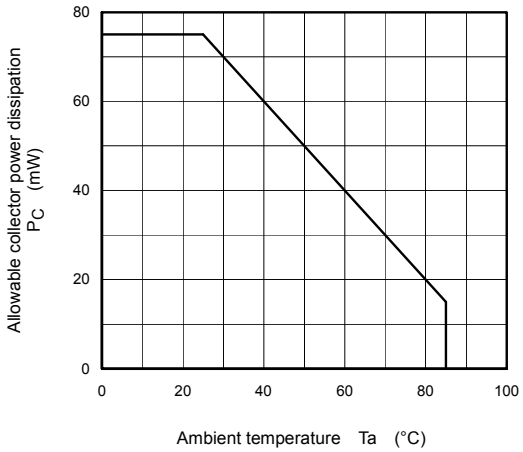


1: Cathode
2: Anode
3: Collector
4: Emitter

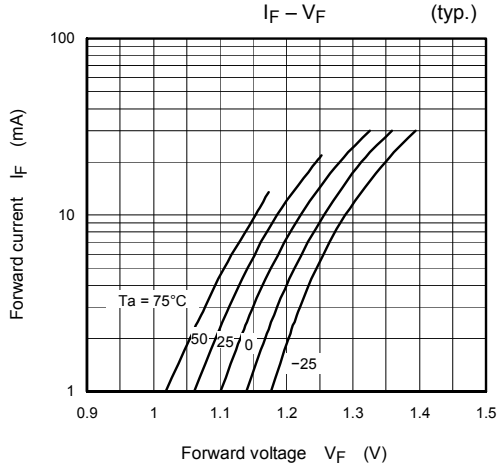
I_F – Ta



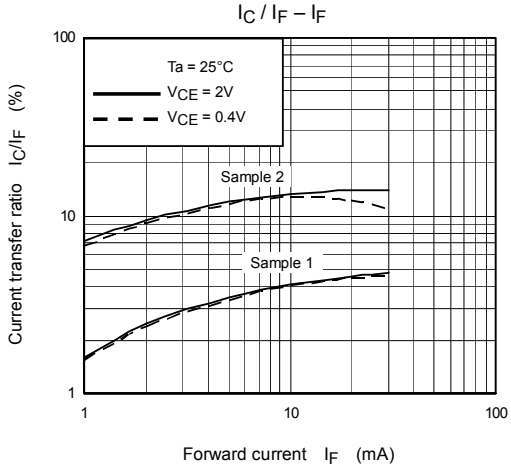
P_C – Ta



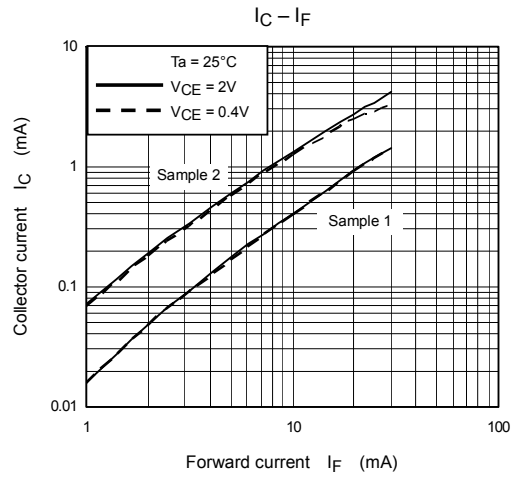
I_F – V_F (typ.)



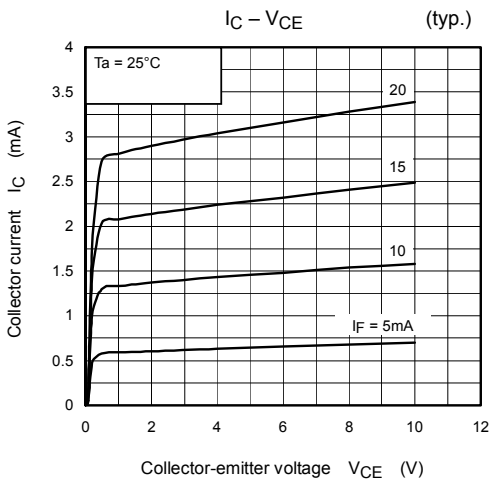
I_C / I_F – I_F



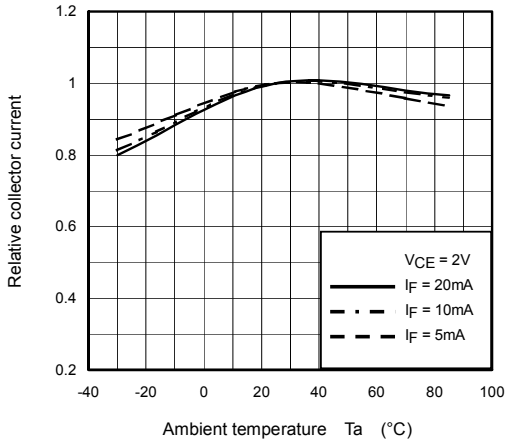
I_C – I_F



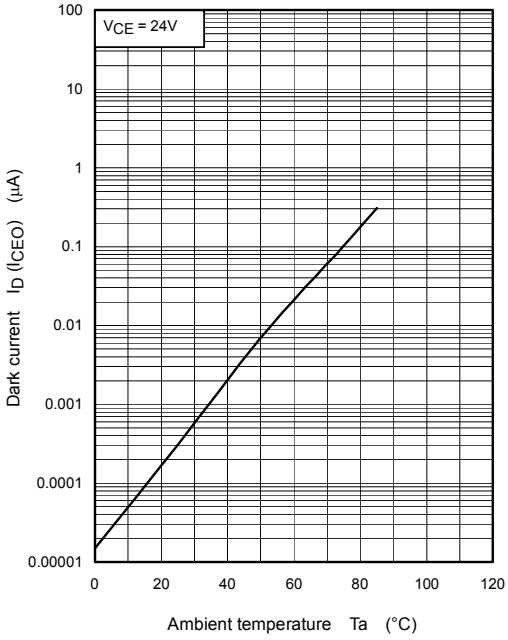
I_C – V_{CE} (typ.)



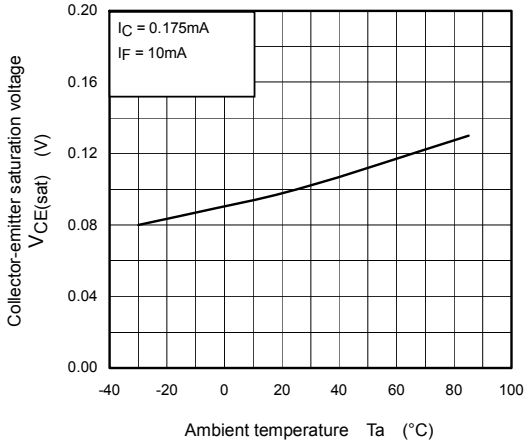
Relative I_C – Ta (typ.)



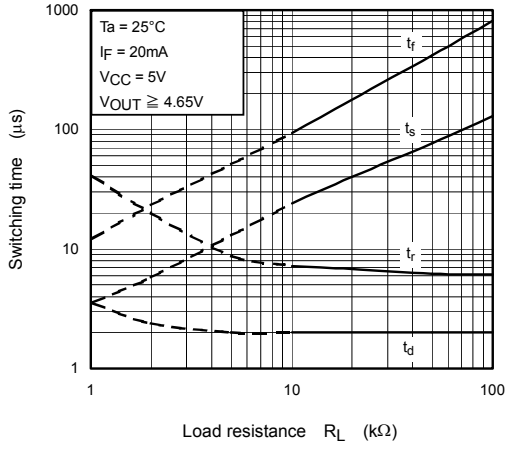
I_D (I_{CEO}) – Ta (typ.)



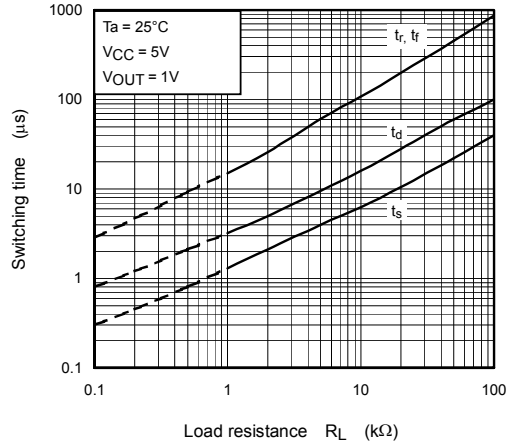
$V_{CE\ (sat)}$ – Ta (typ.)

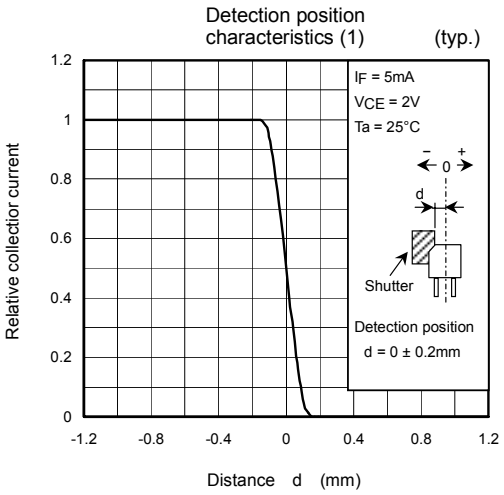


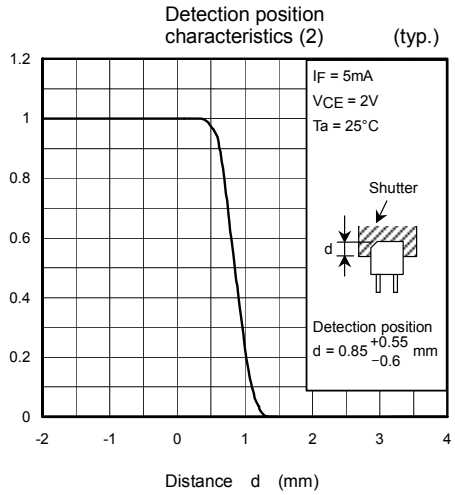
Switching characteristics (saturated operation) (typ.)



Switching characteristics (non saturated operation) (typ.)

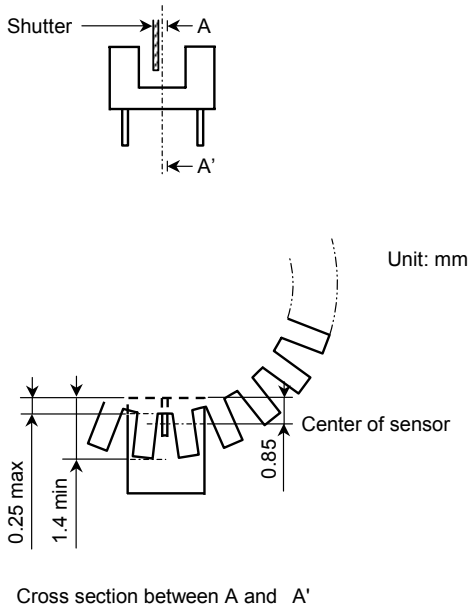






Relative Positioning of Shutter and Device

For normal operation, position the shutter and the device as shown in the figure below. By considering the device's detection direction characteristic and switching time, determine the shutter slit width and pitch.



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