TOSHIBA PHOTOINTERRUPTER INFRARED LED + PHOTO IC

TLP1201A, TLP1201A(C1), TLP1201A(C2)

COPYING MACHINE, LASER BEAM PRINTER

FACSIMILE, PRINTER

AUTOMATIC VENDING MACHINE, TERMINAL EQUIPMENT IN BANKING FACILITIES

PLAYING EQUIPMENT, FA EQUIPMENT

VARIOUS POSITION DETECTION SENSOR

The TLP1201A, 1201A (C1) and 1201A (C2) are digital output photointerrupters having connectors with an GaAs infrared LED and a high sensitivity and low current consumption Si photo IC combined.

The output becomes high level when the light is shielded.

- One side mounting type
- Supply voltage : 5V
- Digital output (Open collector)
- Gap : 5mm
- Resolution : Slit width 0.5mm
- Low current consumption : I_{CC} = 17.5mA (max)
- UL recognized PWB adopted : UL94V-0
- Material of the case : Polycarbonate
- Connectors
  TLP1201A ..... 171825-3 (AMP (Japan), Ltd. made EI Connector)
  TLP1201A (C1) ... 5267-03A (Molex Japan Co., Ltd. made Connector)
  TLP1201A (C2) ... B3P-SHF-1AA (Japan Solderless Terminal MFG. made NH Connector)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltge	V_{CC}	6	V
Output Voltage	V_O	28	V
Low Level Output Current	I_{OL}	50	mA
Low Level Output Current Derating (Ta > 25°C)	ΔI_{OL} / °C	−0.67	mA / °C
Operating Temperature Range	T_{opr}	−25~75	°C
Storage Temperature Range	T_{stg}	−40~85	°C

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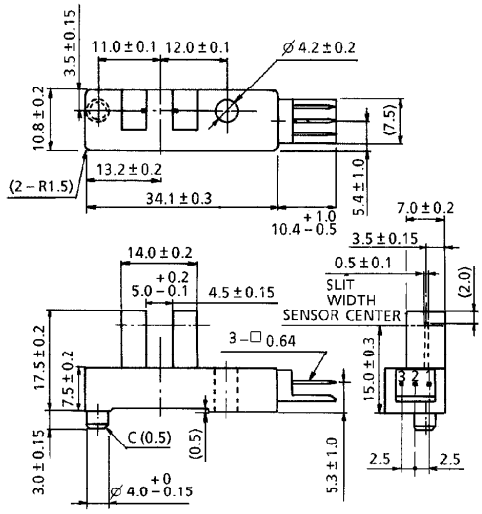
OUTLINE DRAWINGS

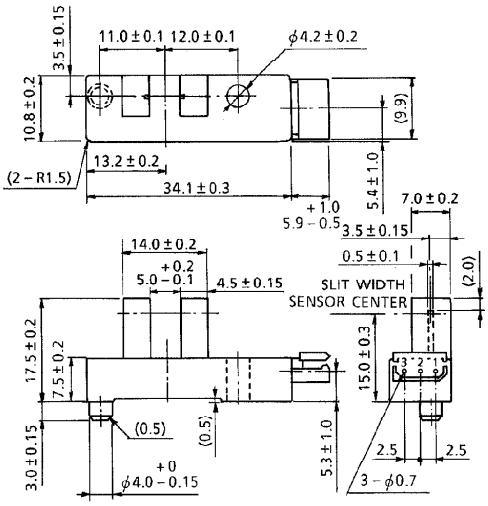
Unit in mm

TLP1201A ( ) : REFERENCE VALUE



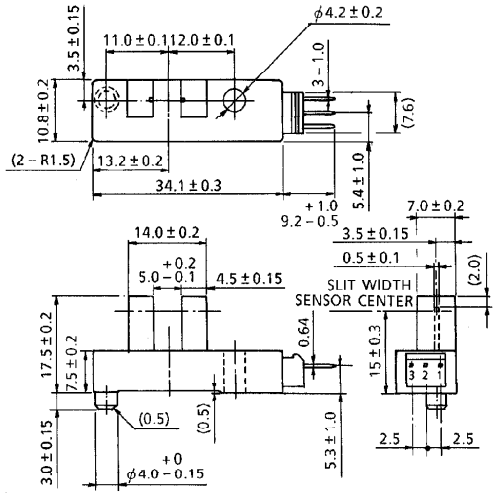
JEDEC	—	
EIAJ	—	
TOSHIBA	11-14C5	

TLP1201A (C1) ( ) : REFERENCE VALUE



JEDEC	—	
EIAJ	—	
TOSHIBA	11-14C6	

TLP1201A (C2)

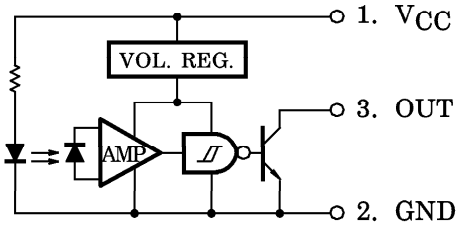


( ) : REFERENCE VALUE

JEDEC	—	
EIAJ	—	
TOSHIBA	11-14C7	

Weight : 2.6g (typ.)

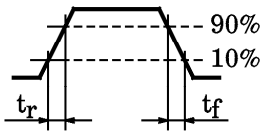
PIN CONNECTION



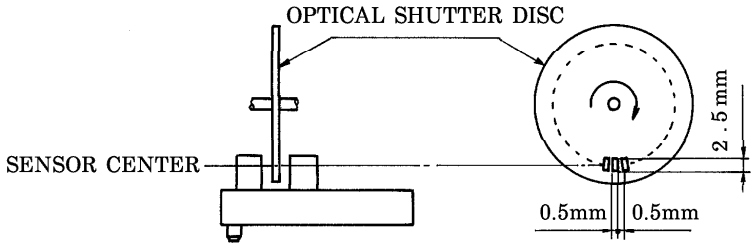
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Output Voltage	V_O	—	5	17	V
Low Level Output Current	I_{OL}	—	—	16	mA
Operating Temperature	T_{opr}	−25	—	75	°C

OPTO-ELECTRICAL CHARACTERISTICS (Unless Otherwise Specified, Ta = −25~75°C, V_{CC} = 5V ± 10%)

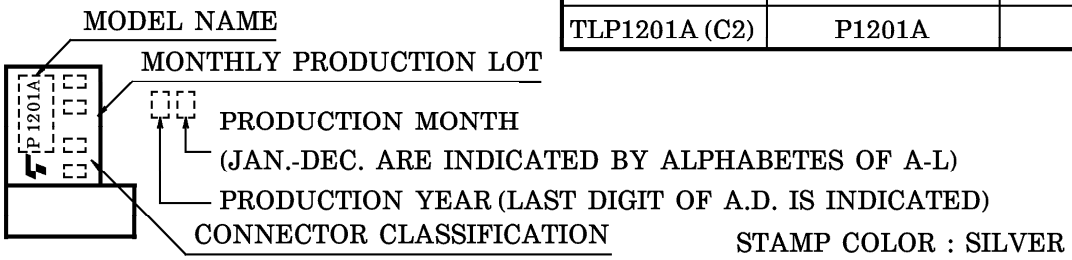
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V_{CC}	—	4.5	5.0	5.5	V
Supply Current	High Level	I_{CCH}	Shutter In	—	—	17.5	mA
	Low Level	I_{CCL}	Without Shutter	—	—	17.5	
Output Voltage	High level	V_{OH}	Shutter In, R_L=47kΩ	0.9V_{CC}	—	—	V
	Low level	V_{OL}	Without Shutter, I_{OL}=16mA, Ta=25°C	—	0.07	0.35	
			Without Shutter, I_{OL}=16mA	—	—	0.4	
Peak Emittion Wavelength		λ_P	Ta=25°C, LED Side	—	940	—	nm
Peak Sensitivity Wavelength		λ_P	Ta=25°C, Photo IC Side	—	900	—	nm
Response Frequency		f	Ta=25°C, R_L=47kΩ (Note)	3000	—	—	Hz
Rise Time		t_r		—	8	—	μs
Fall Time		t_f		—	0.03	—	

(Note) A value measured when the disc shown in the following figure was rotated. No DC current should be output.



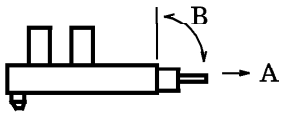
PRODUCT INDICATION

TYPE	ABBREVIATION	CONNECTOR CLASSIFICATION
TLP1201A	P1201A	NO INDICATED
TLP1201A (C1)	P1201A	C1
TLP1201A (C2)	P1201A	C2



TERMINAL STRENGTH (Ta = 25°C)

CHARACTERISTIC	TEST CONDITION		LIMIT
PULL	DIRECTION	A	NO DEFECT OF ELECTRICAL CHARACTERISTICS
	WEIGHT	19.6N	
	TIME	5s / ONCE	
BEND	DIRECTION	B	
	WEIGHT	9.8N	
	TIME	5s / THRICE	



PRECAUTION

Please be careful of the followings.

1. During 100μs after turning on V_{CC}, output voltage changes for stabilizing the inner circuit.
2. When installing, avoid to work by holding the connector by hand. Always, install by holding the main body of the element while assuring the mounting board is not warped or twisted. The connectors shall be inserted or pulled out at normal temperature.
3. Screw shall be tightened to clamping torque of 0.59N·m.
4. 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

RECOMMENDABLE MATCHED CONNECTOR
TLP1201A

AMP (Japan), Ltd. made EI series connector (Standard type)

HOUSING	NATURAL COLOR	BLACK	BLUE	GREEN	RED
	171822-3	2-171822-3	4-171822-3	6-171822-3	8-171822-3
TERMINAL	TYPE No.	PRODUCT FORM	MATERIAL	AWG SIZE	INSULATION DIAMETER
	170204-1	LOOSEN	BRASS	AWG20~26	1.1~1.9mm
	170204-2		PHOSPHOR BRONZE		
	170262-1	LINKED	BRASS		
	170262-2		PHOSPHOR BRONZE		
	170205-1	LOOSEN	BRASS	AWG26~30	1.0~1.4mm
	170205-2		PHOSPHOR BRONZE		
	170263-1	LINKED	BRASS		
	170263-2		PHOSPHOR BRONZE		

AMP (Japan), Ltd. made EI series connector (Low profile type)

HOUSING	NATURAL COLOR	BLACK	BLUE	GREEN	RED
	172142-3	2-172142-3	4-172142-3	6-172142-3	8-172142-3
TERMINAL	TYPE No.	PRODUCT FORM	MATERIAL	AWG SIZE	INSULATION DIAMETER
	170369-1	LOOSEN	PHOSPHOR BRONZE	AWG22~26	1.1~1.9mm
	170354-1	LINKED			
	170370-1	LOOSEN		AWG26~30	1.0~1.5mm
	170355-1	LINKED			

TLP1201A (C1)

Molex Japan Co., Ltd. made connector (Low profile type)

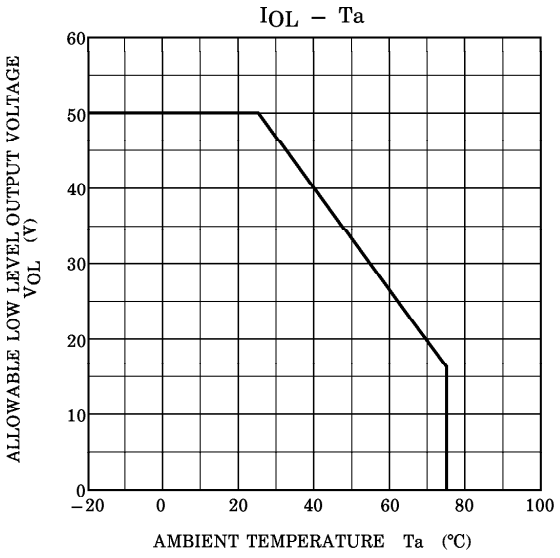
HOUSING	5264-03				
TERMINAL	TYPE No.	PRODUCT FORM	MATERIAL	AWG SIZE	INSULATION DIAMETER
	5263PBTL	LOOSEN	PHOSPHOR BRONZE	AWG22~28	1.9mm MAX.
	5263PBT	LINKED			

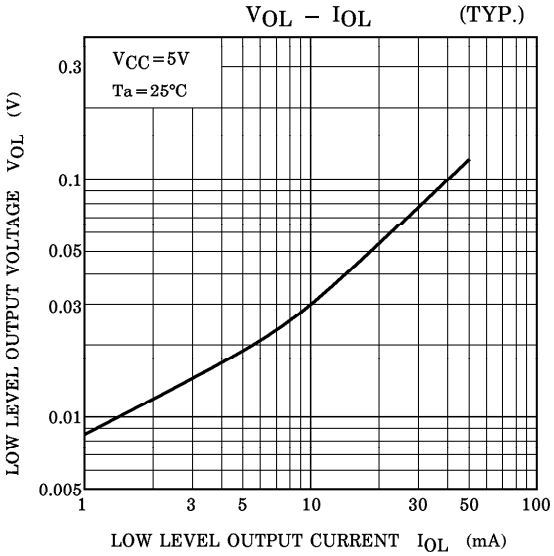
TLP1201A (C2)

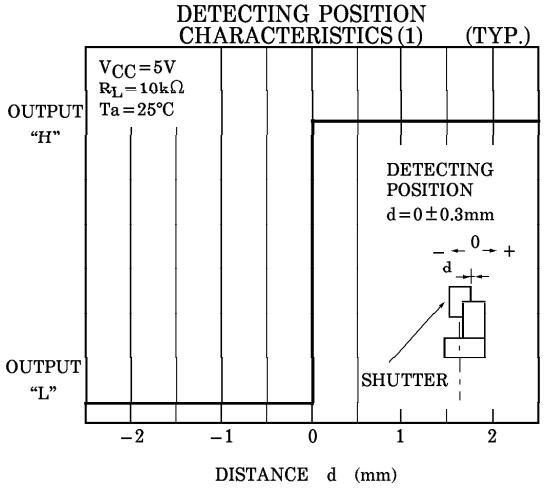
Japan solderless terminal MFG. made NH connector

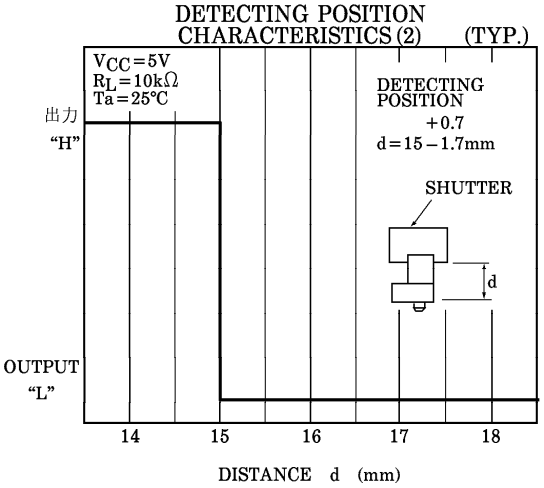
HOUSING	H3P-SHF-AA				
TERMINAL	TYPE No.	PRODUCT FORM	MATERIAL	AWG SIZE	INSULATION DIAMETER
	SHF-001T-0.8SS	LOOSEN	BRASS	AWG22~26	1.3~1.7mm
	SHF-001T-0.8BS		PHOSPHOR BRONZE		
	SHF-002T-0.8SS		BRASS	AWG28~30	1.0~1.2mm
	SHF-002T-0.8BS		PHOSPHOR BRONZE		

For details of the connectors, please refer to the connector maker.


IOL – Ta
ALLOWABLE LOW LEVEL OUTPUT VOLTAGE VOL (V)
60
50
40
30
20
10
0
–20
0
20
40
60
80
100
AMBIENT TEMPERATURE Ta (°C)


VOL – IOL (TYP.)
VCC=5V
Ta=25°C
LOW LEVEL OUTPUT VOLTAGE VOL (V)
0.3
0.1
0.05
0.03
0.01
0.005
1
3
5
10
30
50
100
LOW LEVEL OUTPUT CURRENT IOL (mA)


DETECTING POSITION CHARACTERISTICS (1) (TYP.)
VCC=5V
RL=10kΩ
Ta=25°C
OUTPUT "H"
OUTPUT "L"
DETECTING POSITION
d=0±0.3mm
0
–
+
d
SHUTTER
–2
–1
0
1
2
DISTANCE d (mm)


DETECTING POSITION CHARACTERISTICS (2) (TYP.)
VCC=5V
RL=10kΩ
Ta=25°C
出力
"H"
OUTPUT "L"
DETECTING POSITION
+0.7
d=15–1.7mm
SHUTTER
d
14
15
16
17
18
DISTANCE d (mm)