

TOSHIBA PHOTOREFLECTIVE SENSORS INFRARED LED + PHOTODARLINGTON TRANSISTOR

# TLP907, TLP907 (LB)

DETECTION OF START AND END MARKS ON VIDEO AND AUDIO TAPE

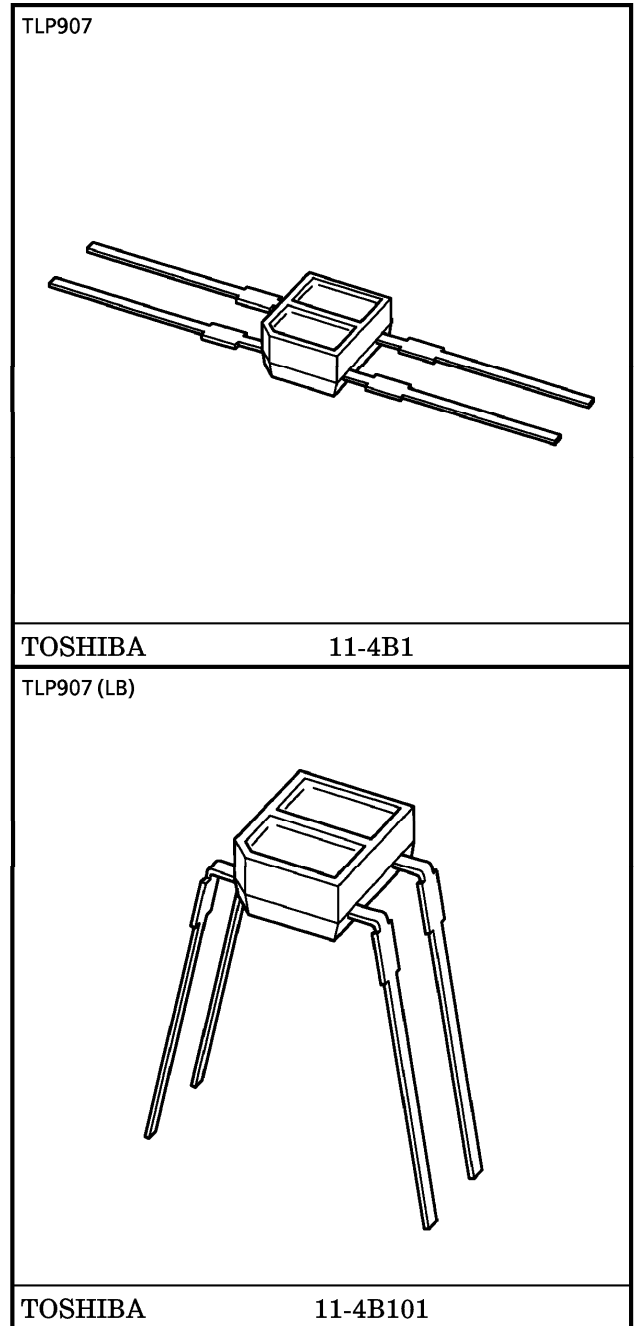
DETECTION OF VCR REEL ROTATION

DETECTION OF INDEX WRITE-PROTECT AND PRESENCE OF DISK FOR FLOPPY DISK DRIVE

TIMING DETECTION IN ELECTRONIC PRINTERS AND TYPEWRITERS

READING OF CAMERA FILM INFORMATION (DX CODE)

- Very small package : 2.6 mm × 3.4 mm (height 1.5 mm)
  - TLP907 : Flat-lead type
  - TLP907 (LB) : Small DIP
- Short detection distance : Optimum distance 0.5 mm~1.5 mm
- High sensitivity :  $I_C = 3 \text{ mA}$  (typ.)
- Protected from external light by black mold package.



Weight : 0.05 g (typ.)

MAXIMUM RATINGS (Ta = 25°C)

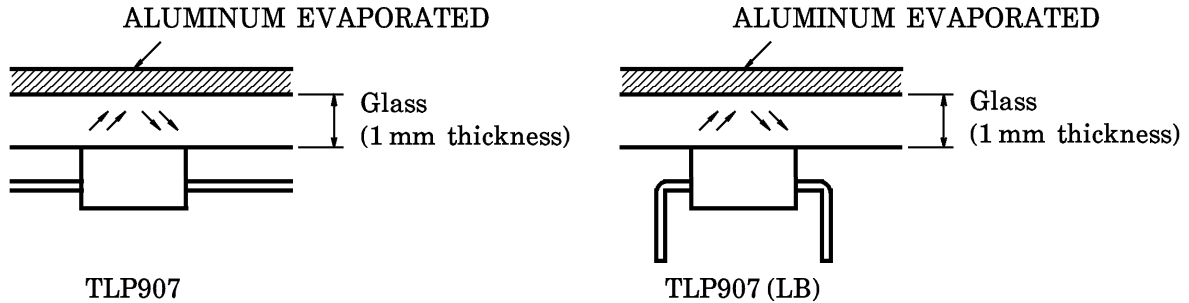
CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I <sub>F</sub>	50	mA
	Forward Current Derating (Ta > 25°C)	ΔI <sub>F</sub> /°C	-0.67	mA/°C
	Pulse Forward Current (Note 1)	I <sub>FP</sub>	400	mA
	Reverse Voltage	V <sub>R</sub>	5	V
DETECTOR	Collector-Emitter Voltage	V <sub>CEO</sub>	30	V
	Emitter-Collector Voltage	V <sub>ECO</sub>	5	V
	Collector Power Dissipation	P <sub>C</sub>	50	mW
	Collector Power Dissipation Derating (Ta > 25°C)	ΔP <sub>C</sub> /°C	-0.67	mW/°C
	Collector Current	I <sub>C</sub>	20	mA
Operating Temperature Range		T <sub>opr</sub>	-25~85	°C
Storage Temperature Range		T <sub>stg</sub>	-30~10	°C

(Note 1) : Pulse width ≤ 100 μs, Repetitive frequency = 100 Hz

OPTICAL AND ELECTRICAL CHARACTERISTICS (Ta = 25°C)

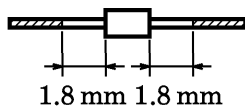
CHARACTERISTIC		SYMBOL	TEST CONDITION	Min	Typ.	Max	UNIT	
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10 mA	1.00	1.15	1.30	V	
	Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V	—	—	10	μA	
	Peak Emission Wavelength	λ <sub>P</sub>	I <sub>F</sub> = 4 mA	—	940	—	nm	
DETECTOR	Dark Current	I <sub>D</sub> (I <sub>CEO</sub> )	V <sub>CE</sub> = 16 V, I <sub>F</sub> = 0	—	—	0.25	μA	
	Peak Sensitivity Wavelength	λ <sub>P</sub>	—	—	900	—	nm	
COUPLED	Current Current	I <sub>C</sub>	V <sub>CE</sub> = 2 V, I <sub>F</sub> = 4 mA	TLP907	0.5	3	15	mA
				TLP907 (R)	0.5	—	1.9	
				TLP907 (O)	1.45	—	5.4	
				TLP907 (Y)	4.5	—	15	
				TLP907 (LB)	0.5	3	15	
				TLP907 (R, LB)	0.5	—	1.9	
				TLP907 (O, LB)	1.45	—	5.4	
				TLP907 (Y, LB)	4.5	—	15	
Leakage Current	I <sub>LEAK</sub>	V <sub>CE</sub> = 2 V, I <sub>F</sub> = 4 mA without reflector	—	—	0.25	μA		
Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)	I <sub>F</sub> = 4 mA, I <sub>C</sub> = 0.25 mA	—	0.85	1.2	V		
Rise Time	t <sub>r</sub>	V <sub>CC</sub> = 5 V, I <sub>C</sub> = 10 mA, R <sub>L</sub> = 100 Ω	—	100	—	μs		
Fall Time	t <sub>f</sub>		—	100	—			

(Note 2) : Collector current test method

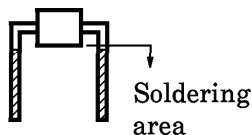


**PRECAUTIONS**

- Soldering temperature : 260°C max Soldering time : 3 s max



TLP907



TLP907 (LB)

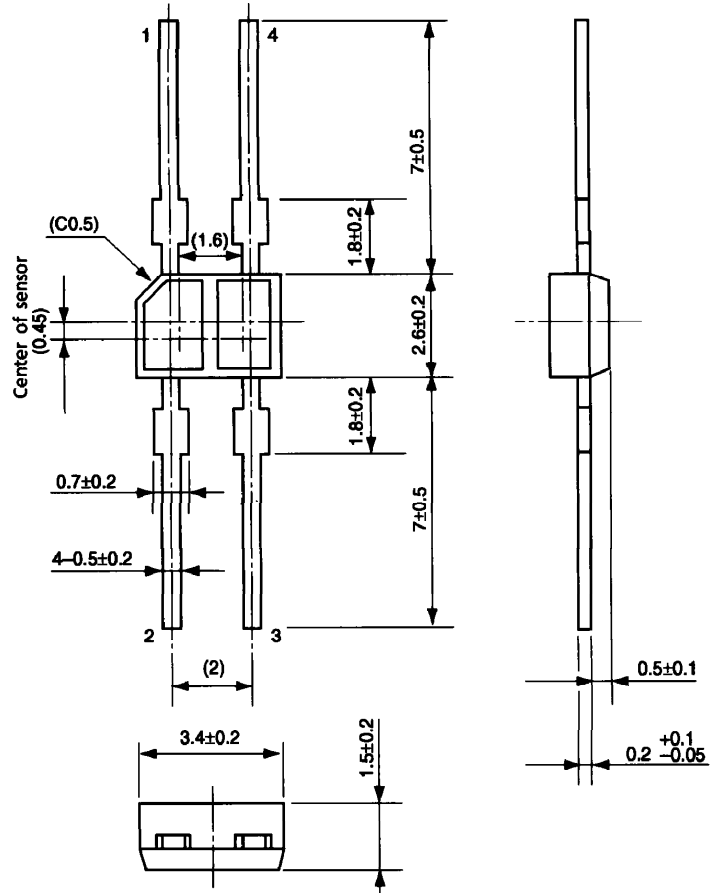
The diagonally shaded part in the diagrams on the left represent the soldering area.

- When forming the leads, be careful not to apply stress to the main body of the device (the resin part). Soldering must be performed after the leads have been formed.
- Collector current 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 fluctuation in collector current to fluctuation in infrared LED optical output is 1 : 1.

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

PACKAGE DIMENSIONS  
11-4B1

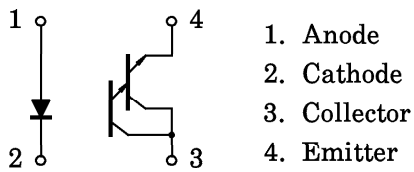
Unit : mm



( ) : Reference value

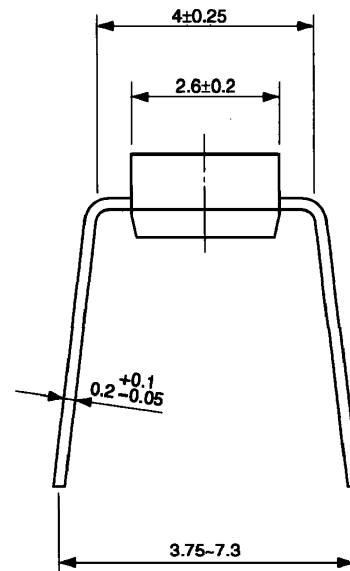
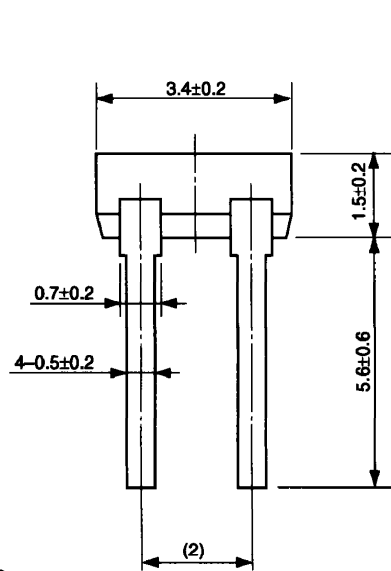
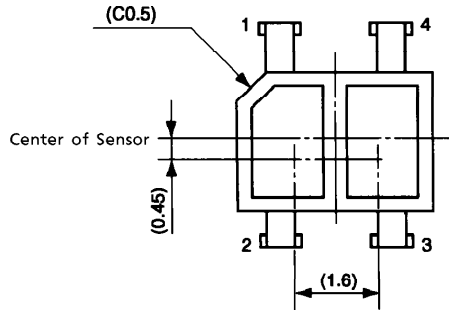
Weight : 0.05 g (typ.)

PIN CONNECTION



PACKAGE DIMENSIONS  
11-4B101

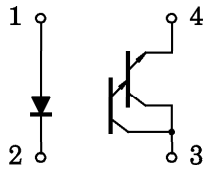
Unit : mm



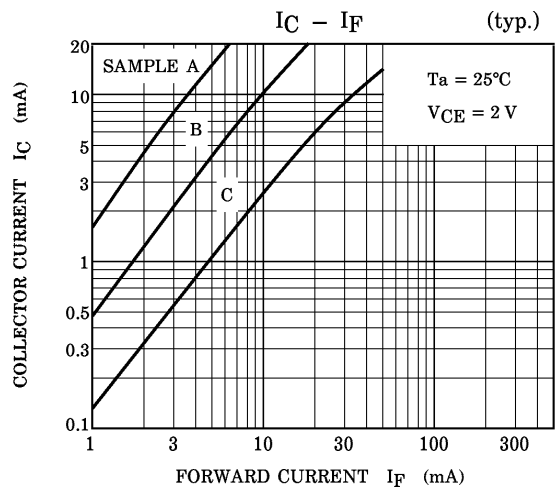
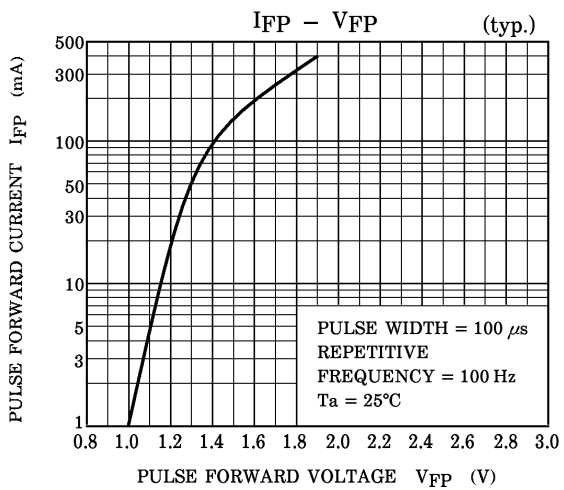
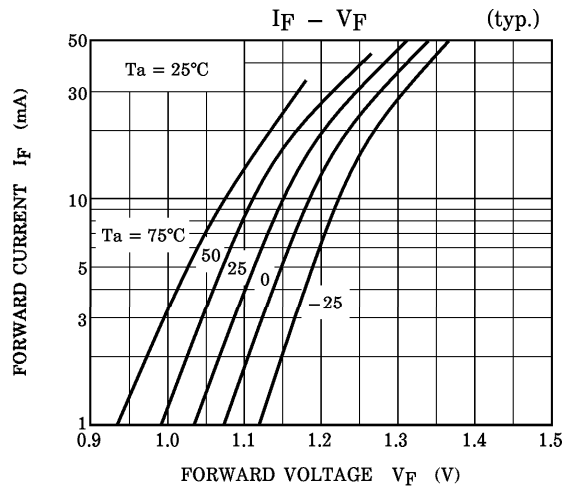
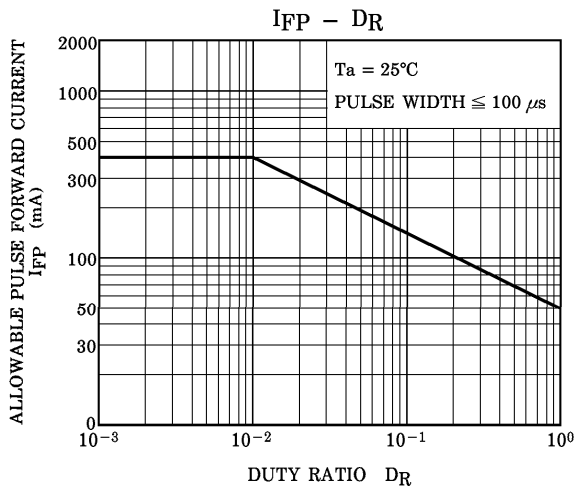
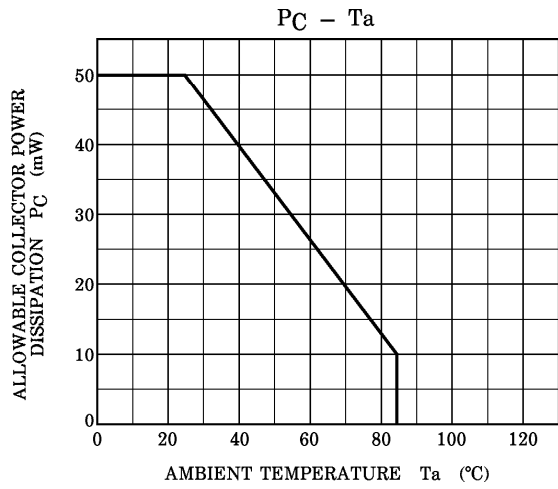
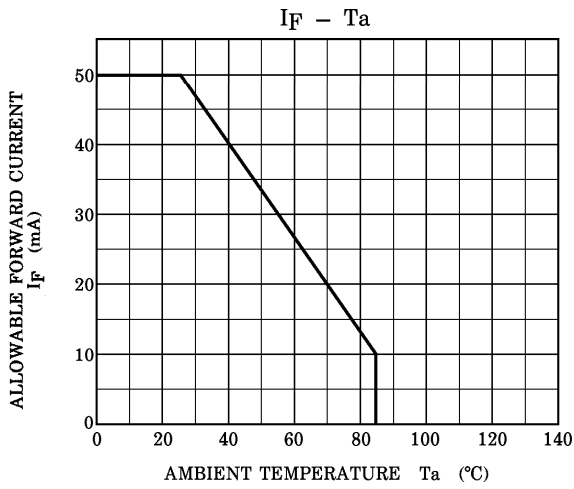
( ) : Reference value

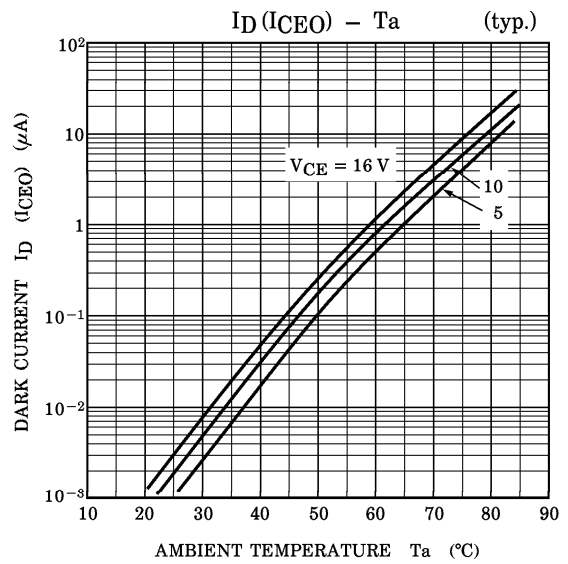
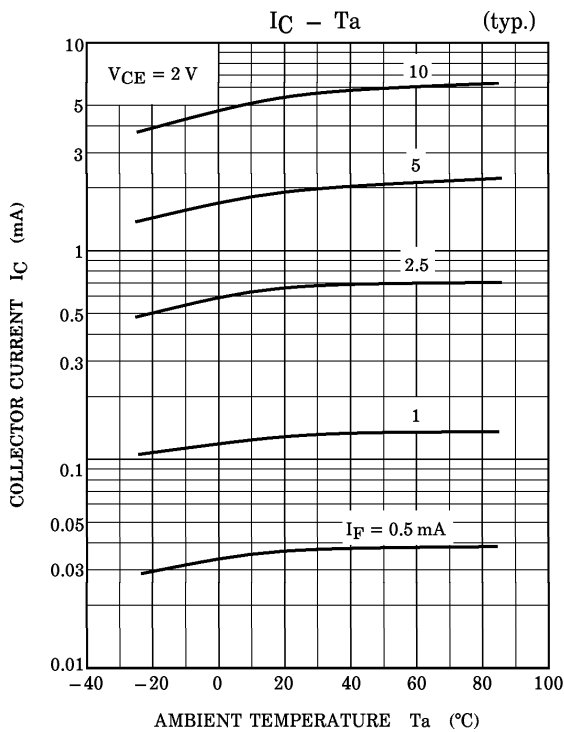
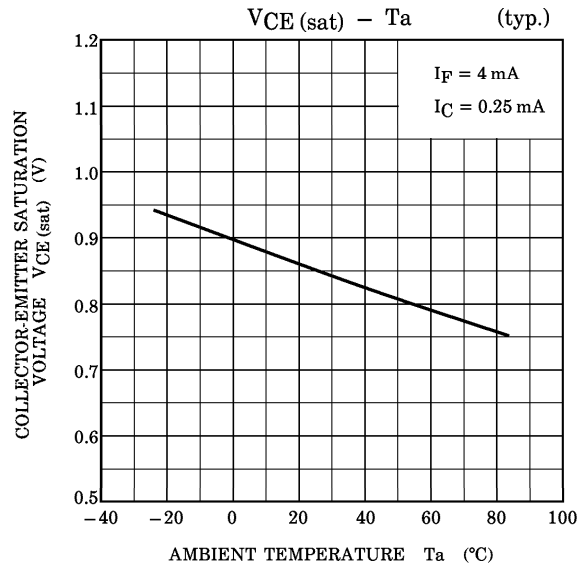
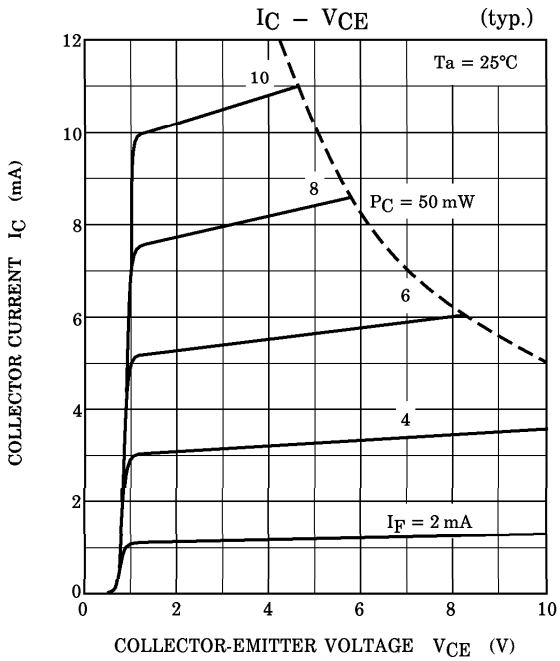
Weight : 0.05 g (typ.)

PIN CONNECTION

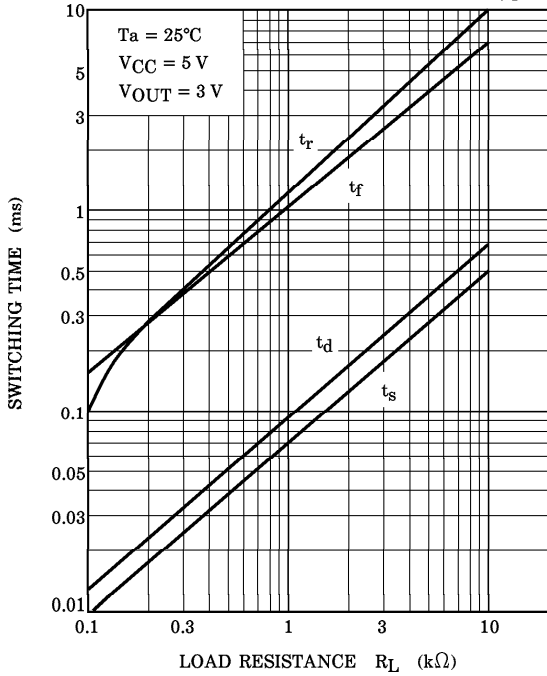


- 1. Anode
- 2. Cathode
- 3. Collector
- 4. Emitter

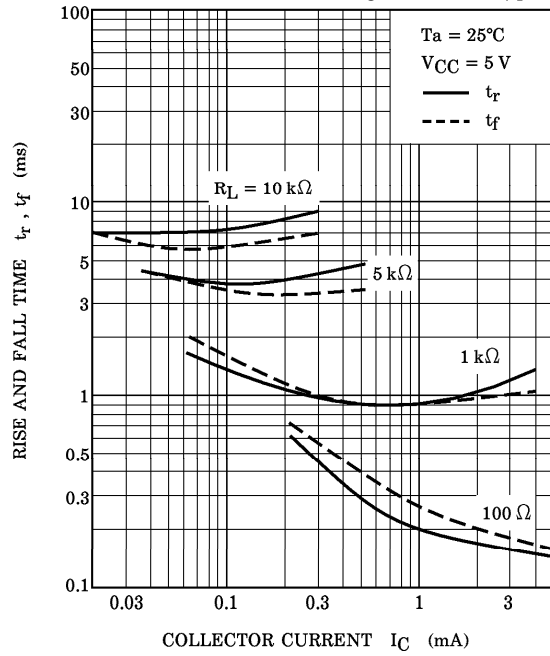




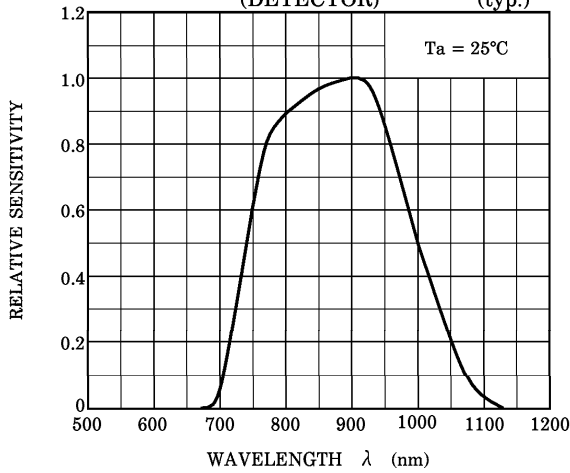
SWITCHING CHARACTERISTICS (typ.)



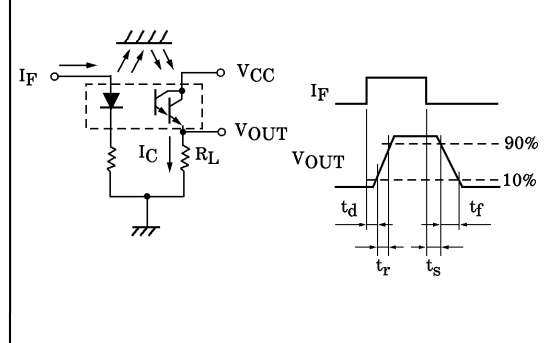
$t_r, t_f - I_C$  (typ.)



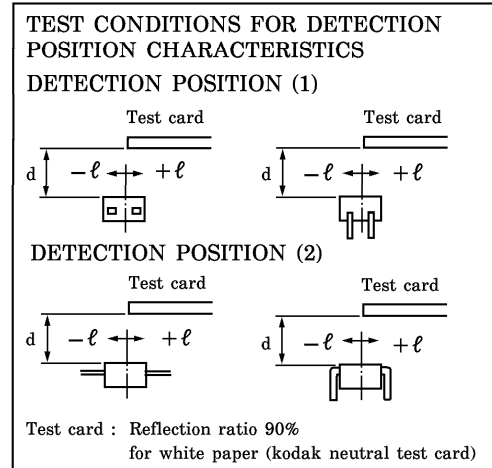
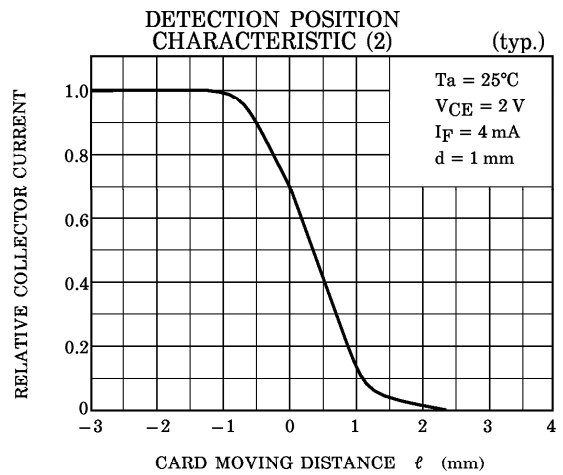
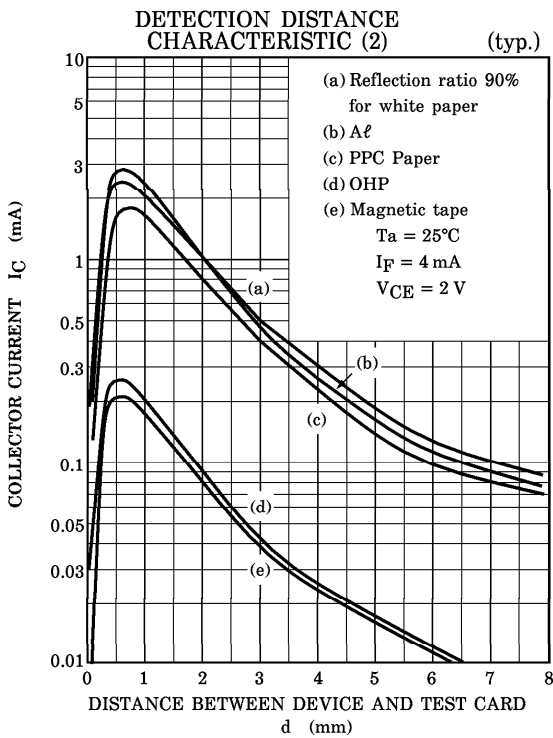
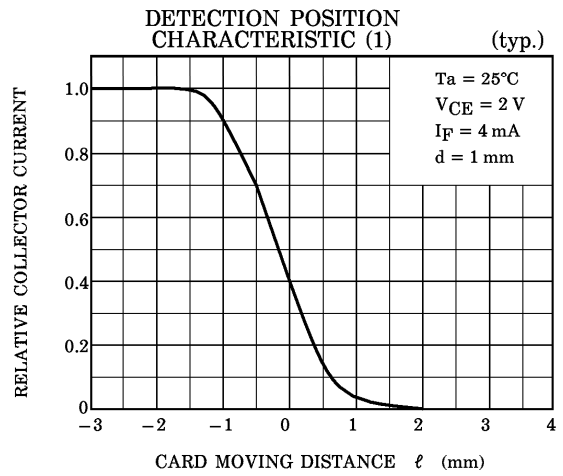
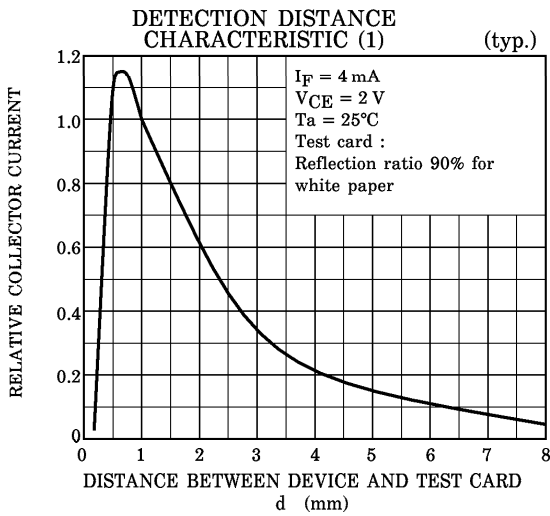
SPECTRAL RESPONSE CHARACTERISTICS (DETECTOR) (typ.)



SWITCHING TIME TEST CIRCUIT







**RESTRICTIONS ON PRODUCT USE**

000707EAC

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.