TOSHIBA PHOTOINTERRUPTER INFRARED LED + PHOTO IC

TLP1020

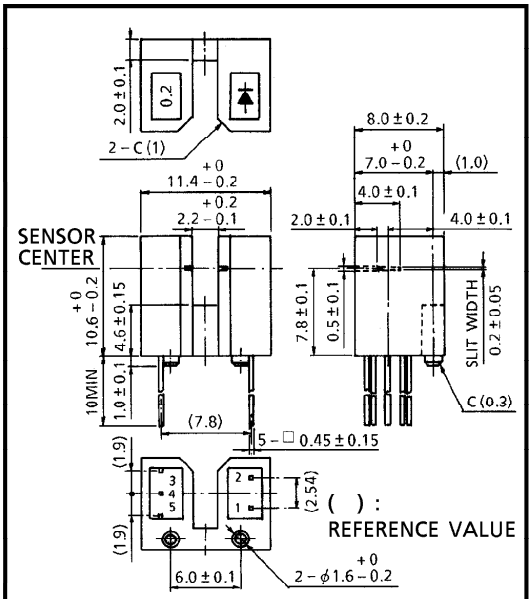
IMAGE SCANNER, HANDY COPY

PHOTOELECTRIC TYPE COUNTER

COPYING MACHINE, FACSIMILE, PRINTER

VARIOUS POSITION DETECTION

Unit in mm



JEDEC	—
EIAJ	—
TOSHIBA	11-11B2

Weight : 0.94g (typ.)

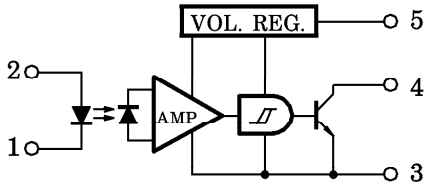
TLP1020 is a digital output photointerrutper combining GaAs infrared LED with high sensitive and high gain Si photo IC.

Because of the oblong detection slit, this photointerrutper is best suited to the upward-downward position detection.

Its output becomes low level when the light is shield. The same size TLP813 with phototransistor output is available.

- Printed wiring board direct mounting type (with a locating pin).
- Gap : 2.2mm
- High resolution :Slit width 0.2×2.0mm (the oblong slit)
- Digital output (open collector)
- Directly connectable to TTL, LSTTL and CMOS.
- Threshold input current: I_{FLH}=10mA (max) at Ta=25°C
- Supply voltage range : V_{CC}=4.5~17V
- Built-in Schmitt circuit
- Fast response speed : t_{pLH}=3μs, t_{pHL}=6μs (typ.)
- Detector side is of visible light cut type.

PIN CONNECTION



1. CATHODE
2. ANODE
3. GND
4. OUT
5. V_{CC}

961001EBC2

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	Supply Voltage	V_{CC}	17	V
	Output Voltage	V_O	30	V
	Output Current	I_O	50	mA
	Power Dissipation	P_O	250	mW
	Power Dissipation Derating (Ta > 25°C)	ΔP_O / °C	−3.33	mW / °C
Operating Temperature Range		T_{opr}	−25~85	°C
Storage Temperature Range		T_{stg}	−40~100	°C
Soldering Temperature (5s)		T_{sol}	260	°C

RECOMMENDED OPERATING CONDITIONS

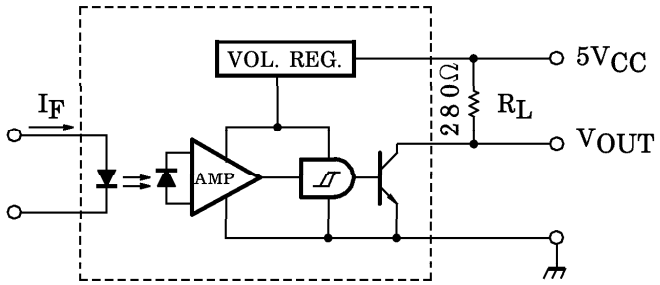
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Forward Current	I_F	23*	—	30	mA
Supply Voltage	V_{CC}	4.5	5	17	V
Output Voltage	V_O	—	5	24	V
Low Level Output Current	I_{OL}	—	—	16	mA

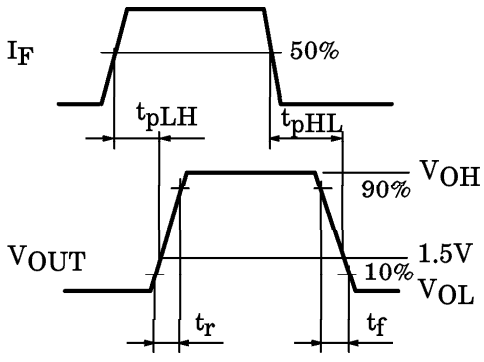
* 23mA is a value when 30% LED deterioration is taken into consideration. Initial threshold input current shall be 15.5mA max

OPTO-ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta = −25~70°C, V_{CC} = 4.5~5.5V)

	CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage		V_F	I_F = 10mA, Ta = 25°C	1.00	1.15	1.30	V
	Reverse Current		I_R	V_R = 5V, Ta = 25°C	—	—	10	μA
	Peak Emission Wavelength		λ_P	I_F = 25mA, Ta = 25°C	—	940	—	nm
DETECTOR	Supply Voltage		V_{CC}	—	4.5	—	17	V
	Low Level Supply Current		I_{CCL}	I_F = 0	—	—	5.0	mA
				I_F = 0, V_{CC} = 17V	—	—	5.2	
	High Level Supply Current		I_{CCH}	I_F = 25mA	—	—	3.0	mA
				I_F = 25mA, V_{CC} = 17V	—	—	3.2	
	Low Level Output Voltage		V_{OL}	I_{OL} = 16mA, I_F = 0 Ta = 25°C	—	0.07	0.3	V
				I_{OL} = 16mA, I_F = 0 V_{CC} = 17V	—	—	0.4	
	High Level Output Current		I_{OH}	I_F = 25mA, V_O = 30V	—	—	15	μA
	Peak Sensitivity Wavelength		λ_P	Ta = 25°C	—	900	—	nm
COUPLED	L→H Threshold Input Current		I_{FLH}	Ta = 25°C	—	—	10	mA
				V_{CC} = 17V	—	—	15.5	
	Hysteresis Ratio		I_{FHL}/I_{FLH}	Ta = 25°C	—	0.67	—	—
	Propagation Delay Time	(L→H)	t_{pLH}	V_{CC} = 5V, I_F = 25mA R_L = 280Ω, Ta = 25°C (Note)	—	3	—	μs
		(H→L)	t_{pHL}		—	6	—	
	Rise Time		t_r		—	0.1	—	
	Fall Time		t_f		—	0.05	—	

NOTE : SWITCHING TIME TEST CIRCUIT





PRECAUTION

Please be careful of the followings.

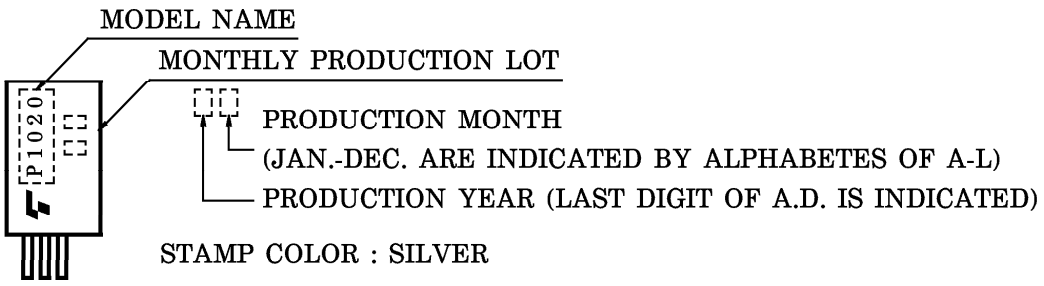
1. Soldering should be performed after lead forming.
2. If chemicals are used for cleaning, the soldered surface only shall be cleaned with chemicals avoiding the whole cleaning of the package.
3. The container is made of polycarbonate. Polycarbonate is usually stable with acid, alcohol, and aliphatic 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>

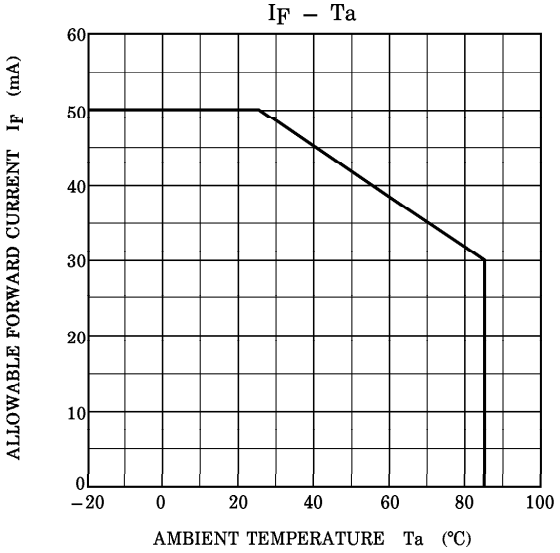
	PHENOMENON	CHEMICALS
A	Little deterioration but staining	• nitric acid (low concentration), hydrogen peroxide, chlorine
B	Cracked, crazed, or swollen	• acetic acid (70% or more) • gasoline • methyl ethyl ketone, ehtyl acetate, butyl acetate • ethyl methacrylate, ethyl ether, MEK • acetone, m-amino alcohol, 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

4. During 100μs after turning on V_{CC}, output voltage changes for stabilizing the inner circuit.
5. Supply the by-pass condenser up to 0.01μF betweeen V_{CC} and GND near device to stabilize the power supply line.

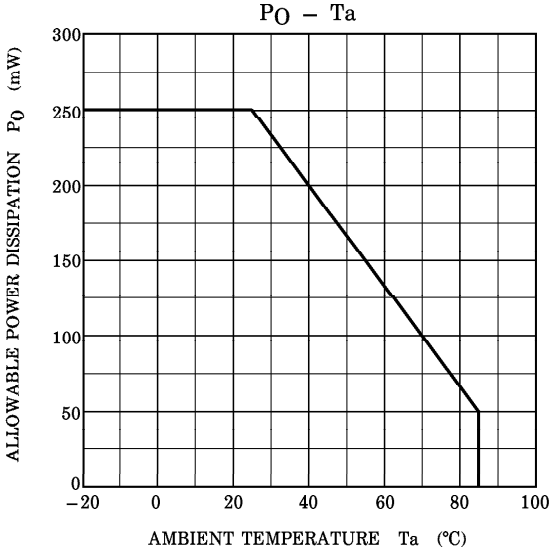
PRODUCT INDICATION



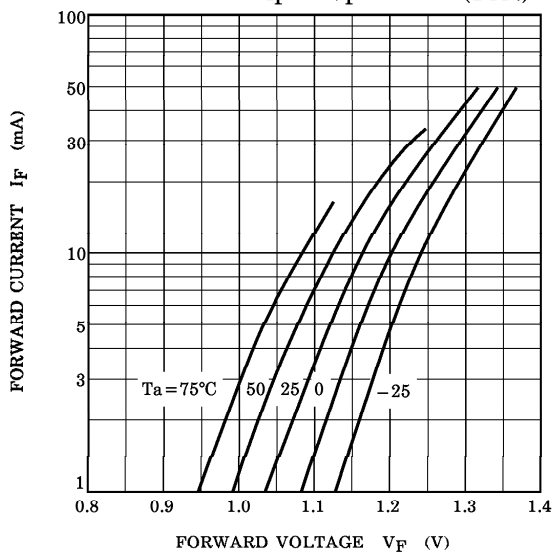
I_F – Ta



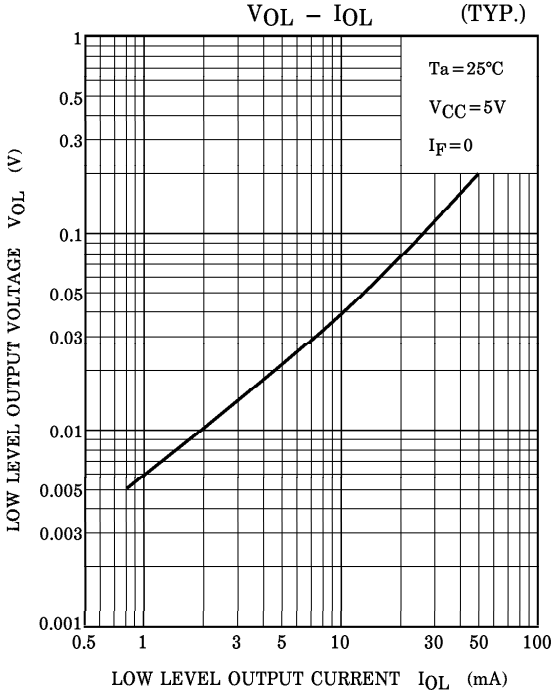
P_O – Ta



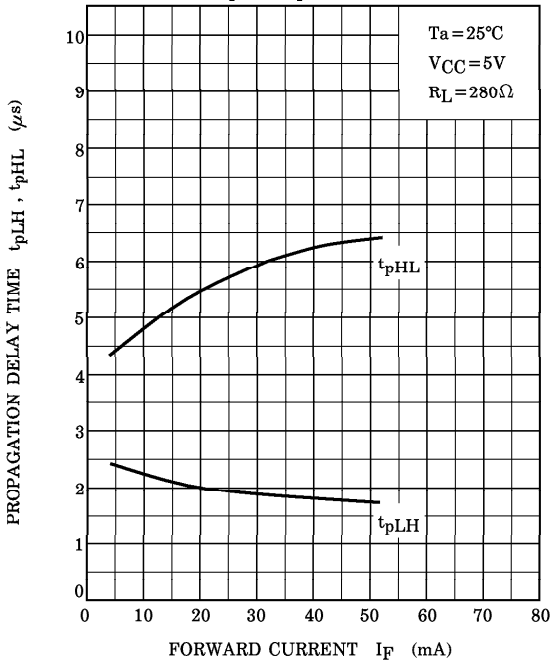
I_F – V_F (TYP.)



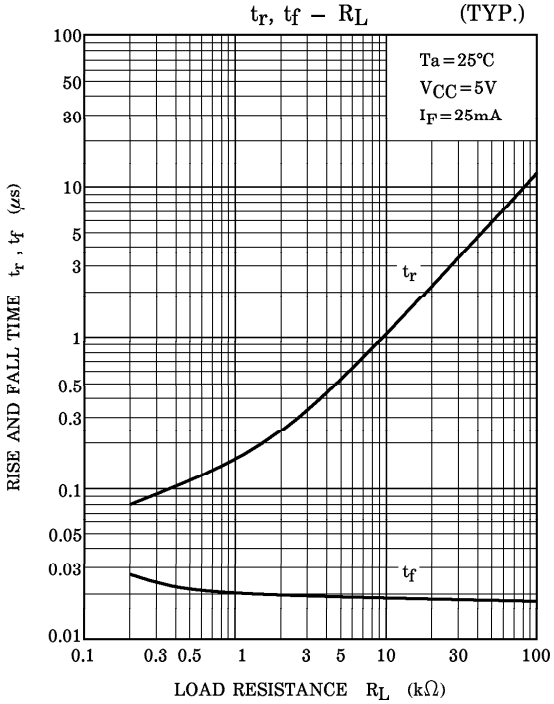
V_{OL} – I_{OL} (TYP.)



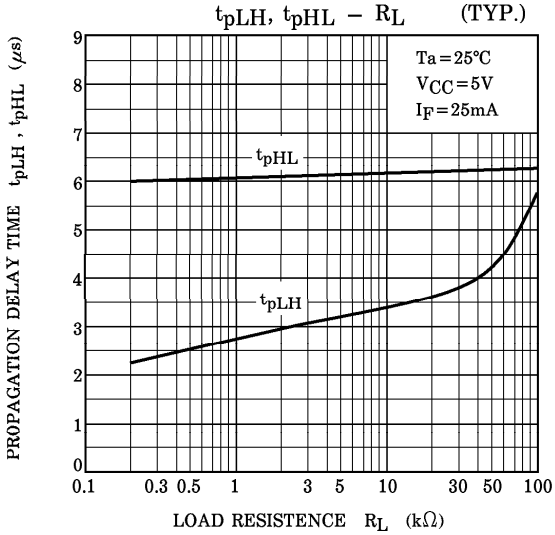
t_{pLH}, t_{pHL} – I_F (TYP.)

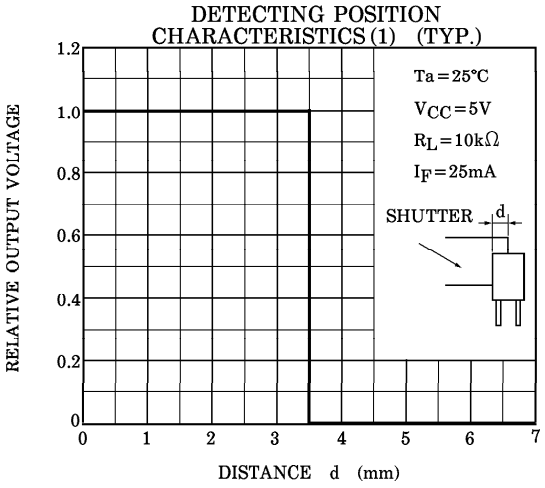


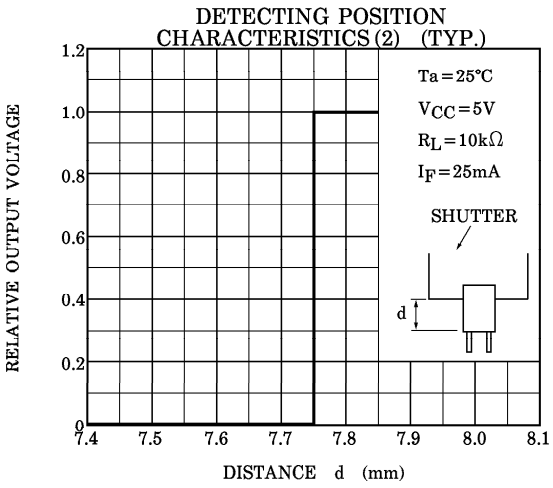
t_r, t_f – R_L (TYP.)



t_{pLH}, t_{pHL} – R_L (TYP.)





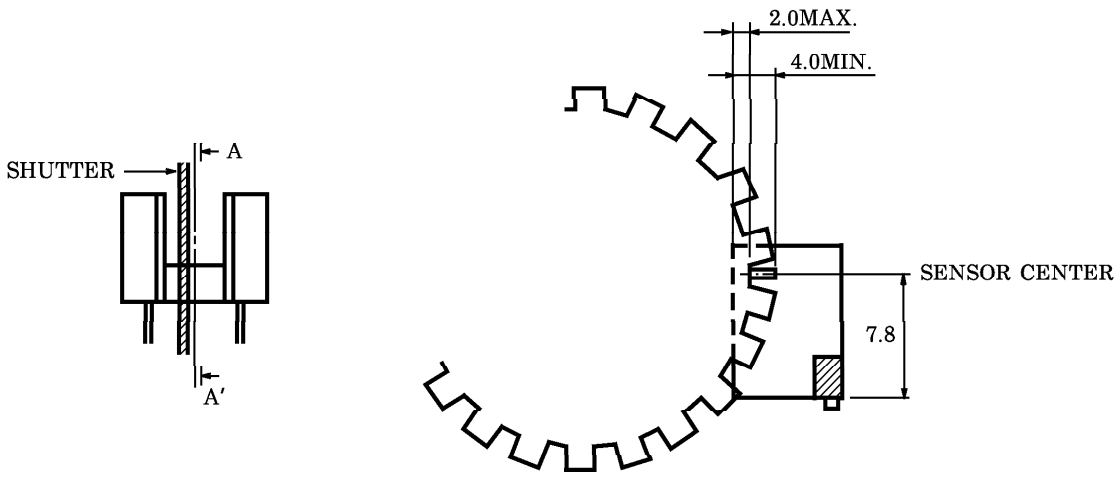


POSITIONING OF SHUTTER AND DEVICE

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.

UNIT IN mm



A – A′ CROSS SECTION