

TOSHIBA PHOTOINTERRUPTER INFRARED + PHOTODARLINGTONTRANSISTOR

TLP864, TLP865

VCR, COMPACT DISC PLAYER

COPYING MACHINE, FACSIMILE, PRINTER

VENDING MACHINE, TICKETING MACHINE

FOR VARIOUS POSITION DETECTION

The TLP864 and TLP865 are photointerrupter combining GaAs infrared LED with high sensitivity Si photo-darlingtontransistor. They have a high current transfer ratio, can be driven by low input current and is best suited to a low power circuit.

- Small package
- Printed wiring board direct mounting type. : TLP864
- Side mounting type : TLP865
- Gap : 3mm
- Resolution : Slit width 0.5mm
- High current transfer ratio : $I_C / I_F = 50\%$ (min) at $I_F = 1\text{mA}$
- The detector 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)	$\Delta I_F / ^\circ\text{C}$	-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)	$\Delta P_C / ^\circ\text{C}$	-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

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RECOMMENDED OPERATING CONDITION

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 ($T_a = 25^\circ\text{C}$)

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		—	870	—	nm
COUPLED	Current Transfer Ratio	I_C / I_F	$V_{CE} = 2\text{V}, I_F = 1\text{mA}$	50	—	2000	%
	Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_F = 2\text{mA}, I_C = 0.5\text{mA}$	—	0.75	1	V
	Rise Time	t_r	$V_{CC} = 5\text{V}, I_C = 1\text{mA}$ $R_L = 1\text{k}\Omega$	—	600	—	μs
	Fall Time	t_f		—	500	—	

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 peroxochemicals (such as benzene, toluene, and acetone), alkali, aromatic hydrocarbons, or chloric hydrocarbons, polycarbonate becomes cracked, swollen, or melted. Please take care when choosing a packaging material by referencing the table below.

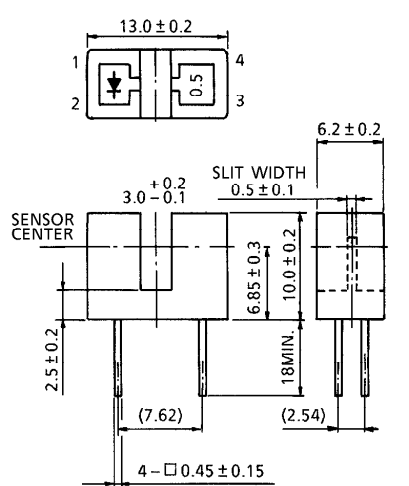
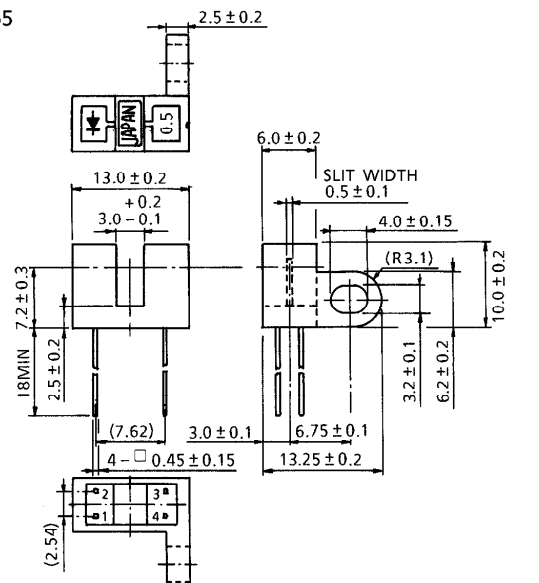
<Chemicals to avoid with polycarbonate>

	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, 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	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

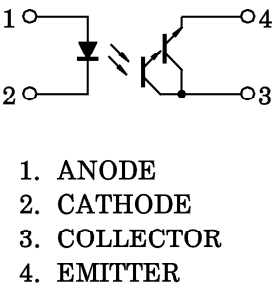
3. TLP864, TLP865 shall be mounted on an unwarped surface.
4. Screw shall be tightened to clamping torque of 0.59N·m. (TLP865)

OUTLINE DRAWINGS

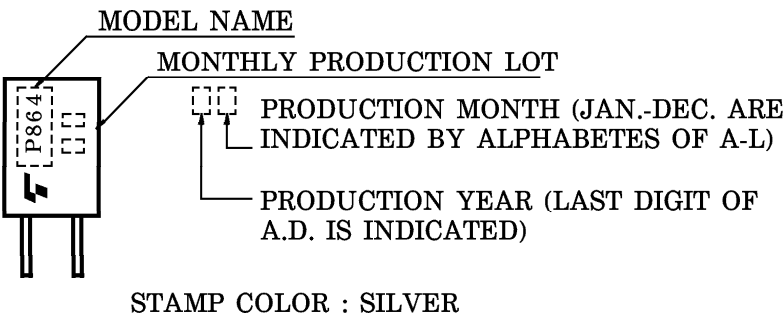
Unit in mm

TLP864  () : REFERENCE VALUE <table><tr><td>JEDEC</td><td>—</td></tr><tr><td>EIAJ</td><td>—</td></tr><tr><td>TOSHIBA</td><td>11-13K1</td></tr></table> Weight : 0.81g (typ.)	JEDEC	—	EIAJ	—	TOSHIBA	11-13K1	TLP865  () : REFERENCE VALUE <table><tr><td>JEDEC</td><td>—</td></tr><tr><td>EIAJ</td><td>—</td></tr><tr><td>TOSHIBA</td><td>11-13M1</td></tr></table> Weight : 0.82g (typ.)	JEDEC	—	EIAJ	—	TOSHIBA	11-13M1
JEDEC	—												
EIAJ	—												
TOSHIBA	11-13K1												
JEDEC	—												
EIAJ	—												
TOSHIBA	11-13M1												

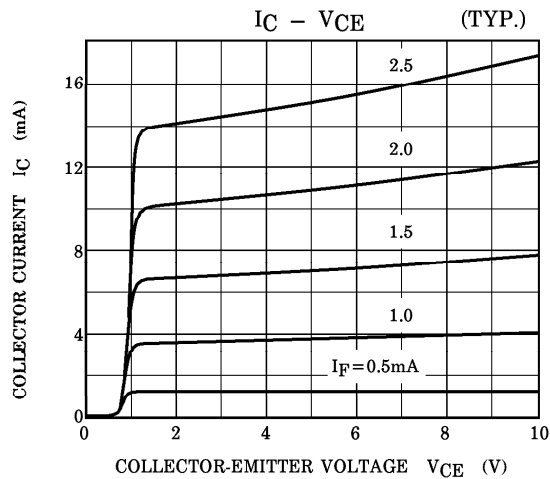
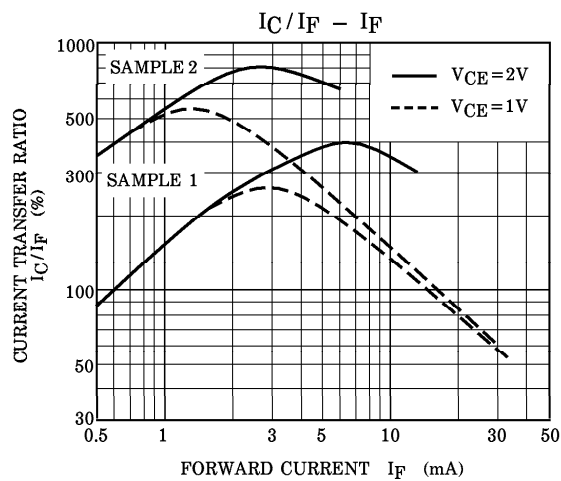
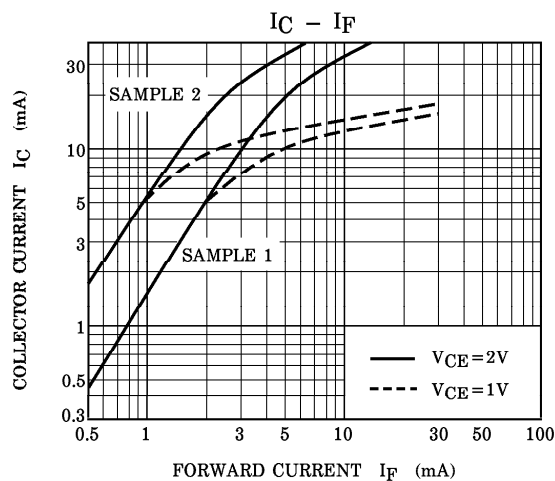
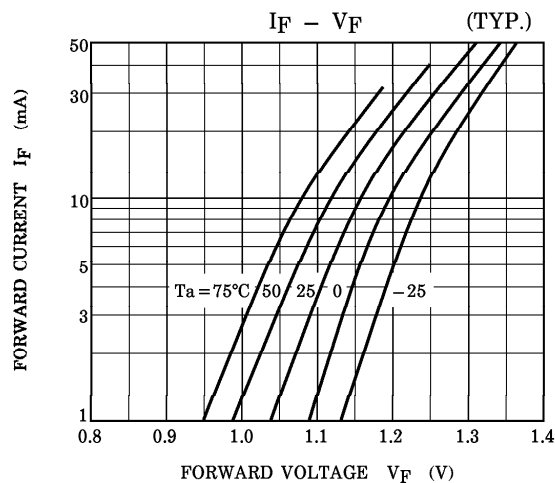
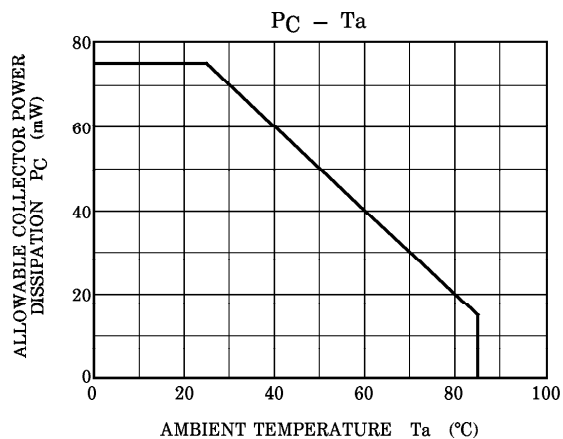
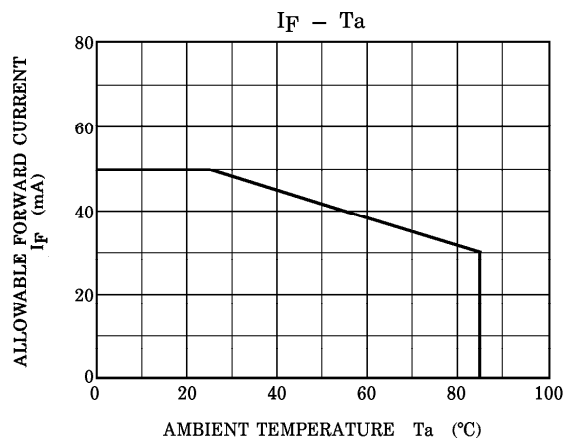
PIN CONNECTION

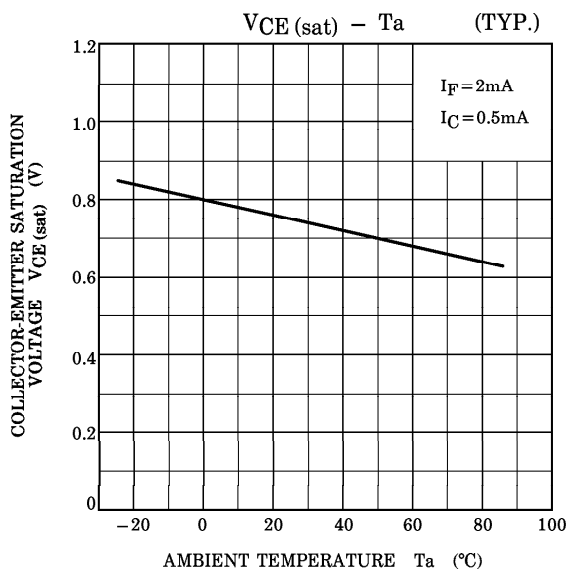
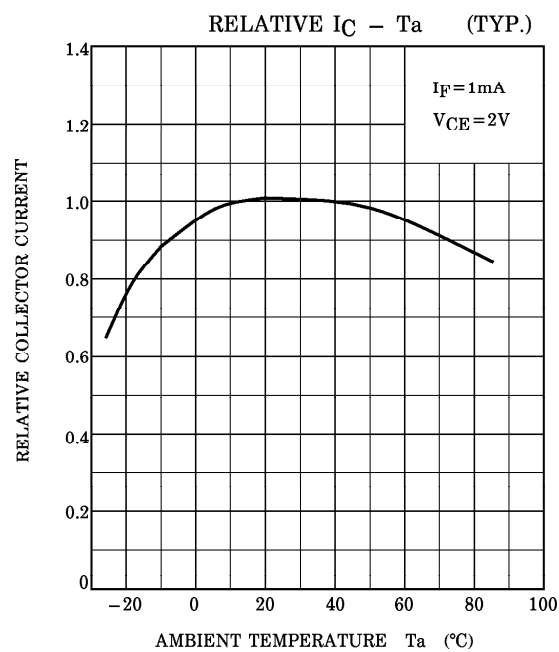
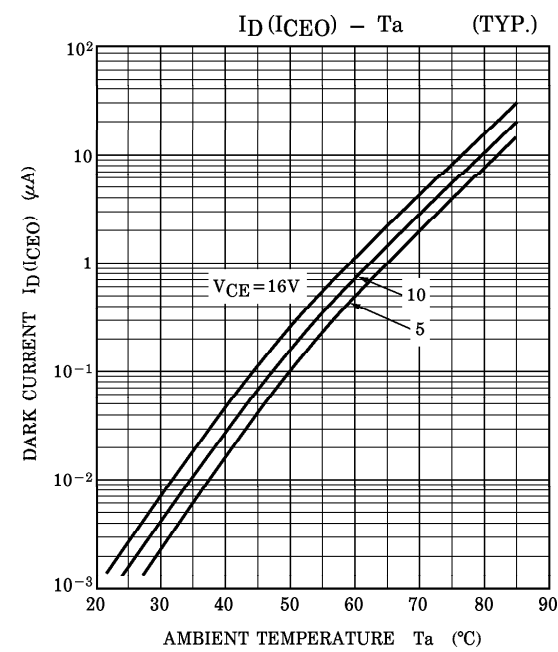


PRODUCT INDICATION

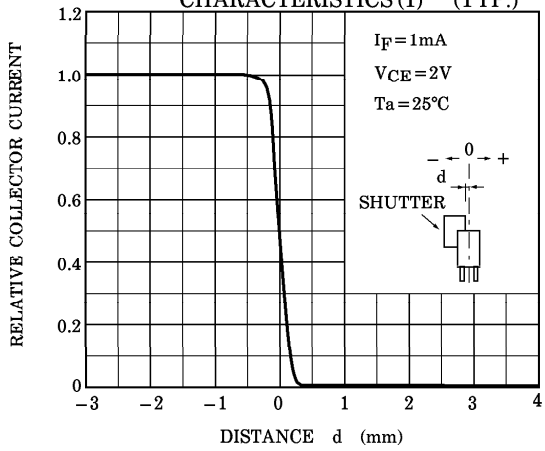


ABBREVIATION	TYPE
P864	TLP864
P865	TLP865

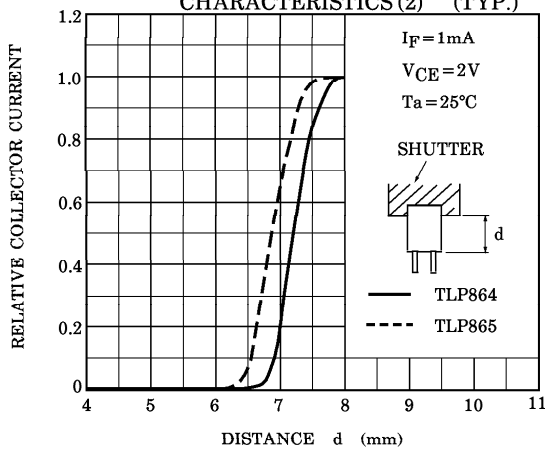




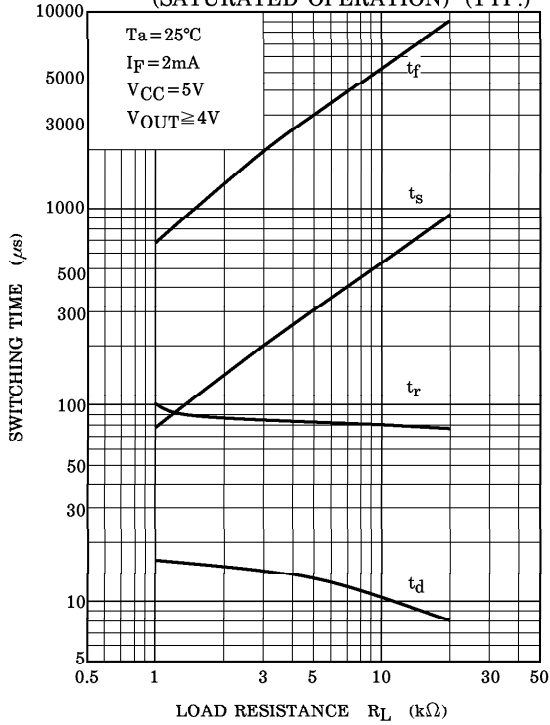
DETECTING POSITION
CHARACTERISTICS (1) (TYP.)



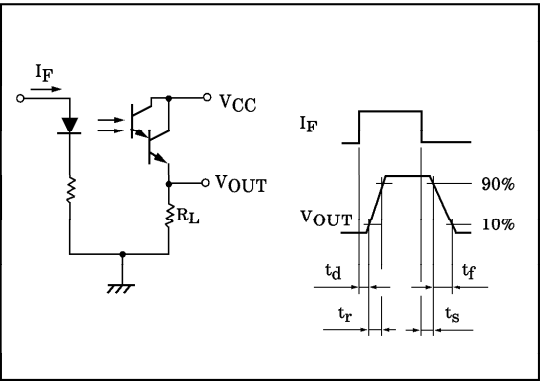
DETECTING POSITION
CHARACTERISTICS (2) (TYP.)



SWITCHING CHARACTERISTICS
(SATURATED OPERATION) (TYP.)



SWITCHING TIME TEST CIRCUIT



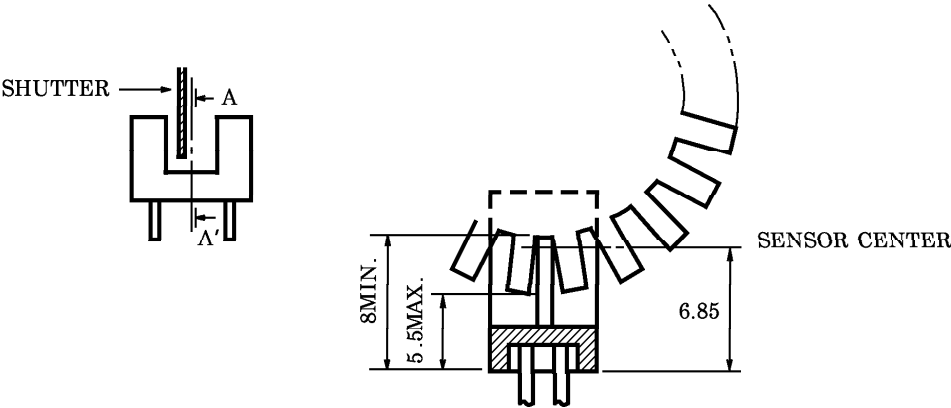
POSITIONING OF SHUTTER AND DEVICE

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.

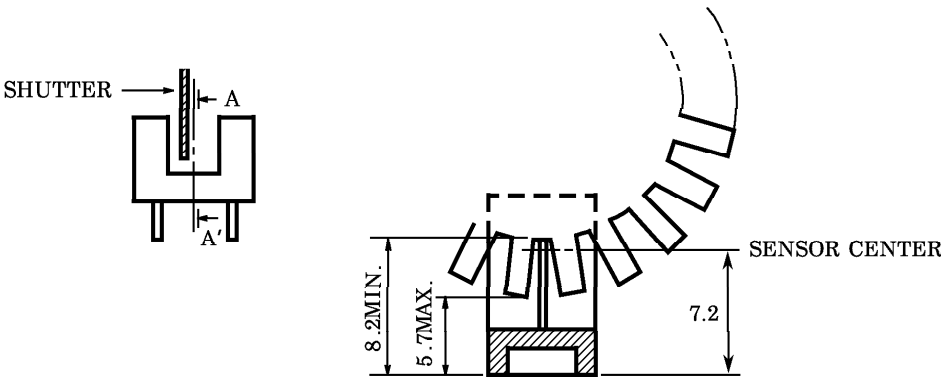
TLP864

UNIT IN mm



A – A' CROSS SECTION

TLP865



A – A' CROSS SECTION