TOSHIBA PHOTOINTERRUPTER INFRARED LED + PHOTOTRANSISTOR

TLP1231(C5)

COPIER, LASER BEAM PRINTER

FACSIMILE, PRINTER, ELECTRONIC TYPEWRITER

AUTOMATIC VENDING MACHINE, TERMINAL EQUIPMENT IN BANKING FACILITIES

VARIOUS POSITION DETECTION SENSOR

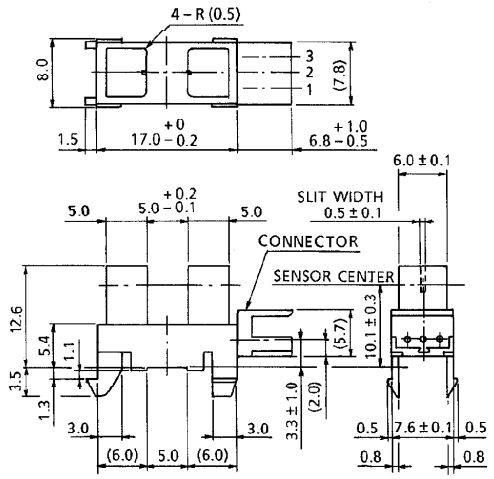
The TLP1231 (C5) is a photointerrupter with a connector using an GaAs infrazred LED at the emitter side and a Si photo IC at the detector side respectively. The photo transistor is turned off when a substance is detected (when the light is shield).

This product is also usable in applications requiring severe using temperature condition such as detection of paper exit on copier, etc.

- Small package
- Phototransistor output (Anode, collector common)
- Mountable by one touch (Snap-in mounting type)
- Mountable to boards in 2 kinds of thickness (1.0mm, 1.2mm)
- Gap : 5mm
- Resolution : Slit width 0.5mm
- Large operating temperature range : $T_{opr} = -25 \sim 95°C$
- High current transfer ratio : $I_C / I_F = 5\%$ (min)
- UL recognized PWB adopted : UL94V-0
- Material of the case : Polycarbonate
- Connector

  175487-3 (AMP (Japan), Ltd. made CT connector)

Unit in mm



UNLESS OTHERWISE SPECIFIED

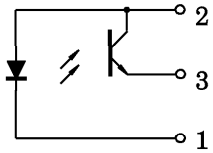
DIMENSION	TOLERANCE
6>	± 0.1
6< 14	± 0.2

( ): REFERENCE VALUE

JEDEC	—
EIAJ	—
TOSHIBA	11-15C5

Weight : 1.14g (typ.)

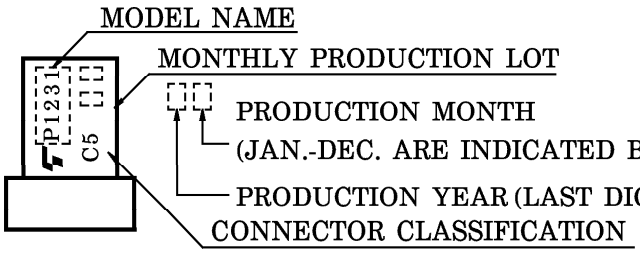
PIN CONNECTION



1. CATHODE
2. ANODE, COLLECTOR
3. EMITTER

961001EBC2

PRODUCT INDICATION



STAMP COLOR: SILVER

MAXIMUM RATINGS (Ta = 25°C)

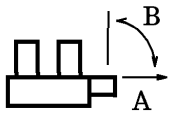
CHARACTERISTIC		SYMBOL	RATING	UNIT
Forward Current		I_F	50	mA
Forward Current Derating	Ta > 25°C	ΔI_F / °C	−0.33	mA / °C
	Tc > 85°C		−2	
Reverse Voltage		V_R	5	V
Collector-Emitter Voltage		V_{CEO}	35	V
Emitter-Collector Voltage		V_{ECO}	5	V
Collector Power Dissipation		P_C	75	mW
Collector Power Dissipation Derating (Ta > 25°C)		ΔP_C / °C	−1	mW / °C
Collector Current		I_C	50	mA
Operating Temperature Range		T_{opr}	−25~95	°C
Storage Temperature Range		T_{stg}	−40~100	°C

OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10mA	1.00	1.15	1.30	V
	Reverse Current	I_R	V_R = 5V	—	—	10	μA
	Peak Emission Wavelength	λ_P	I_F = 20mA	—	940	—	nm
DETECTOR	Dark Current	I_D	V_{CE} = 24V, I_F = 0	—	—	0.1	μA
	Peak Sensitivity Wavelength	λ_P	—	—	870	—	nm
COUPLED	Current Transfer Ratio	I_C / I_F	V_{CE} = 5V, I_F = 20mA	5	—	100	%
	Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_F = 20mA, I_C = 0.5mA	—	0.15	0.4	V
	Rise Time	t_r	V_{CC} = 5V, I_C = 2mA, R_L = 100Ω	—	6	—	μs
	Fall Time	t_f		—	6	—	

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	



RECOMMENDABLE MATCHED CONNECTOR

AMP (Japan), Ltd. made CT connector

HOUSING-TERMINAL EN BLOCK TYPE	TYPE No.	TERMINAL MATERIAL	AWG SIZE	INSULATION DIAMETER
	173977-3	PHOSPHOR BRONZE	AWG 26~28	0.85~1.05mm

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

PRECAUTION

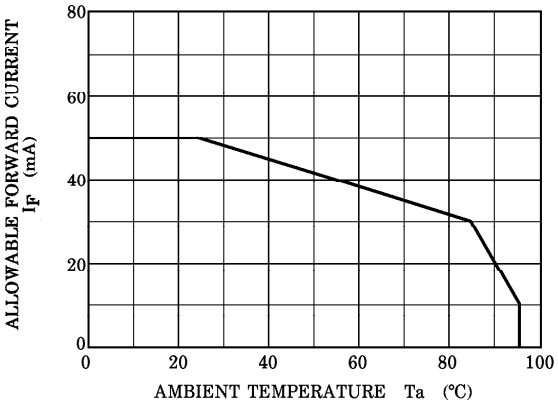
Please be careful of the followings.

1. 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.
2. It is recommended to mount this product by inserting from the sheet metal pressed side.
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.

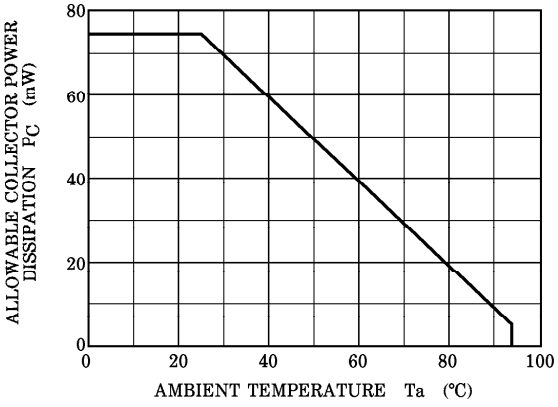
<Chemicals to avoid with polycarbonate>

	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

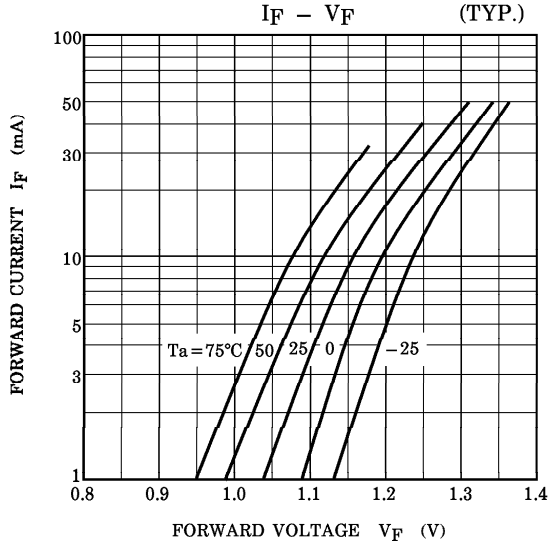
I_F – Ta



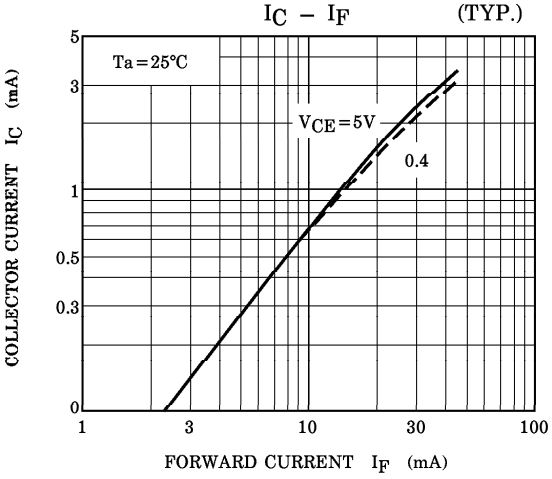
P_C – Ta



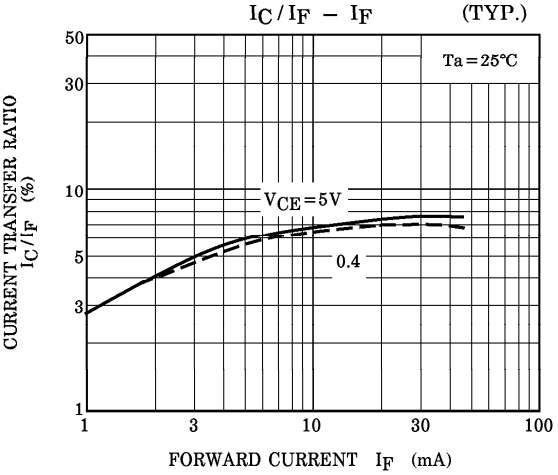
I_F – V_F (TYP.)



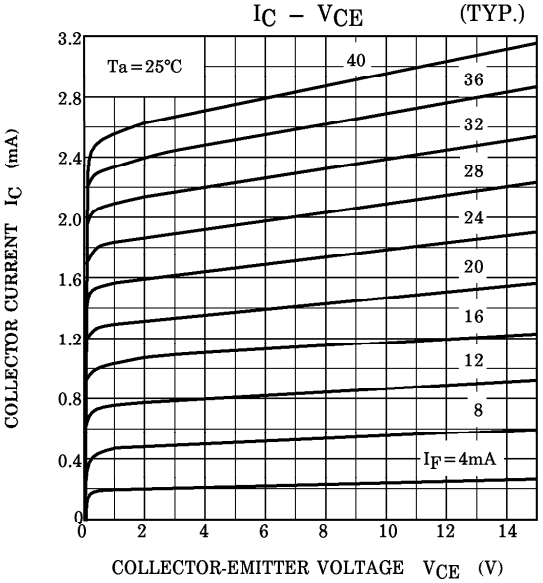
I_C – I_F (TYP.)



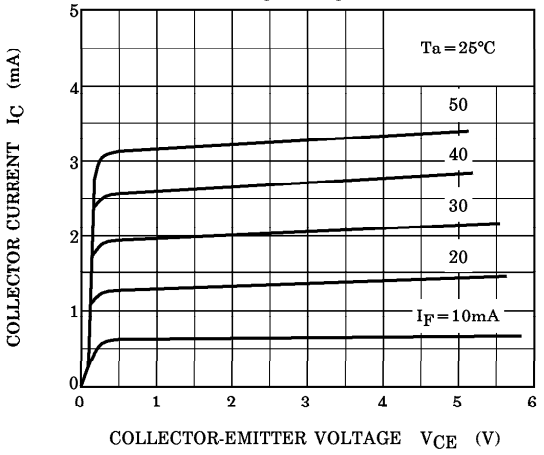
I_C / I_F – I_F (TYP.)



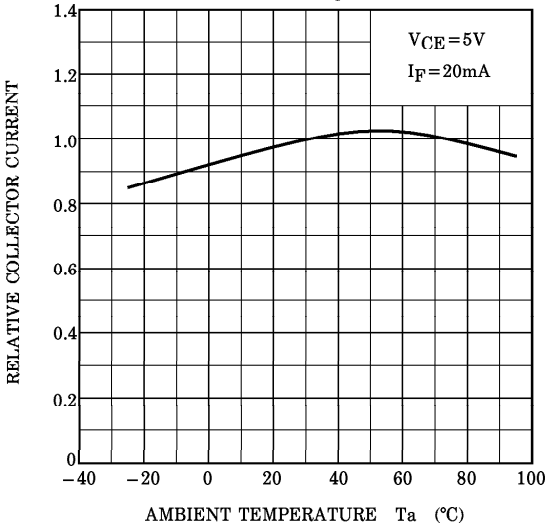
I_C – V_{CE} (TYP.)



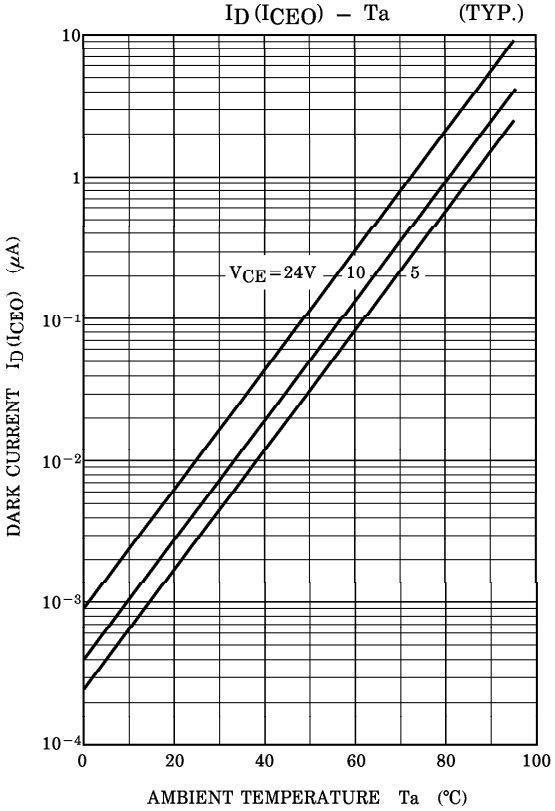
I_C – V_{CE} (TYP.)



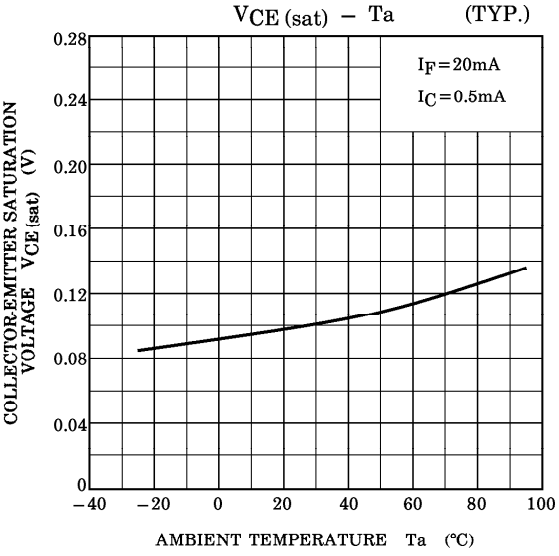
RELATIVE I_C – Ta (TYP.)



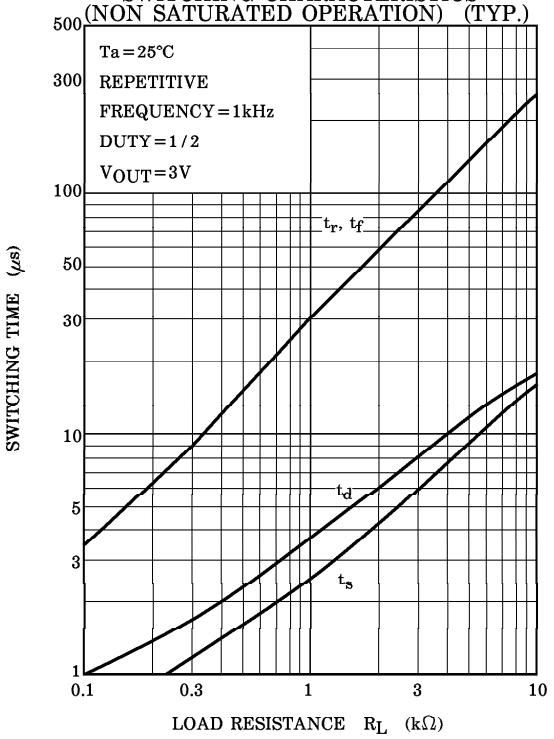
I_D (I_{CEO}) – Ta (TYP.)



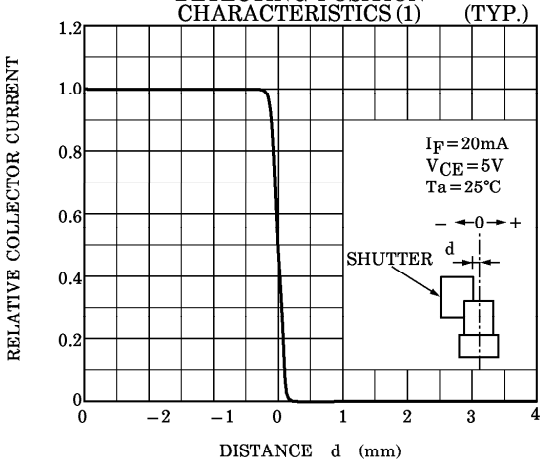
$V_{CE\,(sat)}$ – Ta (TYP.)



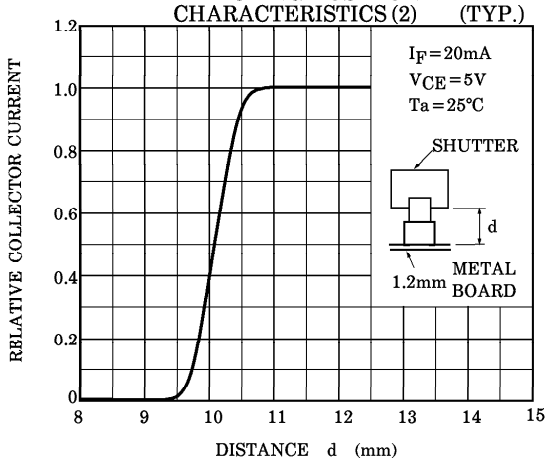
SWITCHING CHARACTERISTICS
(NON SATURATED OPERATION) (TYP.)



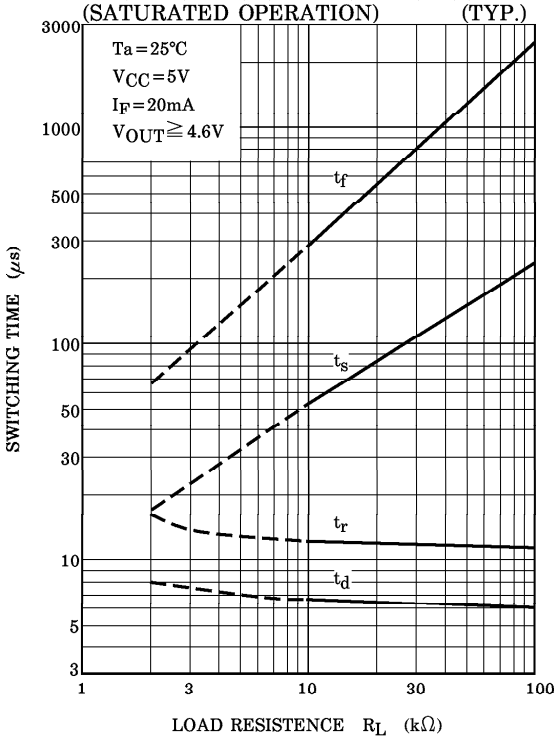
DETECTING POSITION
CHARACTERISTICS (1) (TYP.)



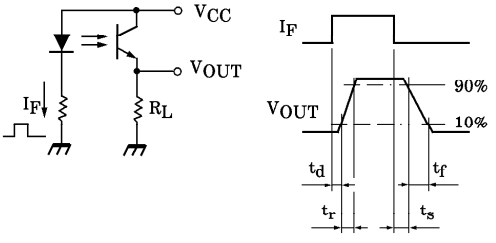
DETECTING POSITION
CHARACTERISTICS (2) (TYP.)



SWITCHING CHARACTERISTICS
(SATURATED OPERATION) (TYP.)



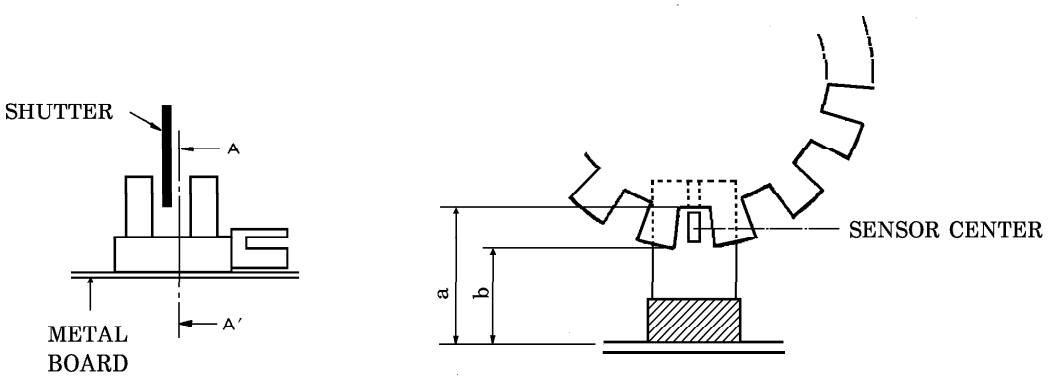
SWITCHING TIME TEST CIRCUIT



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.

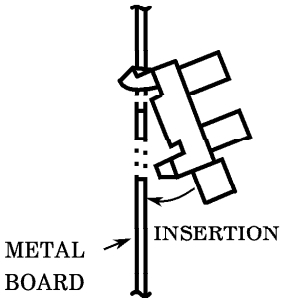


A–A′ CROSS SECTION

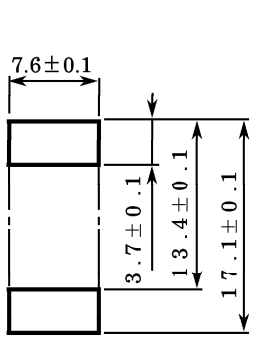
Unit : mm

METAL BOARD THICKNESS	a SIZE	b SIZE
1.0	11.9MIN.	9.4MAX.
1.2	11.7MIN.	9.2MAX.

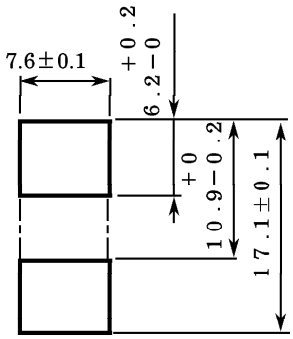
RECOMMENDED MOUNTING HOLE



MOUNTING AWAY



FOR THICKNESS
1.0mm



FOR THICKNESS
1.2mm