

TOSHIBA Photointerrupter Infrared LED + Phototransistor

## TLP830(F)

Lead(Pb)-Free

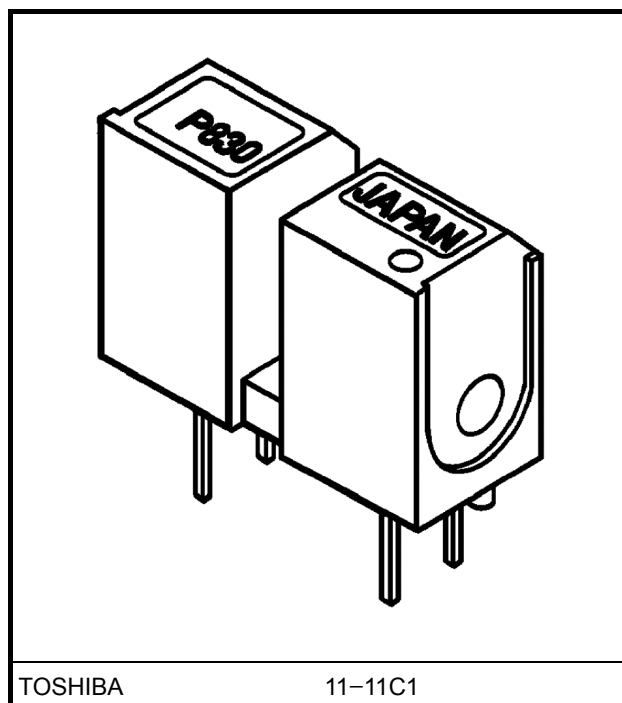
Track "00" Sensor For Floppy Disk Drive

Detection Of Sub-Scanning Quantity By Image Scanner

Various Position Detection Sensor

TLP830(F) is a photointerrupter which uses a high-radiant power GaAs LED and a fast-response Si phototransistor. The device is high resolution with a narrow slit pitch.

- Small package: 7.4mm (H), 4.5mm (D)
- Printed wiring board direct mounting type (with a locating pin).
- Board thickness: 1mm or less
- Short lead type enabling automated mounting
- Gap: 2mm
- High resolution: Slit width 0.15mm
- High current transfer ratio:  $I_C/I_F = 3\%$  (min)
- Material of the package  
: Polybutylene terephthalate  
(UL94V-0, black color)
- Detector side is of visible light cut type.



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Weight: 0.4 g (typ.)

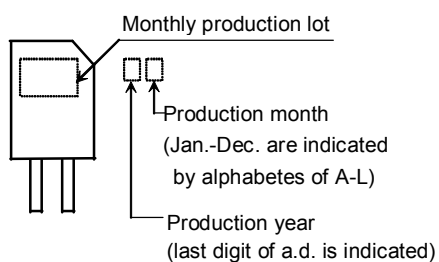
### Absolute Maximum Ratings (Ta = 25°C)

Characteristic			Symbol	Rating	Unit
LED	Forward current		I <sub>F</sub>	50	mA
	Forward current derating	T <sub>a</sub> > 25°C	ΔI <sub>F</sub> / °C	-0.33	mA / °C
		T <sub>a</sub> > 85°C		-2	
	Reverse voltage		V <sub>R</sub>	5	V
Detector	Collector-emitter voltage		V <sub>CEO</sub>	35	V
	Emitter-collector voltage		V <sub>ECO</sub>	5	V
	Collector power dissipation		P <sub>C</sub>	75	mW
	Collector power dissipation derating (T <sub>a</sub> > 25°C)		ΔP <sub>C</sub> / °C	-1	mW / °C
	Collector current		I <sub>C</sub>	50	mA
Operating temperature range			T <sub>opr</sub>	-30~85	°C
Storage temperature range			T <sub>stg</sub>	-40~100	°C
Soldering temperature (5 s)			T <sub>sol</sub>	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).

## Product Indication



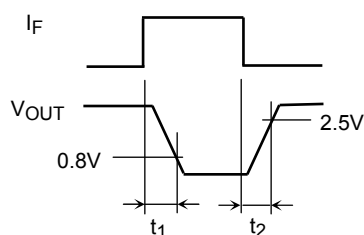
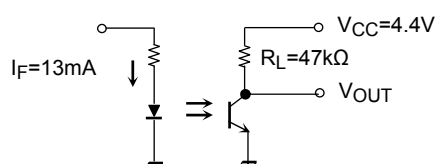
## Operating Ranges

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 ( $T_a = 25^\circ\text{C}$ )

Characteristic			Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage		$V_F$	$I_F = 10 \text{ mA}$	1.00	1.15	1.30	V
	Reverse current		$I_R$	$V_R = 5 \text{ V}$	—	—	10	$\mu\text{A}$
	Peak emission wavelength		$\lambda_P$	$I_F = 10 \text{ mA}$	—	940	—	nm
Detector	Dark current		$I_D$	$V_{CE} = 24 \text{ V}, I_F = 0$	—	—	0.1	$\mu\text{A}$
	Peak sensitivity wavelength		$\lambda_P$		—	870	—	nm
Coupled	Current transfer ratio		$I_C/I_F$	$V_{CE} = 2 \text{ V}, I_F = 10 \text{ mA}$	3	—	20	%
	Collector–emitter saturation voltage		$V_{CE}(\text{sat})$	$I_F = 20 \text{ mA}, I_C = 0.3 \text{ mA}$	—	0.1	0.35	V
	Switching times	Rise time	$t_r$	$V_{CC} = 5 \text{ V}, I_C = 1 \text{ mA}$	—	15	—	$\mu\text{s}$
		Fall time	$t_f$	$R_L = 1 \text{ k}\Omega$	—	15	—	
		Response time (1)	$t_1$	$V_{CC} = 4.4 \text{ V}, I_C = 13 \text{ mA}$	—	—	80	
		Response time (2)	$t_2$	$R_L = 47 \text{ k}\Omega$ (Note)	—	—	800	

Note:  $t_1, t_2$  test condition

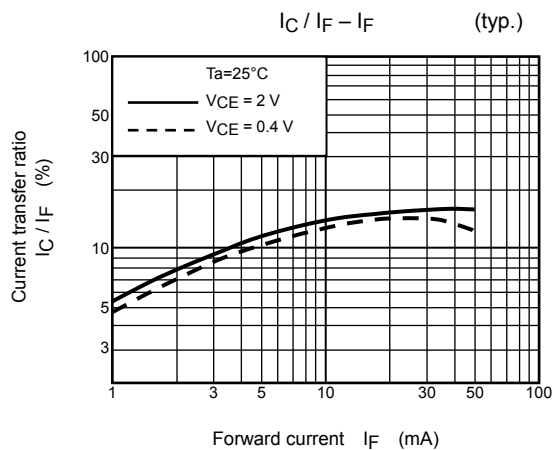
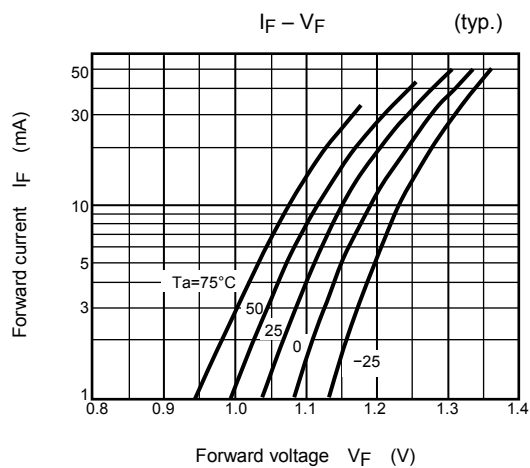
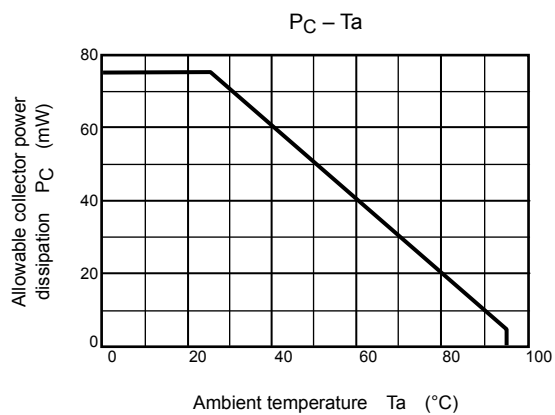
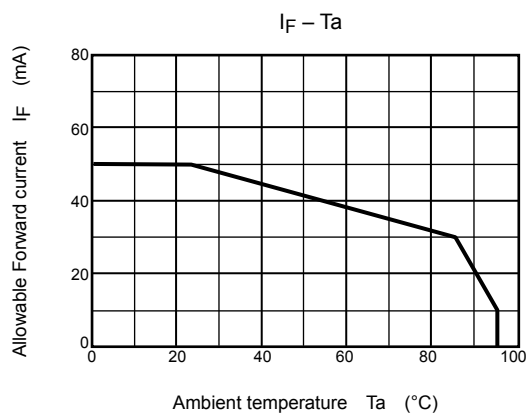


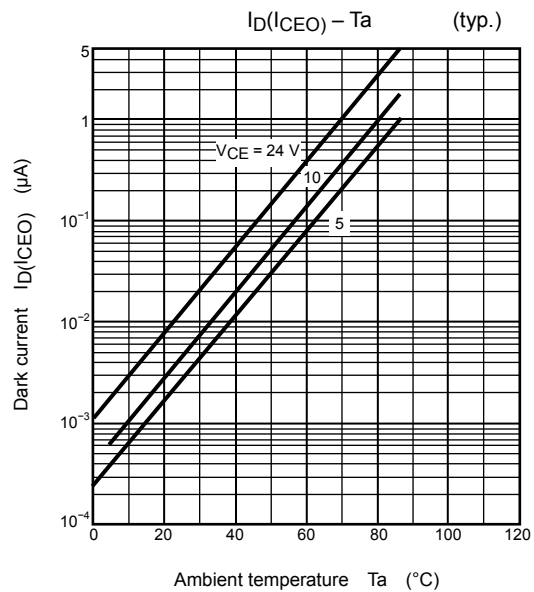
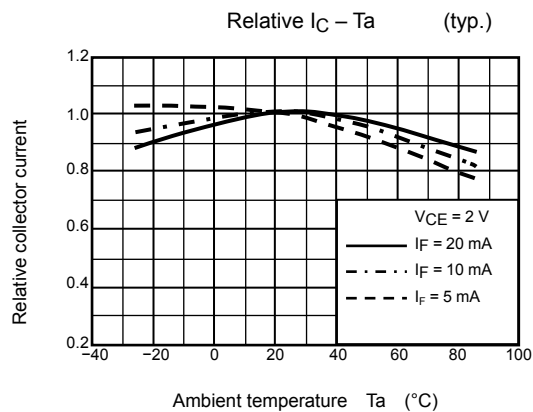
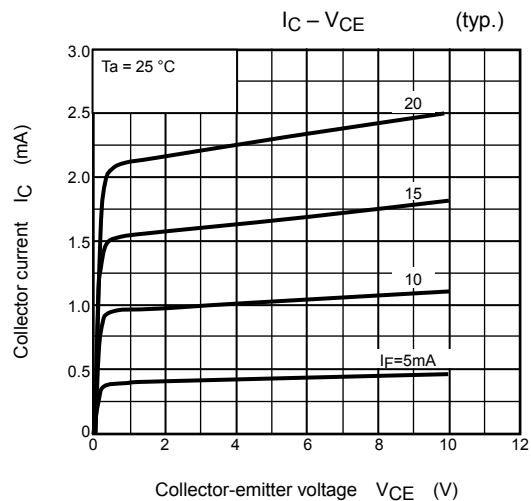
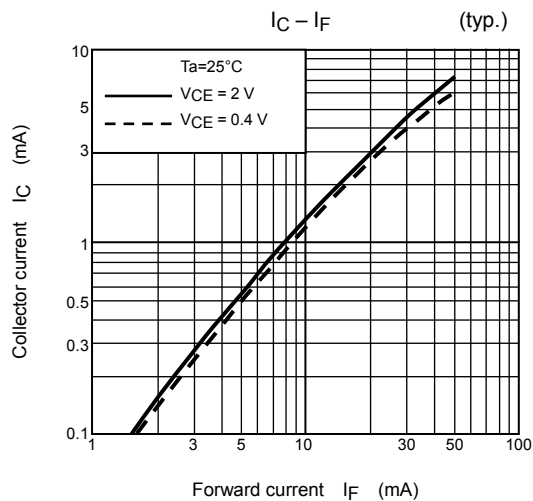
**Precaution**

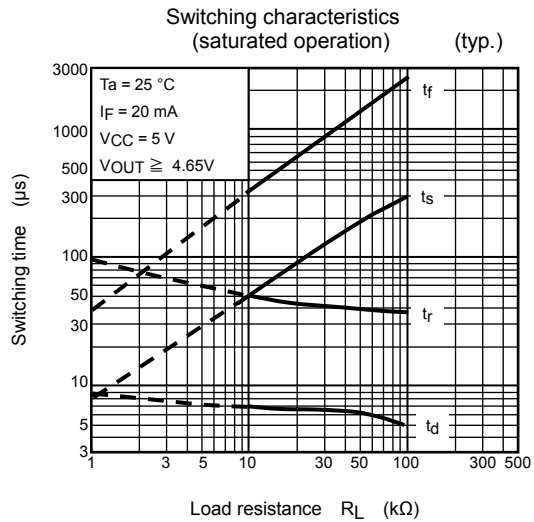
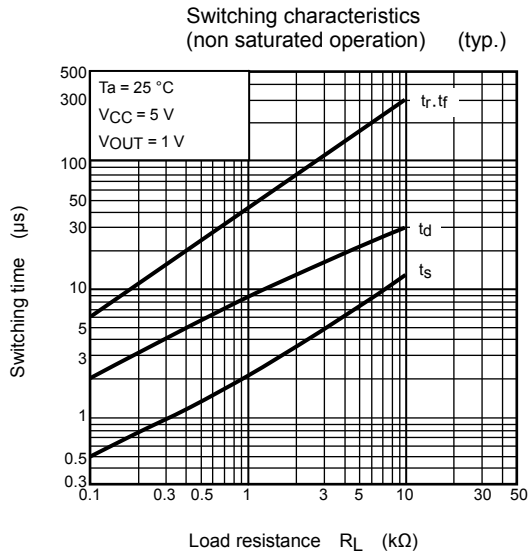
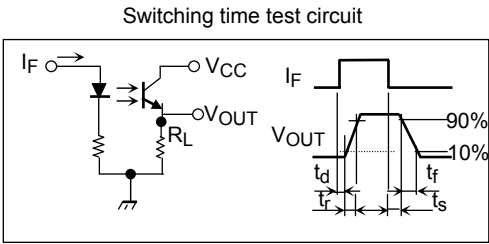
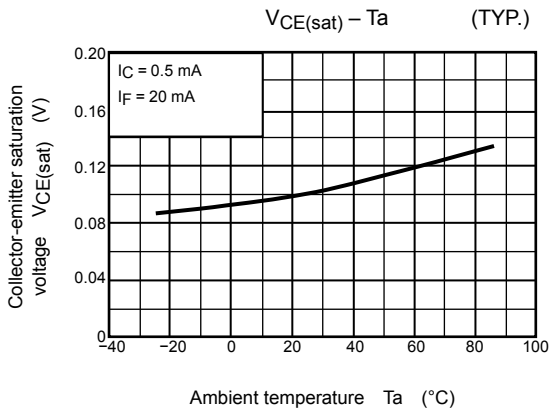
1. If the chemical are used for cleaning, the soldered surface only shall be cleaned with chemicals avoiding the whole cleaning of the package.
2. The container is made of polybutylene terephthalate. Oil or chemicals may cause melting or cracks. Check the environment carefully before installing.
3. Shall be mounted on an unwarped surface.
4. A visible light cut-off type photo transistor which blocks light with frequencies of 700nm or above is used. However, the device cannot block ambient light with a wavelength of 700nm or more or sunlight. Install avoiding the disturbance light.
5. 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.

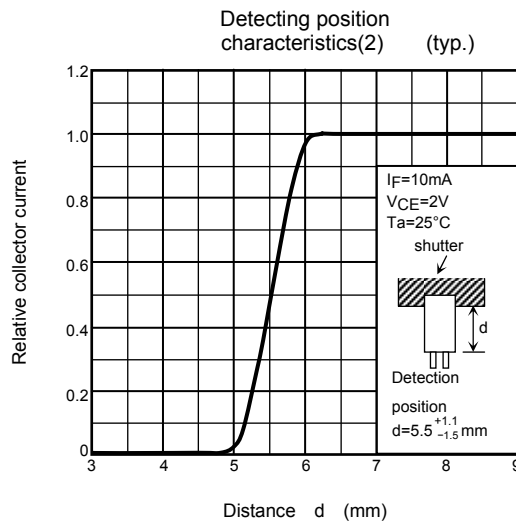
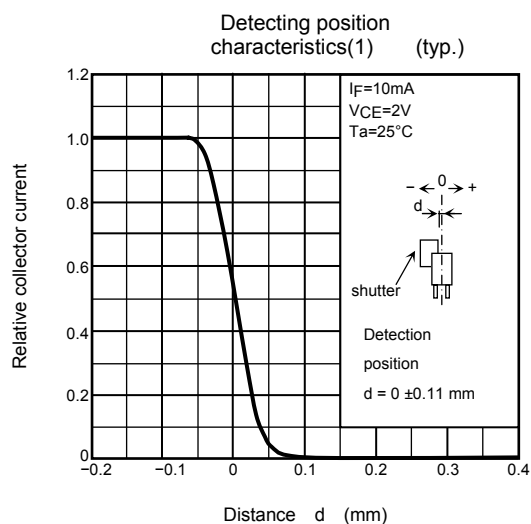
$$\frac{I_C / I_F(t)}{I_C / I_F(0)} = \frac{P_O(t)}{P_O(0)}$$





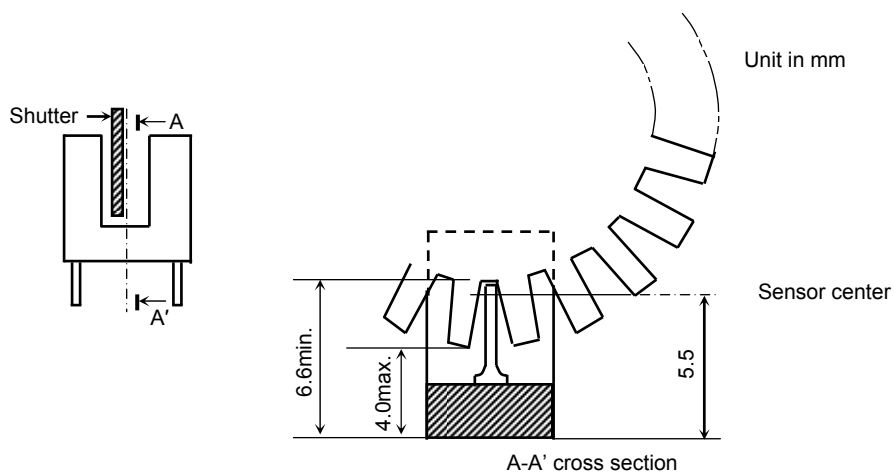






## Positioning Of Shutter And Device

To operate correctly, make sure that the shutter and the device are positioned as shown in the figure below. The slit pitch of the shutter must be set wider than the slit width of the device. Determine the width taking the switching time into consideration.





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