

TOSHIBA PHOTO-INTERRUPTER INFRARED LED + PHOTOTRANSISTOR

**TLP832**

ELECTRONIC EQUIPMENT SUCH AS VCRS AND CD PLAYERS

OFFICE EQUIPMENT SUCH AS COPIERS, PRINTERS AND FAX MACHINES

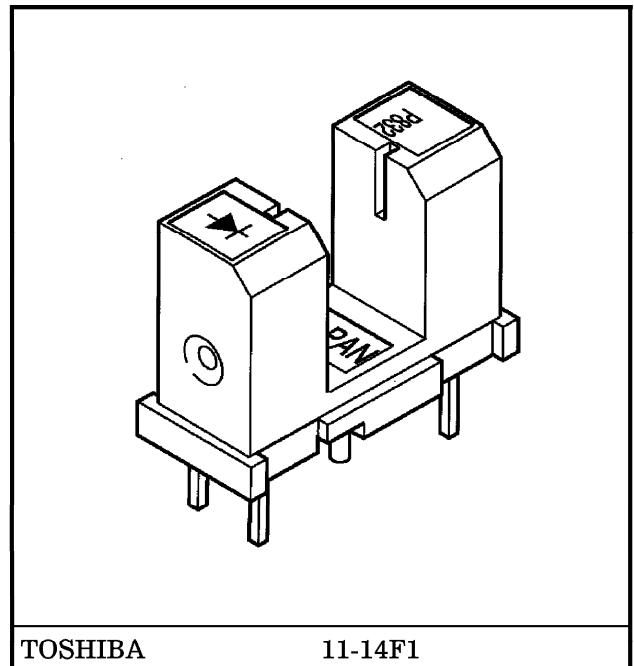
AUTOMATIC VENDING MACHINES

VARIOUS POSITION DETECTION SENSORS

The TLP832 photo-interrupter consists of a GaAs infrared LED and an Si phototransistor.

Housed in a short-lead package, this device is ideal for automatic mounting.

- Designed for direct mounting on printed circuit boards (positioning pins included).
- Short leads enabling automatic mounting  
: Lead length  $3.4 \text{ mm} \pm 0.3 \text{ mm}$
- Board thickness : 1.6 mm or less
- Gap : 5 mm
- Resolution : Slit width = 0.5 mm
- High current transfer ratio :  $I_C / I_F = 5\%$  (min)
- High temperature operation :  $T_{opr} = 95^\circ\text{C}$  (max)
- High response speed :  $t_r, t_f = 15 \mu\text{s}$  (typ.)
- Detector impermeable to visible light
- Package material : Polybutylene terephthalate (UL94V-0, black)



TOSHIBA

11-14F1

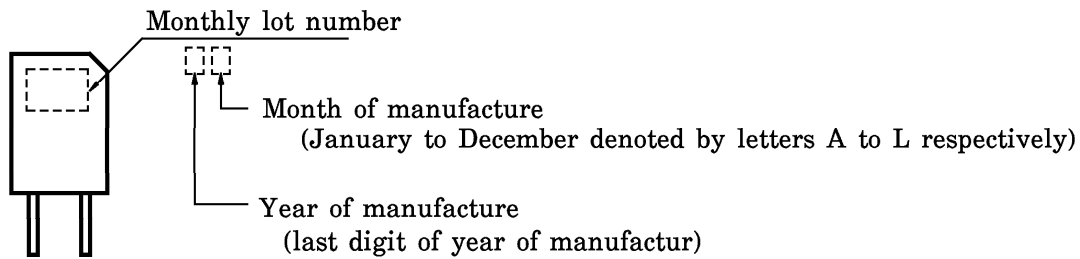
Weight : 0.58 g (typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	$I_F$	50	mA
	Forward Current Derating	$\Delta I_F / ^\circ C$	$25^\circ C < T_a \leq 85^\circ C$	-0.33
			$T_a > 85^\circ C$	-2
	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)	$\Delta P_C / ^\circ C$	-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 1) : At the location of 1.5 mm from the resin package bottom

MARKINGS



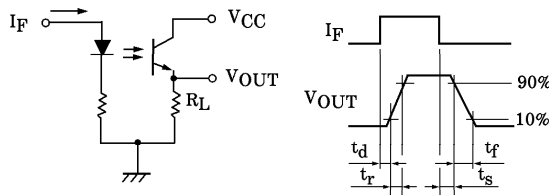
RECOMMENDED OPERATING CONDITIONS

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

OPTICAL AND ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.00	1.15	1.30	V
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA
	Peak Emission Wavelength	λ <sub>P</sub>	I <sub>F</sub> = 10 mA	—	940	—	nm
DETECTOR	Dark Current	I <sub>D</sub> (I <sub>CEO</sub> )	V <sub>CE</sub> = 24 V, I <sub>F</sub> = 0	—	—	0.1	μA
	Peak Sensitivity Wavelength	λ <sub>P</sub>		—	870	—	nm
COUPLED	Current Transfer Ratio	I <sub>C</sub> /I <sub>F</sub>	V <sub>CE</sub> = 2 V, I <sub>F</sub> = 10 mA	5	—	100	%
	Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>F</sub> = 20 mA, I <sub>C</sub> = 0.5 mA	—	0.1	0.35	V
	Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 5 V, I <sub>C</sub> = 1 mA, R <sub>L</sub> = 1 kΩ (Note 2)	—	15	50	μs
	Fall Time	t <sub>f</sub>		—	15	50	

(Note 2) : Switching time measurement circuit and waveform



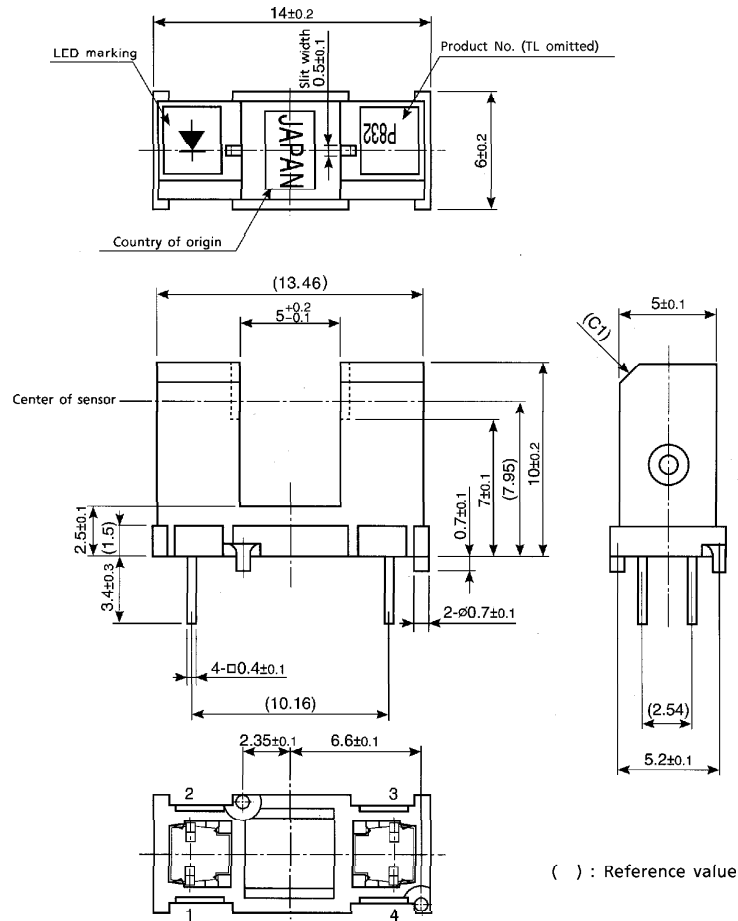
**PRECAUTIONS**

1. When removing flux with chemicals after soldering, clean only the soldered part of the leads. Do not immerse the entire package in the cleaning solvent. Chemical residue on the LED emitter or the phototransistor may adversely affect the optical characteristics of the device and may drastically reduce the conversion efficiency.
2. Care must 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.
3. Mount the device on a level surface.
4. Keep the device away from external light. Although the phototransistor is of low optical sensitivity, the device may malfunction if external light with a wavelength of 700 nm or more is allowed to impinge on it.
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.

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

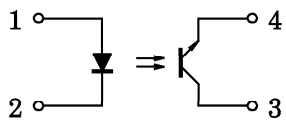
**PACKAGE DIMENSIONS**  
11-14F1

Unit : mm



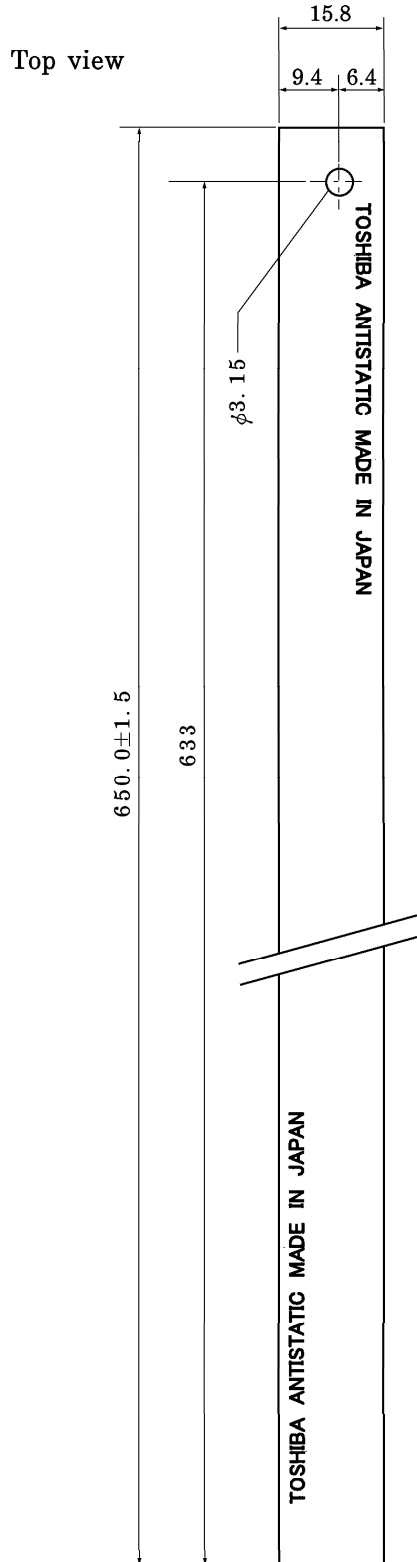
Weight : 0.58 g (typ.)

**PIN CONNECTION**



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

Stick specification of TLP832

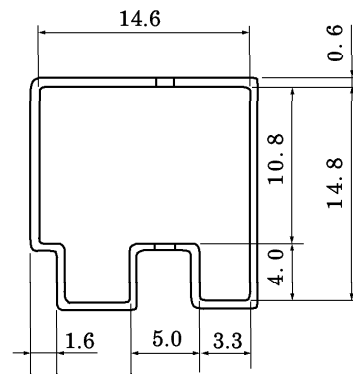


Unit : mm

Unless otherwise specified, tolerance : ±0.3 mm

Material : Polyvinyl chloride (PVC)

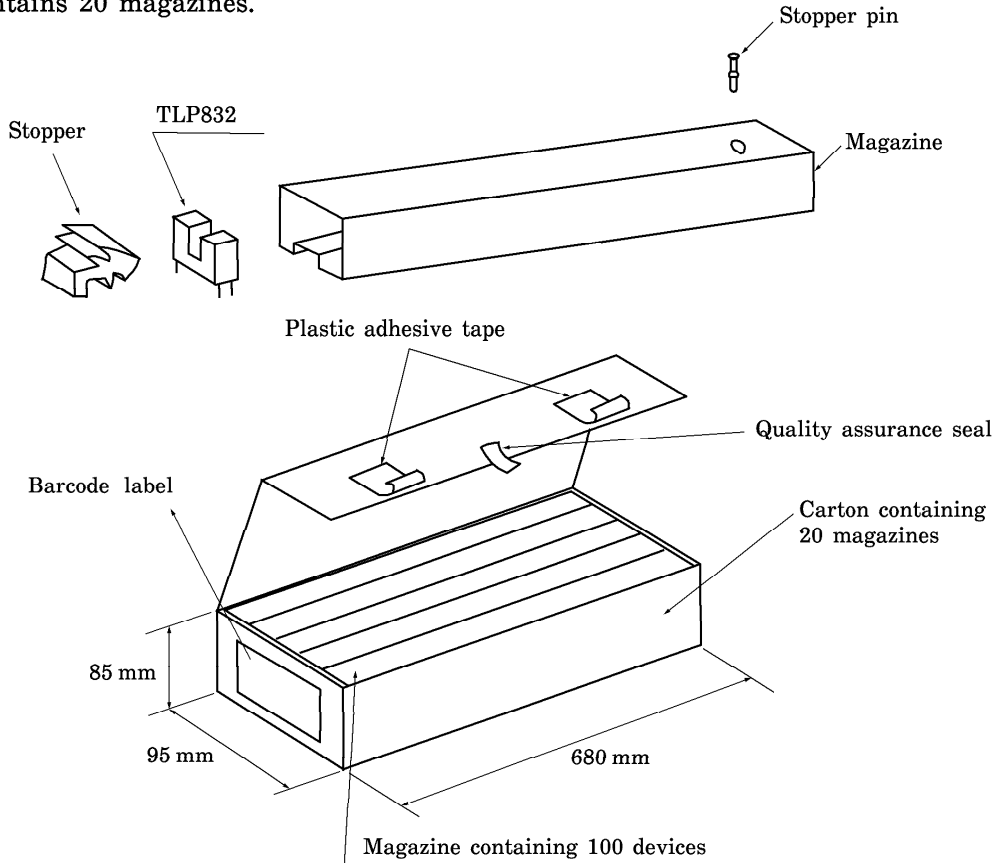
Cross section



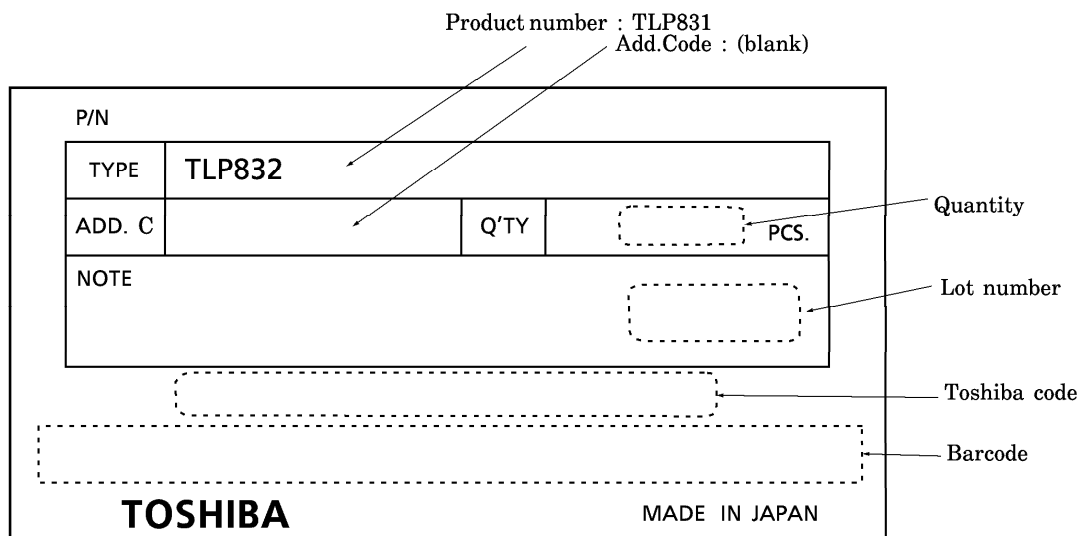
(Note) : Marking color is red.

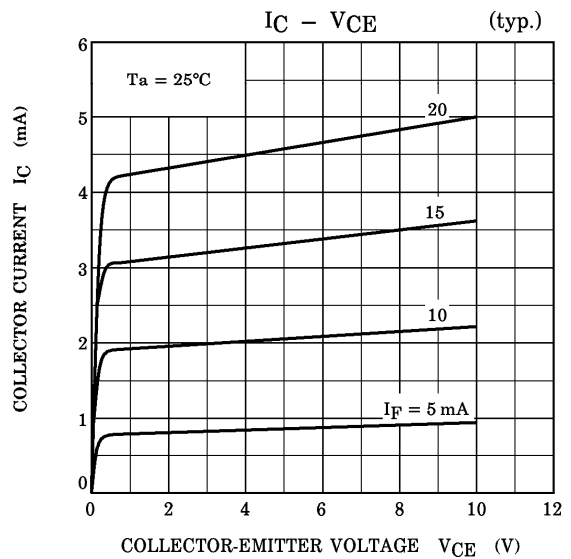
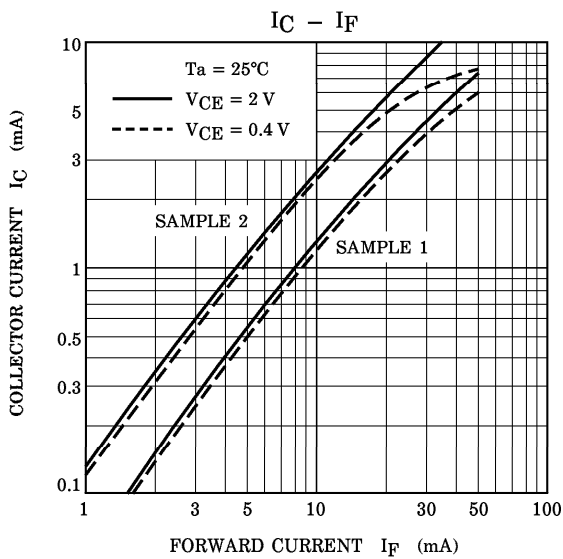
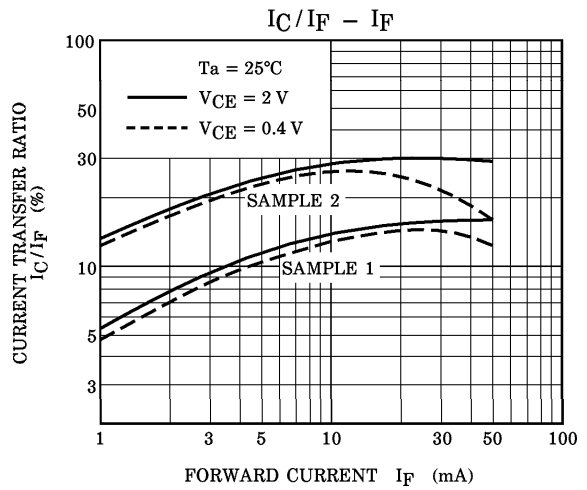
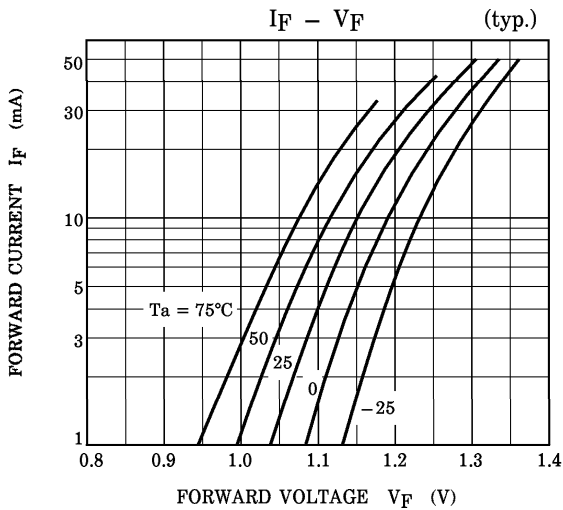
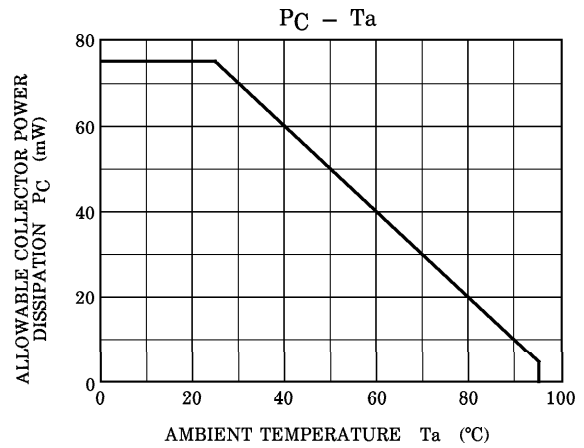
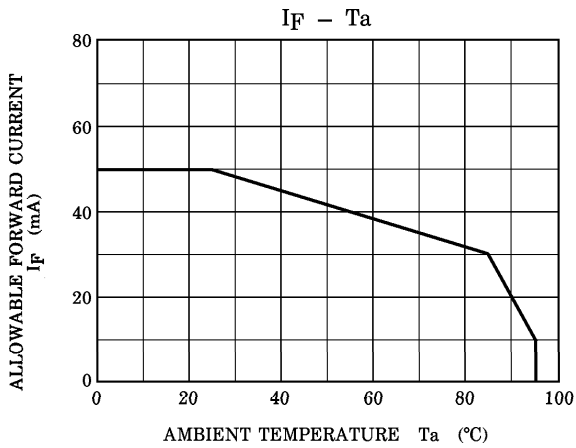
○ Packing format

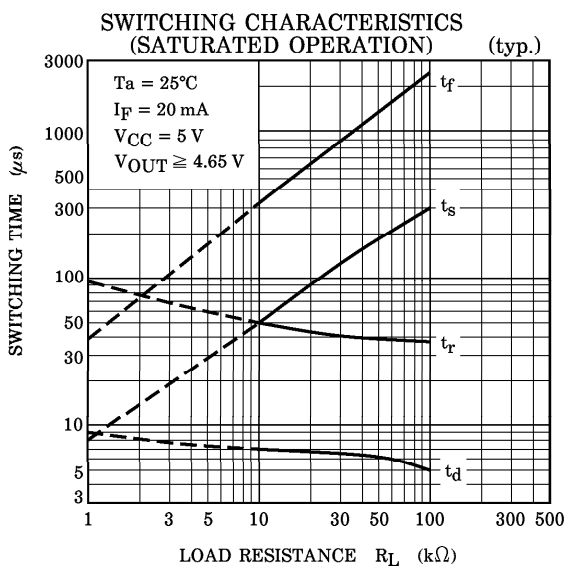
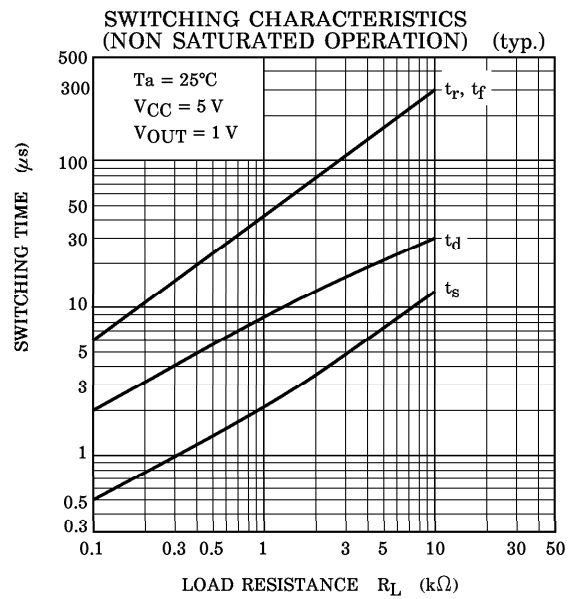
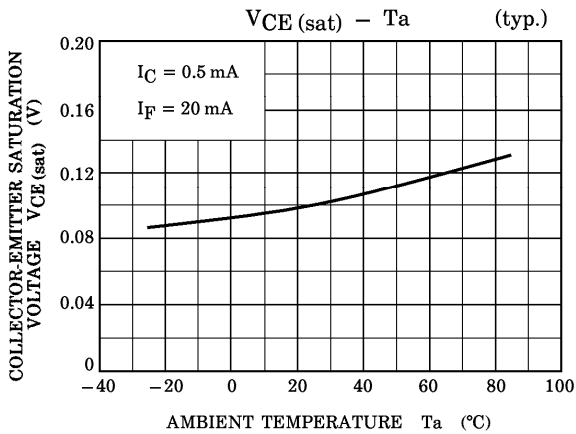
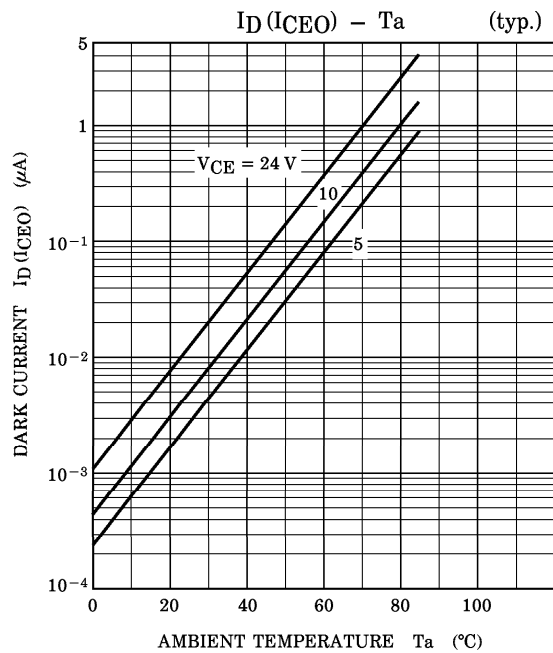
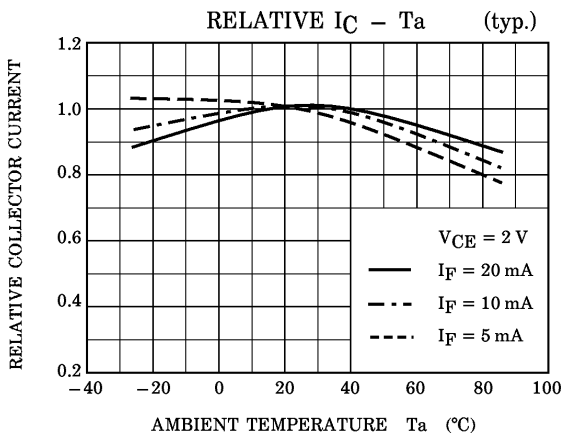
Pack 100 devices are packed in a magazine and put it in a carton.  
The carton contains 20 magazines.



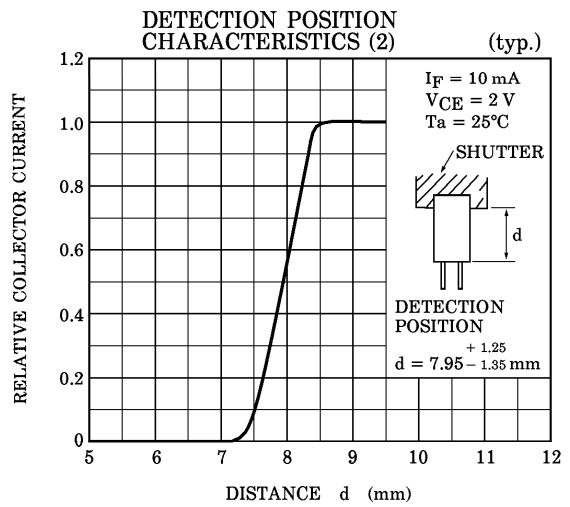
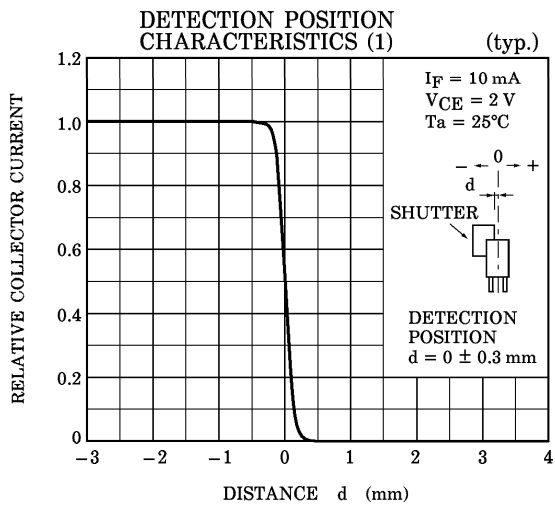
○ Label





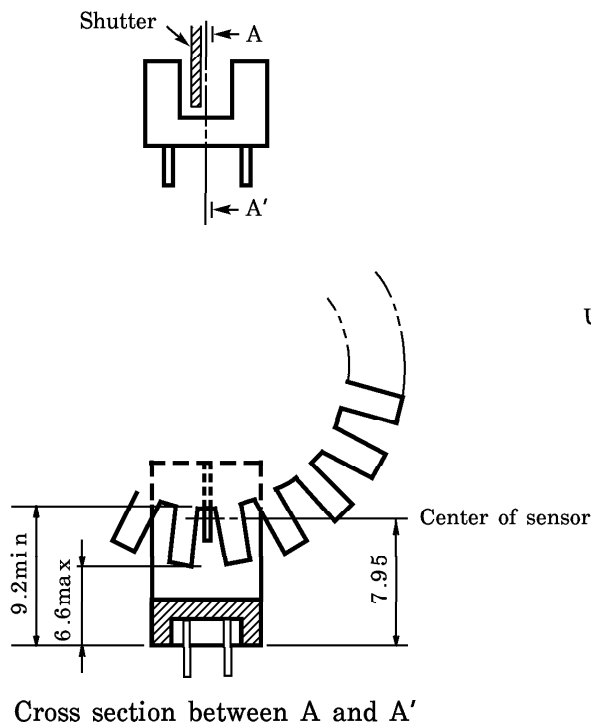






**RELATIVE POSITIONING OF SHUTTER AND DEVICE**

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.



**RESTRICTIONS ON PRODUCT USE**

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