TOSHIBA PhotoInterrupter Infrared LED + Phototransistor

TLP831(F)

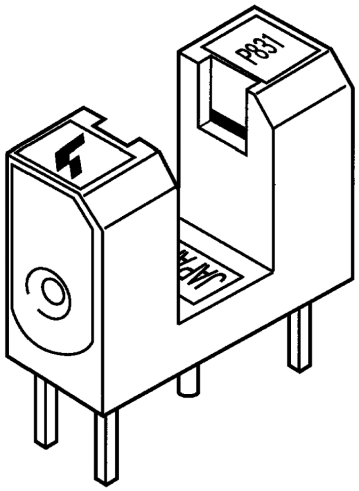
Lead(Pb)-Free

Home Electronics Equipment Such As VCRS And CD Players

OA Equipment Such As Copiers, Printers, And Facsimiles

Automatic Servicing Equipment

Various Position Detection Sensor



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Weight: 0.58 g (typ.)

The TLP831(F) photointerrupter consists of a high radiant power GaAs infrared LED and a Si phototransistor.
Housed in a short lead package, this device is ideal for automatic mounting.

- Printed wiring board direct mounting type (with a locating pin)
- Short lead type enabling automatic mounting
  : Lead length 3.4 ± 0.3mm
- Board thickness: 1.6mm or less
- Gap: 4.2mm
- Resolution: Slit width 0.5mm
- High current transfer ratio: I_C / I_F = 5% (min)
- High response speed: t_r, t_f = 15μs (typ.)
- Detector side is of visible light cut type.
- Material of the package
  : Polybutylene terephthalate (UL94V−0, black color)

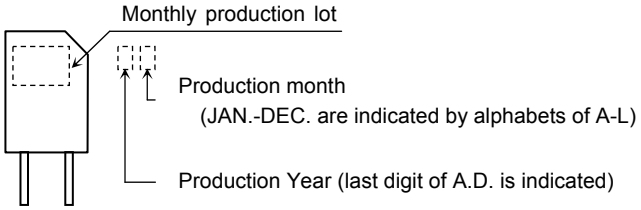
Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	50	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		T_{opr}	−30~85	°C
Storage temperature		T_{stg}	−40~100	°C
Soldering temperature (5 s) (Note 1)		T_{sol}	260	°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 and the operating ranges.
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: At the location of 1.5mm from the resin package bottom

Product Indication



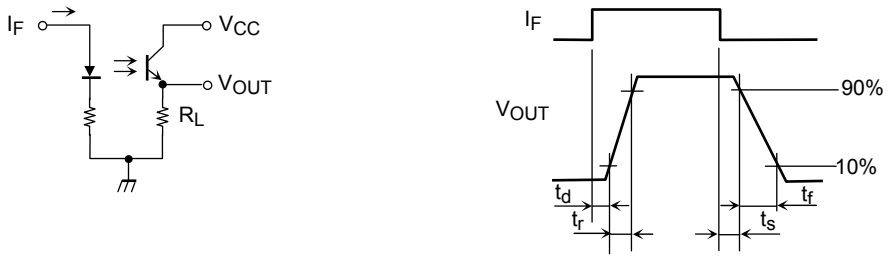
Operating Ranges

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	—	5	24	V
Forward current	I_F	—	—	25	mA
Operating temperature	T_{opr}	−10	—	75	°C

Opto Electrical Characteristics (Ta = 25°C)

	Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	I_F = 10mA	1.00	1.15	1.30	V
	Reverse current	I_R	V_R = 5V	—	—	10	μA
	Peak emission wavelength	λ_P	I_F = 10mA	—	940	—	nm
Detector	Dark current	I_D (I_{CEO})	V_{CE} = 24V, I_F = 0	—	—	0.1	μA
	Peak sensitivity wavelength	λ_P		—	870	—	nm
Coupled	Current transfer ratio	I_C / I_F	V_{CE} = 2V, I_F = 10mA	5	—	100	%
	Collector–emitter saturation voltage	$V_{CE\ (sat)}$	I_F = 20mA, I_C = 0.5mA	—	0.1	0.35	V
	Rise time	t_r	V_{CC} = 5V, I_C = 1mA R_L = 1kΩ (Note 2)	—	15	50	μs
	Fall time	t_f		—	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 a surface of LED or phototransistor, if any, would have a bad influence to the optical characteristics and it may severely lower the conversion efficiency.
- The environment to install the device should be determined carefully. Oil or chemicals may cause the package to be dissolved or cracked.
- The device should be mounted on an unwrapped surface.
- Install this device as avoiding the disturbance light as possible. A visible light cut–off type phototransistor which blocks light with frequencies of 700nm or above is used. However, the device cannot block infrared light with a wavelength of 700nm or more, and it may do mistaken movements.
- 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.

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

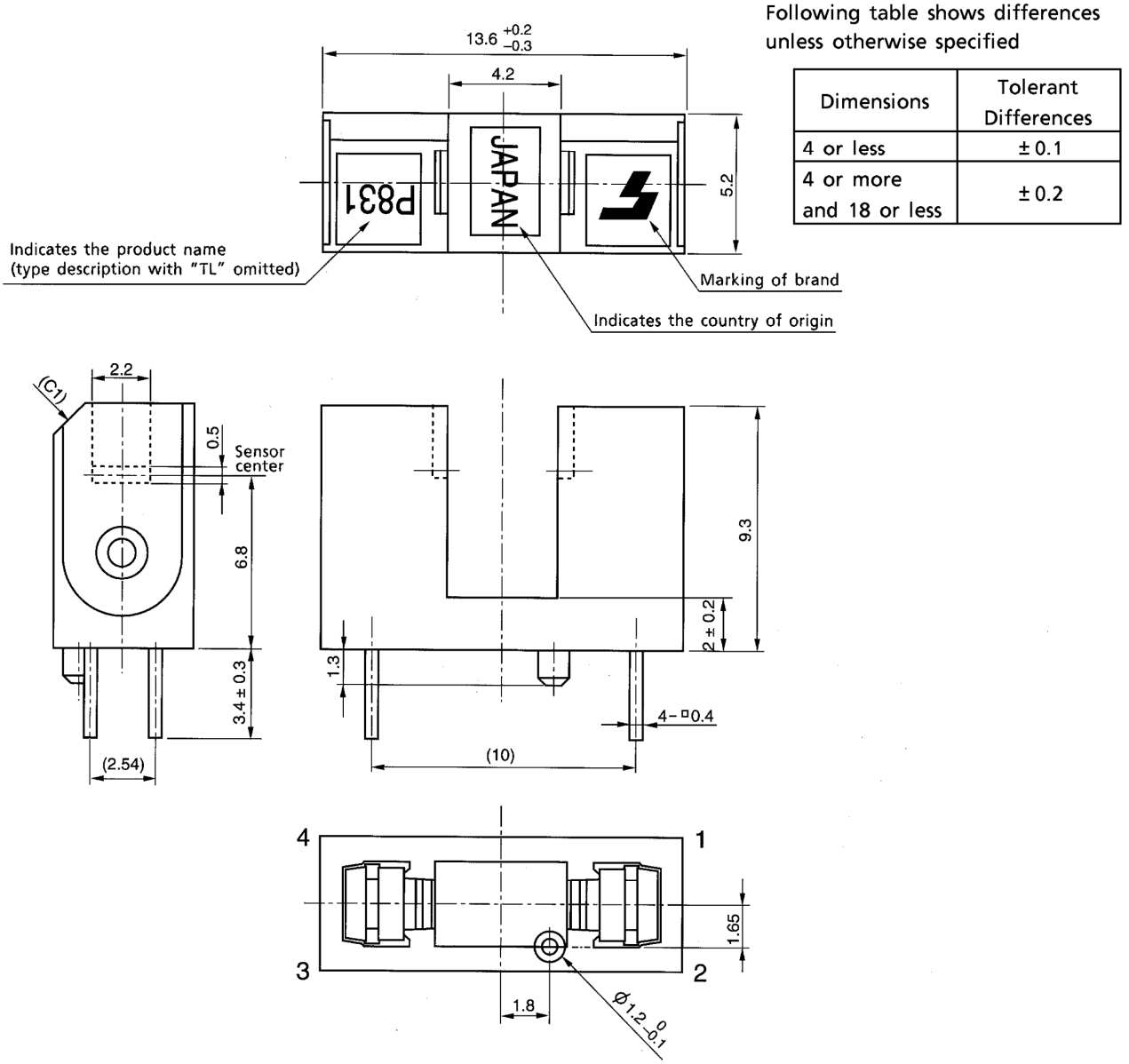
Outline: TOSHIBA

Unit: mm

( ) : REFERENCE VALUE

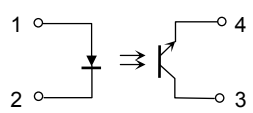
Following table shows differences unless otherwise specified

Dimensions	Tolerant Differences
4 or less	± 0.1
4 or more and 18 or less	± 0.2



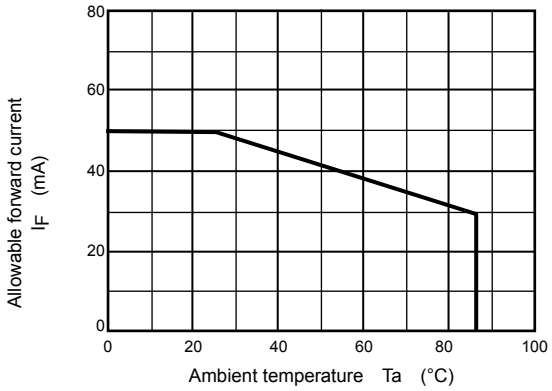
Weight: 0.58 g (typ.)

Pin Connection

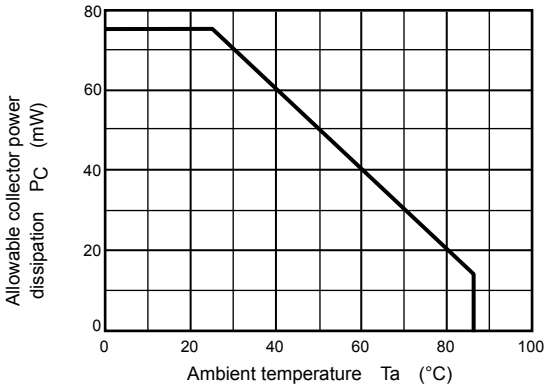


1. Anode
2. Cathode
3. Collector
4. Emitter

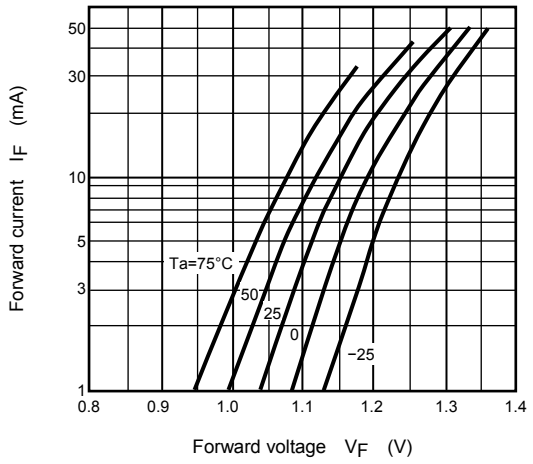
I_F – Ta



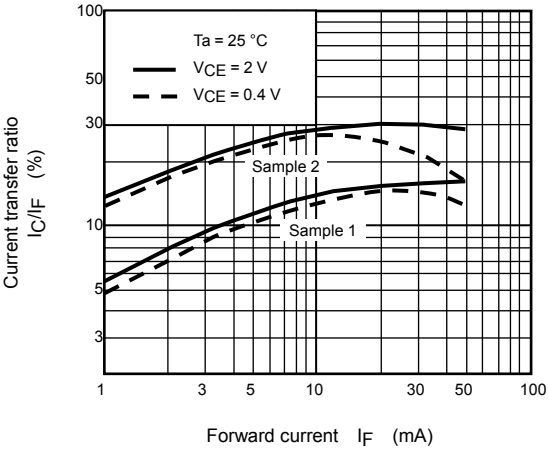
P_C – Ta



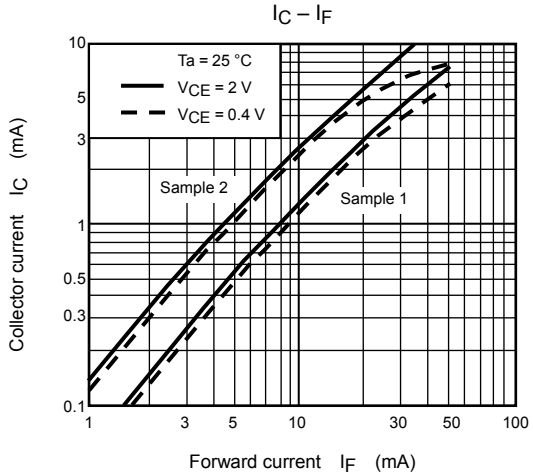
I_F – V_F (typ.)



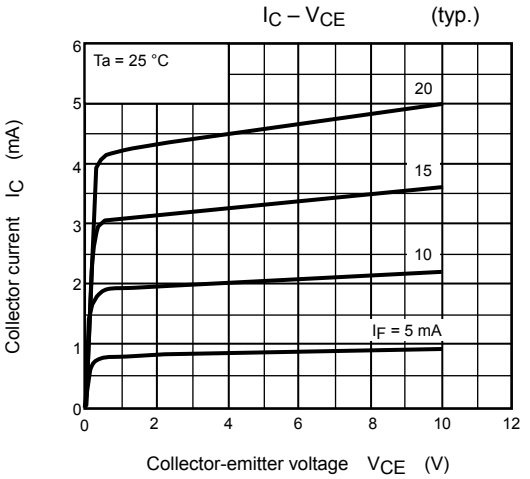
I_C/I_F – I_F



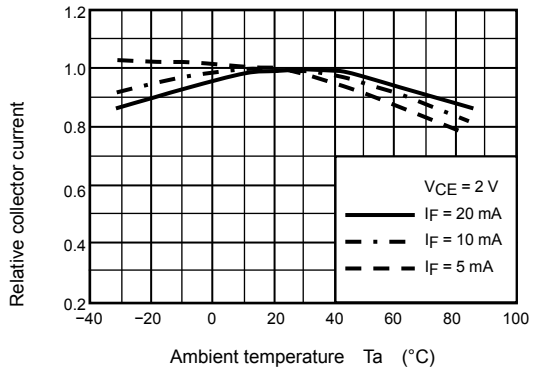
I_C – I_F



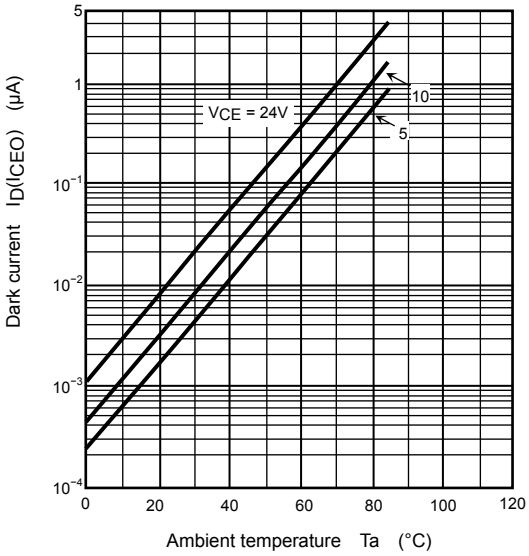
I_C – V_{CE} (typ.)



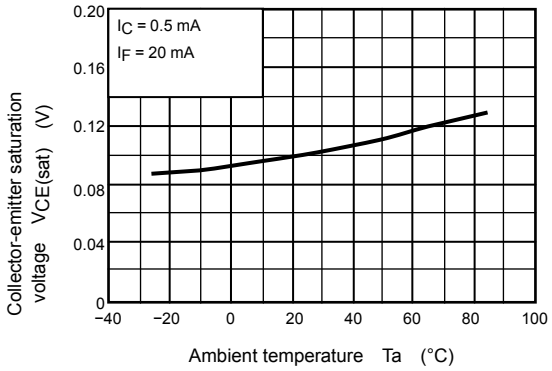
Relative I_C – Ta (typ.)



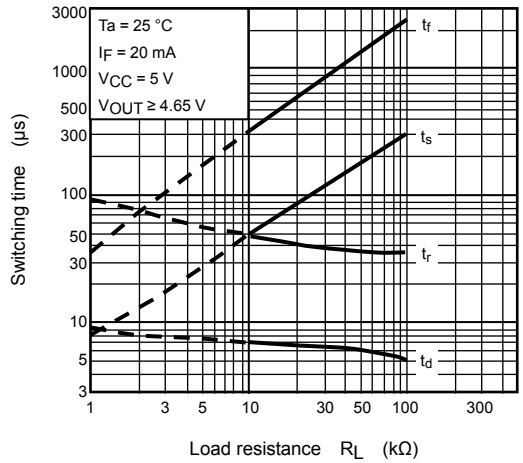
$I_D(I_{CEO})$ – Ta (typ.)



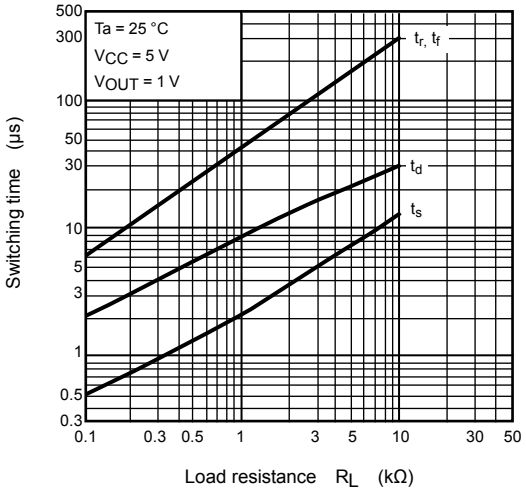
$V_{CE(sat)}$ – Ta (typ.)



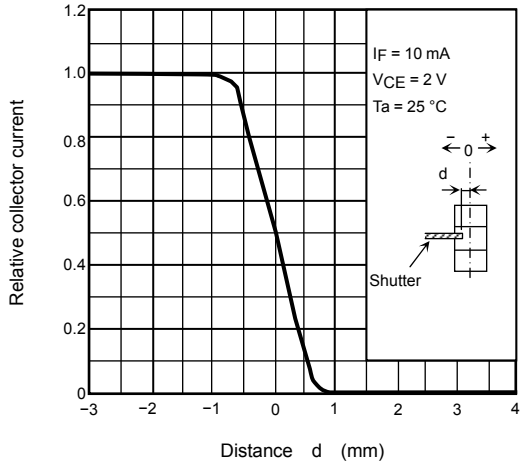
Switching Characteristics (Saturated Operation) (typ.)



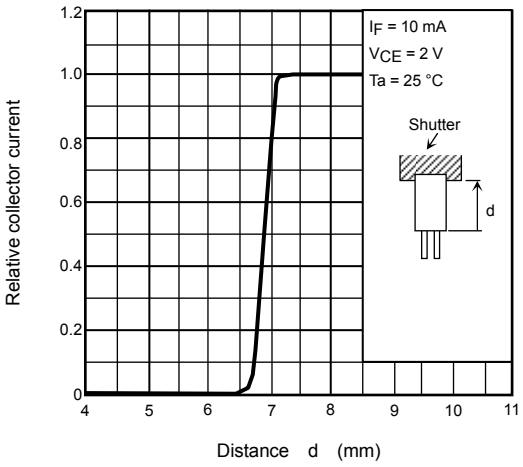
Switching Characteristics (non saturated operation) (typ.)



Detecting Position Characteristics(1) (Typ.)



Detecting Position Characteristics (2) (Typ.)



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