

TOSHIBA PHOTOREFLECTIVE SENSOR INFRARED LED + PHOTODARLINGTON TRANSISTOR

# TLP909

PAPER DETECTORS IN COPIERS, FAX MACHINES, PRINTERS, ETC.

DETECTION OF FILM AND COINS

TIMING AND EDGE SENSORS

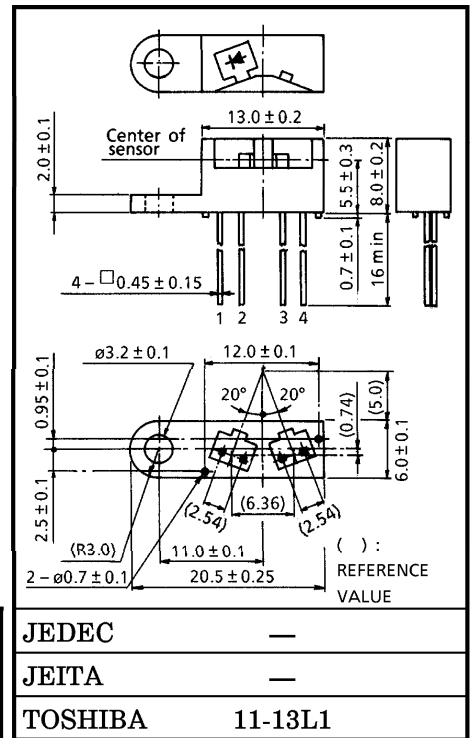
- Large detection distance : Optimum distance 2.5 mm~4.5 mm
- Side mounting type
- Black mold package impermeable to visible light
- Package material : Polycarbonate

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	-0.33	mA / °C
	Pulse Forward Current (Note 1)	I <sub>FP</sub>	600	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>	75	mW
	Collector Power Dissipation Derating (Ta > 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>	-25~85	°C
Storage Temperature Range		T <sub>stg</sub>	-40~100	°C

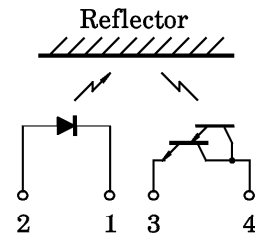
(Note 1) : Pulse width ≤ 100 μs, Repetitive frequency = 100 Hz

Unit : mm



Weight : 0.83 g (typ.)

**PIN CONNECTION**



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

## OPTICAL AND ELECTRICAL CHARACTERISTICS (Ta = 25°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	$I_D (I_{CEO})$	$V_{CE} = 16 \text{ V}, I_F = 0$	—	—	0.25	$\mu\text{A}$
	Peak Sensitivity Wavelength	$\lambda_P$	—	—	870	—	nm
COUPLED	Collector Current	$I_C$	$V_{CE} = 2 \text{ V}, I_F = 10 \text{ mA}$ (Note 2)	1	—	20	mA
	Leakage Current	$I_{LEAK}$	$V_{CE} = 5 \text{ V}, I_F = 25 \text{ mA}$ Without Reflector	—	—	0.25	$\mu\text{A}$
	Collector-Emitter Saturation Voltage	$V_{CE}(\text{sat})$	$I_F = 10 \text{ mA}, I_C = 0.5 \text{ mA}$	—	0.85	1.2	V
	Rise Time	$t_r$	$V_{CC} = 5 \text{ V}, I_C = 10 \text{ mA},$ $R_L = 100 \Omega$	—	100	—	$\mu\text{s}$
	Fall Time	$t_f$		—	100	—	

(Note 2) : Reflection ratio 90% at white color paper (KODAK NEUTRAL TEST CARD),  
Detecting Distance 5mm.

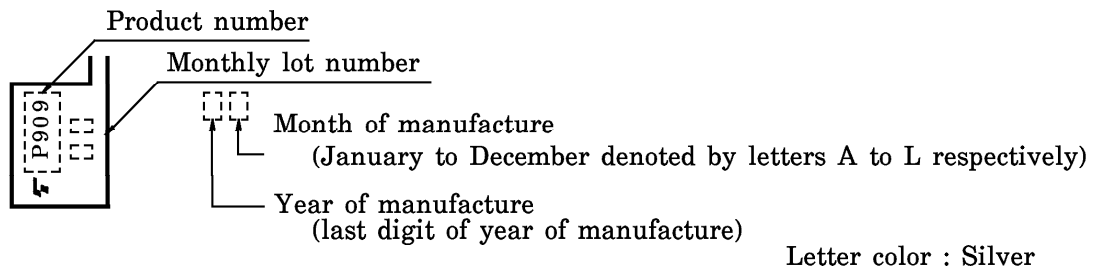
## PRECAUTIONS

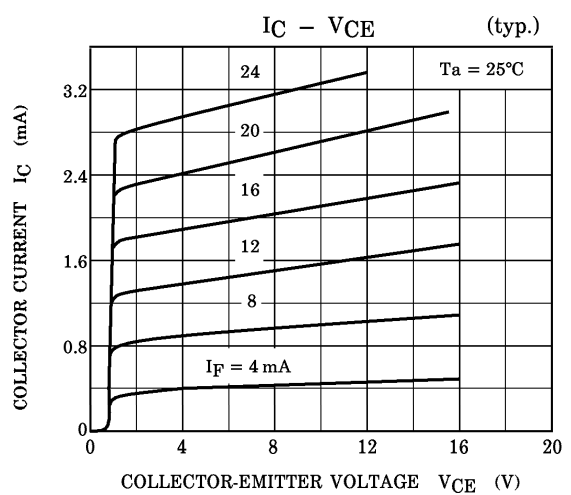
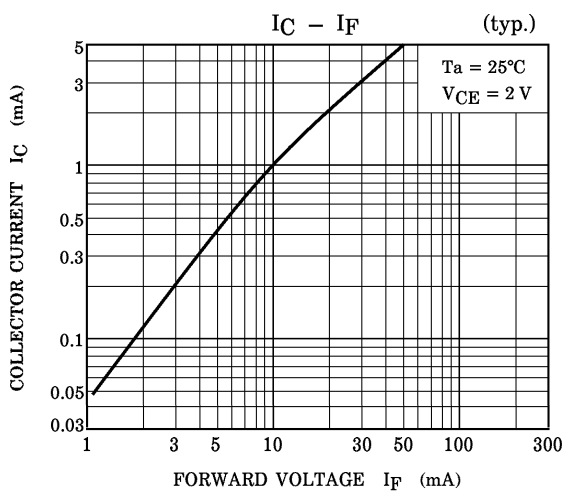
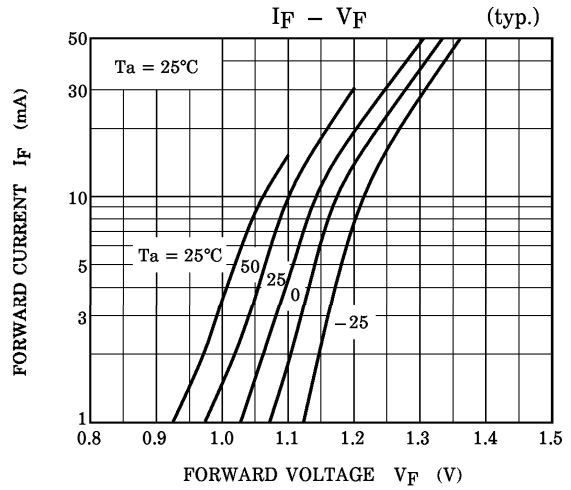
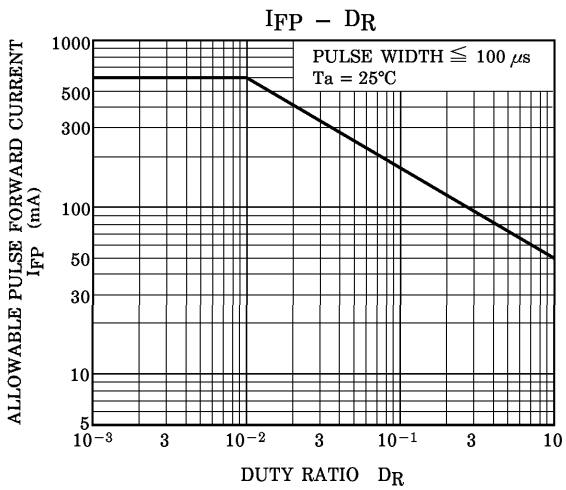
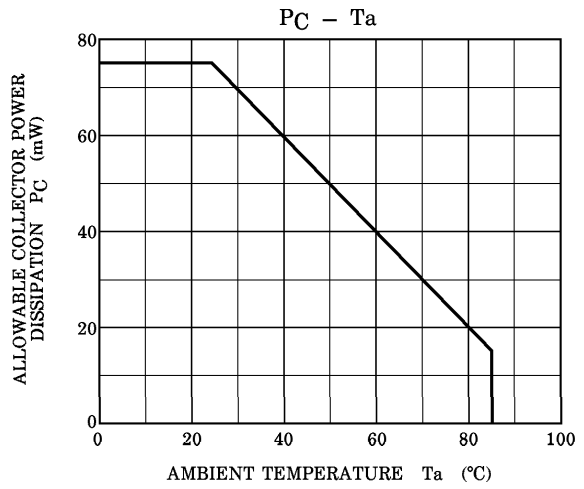
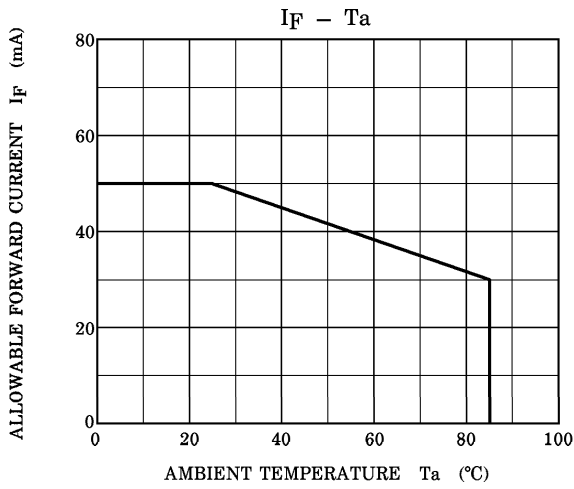
The following points must be borne in mind.

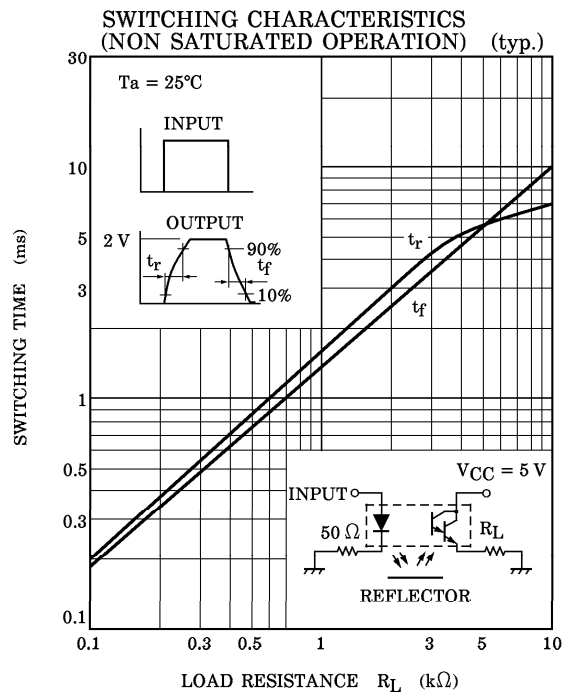
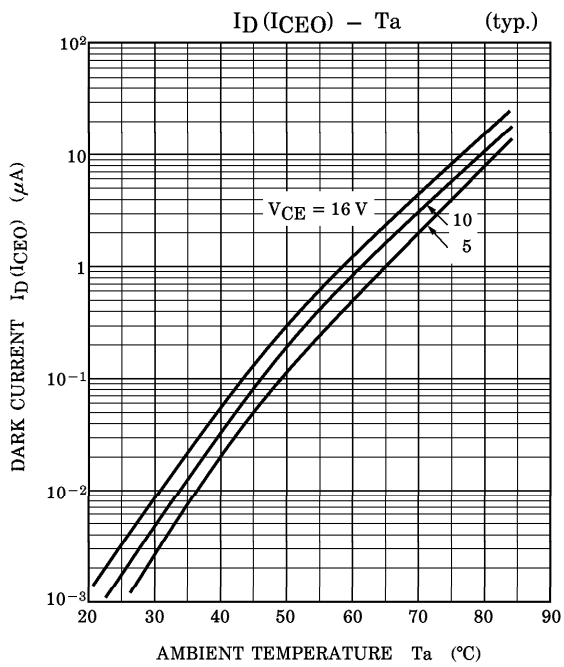
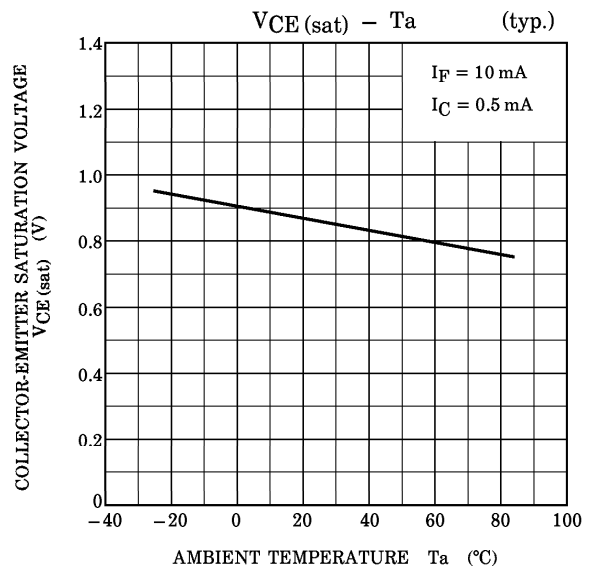
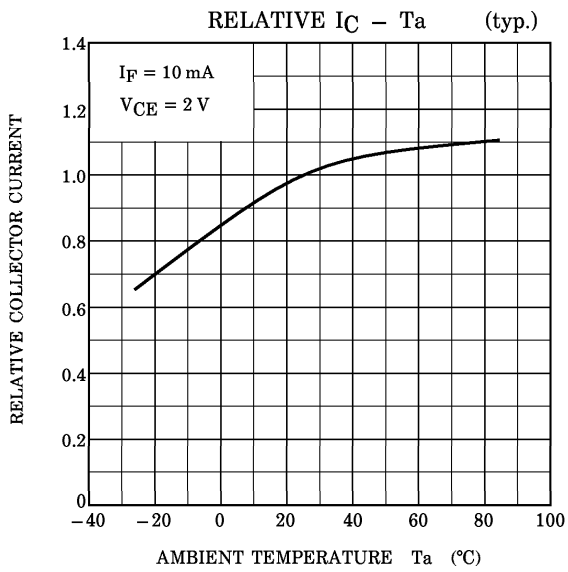
- Soldering temperature : 260°C max  
Soldering time : 5 s max  
(Soldering must be performed 1.5 mm under the package body.)
- Clean only the soldered part of the leads. Do not immerse the entire package in the cleaning solvent.
- The package is made of polycarbonate. Oil or chemicals may cause the package to melt or crack.
- Mount the device on a level surface.
- Screws should be tightened to a clamping torque of 0.59 N·m.
- The collector current increases over time due to current flowing in the infrared LED. The design of circuits which incorporate the device must take into account the change in collector current over time. The change in collector current is equal to the reciprocal of the change in LED infrared optical output.

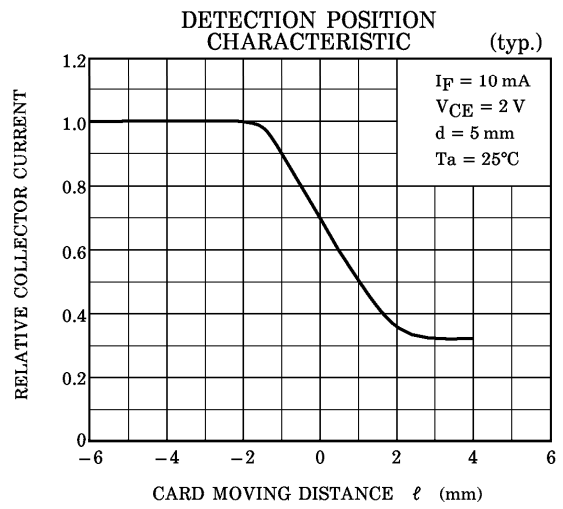
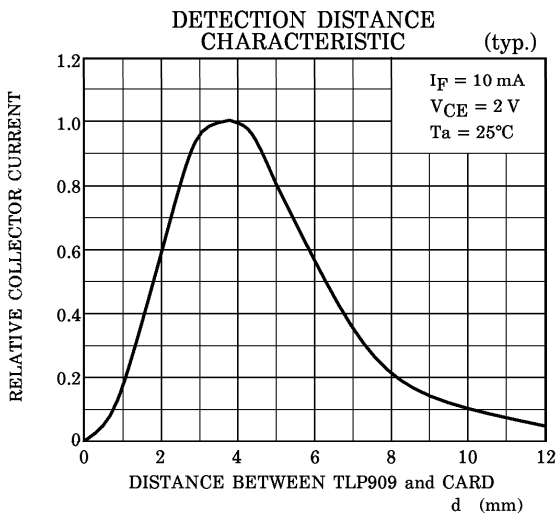
$$\frac{I_C(t)}{I_C(0)} = \frac{P_O(t)}{P_O(0)}$$

MARKINGS

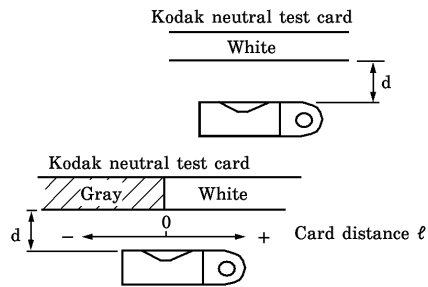








**TEST CONDITIONS FOR DETECTION DISTANCE AND DETECTION POSITION CHARACTERISTICS**



White: Reflection ratio = 90%  
 Gray : Reflection ratio = 18%

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