

**Detector**  
LTR-4206E

## 1. Description

LTR-4206E series is a phototransistor molded in standard T-1 package. It is designed with special dark dye which enables it to block ambient visible light. A good phototransistor to be paired with infrared emitter.

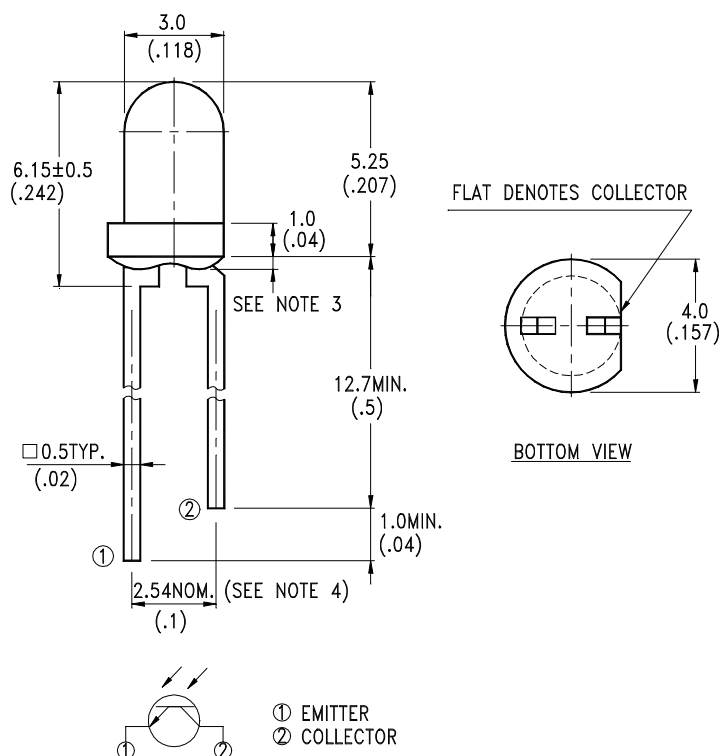
## . 1. Features

- Lead (Pb) free product and RoHS compliant.
- High radiant sensitivity
- With daylight filter function
- Black lens

## 1.2. Applications

- Position Sensor
- Opto-interrupters
- Encoders
- Optical Switches

## 2. Outline Dimensions



### Notes :

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.25\text{mm}$  (.010") unless otherwise noted.
3. Protruded resin under flange is 1.5mm (.059") max.
4. Lead spacing is measured where the leads emerge from the package.

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### 3. Absolute Maximum Ratings at TA=25°C

Parameter	Maximum Rating	Unit
Power Dissipation	100	mW
Collector - Emitter Voltage	30	V
Emitter - Collector Voltage	5	V
Operating Temperature Range	-40°C to + 85°C	
Storage Temperature Range	-55°C to + 100°C	
Lead Soldering Temperature [1.6mm From Body]	260°C for 5 Seconds max	

### 4. Electrical / Optical Characteristics at TA=25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Bin
Collector - Emitter Break Down Voltage	$V_{(BR)CEO}$	30			V	$I_C = 1mA, E_e = 0mW/cm^2$	
Emitter - Collector Break Down Voltage	$V_{(BR)ECO}$	5			V	$I_E = 100\mu A$ $E_e = 0mW/cm^2$	
Collector – Emitter saturation voltage	$V_{CE(SAT)}$			0.4	V	$I_C = 100\mu A$ $E_e = 1mW/cm^2$	
Rise Time	$t_r$		10		$\mu S$	$V_{CC} = 5V$ $I_C = 1mA, R_L = 1K\Omega$	
Fall Time	$t_f$		10				
Collector Dark Current	$I_{CEO}$			100	nA	$V_{CE} = 10V, E_e = 0mW/cm^2$	
On state collector current	$I_{CON}$	0.4		1.2	mA	$V_{CE} = 5V, E_e = 1mW/cm^2$ $\lambda = 940nm$	Bin B
		0.8		2.4			Bin C
		1.6		4.8			Bin D
		3.2		9.6			Bin E
		6.4					Bin F
Angle of half sensitivity	$\theta_{1/2}$		$\pm 20$		deg.		
Wavelength of Max Sensitivity	$\lambda_{S MAX}$		900		nm		
Range of Spectral Bandwidth	$\lambda$	800		1100	nm		

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### 5. Typical Electrical / Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)

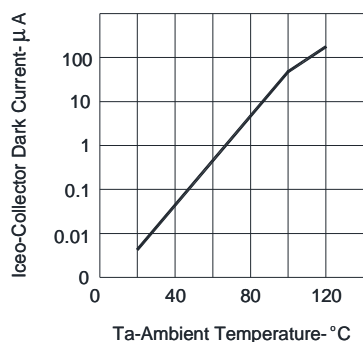


FIG.1 COLLECTOR DARK CURRENT VS AMBIENT TEMPERATURE

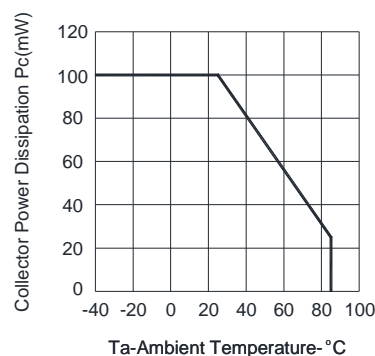


FIG.2 COLLECTOR POWER DISSIPATION VS AMBIENT TEMPERATURE

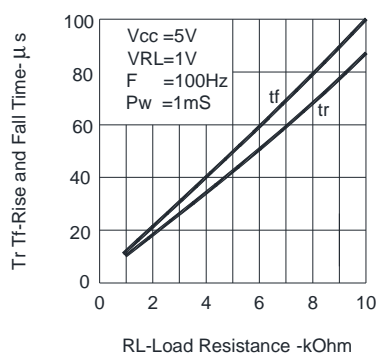


FIG.3 RISE AND FALL TIME VS COLLECTOR CURRENT

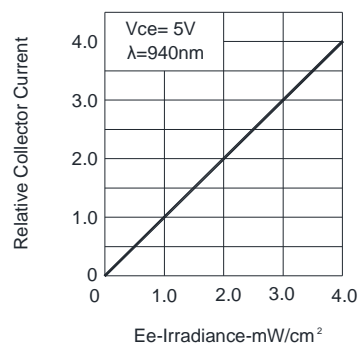


FIG.4 RELATIVE COLLECTOR CURRENT VS IRRADIANCE

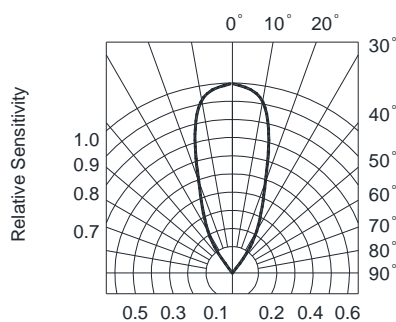


FIG.5 RELATIVE RADIANT SENSITIVITY vs. ANGULAR DISPLACEMENT

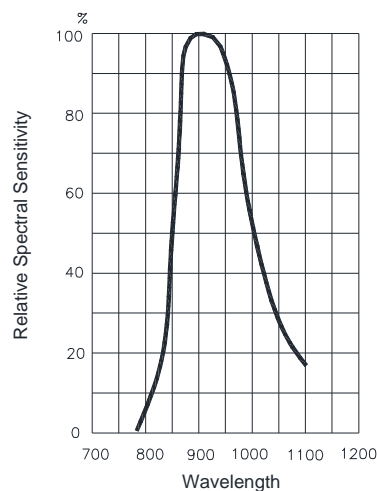


FIG.6 RELATIVE SPECTRAL SENSITIVITY VS WAVELENGTH

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### 6. CAUTIONS

#### 6.1. Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

#### 6.2. Storage

The storage ambient for the LEDs should not exceed 30°C temperature or 70% relative humidity. It is recommended that LEDs out of their original packaging are used within three months. For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant or in desiccators with nitrogen ambient.

#### 6.3. Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LEDs if necessary.

#### 6.4. Lead Forming & Assembly

During lead forming, the leads should be bent at a point at least 3mm from the base of LED lens. Do not use the base of the lead-frame as a fulcrum during forming. Lead forming must be done before soldering, at normal temperature. During assembly on PCB, use minimum clinch force possible to avoid excessive mechanical stress.

#### 6.5. Soldering

Dipping the lens into the solder must be avoided. Do not apply any external stress to the lead frame during soldering while the LED is at high temperature.

#### Recommended solder pad

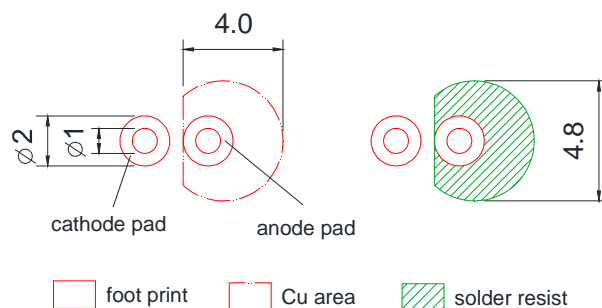


FIG.7 RECOMMENDED SOLDER PAD

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### 6.6. ESD (Electrostatic Discharge)

**Static Electricity or power surge will damage the device.**

**Suggestions to prevent ESD damage:**

- Use a conductive wrist band or anti- electrostatic glove when handling these devices
- All devices, equipment, and machinery must be properly grounded
- Work tables, storage racks, etc. should be properly grounded
- Use ion blower to neutralize the static charge which might have built up on surface of the devices plastic lens as a result of friction between devices during storage and handing

**Suggested checking list:**

#### Training and Certification

- 6.6.1.1. Everyone working in a static-safe area is ESD-certified?
- 6.6.1.2. Training records kept and re-certification dates monitored?

#### Static-Safe Workstation & Work Areas

- 6.6.2.1. Static-safe workstation or work-areas have ESD signs?
- 6.6.2.2. All surfaces and objects at all static-safe workstation and within 1ft measure less than 100V?
- 6.6.2.3. All ionizer activated, positioned towards the units?
- 6.6.2.4. Each work surface mats grounding is good?

#### Personnel Grounding

- 6.6.3.1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
- 6.6.3.1. If conductive footwear used, conductive flooring also present where operator stand or walk?
- 6.6.3.2. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V\*?
- 6.6.3.3. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
- 6.6.3.4. All wrist strap or heel strap checkers calibration up to date?

#### Device Handling

- 6.6.4.1. Every ESDS items identified by EIA-471 labels on item or packaging?
- 6.6.4.2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
- 6.6.4.3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
- 6.6.4.4. All flexible conductive and dissipative package materials inspected before reuse or recycle?

#### Others

- 6.6.5.1. Audit result reported to entity ESD control coordinator?
- 6.6.5.2. Corrective action from previous audits completed?
- 6.6.5.3. Are audit records complete and on file?

## 7. PACKING INFORMATION

Packaging	Quantity per unit packing	Minimum Order Quantity
Bulk-3mm	1000/polybag	10000