

TOSHIBA PHOTO-INTERRUPTER INFRARED LED + PHOTODARLINGTON TRANSISTOR

TLP507A

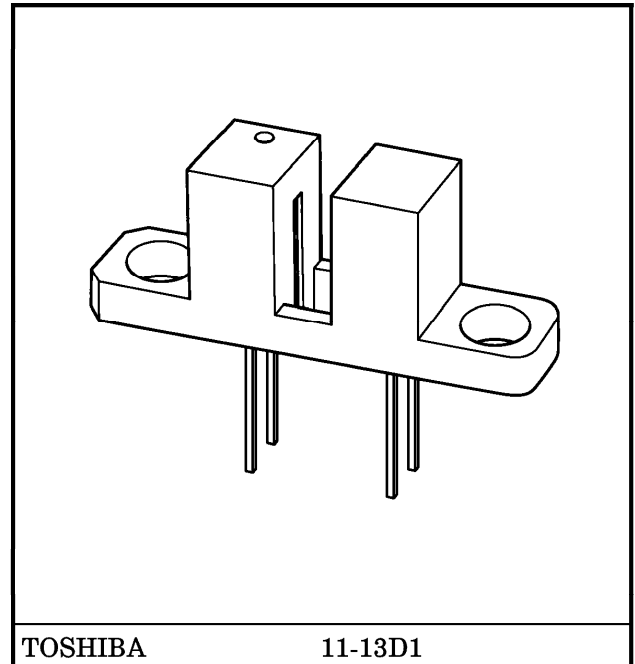
HIGH-POWER AMPLIFIER APPLICATIONS

AUTOMATIC CONTROL UNITS

POSITION AND ROTATIONAL SPEED SENSORS

The TLP507A photo-interrupter features a high current transfer ratio (I_C / I_F).

- Gap : 3 mm
- Resolution : Slit width = 0.5 mm
- High current transfer ratio: $I_C / I_F = 30\%$ (min)
- Dark current : $I_D = 0.25 \mu A$ (max)
- Package material : Polycarbonate



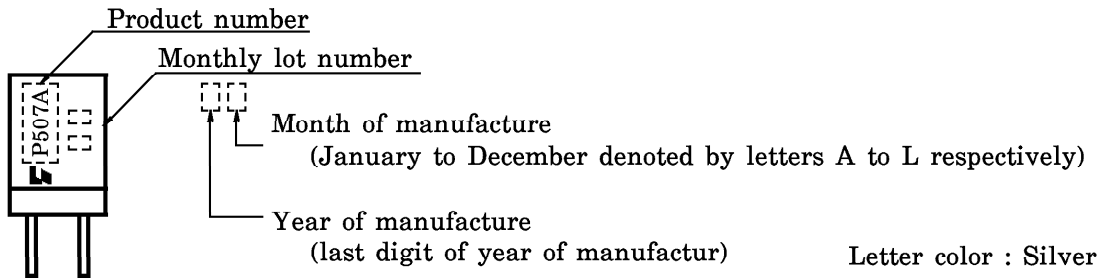
TOSHIBA 11-13D1

Weight : 0.83 g (typ.)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	50	mA
	Forward Current Derating ($T_a > 25^\circ C$)	$\Delta I_F / ^\circ C$	-0.33	mA / $^\circ C$
	Reverse Voltage	V_R	5	V
DETECTOR	Collector-Emitter Voltage	V_{CEO}	30	V
	Emitter-Collector Voltage	V_{ECO}	5	V
	Collector Power Dissipation	P_C	75	mW
	Collector Power Dissipation Derating ($T_a > 25^\circ C$)	$\Delta P_C / ^\circ C$	-1	mW / $^\circ C$
	Collector Current	I_C	50	mA
Operating Temperature Range		T_{opr}	-25~85	$^\circ C$
Storage Temperature Range		T_{stg}	-30~100	$^\circ C$

MARKINGS



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	μA
	Peak Emission Wavelength	λ_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	μA
	Peak Sensitivity Wavelength	λ_P	—	—	800	—	nm
COUPLED	Current Transfer Ratio	I_C / I_F	$V_{CE} = 2 \text{ V}, I_F = 10 \text{ mA}$	30	—	440	%
	Rise Time	t_r	$V_{CC} = 5 \text{ V}, I_C = 10 \text{ mA}, R_L = 100 \Omega$	—	200	—	μs
	Fall Time	t_f		—	200	—	

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.
- Mount the device on a level surface.
- Screws should be tightened to a clamping torque of 0.59 N·m.
- The package is made of polycarbonate. Polycarbonate is usually stable with acid, alcohol and aliphatic hydrocarbons, however, with petrochemicals (such as benzene, toluene and acetone), alkalis, aromatic hydrocarbons, or chloric hydrocarbons, polycarbonate may crack, swell or melt. Please take this into account when choosing a packaging material by referring to the table below.

<Chemicals which should not be used with polycarbonate>

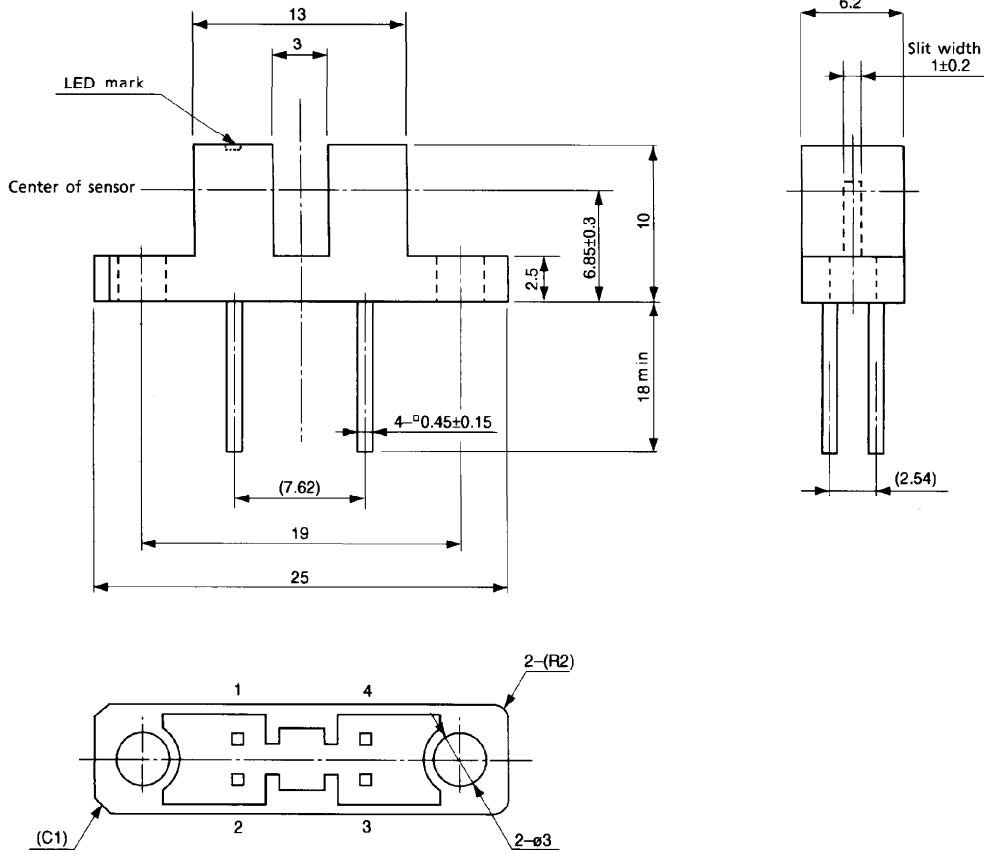
	PHENOMENON	CHEMICALS
A	Staining and slight deterioration	<ul style="list-style-type: none"> Nitric acid (diluted), hydrogen peroxide, chlorine
B	Cracking, crazed or swelling	<ul style="list-style-type: none"> Acetic acid (70% or more) Gasoline Methyl ethyl ketone, ethyl acetate, butyl acetate Ethyl methacrylate, ethyl ether, MEK Acetone, m-amino alcohol, carbon tetrachloride Carbon disulfide, trichloroethylene, cresol Thinners, oil of turpentine Triethanolamine, TCP, TBP
C	Melting { } : Used as solvent	<ul style="list-style-type: none"> Concentrated sulfuric acid Benzene Styrene, acrylonitrile, vinyl acetate Ethylenediamine, diethylenediamine {Chloroform, methyl chloride, tetrachloromethane, dioxane, 1, 2-dichloroethane}
D	Decomposition	<ul style="list-style-type: none"> Ammonia water Other alkalis

- 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
11-13D1

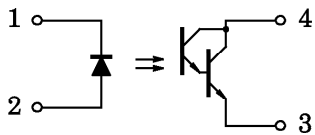
Unit : mm



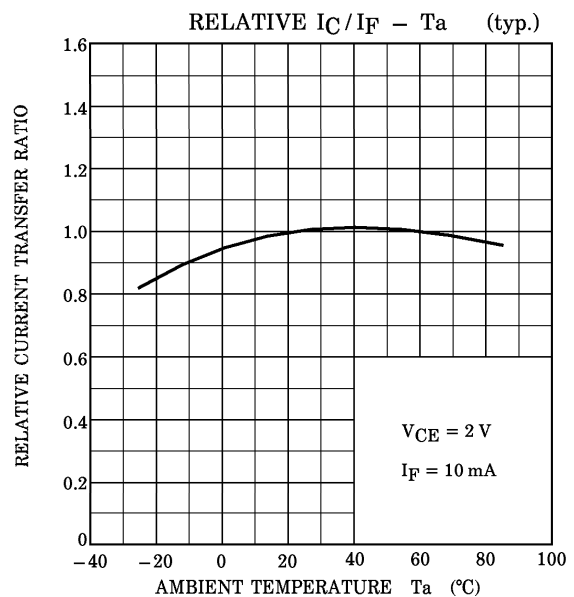
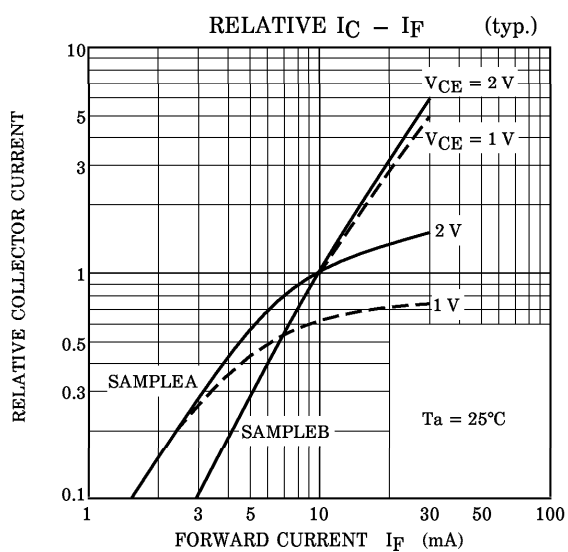
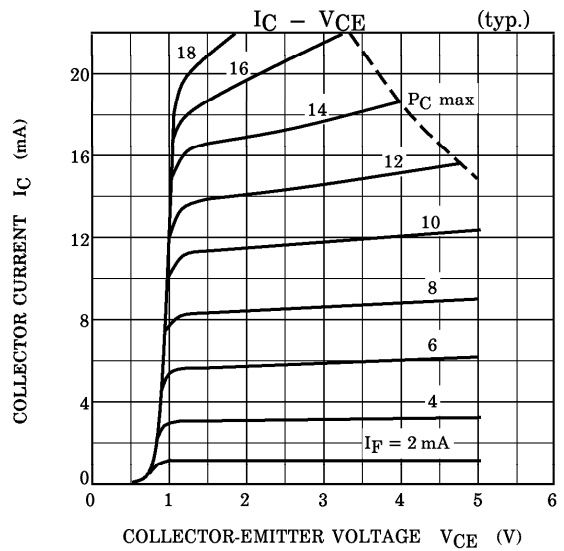
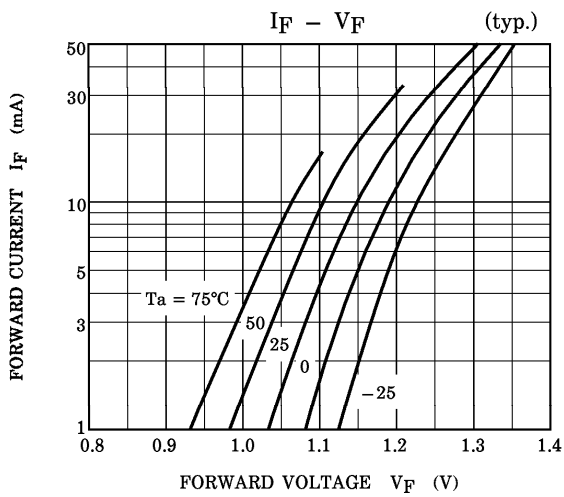
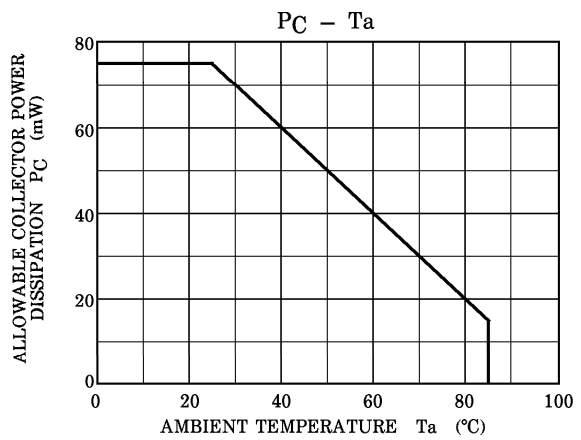
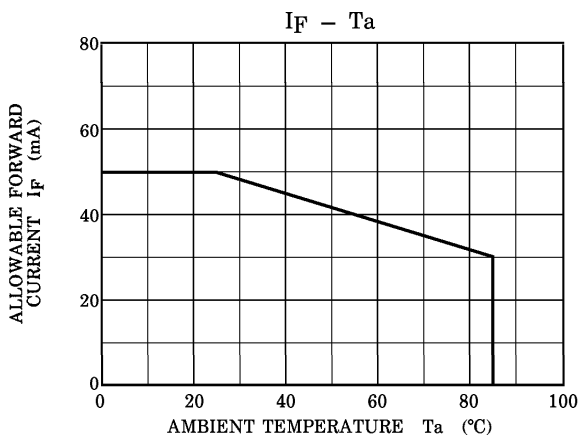
Tolerance unless otherwise specified : ±0.25
() : Reference value

Weight : 0.83 g (typ.)

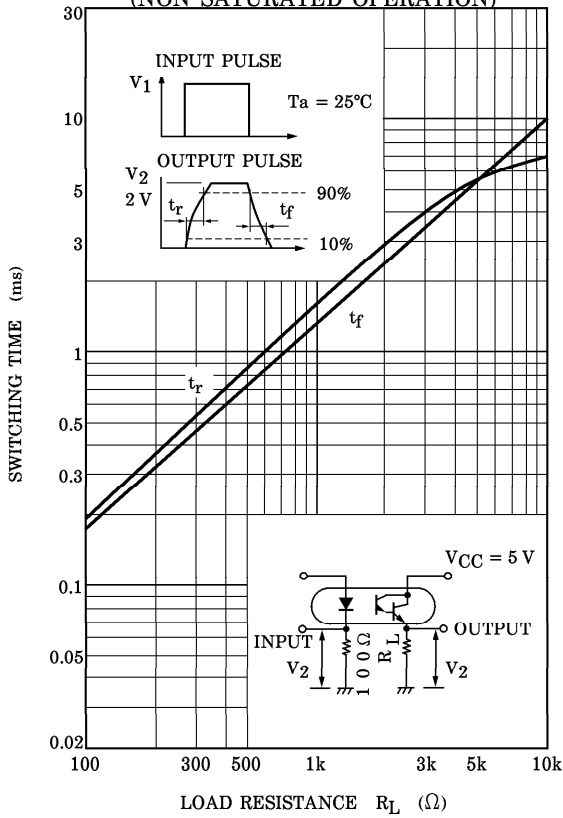
PIN CONNECTION



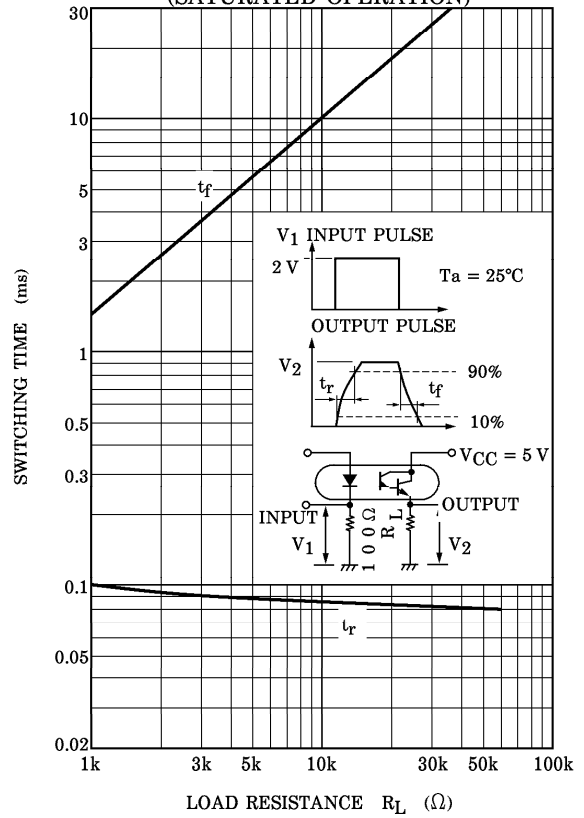
- 1. Cathode
- 2. Anode
- 3. Emitter
- 4. Collector



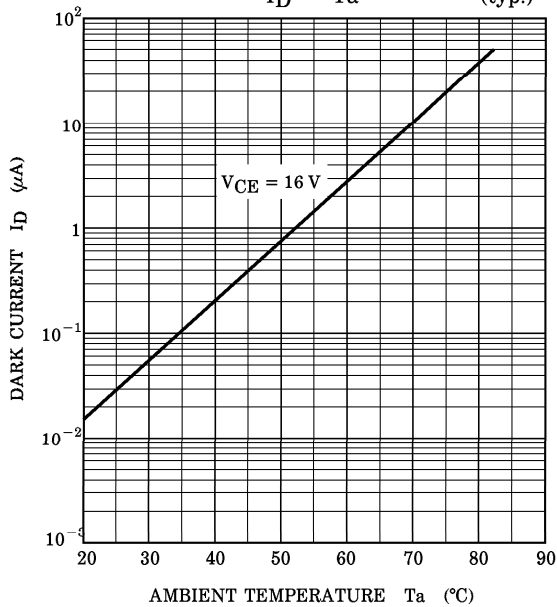
SWITCHING CHARACTERISTICS
(NON SATURATED OPERATION)



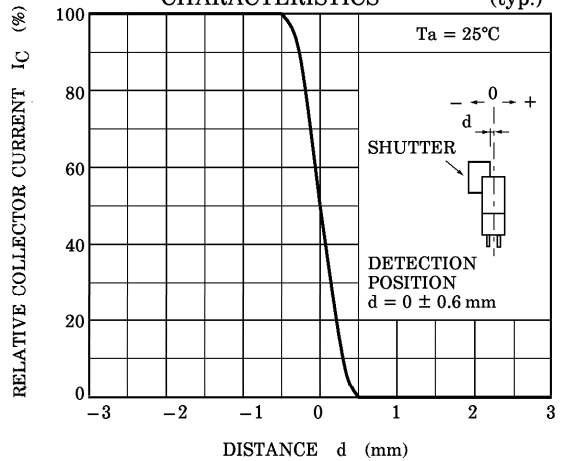
SWITCHING CHARACTERISTICS
(SATURATED OPERATION)



$I_D - T_a$ (typ.)

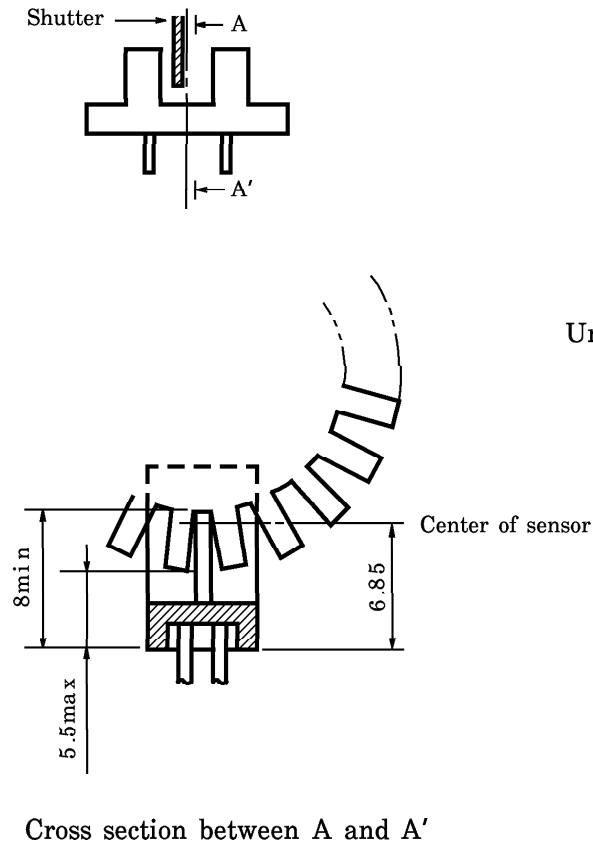


DETECTION POSITION CHARACTERISTICS (typ.)



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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