



## Slotted Photointerrupters

LTH-301A/LTH-301-05/LTH-301-07/LTH-301-19

LTH-301-23/LTH-301-32/LTH-306-01/LTH-306-02

### Features

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

### Application

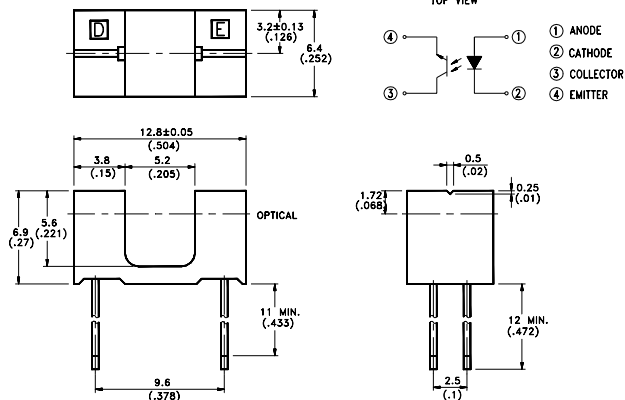
- Scanner
- Printer
- FAX machine
- Counter

### Description

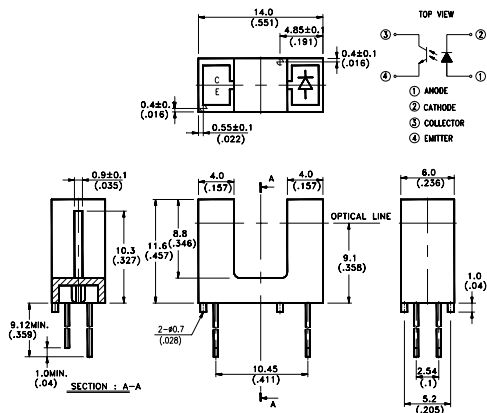
The LTH-301/LTH-306 series consist of Gallium Arsenide infrared emitting diode and a NPN silicon phototransistor mounted in a black plastic housing. Phototransistor switching takes place whenever an opaque object passes through the slot. These series are designed for direct soldering into PC board or mounting in standard dual-in-line socket.

### Package Dimensions

LTH-301A



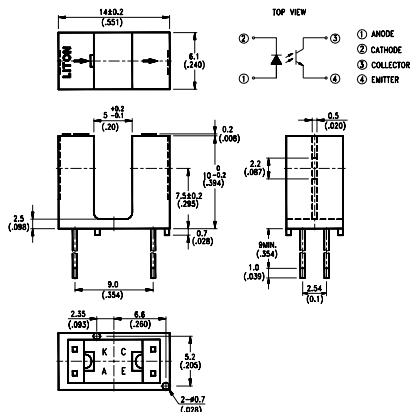
LTH-301-05



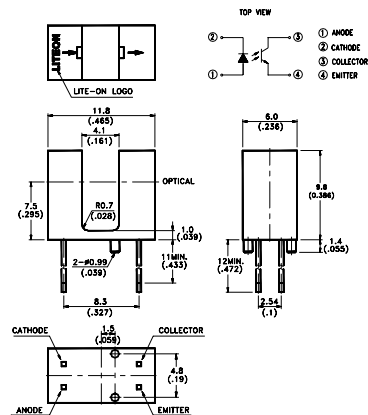
#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.25$  mm (.010").
3. Lead spacing is measured where the leads emerge from the package.
4. Specifications are subject to change without notice.

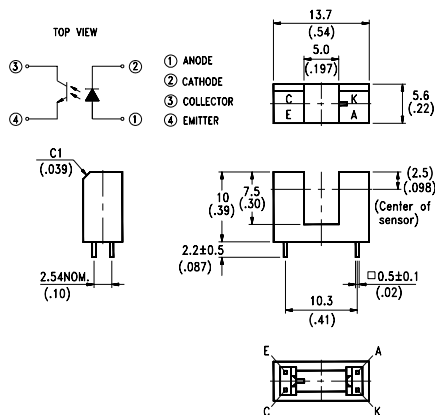
LTH-301-07



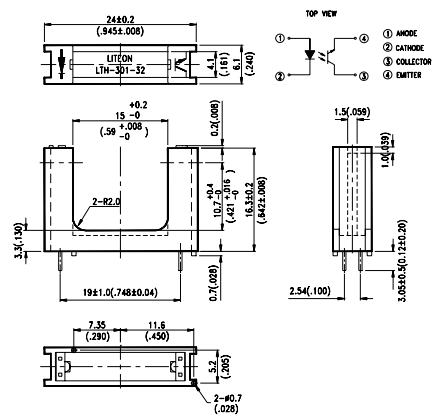
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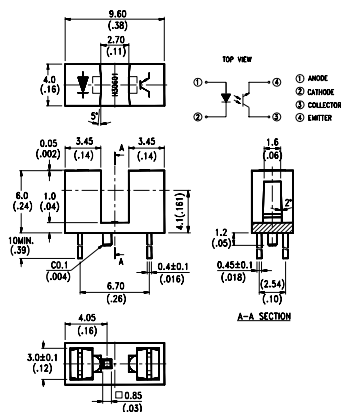
LTH-301-23



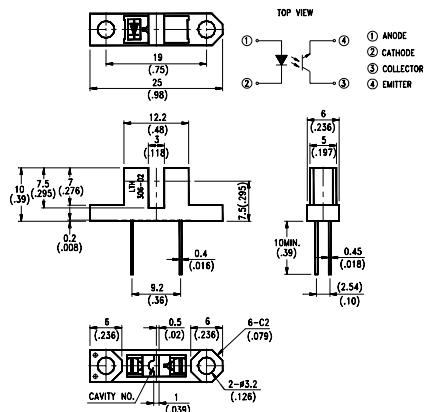
LTH-301-32



LTH-306-01



LTH-306-02



## Absolute Maximum Ratings at Ta=25°C

| Parameter                                                |                                                        | Symbol           | Maximum Rating      | Unit |
|----------------------------------------------------------|--------------------------------------------------------|------------------|---------------------|------|
| Input LED                                                | Continuous Forward Current                             | I <sub>F</sub>   | 60                  | mA   |
|                                                          | Reverse Voltage                                        | V <sub>R</sub>   | 5                   | V    |
|                                                          | Peak Forward Current<br>(Pulse Wide=10 $\mu$ S,300PPS) | I <sub>CP</sub>  | 1                   | A    |
|                                                          | Power Dissipation                                      | P <sub>D</sub>   | 75                  | mW   |
| Output phototransistor                                   | Collector Current                                      | I <sub>C</sub>   | 20                  | mA   |
|                                                          | Power Dissipation                                      | P <sub>C</sub>   | 100                 | mW   |
|                                                          | Collector-emitter Voltage                              | V <sub>CEO</sub> | 30                  | V    |
|                                                          | Emitter-collector Voltage                              | V <sub>ECO</sub> | 5                   | V    |
| Operating Temperature Range                              |                                                        | T <sub>opr</sub> | -25°C to + 85°C     |      |
| Storage Temperature Range                                |                                                        | T <sub>stg</sub> | -40°C to + 100°C    |      |
| Lead Soldering Temperature<br>[1.6mm(.063 in.)from body] |                                                        | T <sub>s</sub>   | 260°C for 5 Seconds |      |

## Electrical Optical Characteristics at Ta=25°C

| Parameter                            |                      | Symbol           | Part No. | Min. | Typ. | Max. | Unit    | Test Condition                                                          |
|--------------------------------------|----------------------|------------------|----------|------|------|------|---------|-------------------------------------------------------------------------|
| Input LED                            |                      |                  |          |      |      |      |         |                                                                         |
| Forward Voltage                      |                      | V <sub>F</sub>   |          |      | 1.2  | 1.6  | V       | I <sub>F</sub> =20mA                                                    |
| Reverse Current                      |                      | I <sub>R</sub>   |          |      |      | 100  | $\mu$ A | V <sub>R</sub> =5V                                                      |
| Output phototransistor               |                      |                  |          |      |      |      |         |                                                                         |
| Collector Dark Current               |                      | I <sub>CEO</sub> |          |      |      | 100  | nA      | V <sub>CE</sub> =10V                                                    |
| Coupler                              |                      |                  |          |      |      |      |         |                                                                         |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | LTH-301A         |          |      |      | 0.4  | V       | I <sub>C</sub> =0.25mA,I <sub>F</sub> =20mA                             |
|                                      |                      | LTH-301-05       |          |      |      | 0.4  |         | I <sub>C</sub> =0.25mA,I <sub>F</sub> =20mA                             |
|                                      |                      | LTH-301-07       |          |      |      | 0.4  |         | I <sub>C</sub> =0.25mA,I <sub>F</sub> =20mA                             |
|                                      |                      | LTH-301-19       |          |      |      | 0.4  |         | I <sub>C</sub> =0.75mA,I <sub>F</sub> =20mA                             |
|                                      |                      | LTH-301-23       |          |      |      | 0.4  |         | I <sub>C</sub> =0.2mA,I <sub>F</sub> =20mA                              |
|                                      |                      | LTH-301-32       |          |      |      | 0.4  |         | I <sub>C</sub> =0.2mA,I <sub>F</sub> =20mA                              |
|                                      |                      | LTH-306-01       |          |      |      | 0.4  |         | I <sub>C</sub> =2.5mA,I <sub>F</sub> =20mA                              |
|                                      |                      | LTH-306-02       |          |      |      | 0.4  |         | I <sub>C</sub> =0.25mA,I <sub>F</sub> =20mA                             |
| On State Collector Current           | I <sub>C(ON)</sub>   | LTH-301A         | 0.5      |      |      |      | mA      | V <sub>CE</sub> =5V,I <sub>F</sub> =20mA                                |
|                                      |                      | LTH-301-05       | 0.5      |      |      |      |         |                                                                         |
|                                      |                      | LTH-301-07       | 0.4      |      |      |      |         |                                                                         |
|                                      |                      | LTH-301-19       | 1.5      |      |      |      |         |                                                                         |
|                                      |                      | LTH-301-23       | 0.4      |      |      |      |         |                                                                         |
|                                      |                      | LTH-301-32       | 0.4      |      |      |      |         |                                                                         |
|                                      |                      | LTH-306-01       | 5.0      |      |      |      |         |                                                                         |
|                                      |                      | LTH-306-02       | 0.5      |      |      |      |         |                                                                         |
| Response Time                        | Rise Time            | t <sub>r</sub>   |          |      | 3    | 15   | $\mu$ S | V <sub>CE</sub> =5V,I <sub>C</sub> =2mA<br>R <sub>L</sub> =100 $\Omega$ |
|                                      | Fall Time            | t <sub>f</sub>   |          |      | 4    | 20   |         |                                                                         |

# Typical Electrical/Optical Characteristic Curves (25°C Ambient Temperature Unless Otherwise Noted)

Fig.1 Power Dissipation vs.  
Ambient Temperature

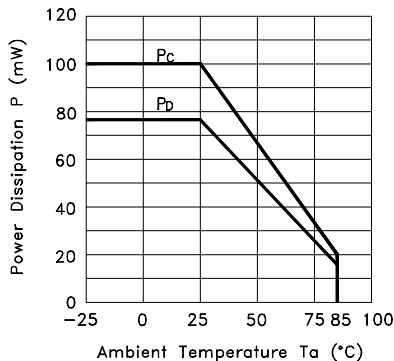


Fig.2 Forward Current vs.  
Forward Voltage

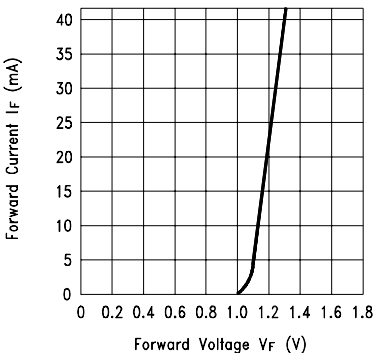


Fig.3 Collector Current vs.  
Collector-emitter Voltage

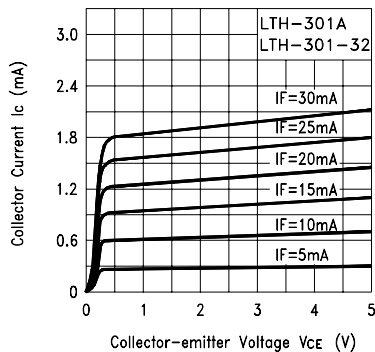


Fig.4 Collector Current vs.  
Collector-emitter Voltage

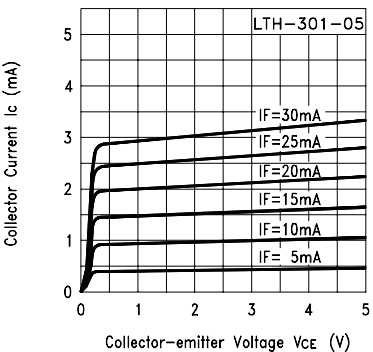


Fig.5 Collector Current vs.  
Collector-emitter Voltage

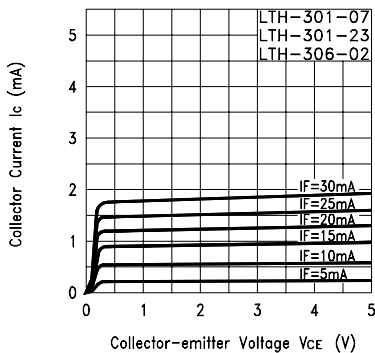
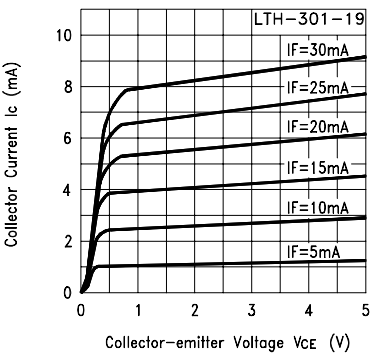


Fig.6 Collector Current vs.  
Collector-emitter Voltage



## Typical Electrical/Optical Characteristic Curves (25°C Ambient Temperature Unless Otherwise Noted)

Fig.7 Collector Current vs.  
Collector-emitter Voltage

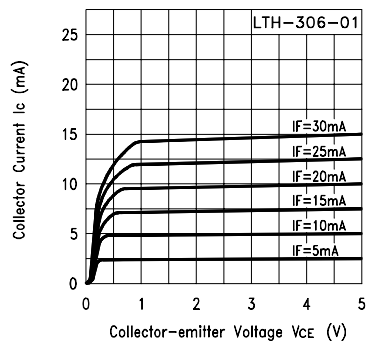


Fig.8 Collector Current vs.  
Ambient Temperature

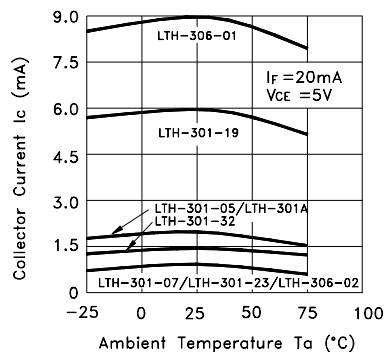


Fig.9 Collector-emitter Saturation  
Voltage vs. Ambient Temperature

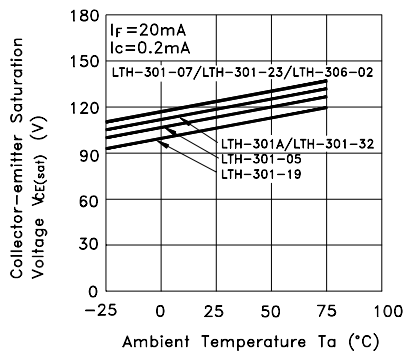
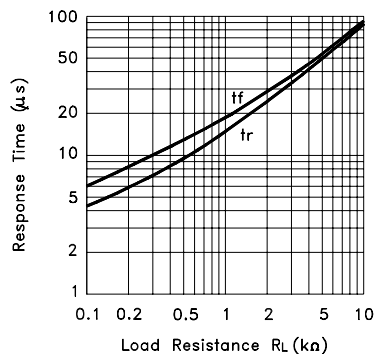


Fig.10 Response Time vs.  
Load Resistance



Test Circuit for Response Time

