

TOSHIBA Photo-Interrupter Infrared LED + Photo IC

TLP1251(C5,F)

Lead-Free Product

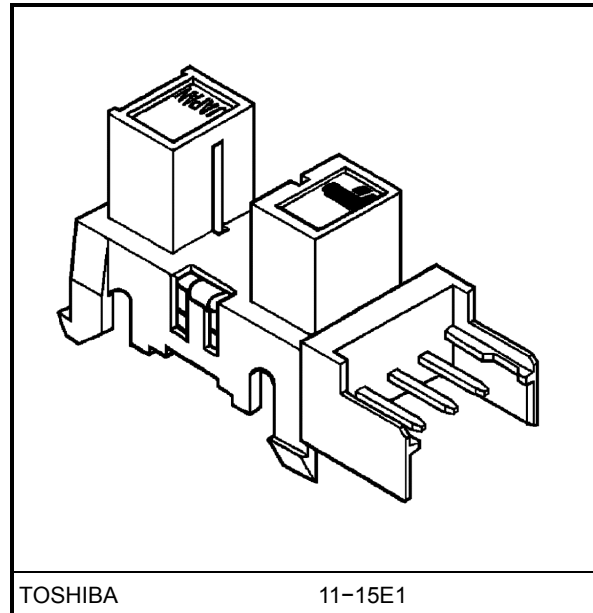
Copiers, Printers, Fax Machines

Game Machines

Air-Conditioners

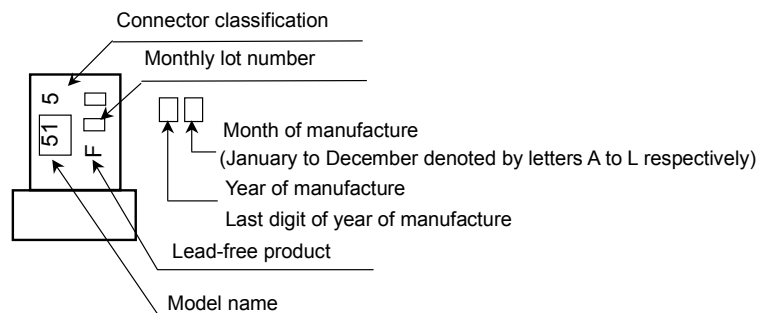
The TLP1251(C5,F) is a compact photo-interrupter with a built-in connector that uses a high radiant power GaAs infrared LED and a Si photo-IC. The device is housed in a highly reliable package which eliminates the need for a printed circuit board or for soldering. It is ideal for use as a paper carrier location sensor for copiers and printers. As the device can operate at temperatures of up to 95°C, it can be used for high-temperature applications such as paper-out sensors. When the light is shielded, outputs are at high level.

- Small package
- Snap-in installation
- Three board thicknesses supported: (1.0mm, 1.2mm, 1.6mm)
- Gap: 5mm
- Resolution: Slit width 0.5mm
- Supply voltage: 5V
- High-temperature operation: $T_{opr} = 95^{\circ}\text{C}$ (max)
- Low current consumption: $I_{CC} = 14 \text{ mA}$ (max)
- Digital output (open collector)
- CT connector (2-mm pitch MT receptacle type) made by Tyco Electronics AMP, Ltd.
- Package material: Body·····Polycarbonate (UL94V-2, black)
: Connector··Polybutylene terephthalate (UL94V-0, white)



Weight: 1.4 g (typ.)

Product Indication



Maximum Ratings (Ta = 25°C)

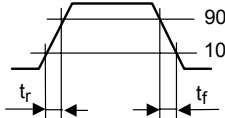
Characteristic	Symbol	Rating	Unit
Supply voltage	V _{CC}	7.5	V
Output voltage	V _O	15	V
Low level output current	I _{OL}	16	mA
Low level output current derating (Ta > 76°C)	ΔI _{OL} / °C	-0.67	mA/°C
Operating temperature range	T _{opr}	-25~95	°C
Storage temperature range	T _{stg}	-40~100	°C

Recommended Operating Conditions

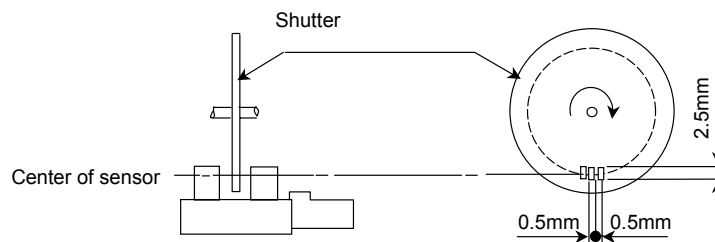
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{CC}	4.5	5.0	5.5	V
Output voltage	V _O	—	5.0	13.2	V
Low level output current	I _{OL}	—	—	16	mA

Opto-Electrical Characteristics

(unless otherwise specified, Ta = - 25~95°C, V_{CC} = 5V ± 10%)

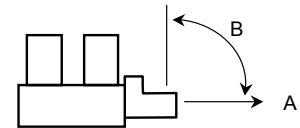
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply voltage	V _{CC}		4.5	5	5.5	V
Supply current	High level	I _{CCH}	When light is shielded	—	14	mA
	Low level	I _{CCL}	When light is detected	—	14	
Output voltage	High level	V _{OH}	When light is shielded, R _L = 47kΩ	0.9V _{CC}	—	V
	Low level	V _{OL}	When light is detected I _{OL} = 16mA, Ta = 25°C	—	0.07	
			When light is detected, I _{OL} = 16mA	—	0.4	
Peak emission 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	R _L = 47kΩ, Ta = 25°C (Note)	3000	—	—	Hz
Rise time	t _r		—	8	—	μs
Fall time	t _f		—	0.03	—	μs

(Note): The response frequency is measured while the shutter is rotated as shown below. There should be no DC output.



Terminal Strength (Ta = 25°C)

Characteristic		Test Condition		Limit
Terminal strength	Pull	Direction	A	No defect of electrical characteristics
		Weight	19.6N	
		Time	5s / once	
	Bend	Direction	B	
		Weight	9.8N	
		Time	5s / three times	



Matched Connector

CT connector manufactured by Tyco Electronics AMP, Ltd. (2-mm pitch MT receptacle type)

Housing-Terminal En Block Type	Type no.	Terminal Material	AWG Size	External Diameter of Insulation Coating
	173977-3	Phosphor bronze	AWG26~28	0.85~1.05mm

For more details of connector characteristics, please contact the relevant connector manufacturer.

Note that the device cannot be connected to a MT crimp receptacle type connector housing.

Precaution

- When VCC is turned on, it takes at least 100 μ s for the internal circuit to stabilize. During this time the output signal is unstable. Please do not use the unstable signal as the output signal.
- Protect the device from ambient light interference. The integrated photo-IC is insensitive to light below 700 nm (e.g. fluorescent light), but is sensitive to light above 700 nm (e.g. incandescent light). If it detects ambient light, it may cause malfunction. Be sure to make a thorough evaluation of the equipment in which the device is to be used.
- The environment to install the device should be determined carefully. Oil or chemicals may cause the package to be dissolved or cracked.
- When installing, avoid to work by holding the connector by hand. Always, install by holding the main body of the device while assuring the metal board is not warped or twisted. The connectors should be inserted or removed at room temperature.
- Toshiba recommends attaching the device to the smoother side of the board.
- Toshiba recommends testing the attachment strength beforehand by actually attaching a device to the board.
- Do not apply solder to the pins of the device's connector. Make sure that the connector is plugged into the CT connector.
- When inserting or removing the CT connector, always grasp it and its cable firmly and either plug it straight into or pull it straight out of the device's connector. If the CT connector is inserted or removed at an angle, both the device's connector and the CT connector may get damaged, resulting in an unreliable connection.

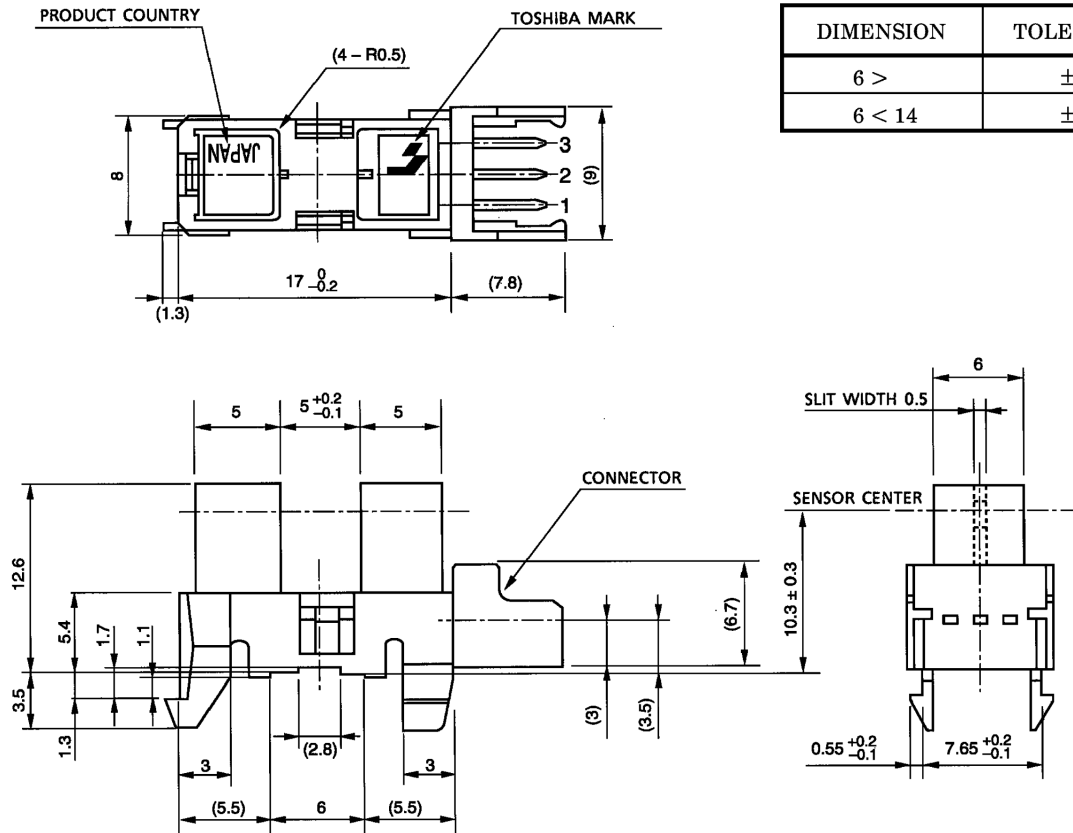
Package Dimensions: TOSHIBA 11-15E1

Unit in mm

() : REFERENCE VALUE

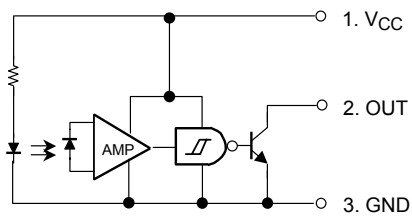
UNLESS OTHERWISE SPECIFIED

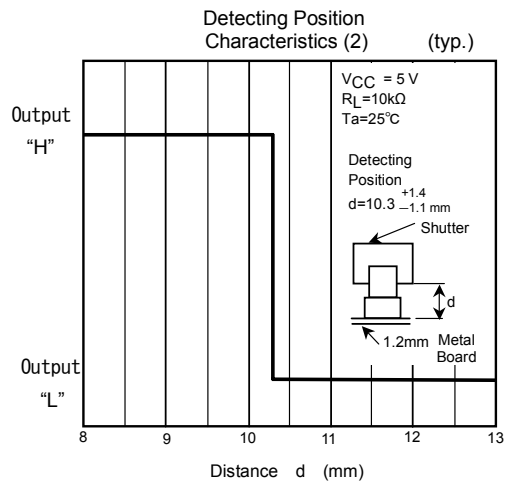
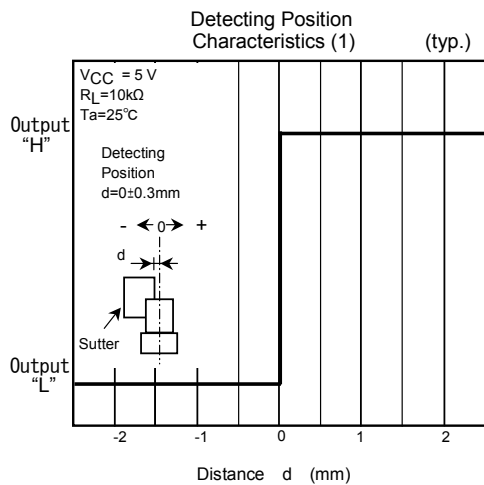
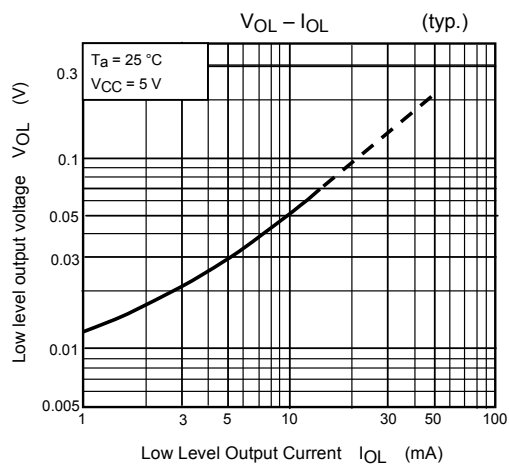
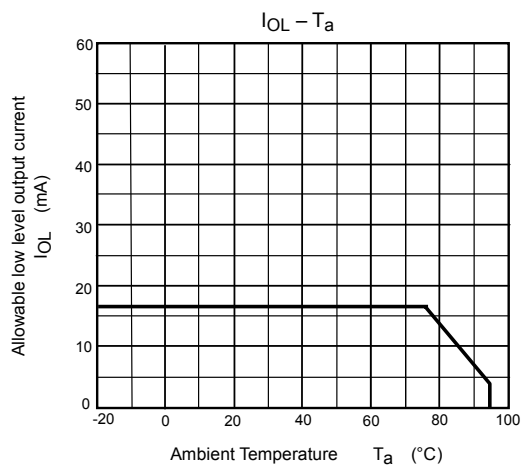
DIMENSION	TOLERANCE
6 >	±0.1
6 < 14	±0.2



Weight : 1.4 g (typ.)

Pin Connection

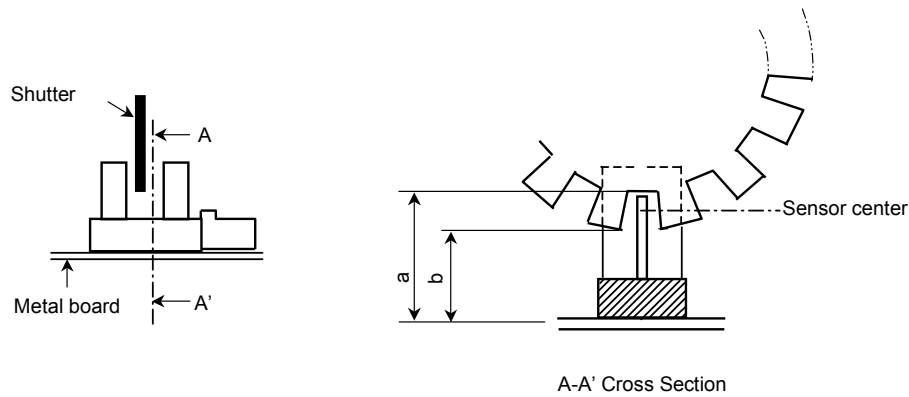




Relative Positioning of Shutter and Device

For normal operation, position the shutter and the device as shown in the figure below. By considering the device's detection direction characteristic and switching time, determine the shutter slit width and pitch.

Unit in mm

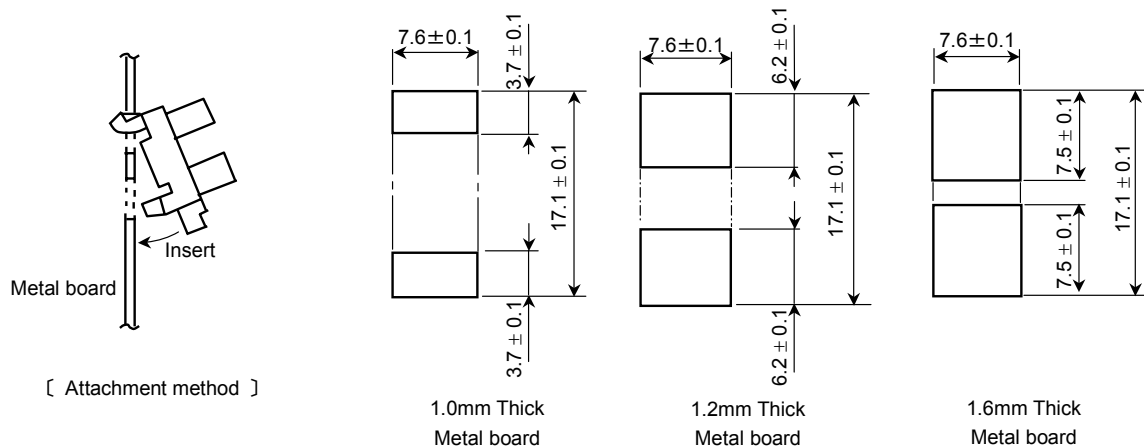


Unit in mm

Thickness of Metal Board	a Dimension	b Dimension
1.0	11.9min	9.4max
1.2	11.7min	9.2max
1.6	11.3min	8.8max

Recommended Size of Connection Holes

(Unit: mm)



For instructions on how to attach the device to a metal board of a type other than the ones shown above, please contact your local Toshiba sales office.

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