TOSHIBA PHOTO INTERRUPTER INFRARED LED + PHOTO TRANSISTOR

TLP832

HOME ELECTRONICS EQUIPMENT SUCH AS VCRS AND CD PLAYERS

OA EQUIPMENT SUCH AS COPIERS, PRINTERS, AND FACSIMILES

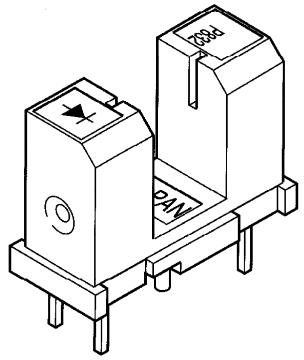
AUTOMATIC SERVICING EQUIPMENT SUCH AS COMMODITY AND TICKET VENDING MACHINES

VARIOUS POSITION DETECTION SENSOR

The TLP832 photointerrupter consists of a 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 : 1mm or less
- Gap : 5mm
- Resolution : Slit width 0.5mm
- High current transfer ratio : $I_C / I_F = 5\%$ (min)
- High response speed : t_r, $t_f = 15\mu s$ (typ.)
- Detector side is of visible light cut type.
- Material of the package : Polybutylene terephthalate (UL94V-0, Black color)



JEDEC	—
EIAJ	—
TOSHIBA	11-14F1

Weight : 0.58g (typ.)

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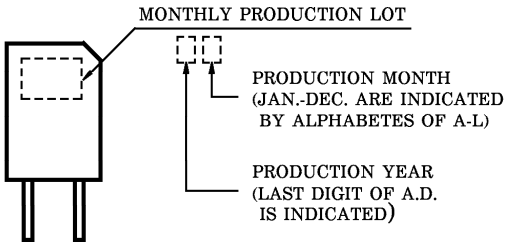
MAXIMUM RATINGS (Ta = 25°C)

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
DETECTER	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 (5s) (Note 1)		T_{sol}	260	°C

Note 1 : At the location of 1.5mm from the resin package bottom

PRODUCT INDICATION



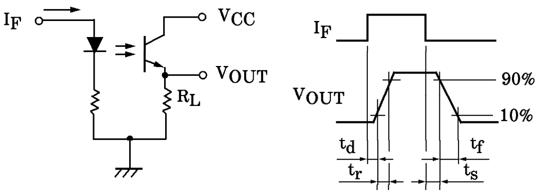
RECOMMENDED OPERATING CONDITIONS

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	$V_{CC} = 5V$, $I_C = 1mA$, $R_L = 1k\Omega$	—	15	50	μs
	Fall Time	t_f		—	15	50	

Note 2 : Switching time measurement circuit and waveform

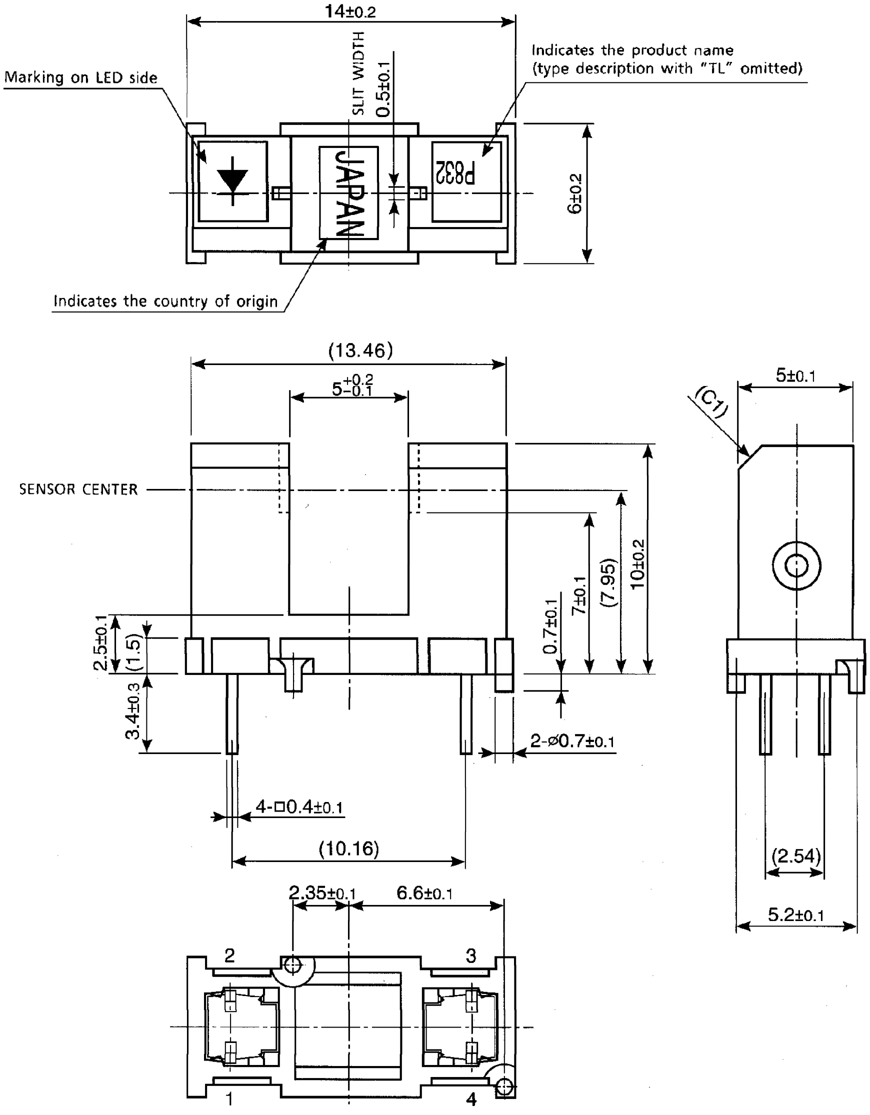


PRECAUTIONS

- 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 an LED or phototransistor light emitter or receiver, 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 unwarped 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.
- The current transfer ratio is gradually lowered when infrared LED is powered. The efficiency deterioration by aging should be considered when designing the circuit.

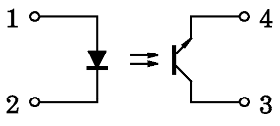
OUTLINE : TOSHIBA

Unit : mm
( ) : REFERENCE VALUE



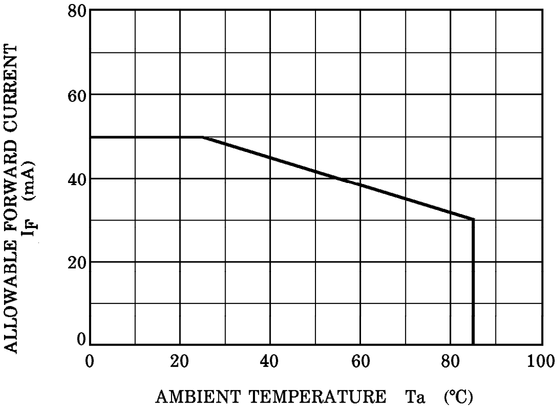
Weight : 0.58g (TYP.)

PIN CONNECTION

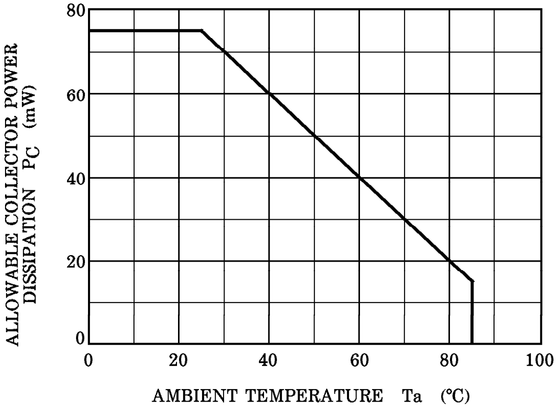


1. ANODE
2. CATHODE
3. COLLECTOR
4. EMITTER

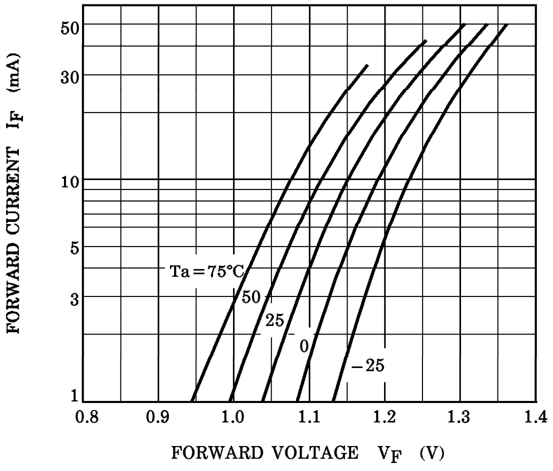
I_F – Ta



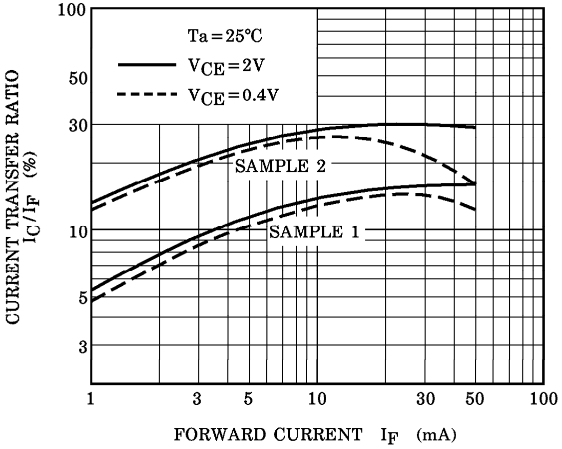
P_C – Ta

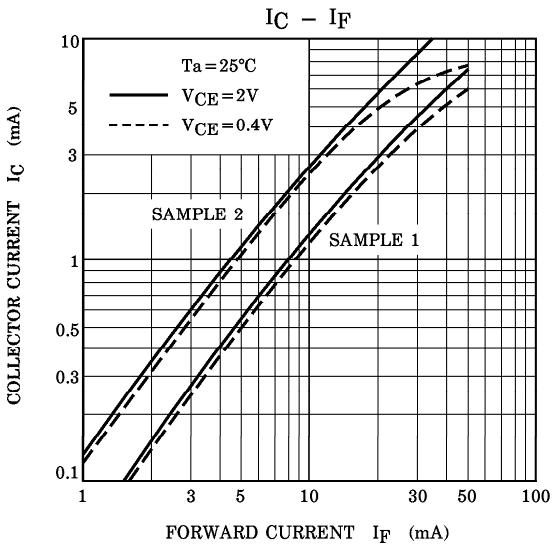


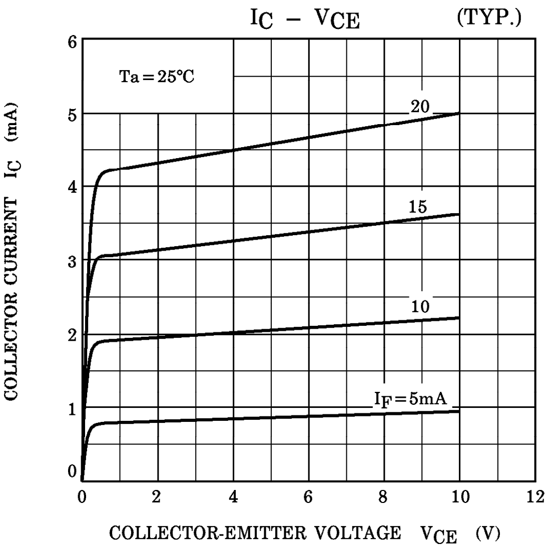
I_F – V_F (TYP.)

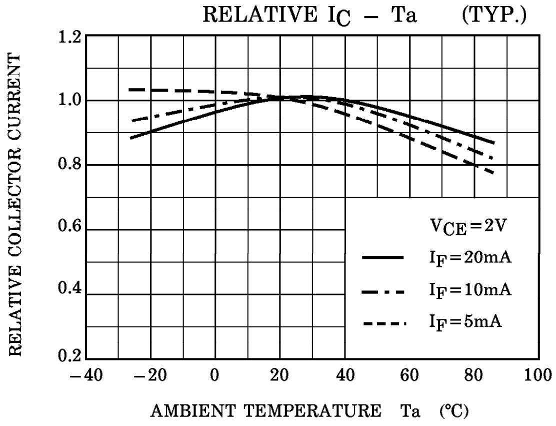


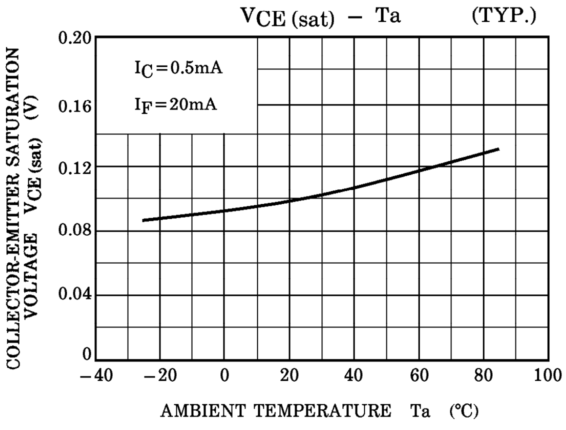
I_C/I_F – I_F

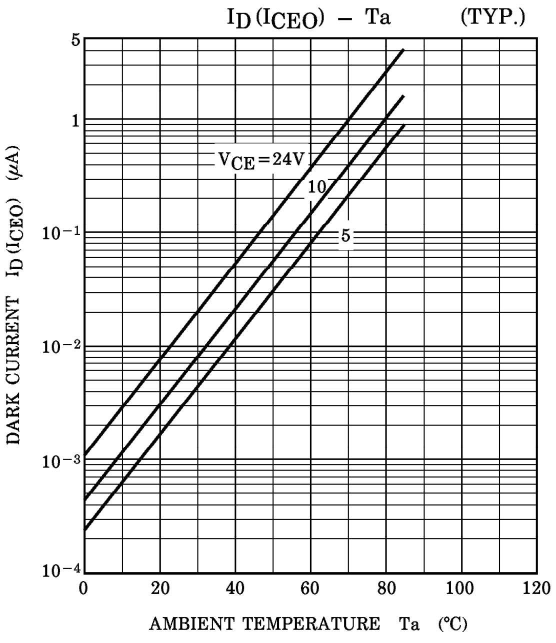



I_C – I_F

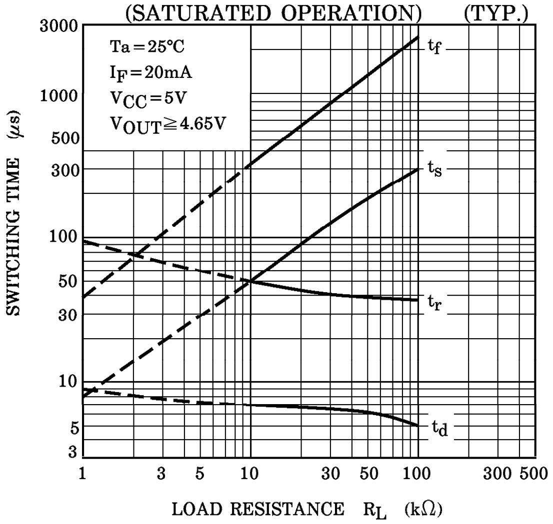

I_C – V_{CE} (TYP.)


RELATIVE I_C – Ta (TYP.)

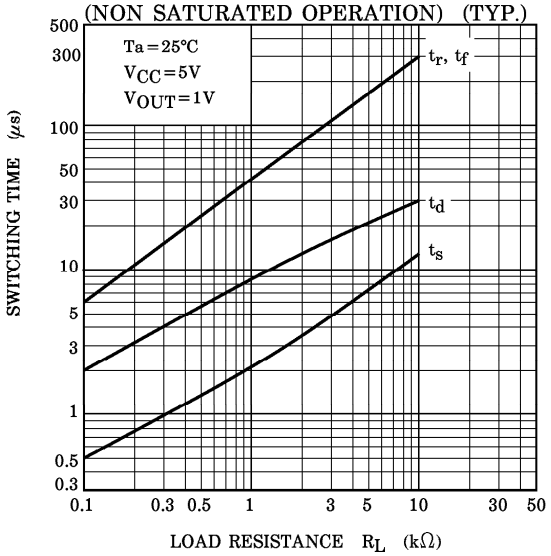

$V_{CE\,(sat)}$ – Ta (TYP.)


I_D (I_{CEO}) – Ta (TYP.)

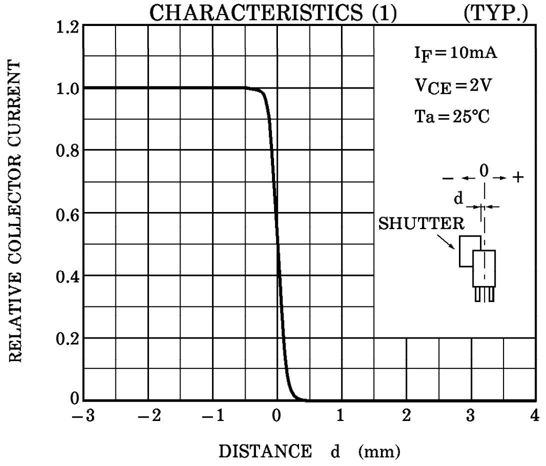
SWITCHING CHARACTERISTICS (SATURATED OPERATION) (TYP.)



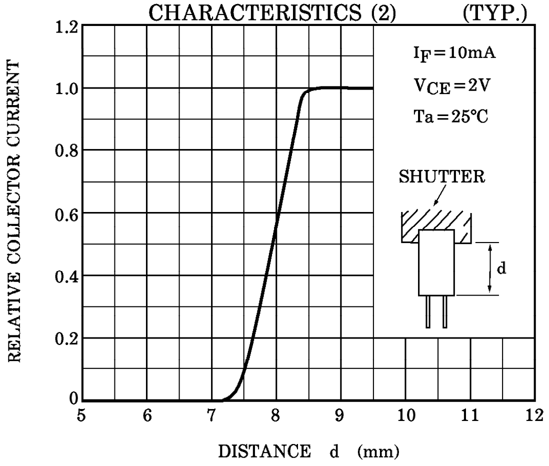
SWITCHING CHARACTERISTICS (NON SATURATED OPERATION) (TYP.)



DETECTING POSITION CHARACTERISTICS (1) (TYP.)



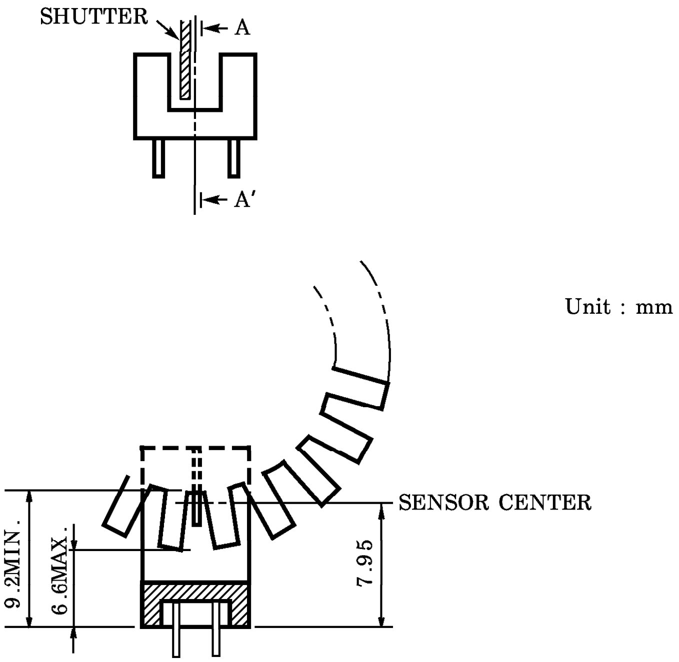
DETECTING POSITION CHARACTERISTICS (2) (TYP.)



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 shit pitch of the shutter must be set wider than the slit width of the device.
Determine the width taking the switching time into consideration.



A – A' CROSS SECTION