TOSHIBA PHOTO-INTERRUPTERS INFRARED LED + PHOTOTRANSISTOR

TLP822, TLP827

VCRS, COMPACT DISC PLAYERS

FLOPPY DISK DRIVES, FAX MACHINES, PRINTERS

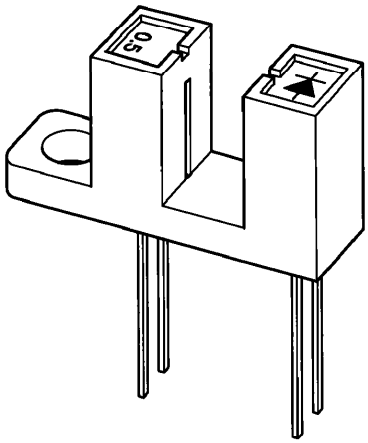
VENDING MACHINES, TICKET MACHINES

VARIOUS POSITION DETECTION SENSORS

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

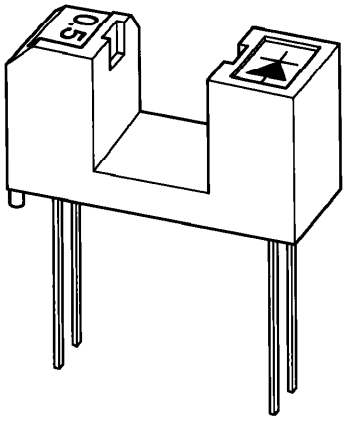
- Small package
- Side mounting type : TLP822
- Designed for direct mounting on printed circuit boards : TLP827 (the oblong slit)
- Gap : 5 mm
- Resolution : Slit width = 0.5 mm
- High current transfer ratio : I_C / I_F = 5% (min) at I_F = 10 mA
- Detector impermeable to visible light
- Package material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

TLP822



TOSHIBA 11-20B2

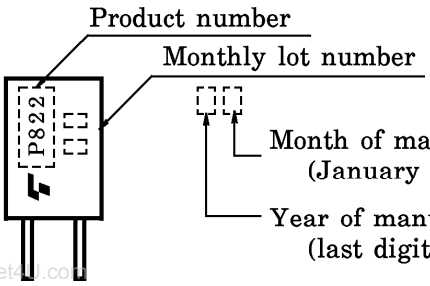
TLP827



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 Derating	(Ta > 25°C)	ΔI_F / °C	−0.33	mA / °C
		(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		ΔP_C / °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 mA	1.00	1.15	1.30	V
	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
	Peak Emission Wavelength	λ_P	I_F = 10 mA	—	940	—	nm
DETECTOR	Dark Current	I_D (I_{CEO})	V_{CE} = 24 V, I_F = 0	—	—	0.1	μA
	Peak Sensitivity Wavelength	λ_P	—	—	870	—	nm
COUPLED	Current Transfer Ratio	I_C / I_F	V_{CE} = 2 V, I_F = 10 mA	5	—	75	%
	Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_F = 20 mA, I_C = 0.5 mA	—	0.1	0.4	V
	Rise Time	t_r	V_{CC} = 5 V, I_C = 1 mA, R_L = 1 kΩ	—	15	50	μs
	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 chosing a packaging material by refering to the table below.

<Chemicals which should not be used with polycarbonate>

	PHENOMENON	CHEMICALS
A	Staining and slight deterioration	• Nitric acid (diluted), hydrogen peroxide, chlorine
B	Cracking, crazed or swelling	• 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	• Concentrated sulfuric acid • Benzene • Styrene, acrylonitrile, vinyl acetate • Ethylenediamine, diethylenediamine • {Chloroform, methyl chloride, tetrachloromethane, dioxane, 1, 2-dichloroethane}
D	Decomposition	• Ammonia water • Other alkalis

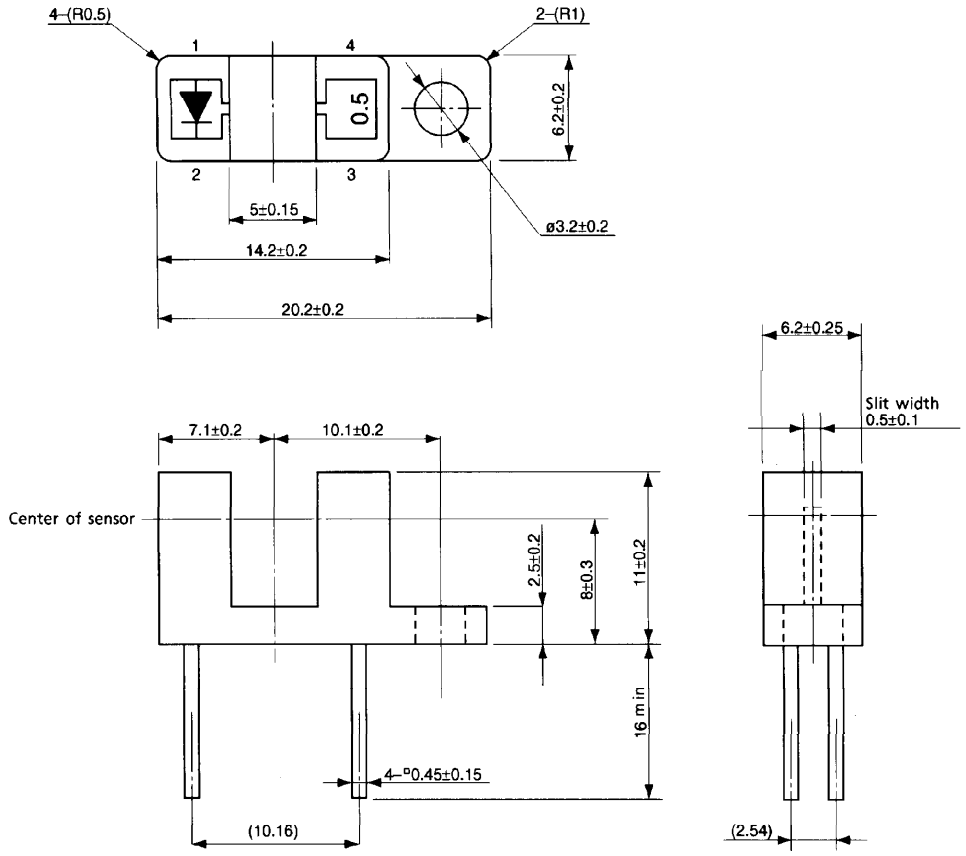
3. Mount the device on a level surface.
4. Screws should be tightened to a clamping torque of 0.59 N·m.
5. Conversion efficiency falls over time due to the current which flows in the infrared LED. When designing a circuit, take into account this change in conversion efficiency over time. The ratio of 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

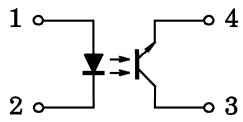
Unit : mm



( ) : Reference value

Weight : 0.87 g (typ.)

PIN CONNECTION

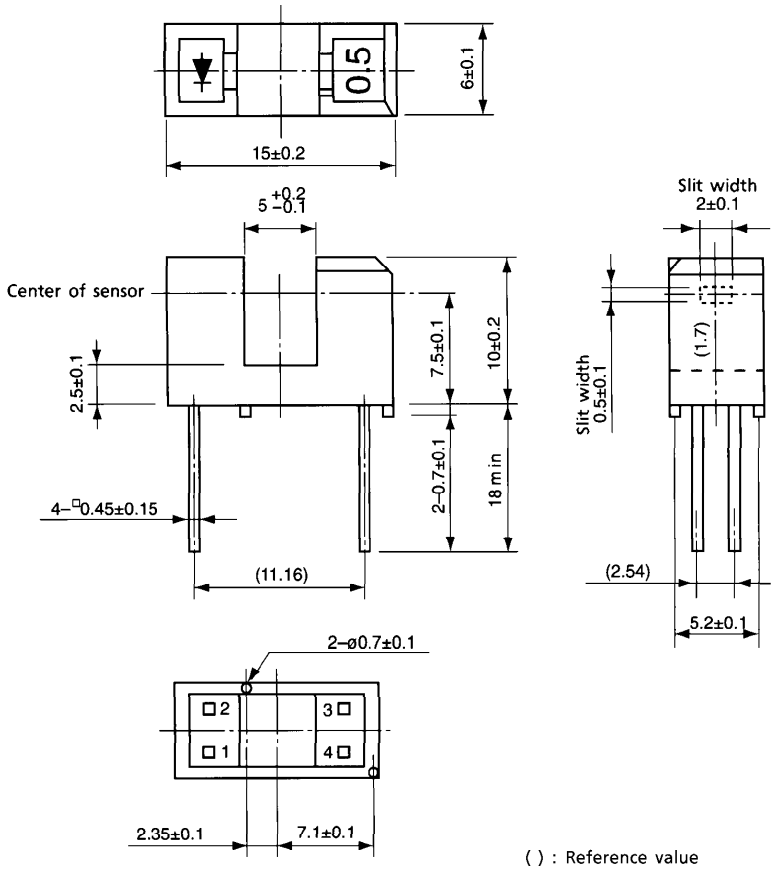


1. ANODE
2. CATHODE
3. COLLECTOR
4. EMITTER

PACKAGE DIMENSIONS

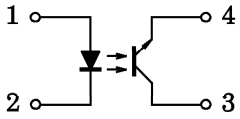
11-15B1

Unit : mm



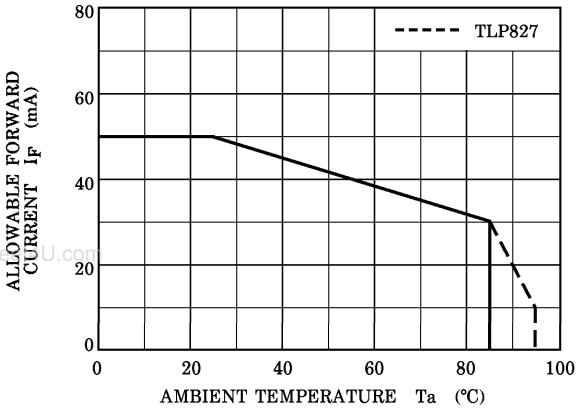
Weight : 0.72 g (typ.)

PIN CONNECTION

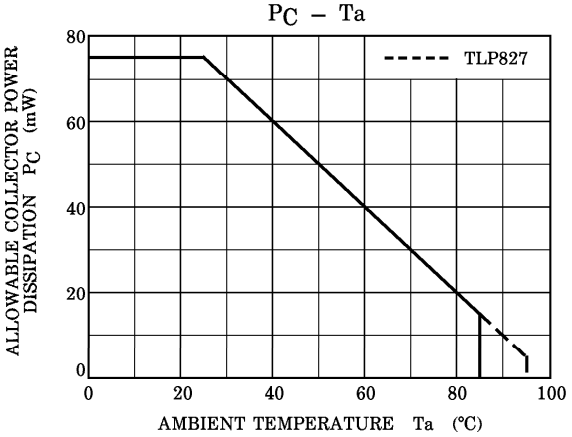


1. ANODE
2. CATHODE
3. COLLECTOR
4. EMITTER

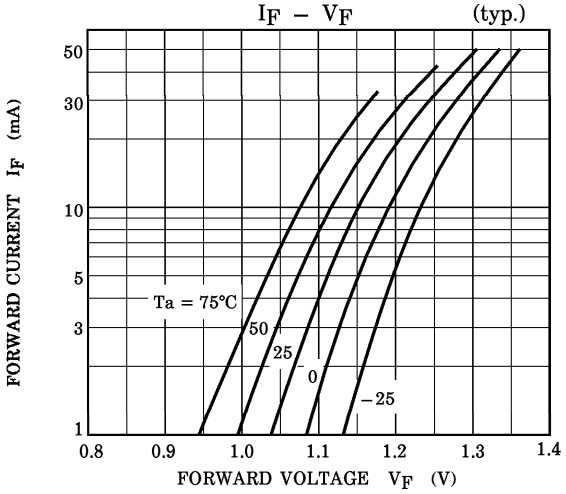
I_F – Ta



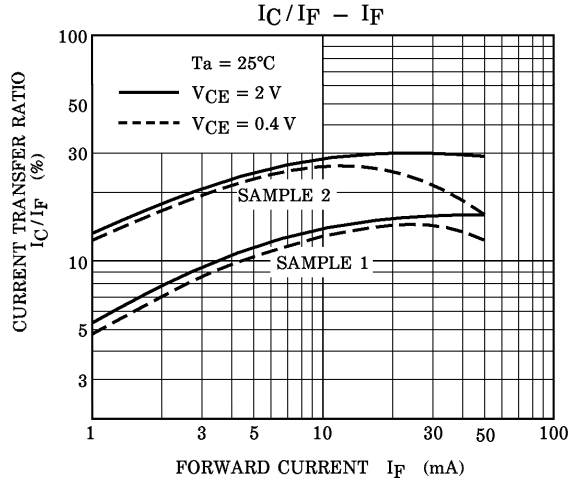
P_C – Ta



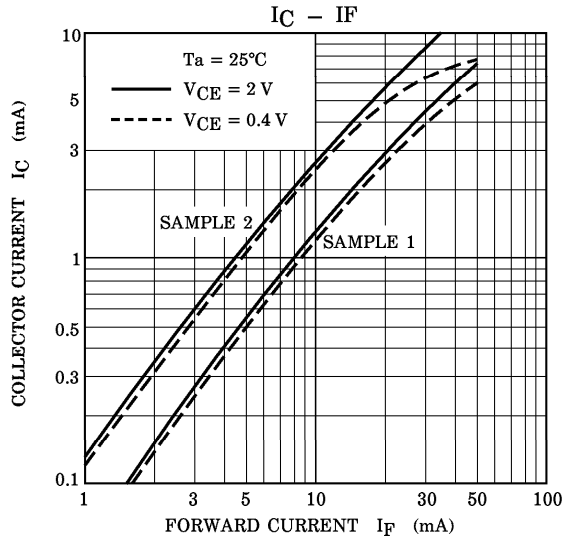
I_F – V_F (typ.)



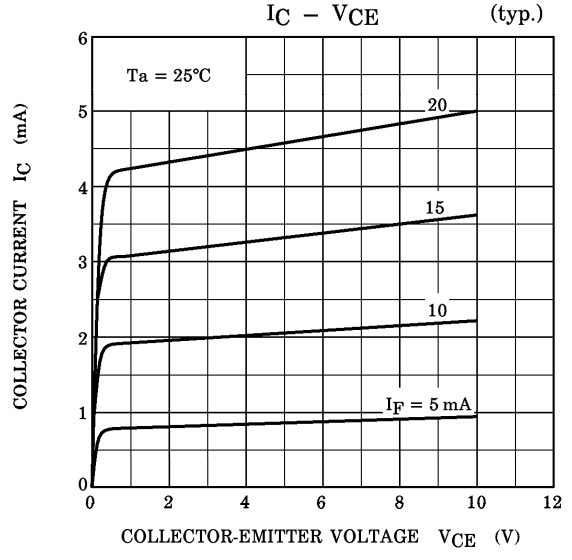
I_C / I_F – I_F



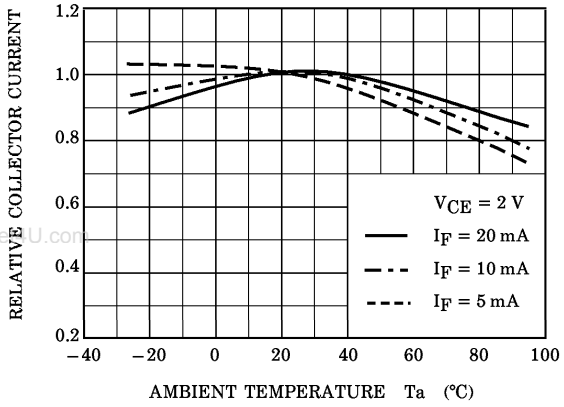
I_C – IF



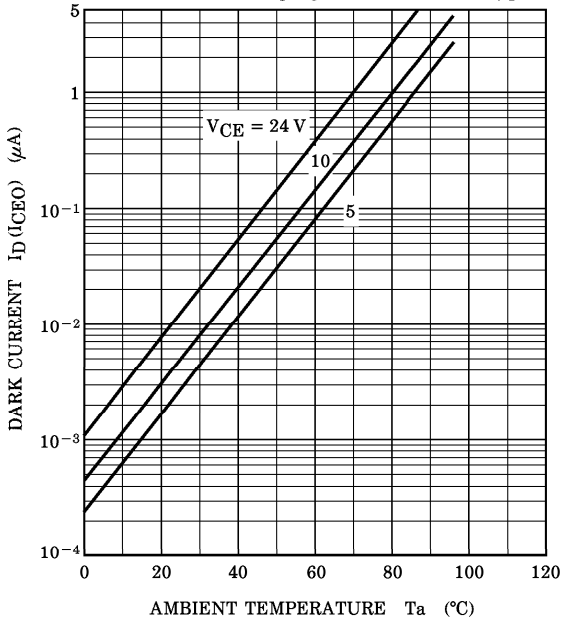
I_C – V_{CE} (typ.)



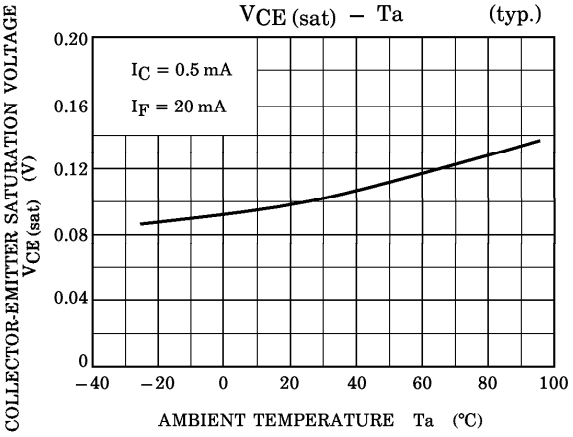
RELATIVE I_C – Ta (typ.)



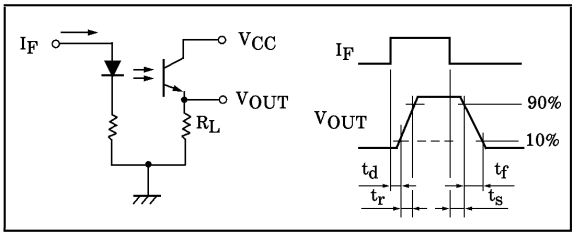
I_D (I_{CEO}) – Ta (typ.)



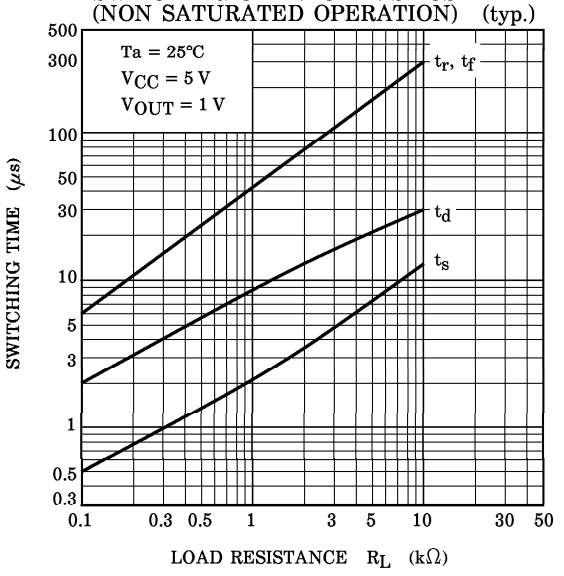
V_{CE} (sat) – Ta (typ.)



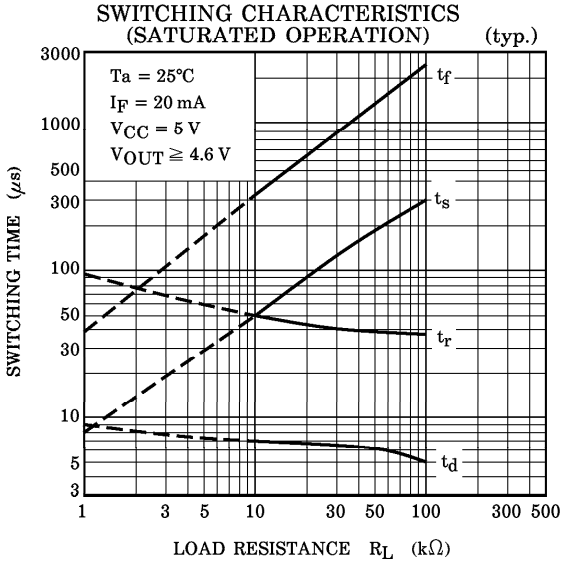
SWITCHING TIME TEST CIRCUIT



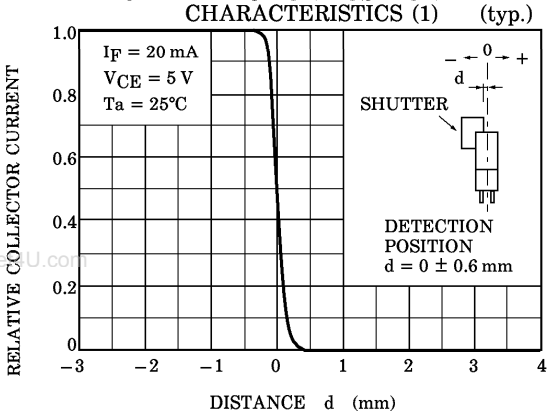
SWITCHING CHARACTERISTICS (NON SATURATED OPERATION) (typ.)



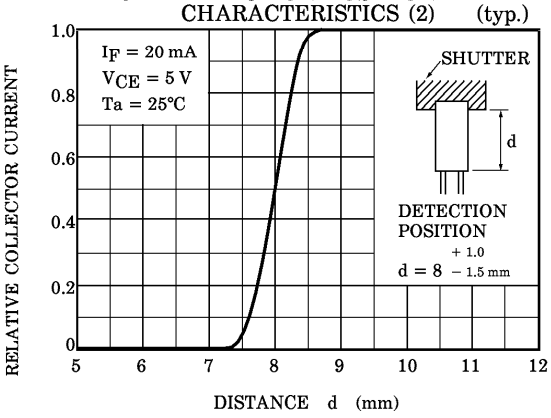
SWITCHING CHARACTERISTICS (SATURATED OPERATION) (typ.)



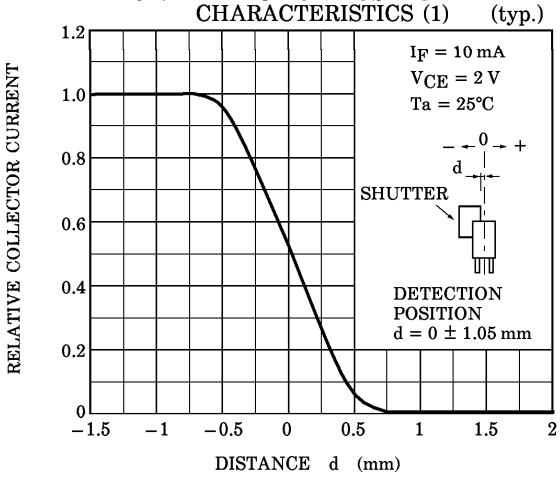
TLP822 DETECTION POSITION CHARACTERISTICS (1) (typ.)



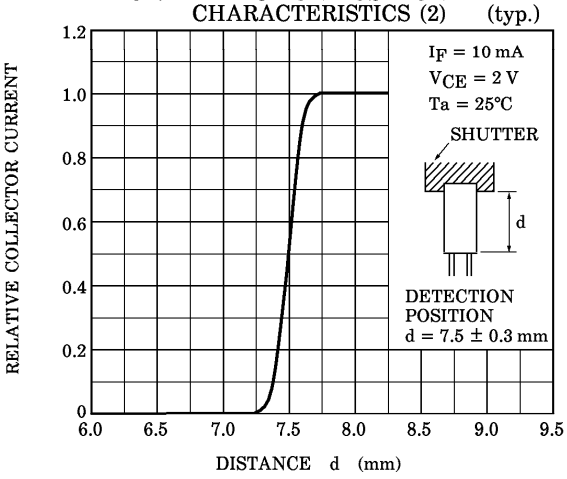
TLP822 DETECTION POSITION CHARACTERISTICS (2) (typ.)



TLP827 DETECTION POSITION CHARACTERISTICS (1) (typ.)



TLP827 DETECTION POSITION CHARACTERISTICS (2) (typ.)

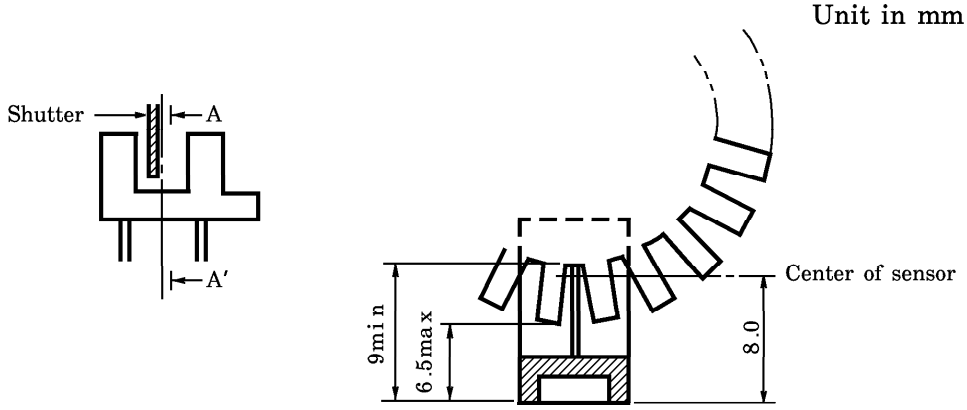


RELATIVE POSITIONING OF SHUTTER AND DEVICE

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

Unit in mm



Cross section between A and A'

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000707EAC

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