LA221

Features

- Non-contact switching.
- For direct PC board or dual-in-line socket mounting.
- Fast switching speed.

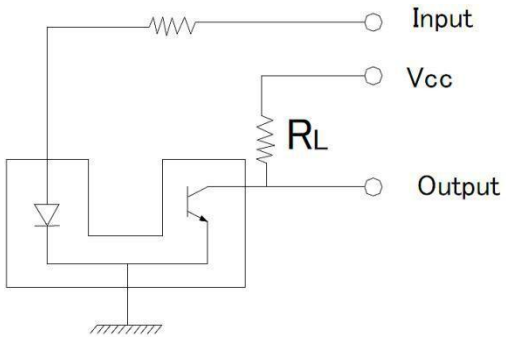
Application

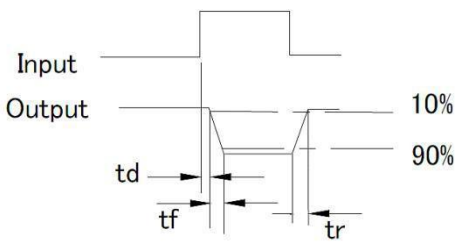
- Scanner
- Edge,Position Detections
- FAX machine
- Counter

Description

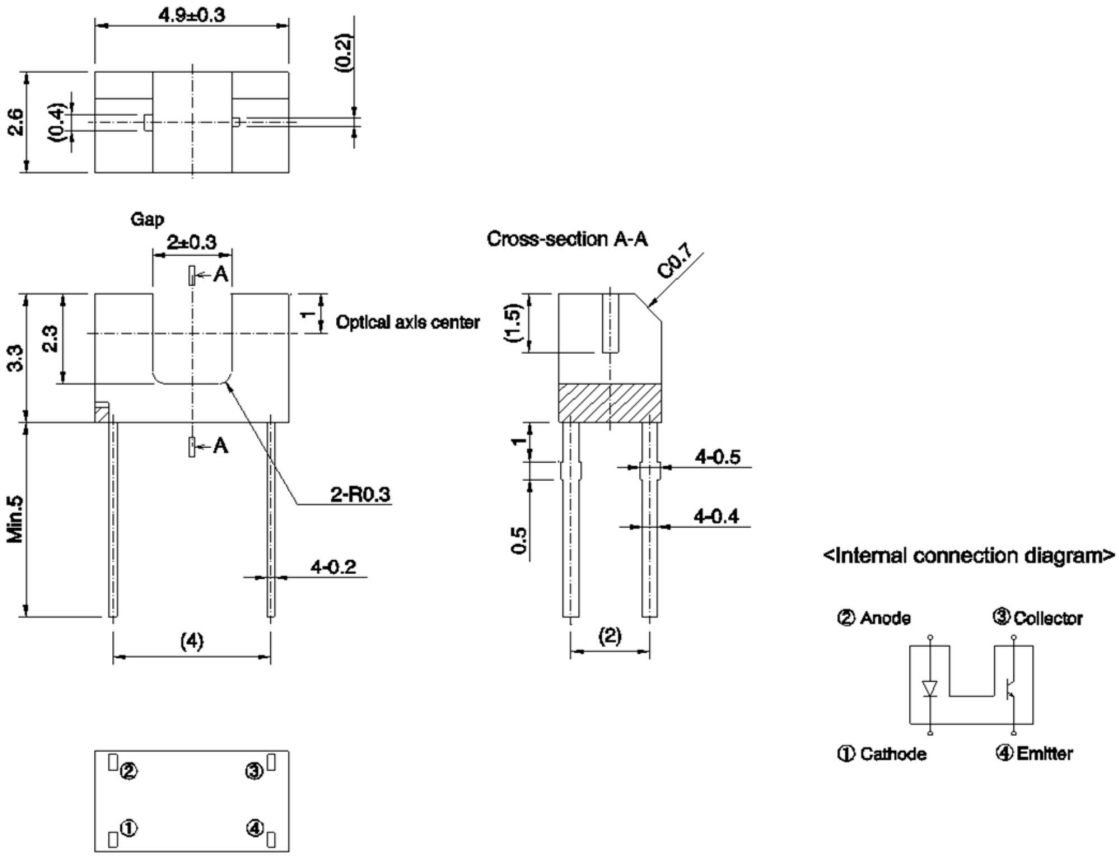
The LA221 series consist of Gallium Arsenide infrared emitting diode and a NPN sillicon phototransistor mounted in a black plastic housing. Phototransistor switching takes place whenever an opaque object passes through the slot. These series are designed for direct soldering into PC board or mounting in standard dual-in-line socket.

Switching time measurement circuit





PACKAGE DIMENSIONS



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25mm(.010") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.

ABSOLUTE MAXIMUM RATINGS AT TA=25℃

Parameter		Symbol	Value	Unit
Input (LED)	Forward current	I_F	50	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	80	mW
Output (photo-transistor)	Collector-emitter voltage	V_{CEO}	30	V
	Emitter-collector voltage	V_{ECO}	4.5	V
	Collector current	I_C	30	mA
	Collector power dissipation	P_C	80	mW
Operating temperature		T_{opr}	–25 to +85	°C
Storage temperature		T_{stg}	–30 to +85	°C

ELECTRICAL OPTICAL CHARACTERISTICS AT T_A=25℃

Parameter		Symbol	Conditions	Values			Unit
				Min.	Typ.	Max.	
Input characteristics	Forward voltage	V_F	I_F =50mA	-	1.3	1.6	V
	Reverse current	I_R	V_R =5V	-	-	10	μA
Output characteristics	Dark current	I_{CEO}	V_{CE}=10V	-	-	0.5	μA
	Peak sensitivity wavelength	λ_p	-	-	800	-	nm
Transfer characteristics	Collector current	I_C	V_{CE} =5V, I_F=10mA	0.18	0.3	0.95	mA
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F =20mA, I_C=0.1mA	-	-	0.4	V
	Response time	tr·tf	V_{CC} =5V, I_F=20mA, R_L=100Ω	-	10	-	μs
Infrared light emitter diode	Cut-off frequency	f_C	I_F =50mA * Non-coherent Infrared light emitting diode used.	-	1	-	MHz
	Peak light emitting wavelength	λ_p		-	950	-	nm
Photo transistor	Response time	tr·tf	V_{CC} =5V, I_C=1mA, R_L=100Ω *This product is not designed to be protected against electromagnetic wave.	-	10	-	μs
	Maximum sensitivity wavelength	λ_p	-	-	800	-	nm

TYPICAL ELECTRICAL / OPTICAL CHARACTERISTICS CURVES

(25℃ Ambient Temperature Unless Otherwise Noted)

Fig.1 Relative Output Current vs.Distance (I)

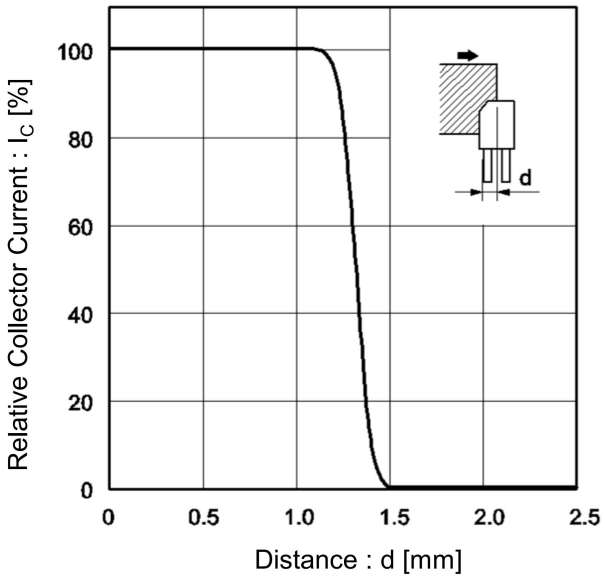


Fig.2 Relative Output Current vs.Distance (II)

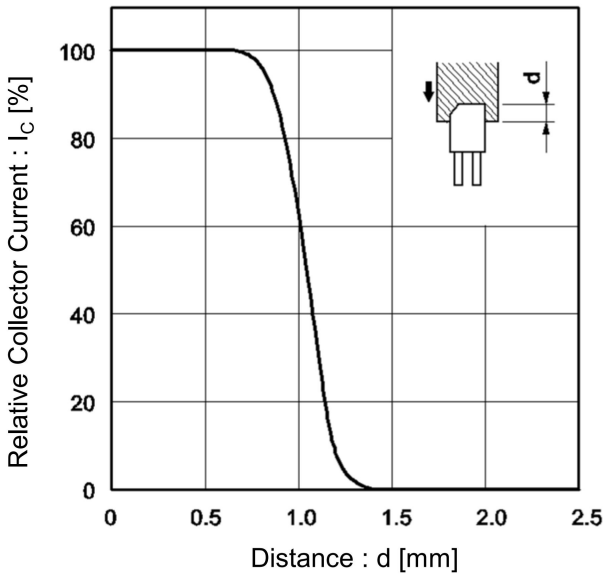


Fig.3 Forward Current Falloff

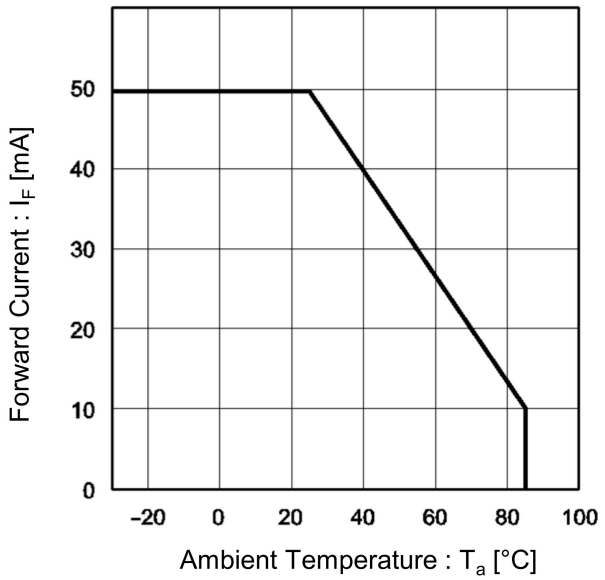


Fig.4 Power Dissipation / Collector Power Dissipation vs. Ambient Temperature

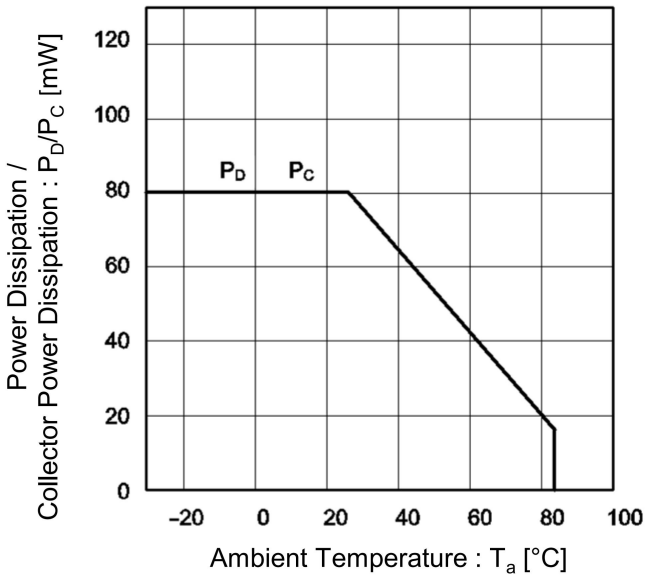


Fig.5 Forward Current vs. Forward Voltage

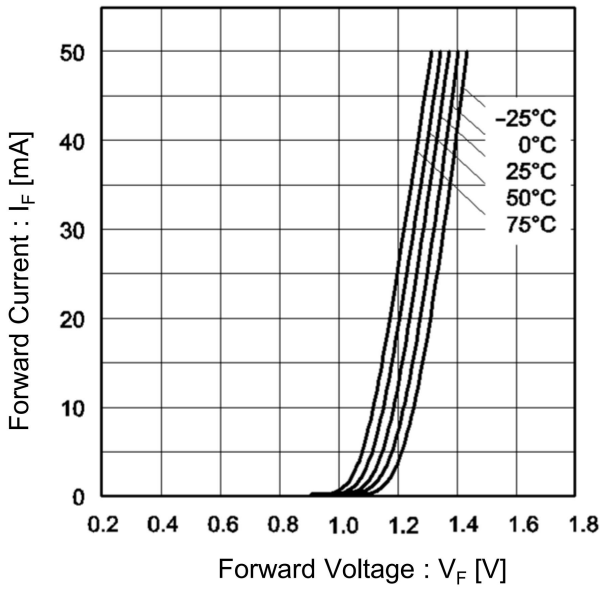


Fig.6 Collector Current vs. Forward Current

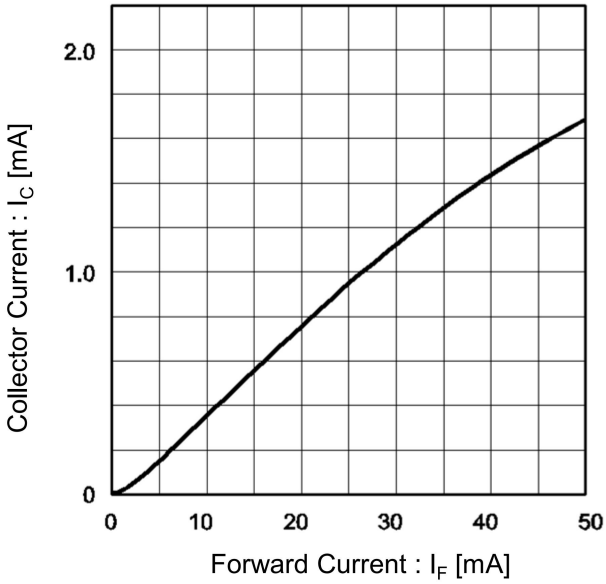


Fig.7 Relative Output vs. Ambient Temperature

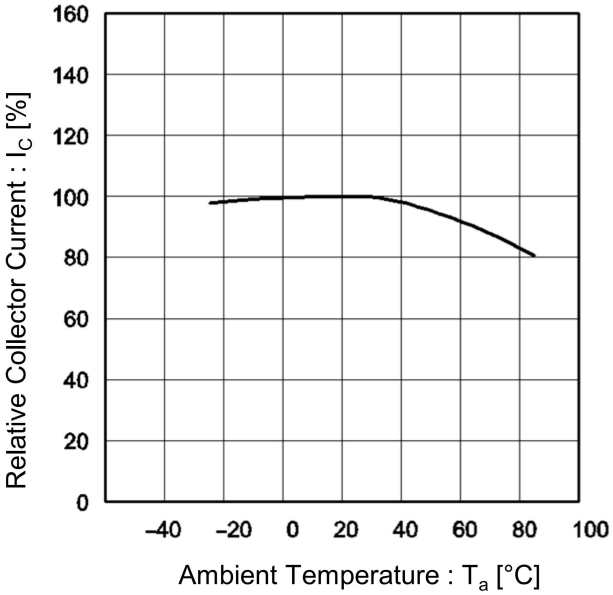


Fig.8 Response Time vs. Collector Current

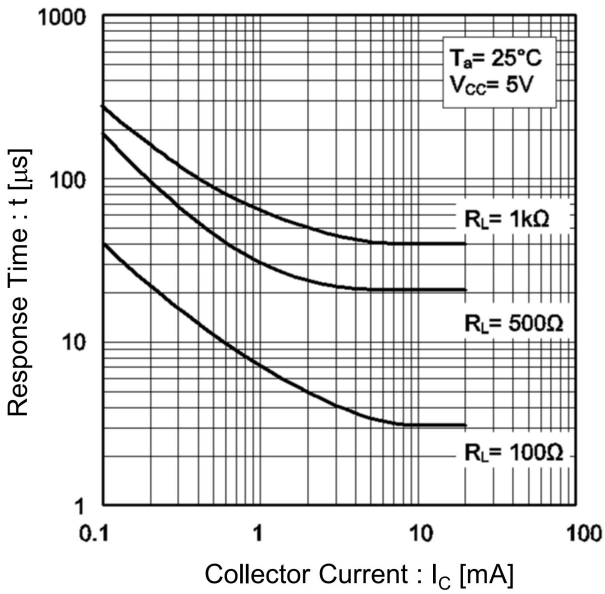


Fig.9 Dark Current vs. Ambient Temperature

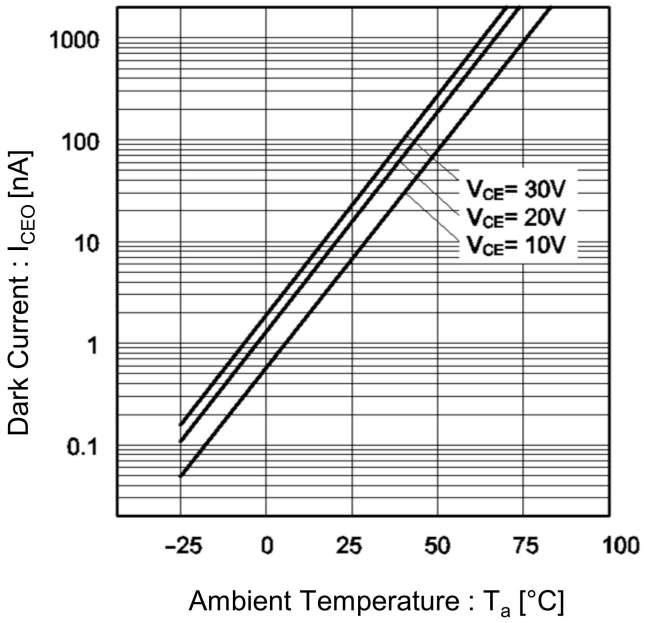
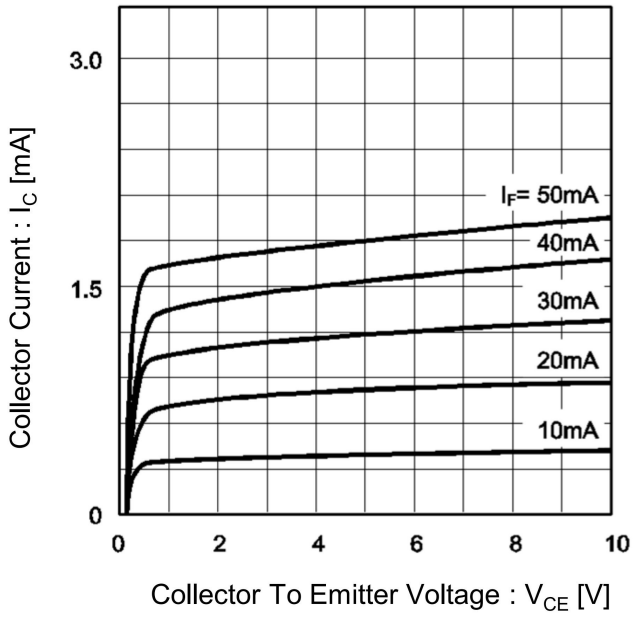


Fig.10 Output Characteristics



Packing Quantity Specification

1. 195Pcs/Type, 30Type/1Box

2. 4Boxes/1Carton

Label Form Specification

- PRODUCT: Part Number
- CODE NO.: Product Serial Number
- QTY: Packing Quantity
- LOT No: Lot Number
- REMARKS:Remarks

Notes

Lead Forming

1.During lead frame bending, the lead frame should be bent at a distance more than 3mm from bottom of the epoxy.

Note: Must fix lead frame and do not touch epoxy before bending to avoid Photo Interrupter broken.

2. Lead forming should be done before soldering.

3.Avoid stressing the Photo Interrupter package during leads forming. The stress to the base may damage the characteristics of Photo Interrupter, or it may break the Photo Interrupter.

4.Cut the Photo Interrupter lead frame at room temperature. Cutting the lead frame at high temperatures may cause failure of the Photo Interrupter.

5.When mounting the Photo Interrupter onto a PCB, the PCB holes must be aligned exactly with the lead position of the Photo Interrupter. If the Photo Interrupter are mounted with stress at The leads, it causes deterioration of the epoxy resin and this will degrade the Photo Interrupter.

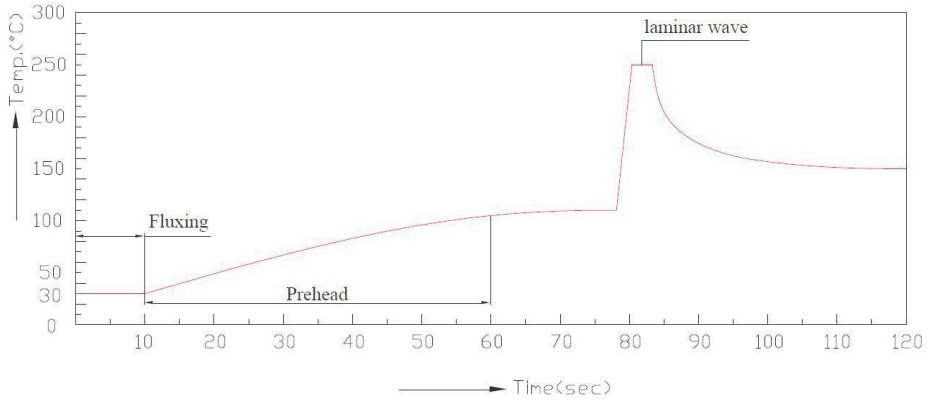
Soldering

1.Careful attention should be paid during soldering. When soldering, leave more than 3mm from solder joint to epoxy bulb, and soldering beyond the base of the tie bar is recommended.

2. Recommended soldering conditions:

Hand Soldering		DIP Soldering	
Temp. at tip of iron	300℃ Max. (30W Max.)	Preheat temp.	100℃ Max. (60 sec Max.)
Soldering time	3 sec Max.	Bath temp. & time	260 Max., 5 sec Max
Distance	3mm Min.(From solder joint to epoxy bulb)	Distance	3mm Min. (From solder joint to epoxy bulb)

3. Recommended soldering profile



4.Avoiding applying any stress to the lead frame while the Photo Interrupter are at high temperature particularly when soldering.

5. Dip and hand soldering should not be done more than one time

6.After soldering the Photo Interrupter, the epoxy bulb should be protected from mechanical shock or vibration until the Photo Interrupter return to room temperature.

7.A rapid-rate process is not recommended for cooling the Photo Interrupter down from the peak temperature.

8.Although the recommended soldering conditions are specified in the above table, dip or hand soldering at the lowest possible temperature is desirable for the Photo Interrupter.

9.Wave soldering parameter must be set and maintain according to recommended temperature and dwell time in the solder wave.

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