TOSHIBA Photo-interrupter Infrared LED+Phototransistor

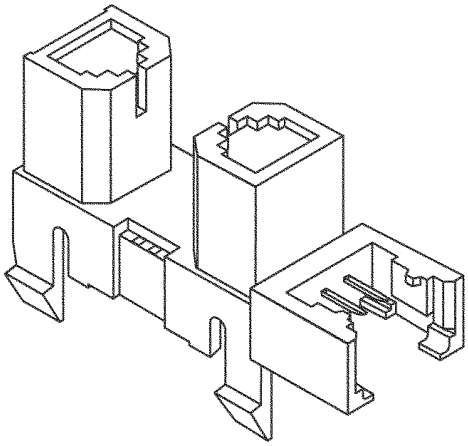
TLP1243(C8)

Copiers, Printers and Fax Machines

Fanheaters and Air-conditioners

Bank Atms

Game Machines



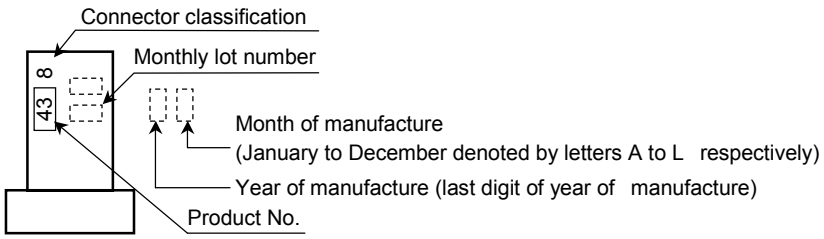
TOSHIBA	11-15G1

Weight: 0.8 g (typ.)

The TLP1243 (C8) is a compact photointerrupter with a built-in connector, which uses a GaAs infrared LED and an Si phototransistor.

- Small package
  Compared to Toshiba TLP1241 (C5), the volume and the mounting area of the TLP1243 (C8) are reduced to 70% and 75% respectively.
- Three board thicknesses supported: 1.0 mm, 1.2 mm and 1.6 mm
- Gap: 5 mm
- Resolution: Slit width = 0.7 mm
- High-temperature operation: T_{opr} = 95°C (max)
- Current transfer ratio: I_C/I_F = 2.5% (min)
- Mini CT connector (1.5-mm pitch MT RECEPTACLE ASSEMBLY/HOUSING CRIMP TYPE) made by Tyco Electronics AMP, Ltd.
- Package and connector material: Polycarbonate (UL94V-2)
- Mounted with lead-free soldering alloys.

Marking



Maximum Ratings (Ta = 25°C)

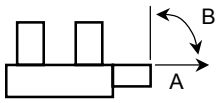
Characteristics		Symbol	Rating	Unit
LED	Forward current	I_F	30	mA
	Forward current derating (Ta>25°C)	ΔI_F/°C	−0.28	mA/°C
	Reverse voltage	V_R	5	V
Detector	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	5	V
	Collector power dissipation	P_C	75	mW
	Collector power dissipation derating (Ta>25°C)	ΔP_C/°C	−1	mW/°C
	Collector current	I_C	50	mA
Operating temperature range		T_{opr}	−30 to 95	°C
Storage temperature range		T_{stg}	−40 to 100	°C

Optical and Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test conditions	Min	Typ.	Max	Unit
LED	Forward voltage	V_F	I_F = 10 mA	1.00	1.18	1.40	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Peak emission wavelength	λ_P	I_F = 10 mA	—	940	—	nm
Detector	Dark current	I_D (I_{CEO})	V_{CE} = 24 V, I_F = 0	—	0.001	0.1	μA
	Peak sensitivity wavelength	λ_P	—	—	870	—	nm
Coupled	Current transfer ratio	I_C/I_F	V_{CE} = 2 V, I_F = 10 mA	2.5	—	100	%
	Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_F = 20 mA, I_C = 0.25 mA	—	0.1	0.35	V
	Rise time	t_r	V_{CE} = 5 V, I_C = 1 mA, R_L = 1 kΩ	—	15	50	μs
	Fall time	t_f		—	15	50	

Pin Strength (Ta = 25°C)

Characteristics	Test conditions		Limit
Pulling	Direction	A	No defect in electrical characteristics
	Weight	19.6N	
	Time	5 s/once	
Bending	Direction	B	
	Weight	9.8N	
	Time	5 s/three times	



Recommended Connector

Mini CT connector (1.5-mm pitch, MT RECEPTACLE ASSEMBLY/HOUSING CRIMP TYPE) made by Tyco Electronics AMP, Ltd.

	Type	Model Number	Terminal Material	AWG Size	External Diameter of Insulation Coating
Housing-Terminal En Block Type	MT RECEPTACLE ASSEMBLY	353293-3	Phosphor bronze	AWG26 to 28	0.85 mm to 0.95 mm
	HOUSING CRIMP TYPE	353908-3			

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

Precautions

- Keep the device away from external light. Although the photo-IC is of low optical sensitivity, the device may malfunction if external light with a wavelength of 700 nm or more is allowed to impinge on it.
- Care must be taken in relation to the environment in which the device is to be installed. Oil or chemicals may cause the package to melt or crack.
- When attaching the device to the metal board, always hold the body of the device. Do not hold it by the connector. Ensure that the board is flat, and not warped or twisted. Attach the device to a metal board 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 Mini CT connector or equivalent connector.
- When inserting or removing the Mini CT connector or equivalent 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 Mini CT connector or equivalent connector is inserted or removed at an angle, both the device's connector and the Mini CT connector or equivalent connector may get damaged, resulting in an unreliable connection.
- Conversion efficiency falls over time due to the current which flows in the infrared LED. When designing a circuit, take into account this change in conversion efficiency over time. The ratio of fluctuation in conversion efficiency to fluctuation in infrared LED optical output is 1:1.

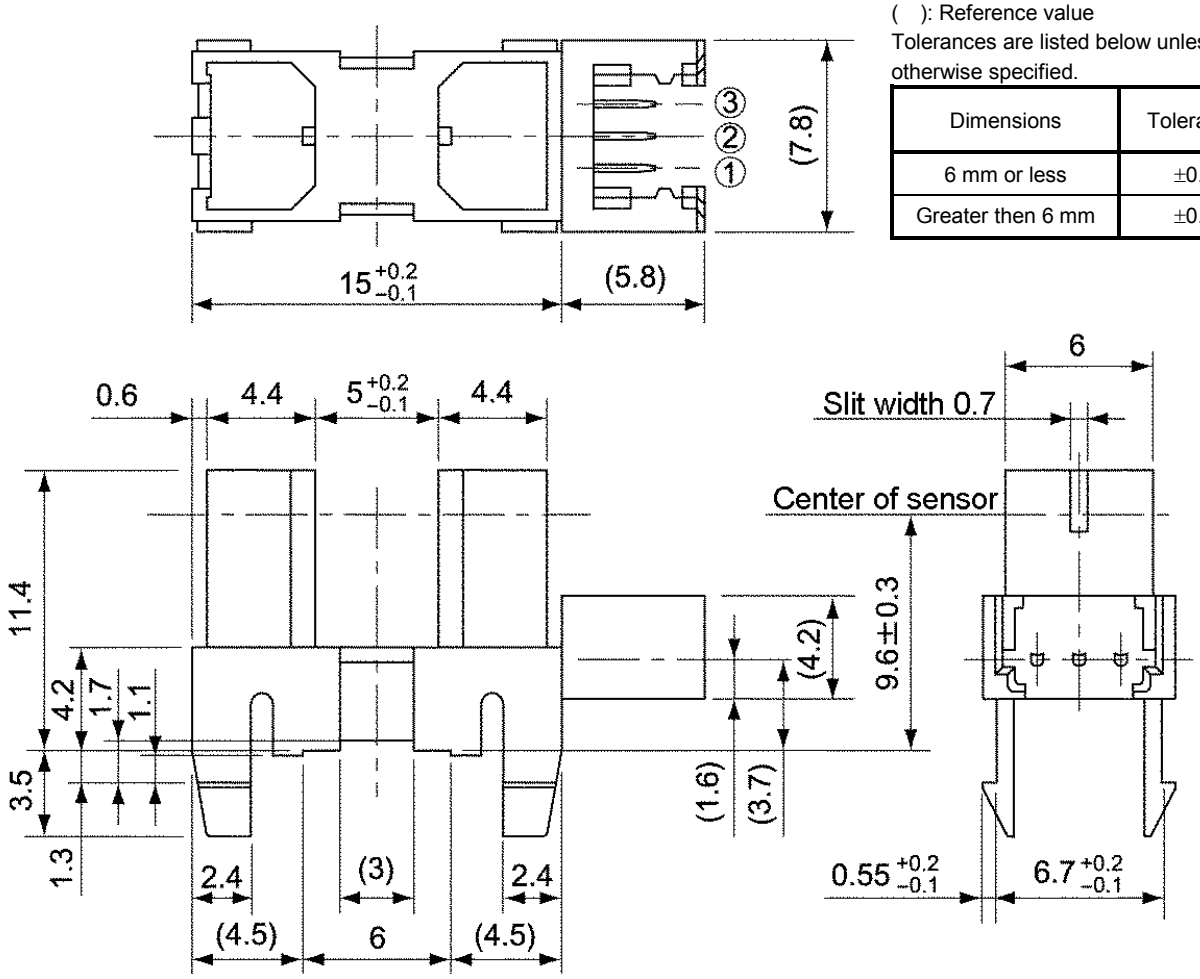
$$\frac{I_C/I_{F\,(t)}}{I_C/I_{F\,(0)}} = \frac{P_{o\,(t)}}{P_{o\,(0)}}$$

Package Dimensions: TOSHIBA 11-15G1

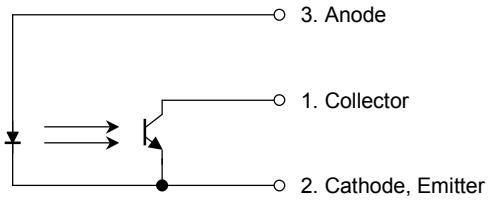
Unit: mm

( ): Reference value
Tolerances are listed below unless otherwise specified.

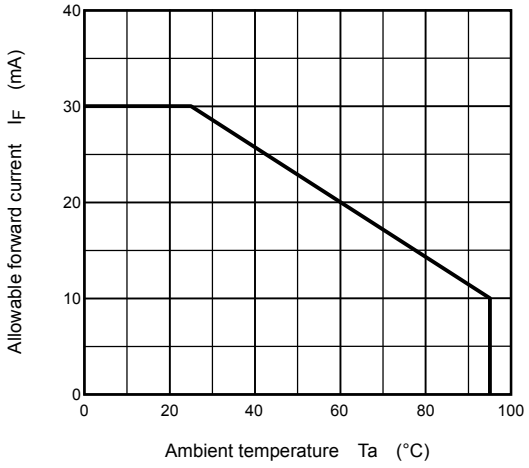
Dimensions	Tolerance
6 mm or less	±0.1
Greater then 6 mm	±0.2



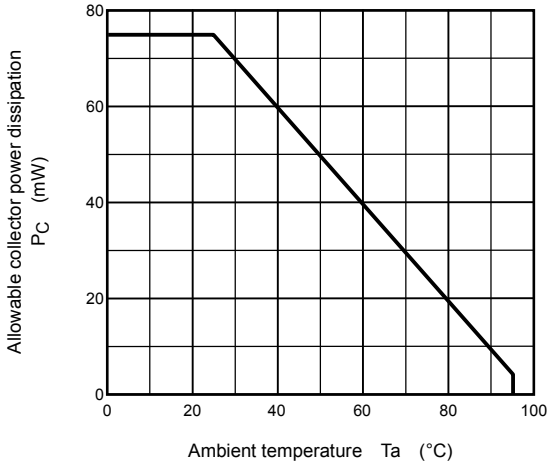
Pin Connection



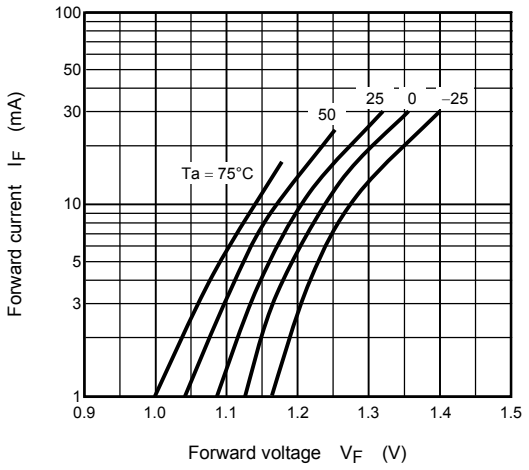
I_F – Ta



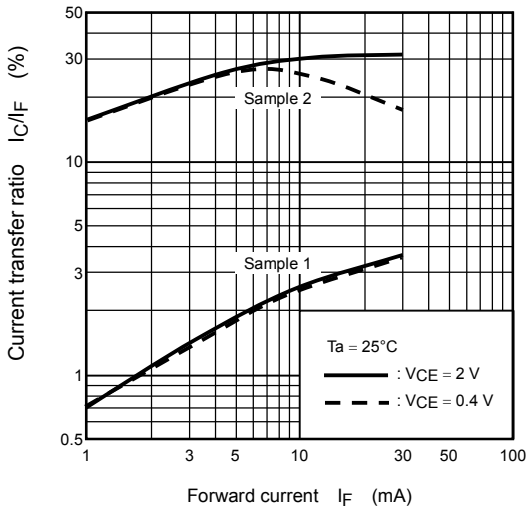
P_C – Ta



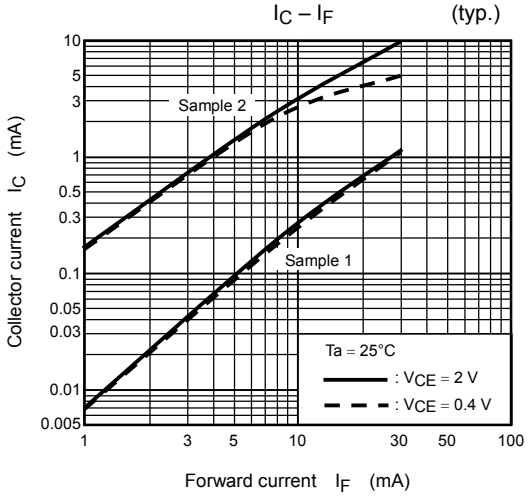
I_F – V_F (typ.)



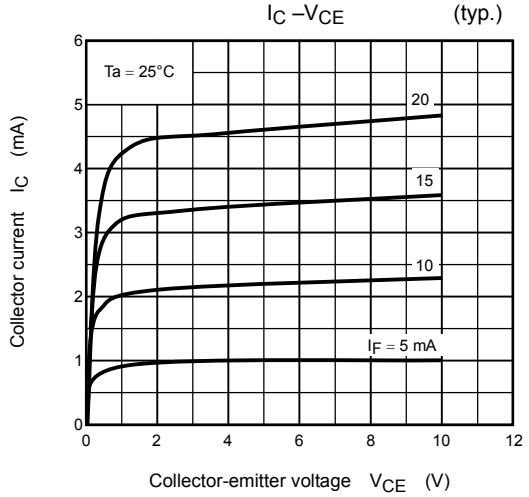
I_C/I_F – I_F (typ.)



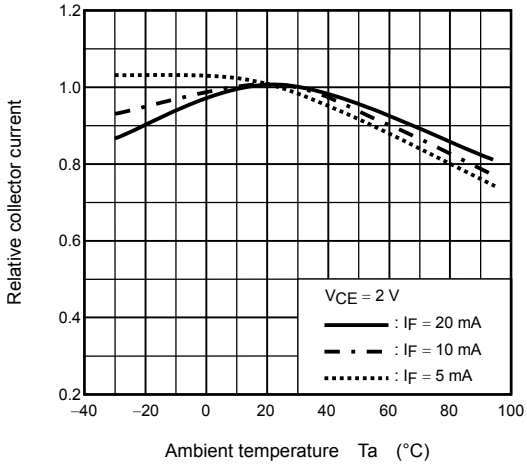
I_C – I_F (typ.)



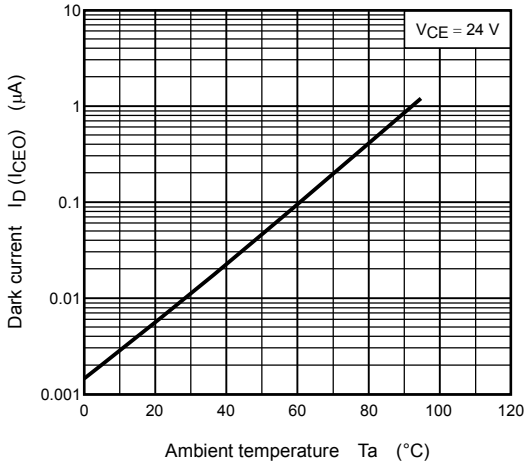
I_C –V_{CE} (typ.)



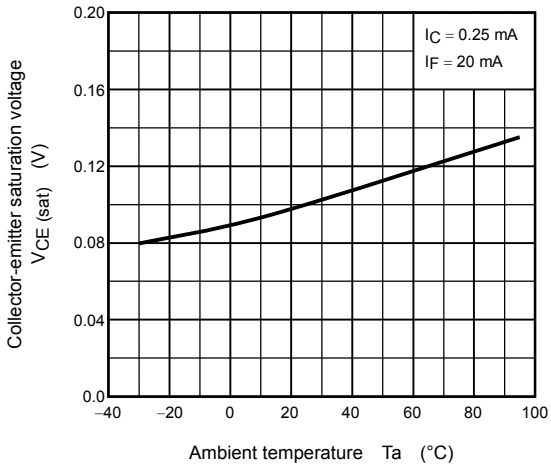
Relative I_C – Ta (typ.)



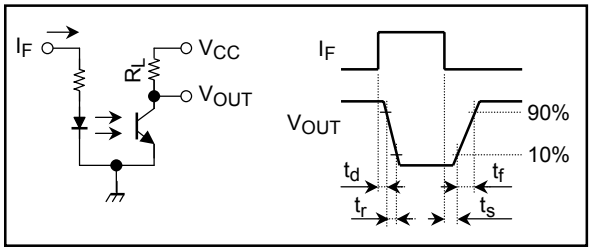
I_D (I_{CEO}) – Ta (typ.)



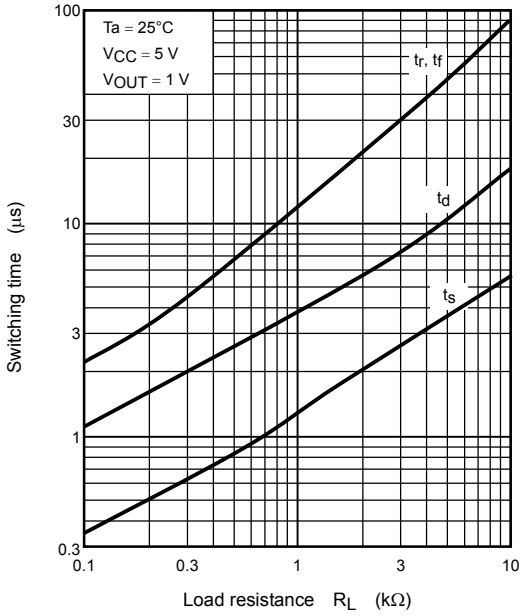
$V_{CE\ (sat)}$ – Ta (typ.)



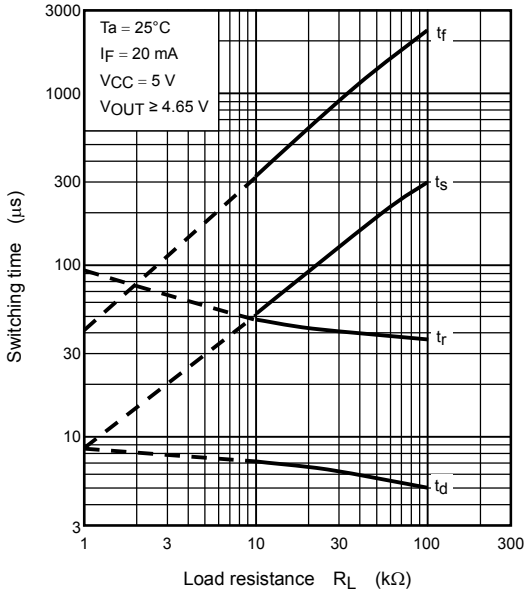
Switching Time Test Circuit



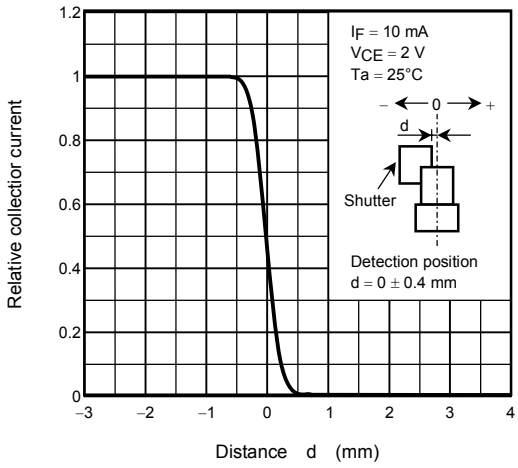
Switching characteristics (non saturated operation) (typ.)



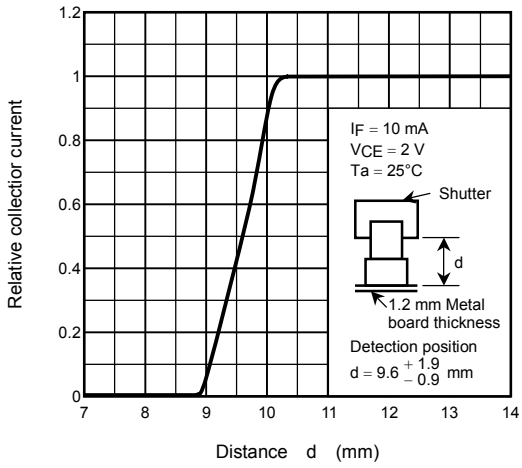
Switching characteristics (saturated operation) (typ.)



Detection position characteristics (1) (typ.)

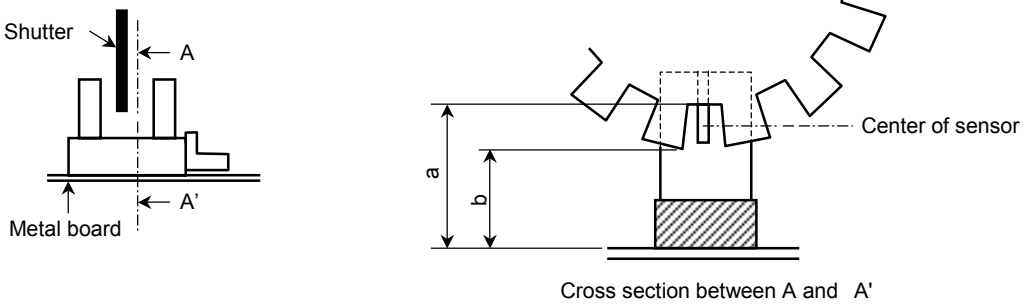


Detection position characteristics (2) (typ.)



Relative Positioning of Shutter and Device

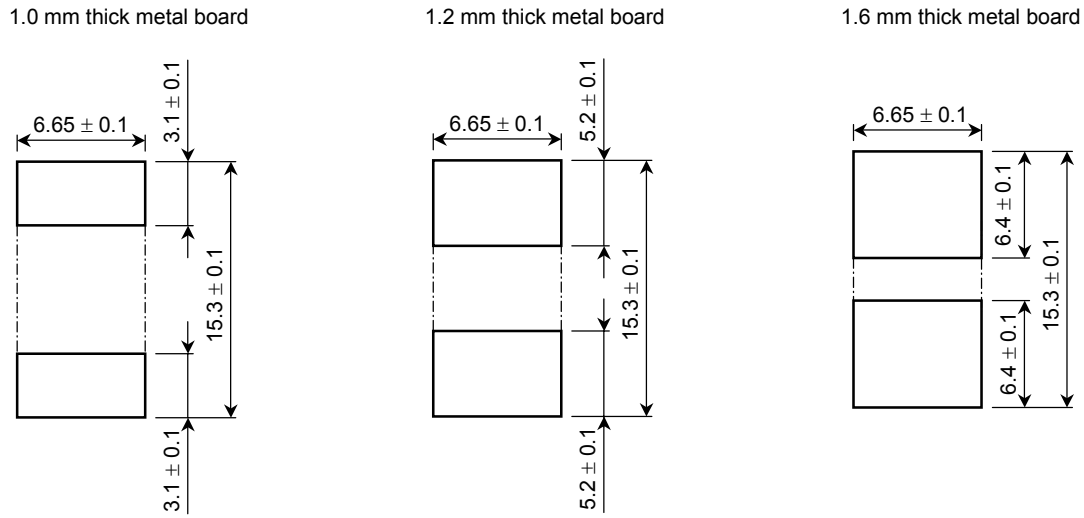
For normal operation, position the shutter and the device as shown in the figure below. By considering the device's detection direction characteristic and switching time, determine the shutter slit width and pitch.



Unit: mm

Thickness of Metal Board	a Dimension	b Dimension
1.0	11.7 min	8.9 max
1.2	11.5 min	8.7 max
1.6	11.1 min	8.3 max

Recommended Size of Connection Holes (Unit: mm)



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020704EAC

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