TOSHIBA PHOTOINTERRUPTER INFRARED + PHOTODARLINGTONTRANSISTOR

TLP862, TLP866, TLP867

VCR, COMPACT DISC PLAYER

COPYING MACHINE, FACSIMILE, PRINTER

VENDING MACHINE, TICKETING MACHINE

FOR VARIOUS POSITION DETECTION

The TLP862, TLP866 and TLP867 are photointerrupters with an GaAs infrared LED and a high sensitivity Si photodarlingtontransistor combined. They have a high current transfer ratio, and be driven by low input current and is best suited to a low power circuit.

- Small package
- Side mounting type : TLP862
- PWB direct mounting type : TLP866
  TLP867 (the oblong slit)
- Gap : 5mm
- Resolution : Slit width 0.5mm
- High current transfer ratio : $I_C / I_F = 30\%$ (min) at $I_F = 1mA$
- The detecter side is of visible light cut type.
- Material of the package : Polycarbonate

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
	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 (Ta > 25°C)	ΔP_C / °C	−1	mW / °C
	Collector Current	I_C	40	mA
Operating Temperature Range		T_{opr}	−25~85	°C
Storage Temperature Range		T_{stg}	−40~100	°C
Soldering Temperature (5s)		T_{sol}	260	°C

961001EBC2

RECOMMENDED OPERATING CONDITIONS

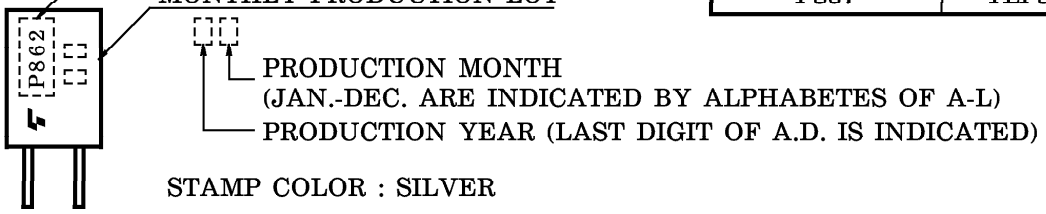
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	16	V
Forward Current	I_F	—	—	20	mA
Operating Temperature	T_{opr}	−10	—	70	°C

OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10mA	1.00	1.15	1.30	V
	Reverse Current	I_R	V_R = 5V	—	—	10	μA
	Peak Emission Wavelength	λ_P	I_F = 10mA	—	940	—	nm
DETECTOR	Dark Current	I_D (I_{CEO})	V_{CE} = 16V, I_F = 0	—	—	0.25	μA
	Peak Sensitivity Wavelength	λ_P	—	—	870	—	nm
COUPLED	Current Transfer Ratio	I_C / I_F	V_{CE} = 2V, I_F = 1mA	30	—	1200	%
	Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_F = 2mA, I_C = 0.3mA	—	0.75	1	V
	Rise Time	tr	V_{CC} = 5V, I_C = 1mA, R_L = 1kΩ	—	600	—	μs
	Fall Time	tf		—	500	—	

PRODUCT INDICATION

ABBREVIATION	TYPE
P862	TLP862
P866	TLP866
P867	TLP867



PRECAUTION

Please be careful of the followings.

1. If chemical are used for cleaning, the soldered surface only shall be cleaned with chemicals avoiding the whole cleaning of the package.
2. The container is made of polycarbonate. Polycarbonate is usually stable with acid, alcohol, and aliphatic hydrocarbons however, with pertochemicals (such as benzene, toluene, and acetone), alkali, aromatic hydrocarbons, or chloric hydrocarbons, polycarbonate becomes cracked, swollen, or melted. Please take care when chosing a packaging material by referencing the table below.

<Chemicals to avoid with polycarbonate>

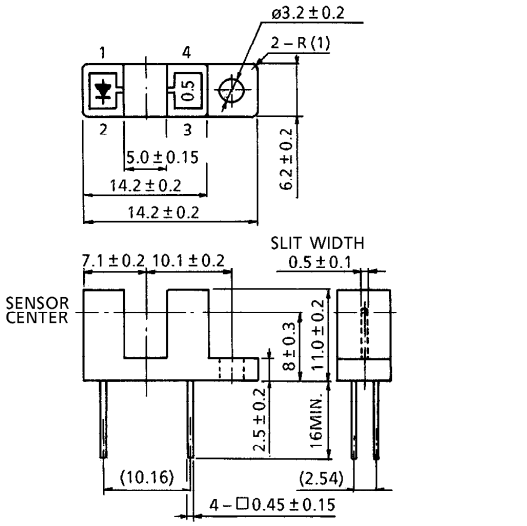
	PHENOMENON	CHEMICALS
A	Little deterioration but staining	• nitric acid (low concentration), hydrogen peroxide, chlorine
B	Cracked, crazed, or swollen	• acetic acid (70% or more) • gasoline • methyl ethyl ketone, ehtyl acetate, butyl acetate • ethyl methacrylate, ethyl ether, MEK • acetone, m-amino alcohol, carbon tetrachloride • carbon disulfide, trichloroethylene, cresol • thinners, oil of turpentine • triethanolamine, TCP, TBP
C	Melted { } : Used as solvent.	• concentrated sulfuric acid • benzene • styrene, acrylonitrile, vinyl acetate • ethylenediamine, diethylenediamine • {chloroform, methyl chloride, tetrachloromethane, dioxane, 1, 2-dichloroethane}
D	Decomposed	• ammonia water • other alkali

3. TLP862, TLP866, TLP867 shall be mounted on an unwarped surface.
4. Screw shall be tightened to clamping torque of 0.59N·m. (TLP862)

OUTLINE DRAWINGS

Unit in mm

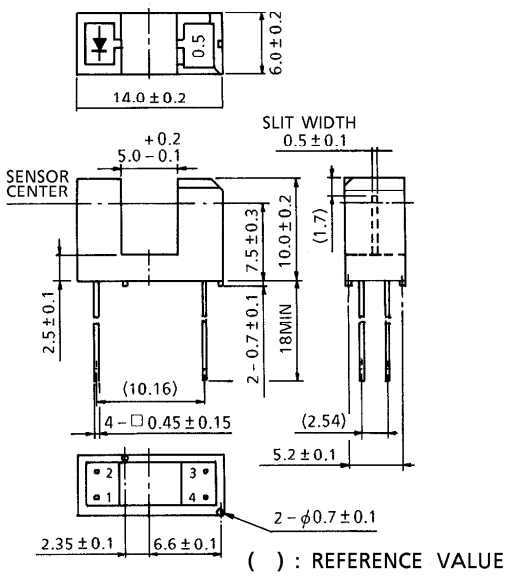
TLP862



( ) : REFERENCE VALUE

JEDEC	—
EIAJ	—
TOSHIBA	11-20B2

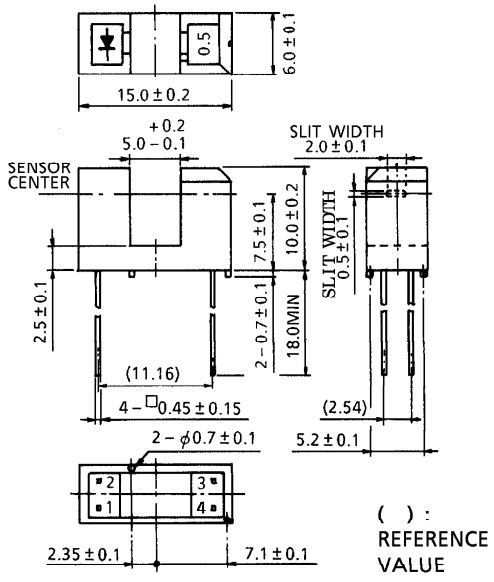
TLP866



( ) : REFERENCE VALUE

JEDEC	—
EIAJ	—
TOSHIBA	11-14A1

TLP867

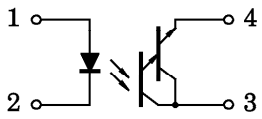


( ) : REFERENCE VALUE

JEDEC	—
EIAJ	—
TOSHIBA	11-15B1

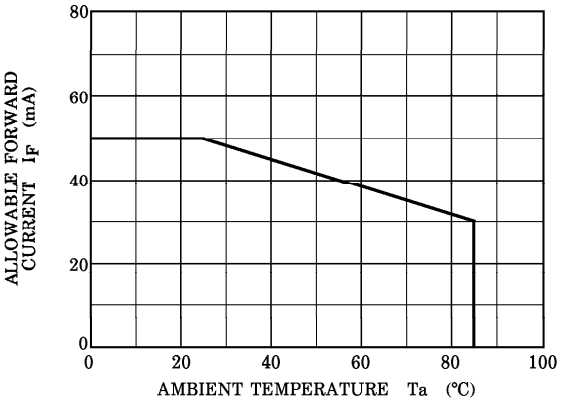
Weight : 0.85g (typ.) (TLP862)
0.65g (typ.) (TLP866)
0.72g (typ.) (TLP867)

PIN CONNECTION

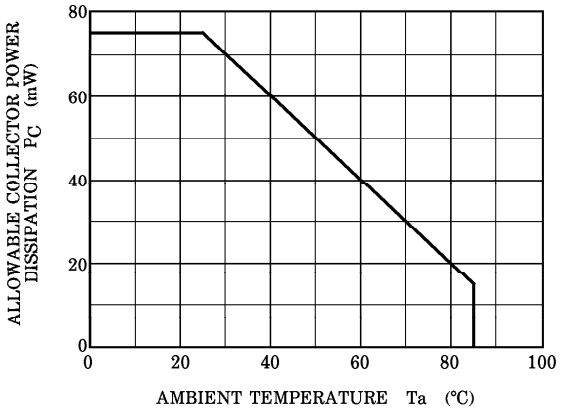


1. ANODE
2. CATHODE
3. COLLECTOR
4. EMITTER

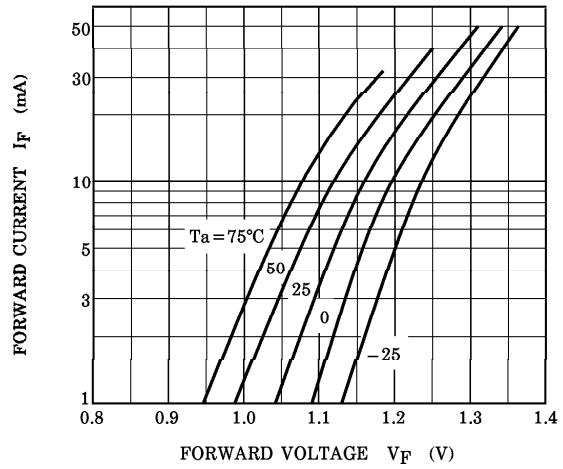
I_F – Ta



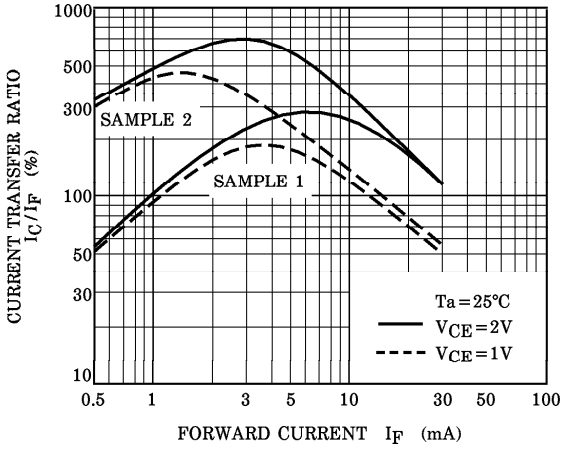
P_C – Ta



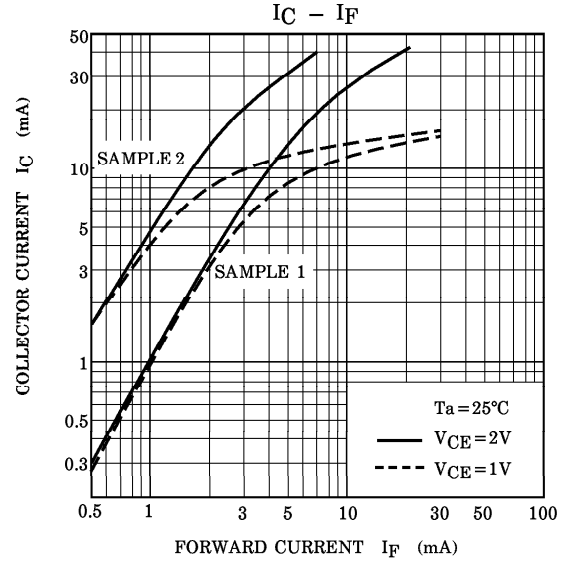
I_F – V_F (TYP.)



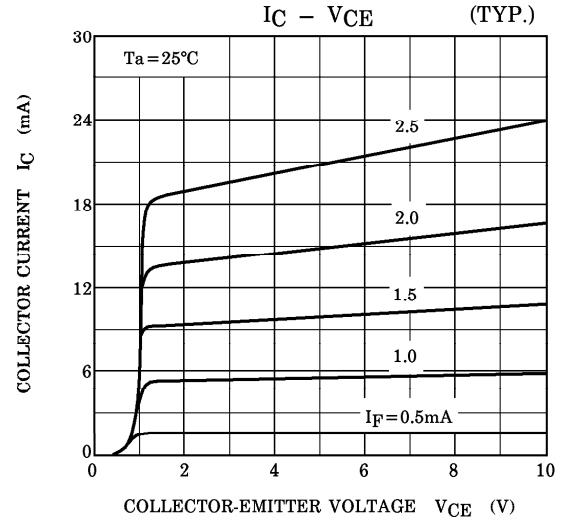
I_C / I_F – I_F



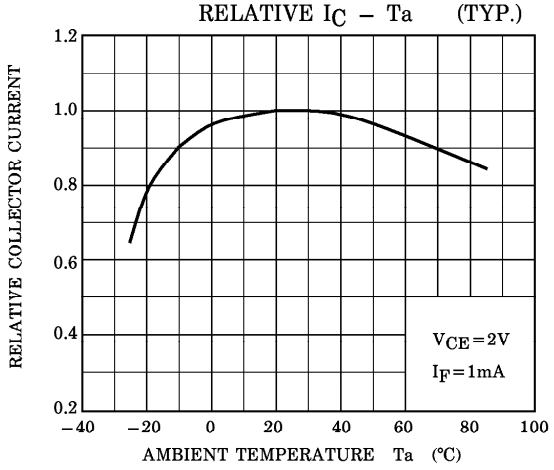
I_C – I_F



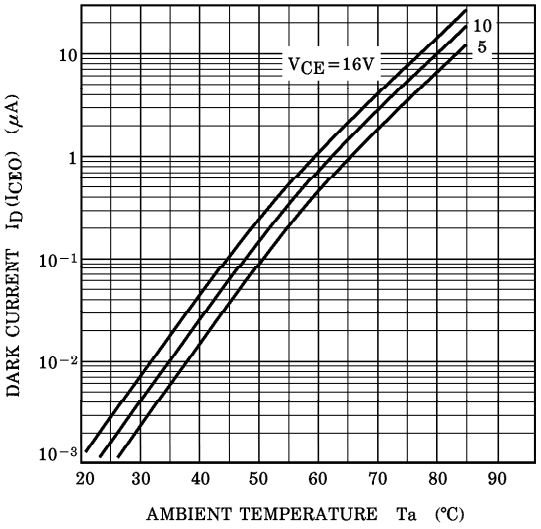
I_C – V_{CE} (TYP.)



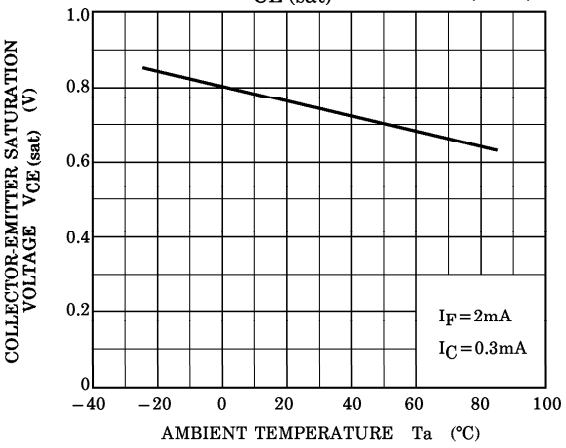
RELATIVE I_C – Ta (TYP.)



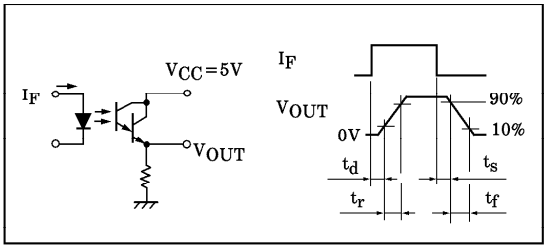
I_D (I_{CEO}) – Ta (TYP.)



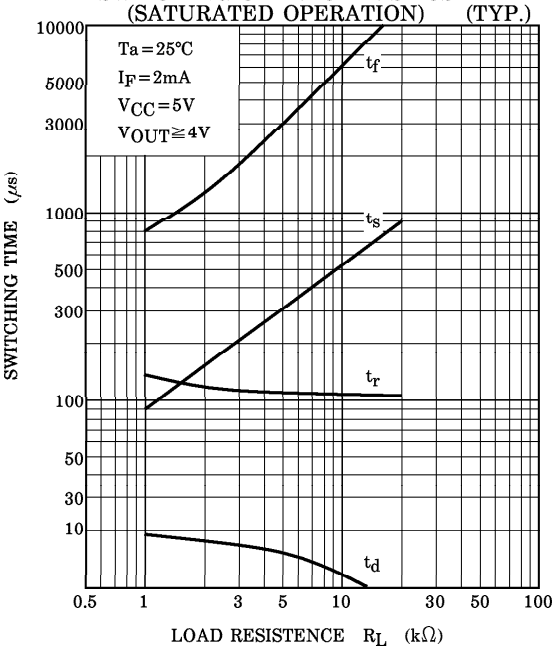
V_{CE} (sat) – Ta (TYP.)



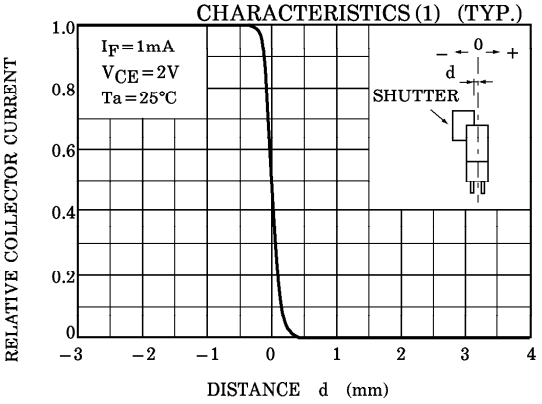
SWITCHING TIME TEST CIRCUIT



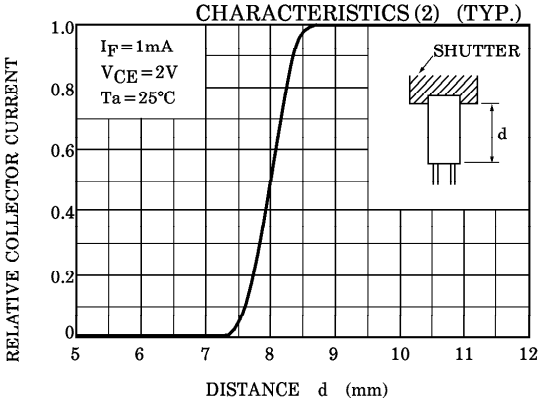
SWITCHING CHARACTERISTICS (SATURATED OPERATION) (TYP.)



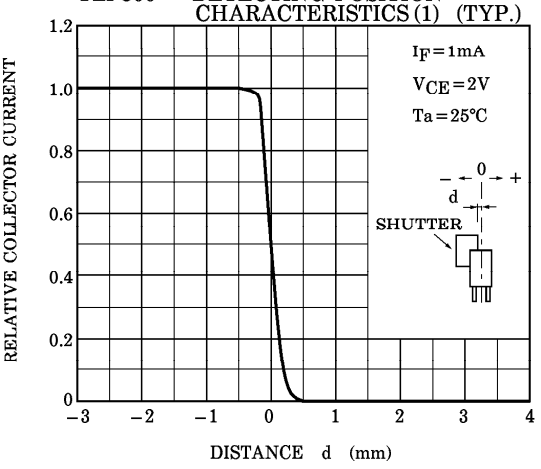
TLP862 DETECTING POSITION CHARACTERISTICS (1) (TYP.)



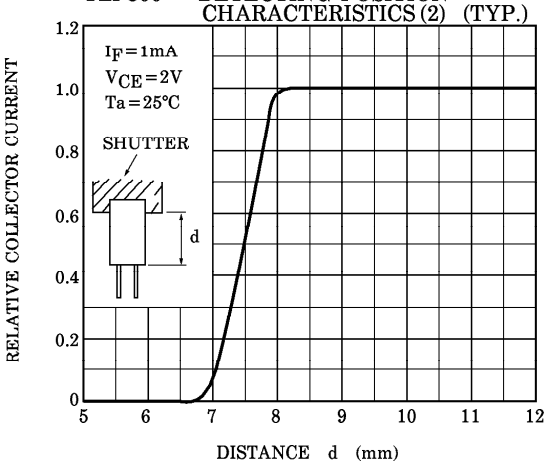
TLP862 DETECTING POSITION CHARACTERISTICS (2) (TYP.)



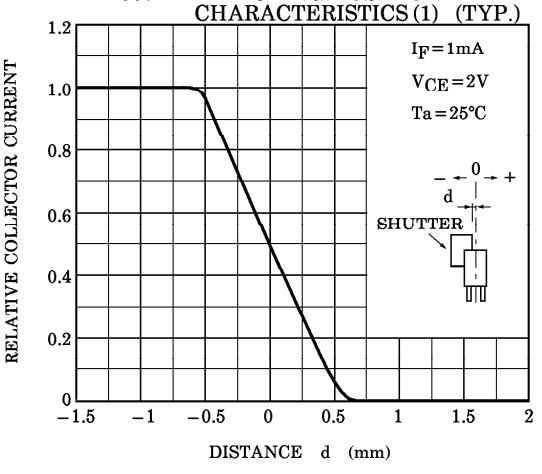
TLP866 DETECTING POSITION CHARACTERISTICS (1) (TYP.)



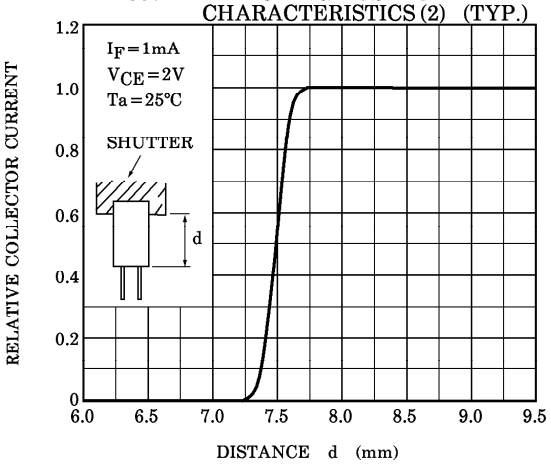
TLP866 DETECTING POSITION CHARACTERISTICS (2) (TYP.)



TLP867 DETECTING POSITION CHARACTERISTICS (1) (TYP.)



TLP867 DETECTING POSITION CHARACTERISTICS (2) (TYP.)

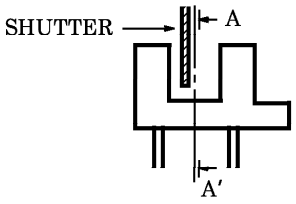


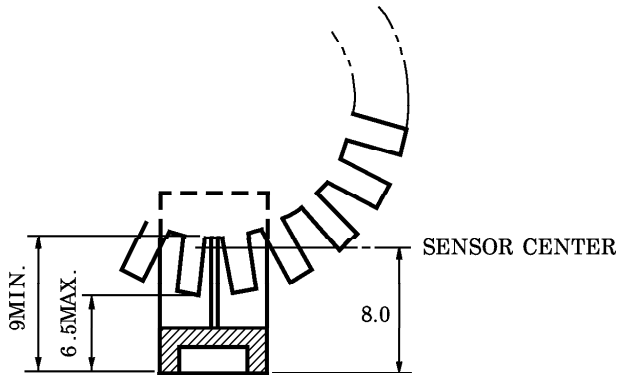
POSITIONING OF SHUTTER AND DEVICE

To operate correctly, make sure that the shutter and the device are positioned as shown in the figure below.

The shit pitch of the shutter must be set wider than the slit width of the device.
Determine the width taking the switching time into consideration.

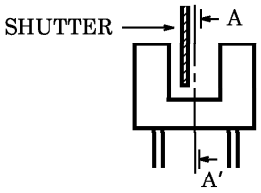
TLP862 Unit in mm

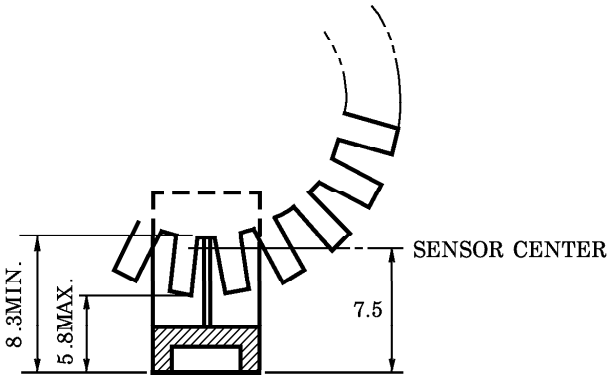




A – A′ CROSS SECTION

TLP866





A – A′ CROSS SECTION