

TOSHIBA PHOTO-INTERRUPTERS INFRARED LED + PHOTOTRANSISTOR

# TLP822, TLP827

VCRS, COMPACT DISC PLAYERS

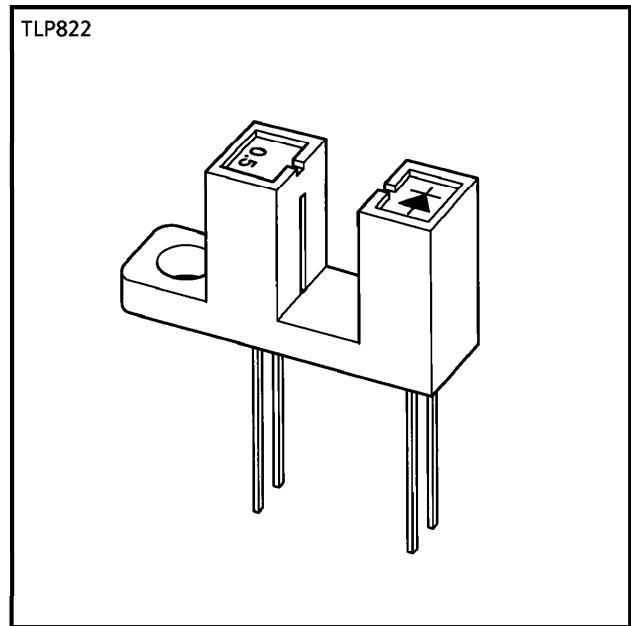
FLOPPY DISK DRIVES, FAX MACHINES, PRINTERS

VENDING MACHINES, TICKET MACHINES

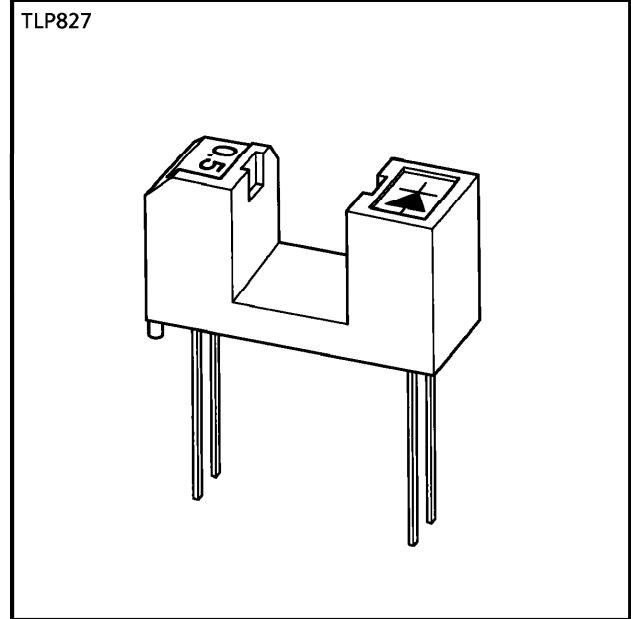
VARIOUS POSITION DETECTION SENSORS

The TLP822 and TLP827 photo-interrupters combine a high-radiant-power GaAs infrared LED with an Si phototransistor.

- Small package
- Side mounting type : TLP822
- Designed for direct mounting on printed circuit boards
- Gap : TLP827  
(the oblong slit)
- Gap : 5 mm
- Resolution : Slit width = 0.5 mm
- High current transfer ratio :  $I_C / I_F = 5\%$  (min)  
at  $I_F = 10$  mA
- Detector impermeable to visible light
- Package material : Polycarbonate



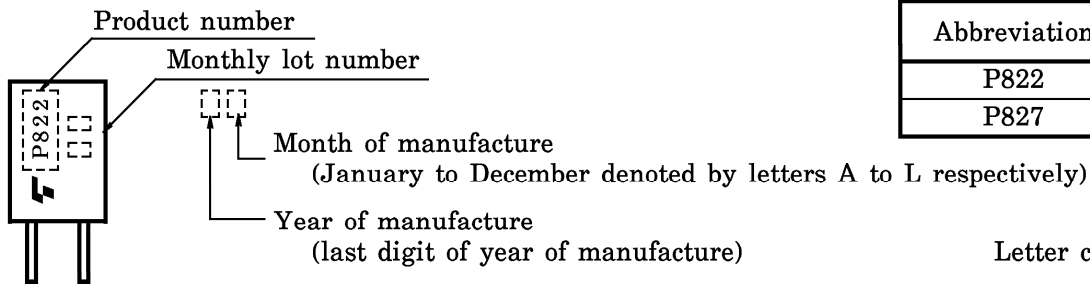
TOSHIBA 11-20B2



TOSHIBA 11-15B1

Weight : 0.87 g (typ.)  
0.72 g (typ.)

**MARKINGS**



Abbreviation	Type
P822	TLP822
P827	TLP827

Letter color : Silver

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	$I_F$	50	mA
	Forward Current (Ta > 25°C)	$\Delta I_F / ^\circ C$	-0.33	mA / °C
	Derating (Ta > 85°C)		-2 (Note)	
	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	$\Delta P_C / ^\circ C$	-1	mW / °C
	Collector Current	$I_C$	50	mA
Operating Temperature Range	TLP822	$T_{opr}$	-25~85	°C
	TLP827		-25~95	
Storage Temperature Range		$T_{stg}$	-40~100	°C
Soldering Temperature (5 s)		$T_{sol}$	260	°C

(Note) : TLP827 only

**RECOMMENDED OPERATING CONDITIONS**

CHARACTERISTIC	SYMBOL	Min	Typ.	Max	UNIT
Supply Voltage	$V_{CC}$	—	5	24	V
Forward Current	$I_F$	—	10	20	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	$V_F$	$I_F = 10 \text{ mA}$	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	$I_D (I_{CEO})$	$V_{CE} = 24 \text{ V}, I_F = 0$	—	—	0.1	$\mu\text{A}$
	Peak Sensitivity Wavelength	$\lambda_P$	—	—	870	—	nm
COUPLED	Current Transfer Ratio	$I_C / I_F$	$V_{CE} = 2 \text{ V}, I_F = 10 \text{ mA}$	5	—	75	%
	Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_F = 20 \text{ mA}, I_C = 0.5 \text{ mA}$	—	0.1	0.4	V
	Rise Time	$t_r$	$V_{CC} = 5 \text{ V}, I_C = 1 \text{ mA}, R_L = 1 \text{ k}\Omega$	—	15	50	$\mu\text{s}$
	Fall Time	$t_f$		—	15	50	

## PRECAUTIONS

The following points must be borne in mind.

1. Clean only the soldered part of the leads. Do not immerse the entire package in the cleaning solvent.
2. 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>

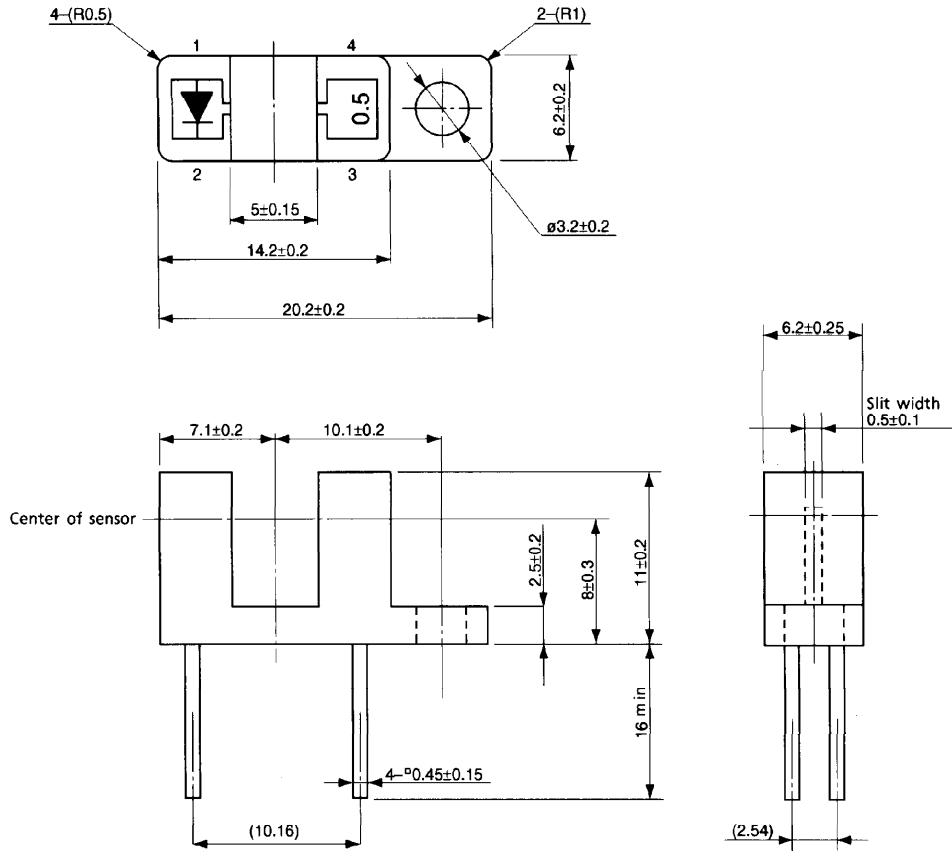
	PHENOMENON	CHEMICALS
A	Staining and slight deterioration	<ul style="list-style-type: none"> <li>• Nitric acid (diluted), hydrogen peroxide, chlorine</li> </ul>
B	Cracking, crazed or swelling	<ul style="list-style-type: none"> <li>• Acetic acid (70% or more)</li> <li>• Gasoline</li> <li>• Methyl ethyl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

3. Mount the device on a level surface.
4. Screws should be tightened to a clamping torque of 0.59 N·m.
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**  
11-20B2

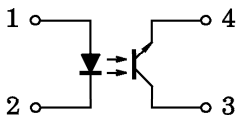
Unit : mm



( ) : Reference value

Weight : 0.87 g (typ.)

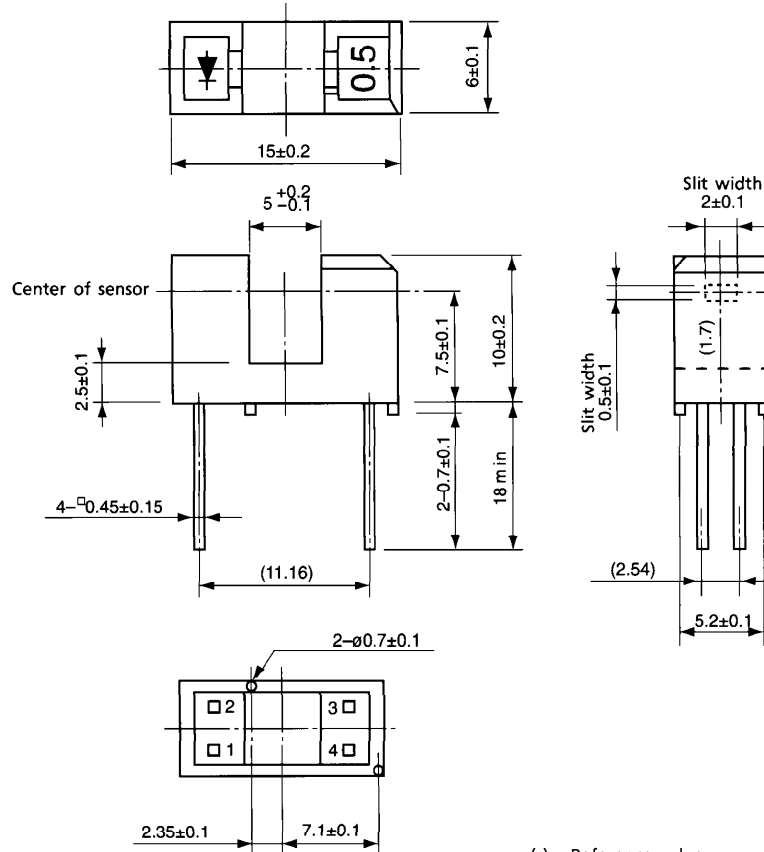
**PIN CONNECTION**



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

**PACKAGE DIMENSIONS**  
11-15B1

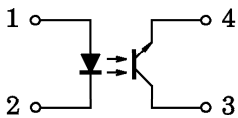
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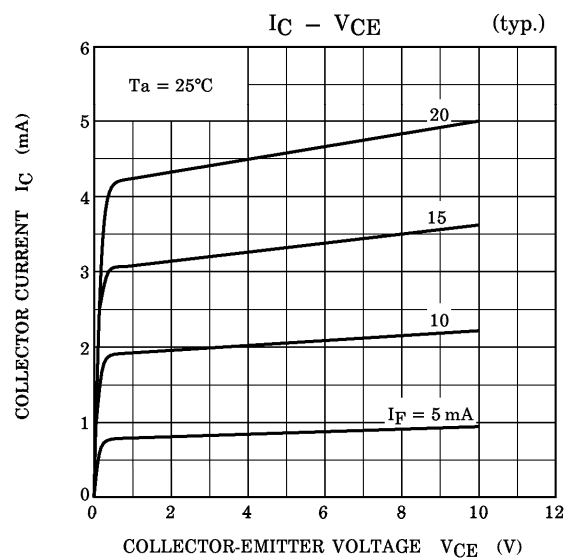
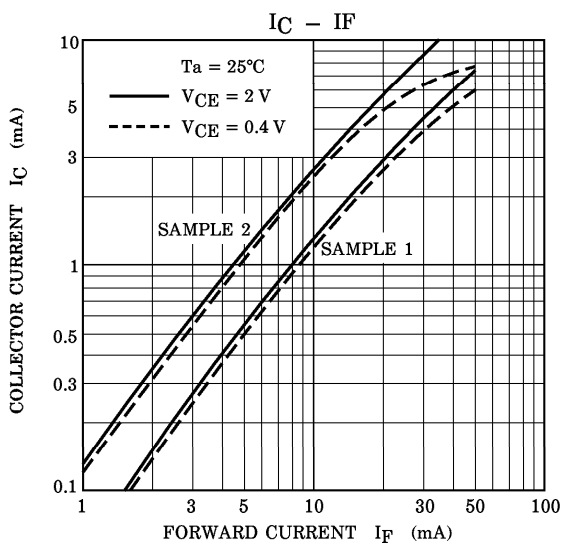
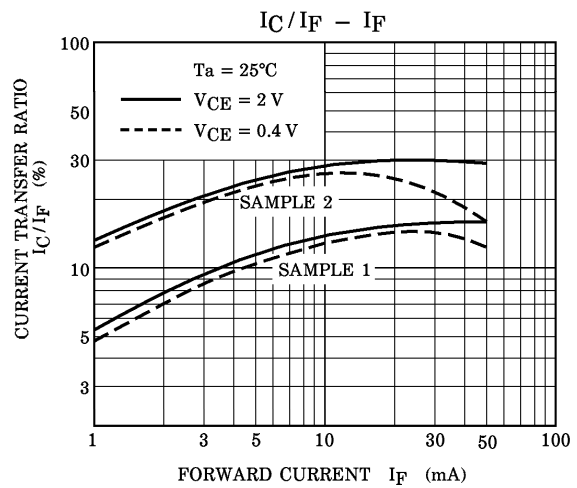
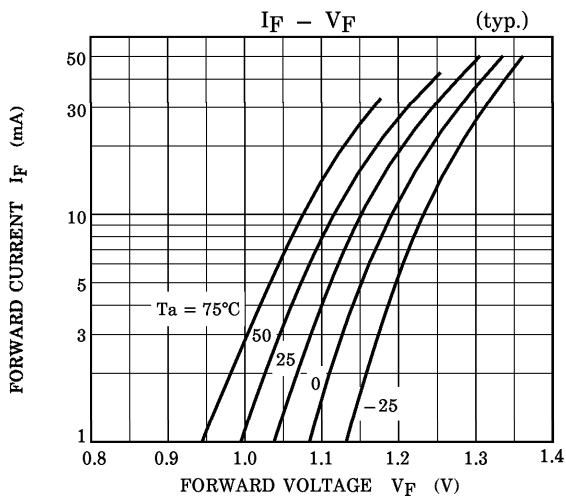
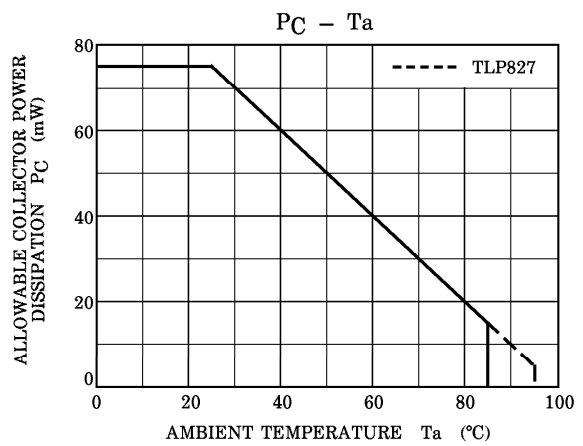
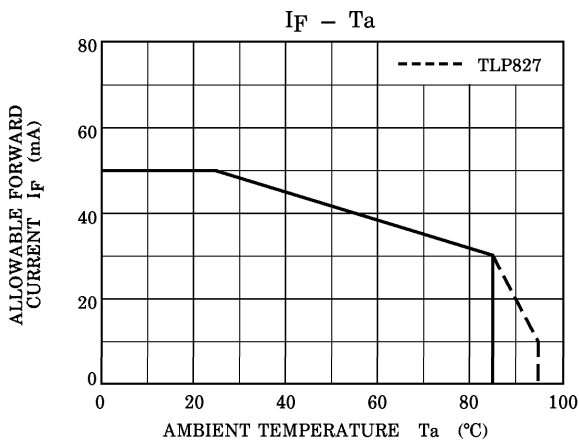
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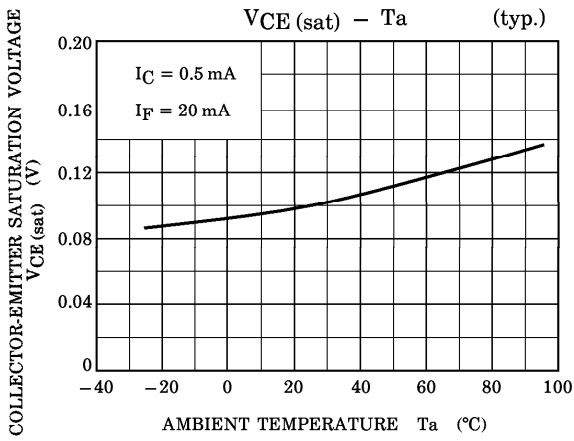
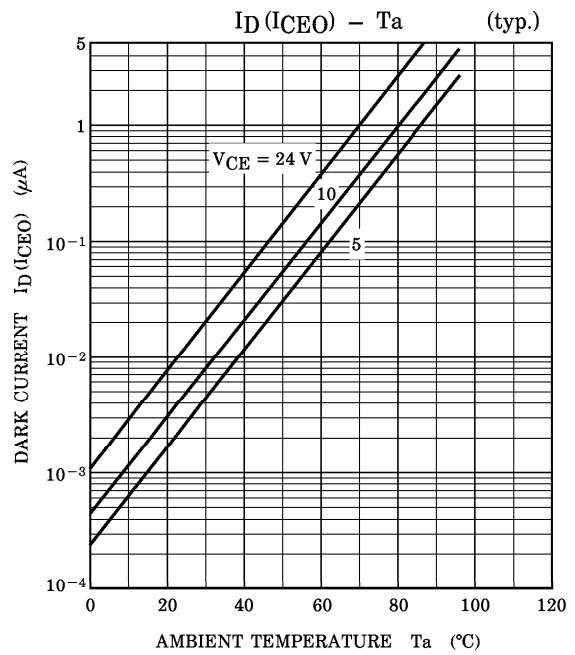
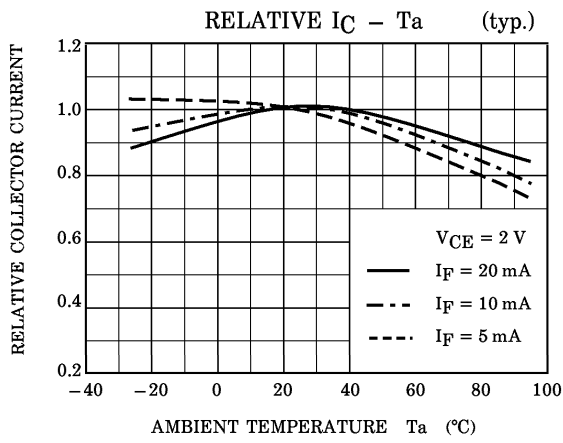
Weight : 0.72 g (typ.)

**PIN CONNECTION**

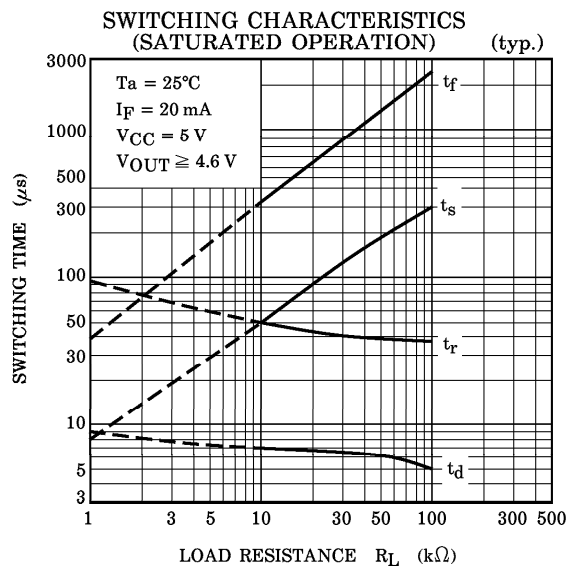
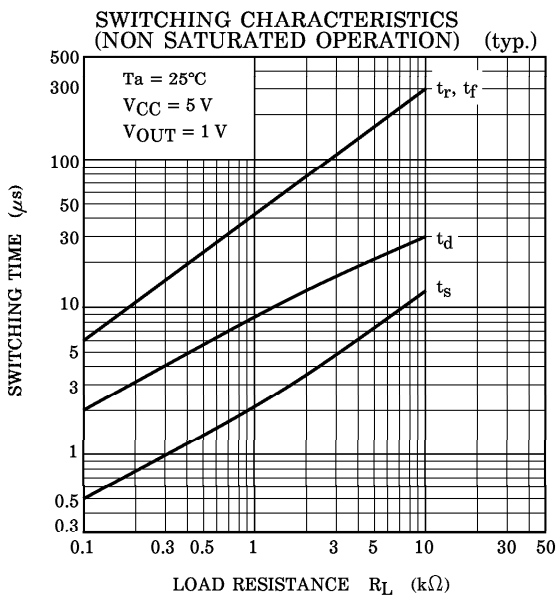
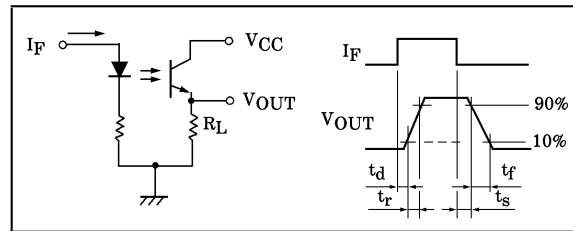


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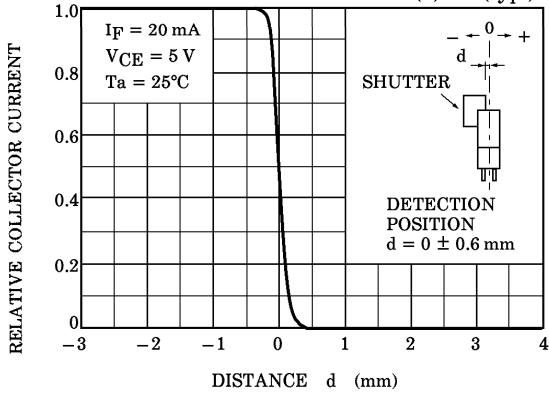


SWITCHING TIME TEST CIRCUIT

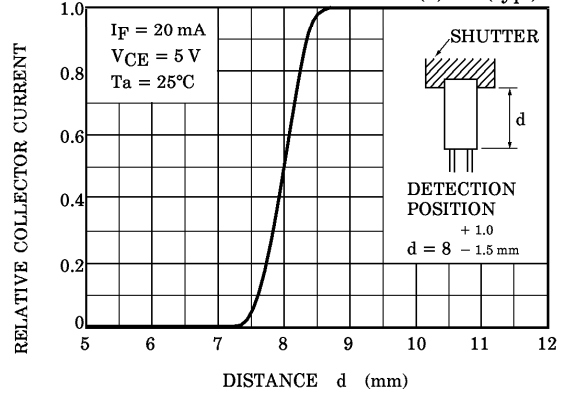




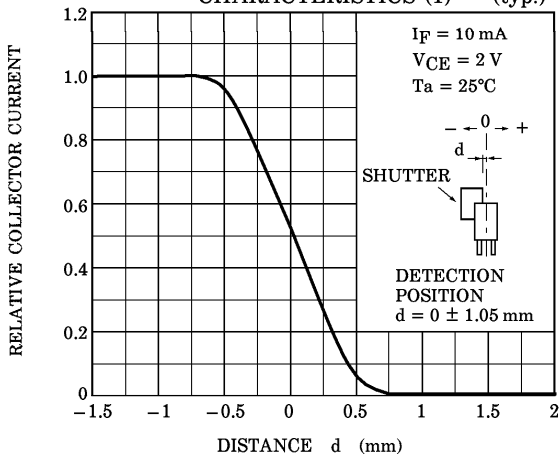
TLP822 DETECTION POSITION CHARACTERISTICS (1) (typ.)



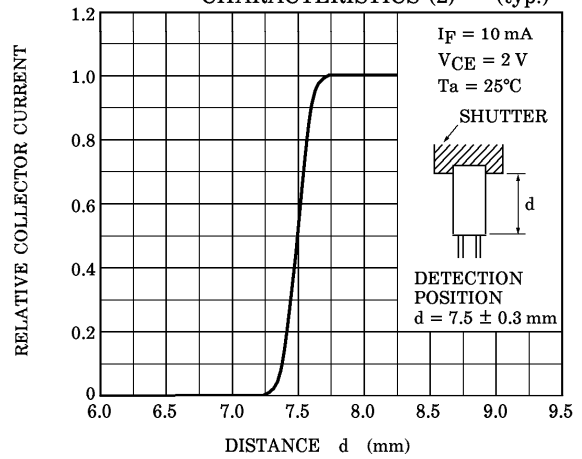
TLP822 DETECTION POSITION CHARACTERISTICS (2) (typ.)



TLP827 DETECTION POSITION CHARACTERISTICS (1) (typ.)



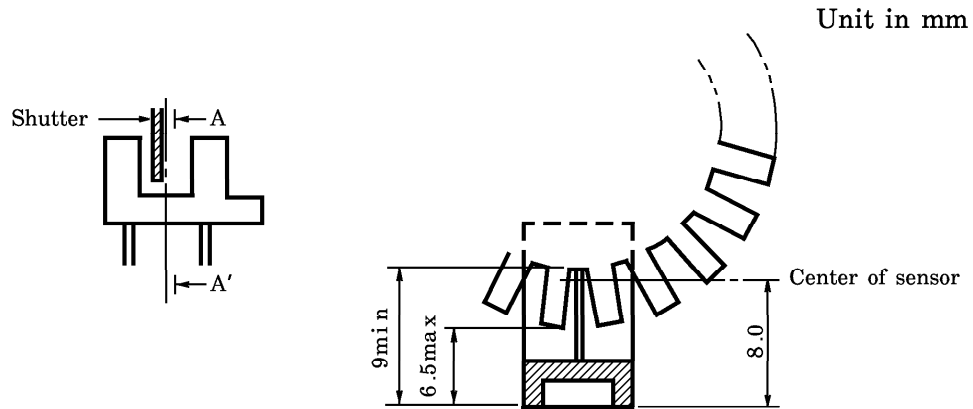
TLP827 DETECTION POSITION CHARACTERISTICS (2) (typ.)



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 position characteristic and switching time, determine the shutter slit width and pitch.

TLP822



Cross section between A and A'

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000707EAC

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