

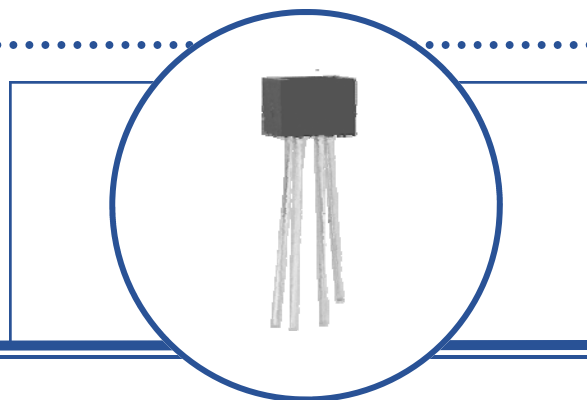
# Reflective Object Sensor

OPB706A, OPB706B, OPB706C  
OPB707A, OPB707B, OPB707C



## Features:

- Choice of Phototransistor (OPB706) or Photodarlington (OPB707) output
- Unfocused for sensing diffuse surface
- Low cost plastic housing
- Designed for use with PCBoards or connectors



## Description:

The **OPB706** consists of an infrared Light Emitting Diode (LED) and an NPN silicon Phototransistor mounted "side-by-side" on parallel axes in a black plastic housing. The **OPB707** consists of an infrared LED and an NPN silicon Photodarlington mounted "side-by-side" on parallel axes in a black plastic housing.

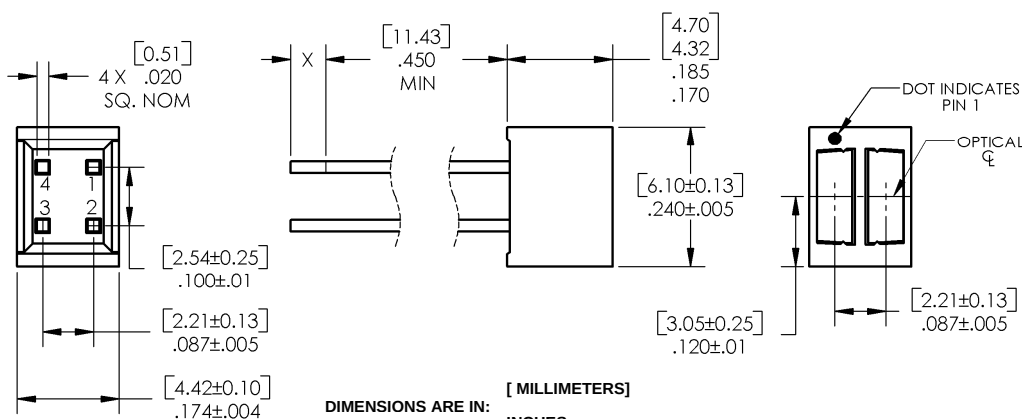
On both **OPB706** and **OPB707**, the LED and Phototransistor / Photodarlington are molded using dark infrared transmissive plastic to reduce ambient light noise. The Phototransistor / Photodarlington responds to light from the emitter when a reflective object passes within its field of view of the device.

Custom electrical, wire and cabling and connectors are available. Contact your local representative or OPTEK for more information.

## Applications:

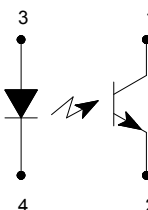
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

| Part Number | LED Peak Wavelength | Sensor     | Reflection Distance | Lead Length / Spacing     |
|-------------|---------------------|------------|---------------------|---------------------------|
| OPB706A     | 935 nm              | Transistor | 0.050"<br>(1.27mm)  | 0.45" / 0.087",<br>0.100" |
| OPB706B     |                     |            |                     |                           |
| OPB706C     |                     |            |                     |                           |
| OPB707A     |                     | Darlington |                     |                           |
| OPB707B     |                     |            |                     |                           |
| OPB707C     |                     |            |                     |                           |

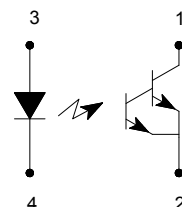


| Pin # | LED     | Pin # | Transistor |
|-------|---------|-------|------------|
| 3     | Anode   | 1     | Collector  |
| 4     | Cathode | 2     | Emitter    |

OPB706



OPB707



RoHS

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

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**Absolute Maximum Ratings** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

|                                                                                                            |                                                |
|------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Storage and Operating Temperature Range                                                                    | $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ |
| Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] <sup>(1)</sup> | $260^{\circ}\text{C}$                          |

**Input Diode**

|                                                             |       |
|-------------------------------------------------------------|-------|
| Forward DC Current                                          | 50 mA |
| Peak Forward Current (1 $\mu\text{s}$ pulse width, 300 pps) | 3 A   |
| Reverse DC Voltage                                          | 2 V   |
| Power Dissipation <sup>(2)</sup>                            | 75 mW |

**Output Phototransistor (OPB706) | Output Photodarlington (OPB707)**

|                                                                     |                 |
|---------------------------------------------------------------------|-----------------|
| Collector-Emitter Voltage<br>OPB706<br>OPB707                       | 24 V<br>15 V    |
| Emitter-Collector Voltage                                           | 5 V             |
| Collector DC Current<br>OPB706<br>OPB707                            | 25 mA<br>125 mA |
| Power Dissipation<br>OPB706 <sup>(2)</sup><br>OPB707 <sup>(3)</sup> | 75 mW<br>100 mW |

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering.
- (2) Derate linearly 1.25 mW/ $^{\circ}\text{C}$  above  $25^{\circ}\text{C}$ .
- (3) Derate linearly 1.67 mW/ $^{\circ}\text{C}$  above  $25^{\circ}\text{C}$ .

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## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

### Input Diode (see OP165W for additional information)

|                |                 |   |   |     |    |                        |
|----------------|-----------------|---|---|-----|----|------------------------|
| V <sub>F</sub> | Forward Voltage | - | - | 1.7 | V  | I <sub>F</sub> = 20 mA |
| I <sub>R</sub> | Reverse Current | - | - | 100 | μA | V <sub>R</sub> = 2 V   |

### Output Phototransistor (see OP505W for additional information) | Photodarlington (see OP535 for additional information)

|                      |                                                         |          |        |            |    |                                                                                    |
|----------------------|---------------------------------------------------------|----------|--------|------------|----|------------------------------------------------------------------------------------|
| V <sub>(BR)CEO</sub> | Collector-Emitter Breakdown Voltage<br>OPB706<br>OPB707 | 24<br>15 | -<br>- | -<br>-     | V  | I <sub>C</sub> = 100 μA                                                            |
| V <sub>(BR)ECO</sub> | Emitter-Collector Breakdown Voltage                     | 5        | -      | -          | V  | I <sub>E</sub> = 100 μA                                                            |
| I <sub>CEO</sub>     | Collector Dark Current<br>OPB706<br>OPB707              | -<br>-   | -<br>- | 100<br>250 | nA | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 0, E <sub>E</sub> ≤ 0.1 μW/cm <sup>2</sup> |

### Combined

|                      |                                                                                              |                                     |                            |                            |                  |                                                                                                                           |
|----------------------|----------------------------------------------------------------------------------------------|-------------------------------------|----------------------------|----------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------|
| I <sub>CX</sub>      | Crosstalk<br>OPB706<br>OPB707                                                                | -<br>-                              | -<br>-                     | 200<br>10                  | nA<br>μA         | I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5 V, No reflecting surface <sup>(1)</sup>                                       |
| I <sub>C(ON)</sub>   | On-State Collector Current<br>OPB706A<br>OPB706B<br>OPB706C<br>OPB707A<br>OPB707B<br>OPB707C | 500<br>350<br>250<br>25<br>17<br>10 | -<br>-<br>-<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>- | μA<br><br><br>mA | I <sub>F</sub> = 20 mA, V <sub>CE</sub> = 5V, d = 0.05" (1.27 mm) <sup>(2) (3)</sup>                                      |
| V <sub>CE(SAT)</sub> | Collector-Emitter Saturation Voltage<br>OPB706<br>OPB707                                     | 0.4<br>1.1                          | -<br>-                     | -<br>-                     | V                | I <sub>F</sub> = 20 mA, d = 0.05" (1.27 mm) <sup>(2) (3)</sup><br>I <sub>C(ON)</sub> = 100μA<br>I <sub>C(ON)</sub> = 2 mA |

#### Notes:

- (1) Crosstalk (I<sub>CX</sub>) is the collector current measured with the indicated current in the input diode and with no reflecting surface.
- (2) The distance from the assembly face to the reflective surface is "d".
- (3) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflecting surface. Reference: Eastman Kodak, Catalog #E 152 7795.
- (4) Lower curve is a calculated worst case condition rather than the conventional -2 Ω limit.
- (5) All parameters tested using pulse techniques.

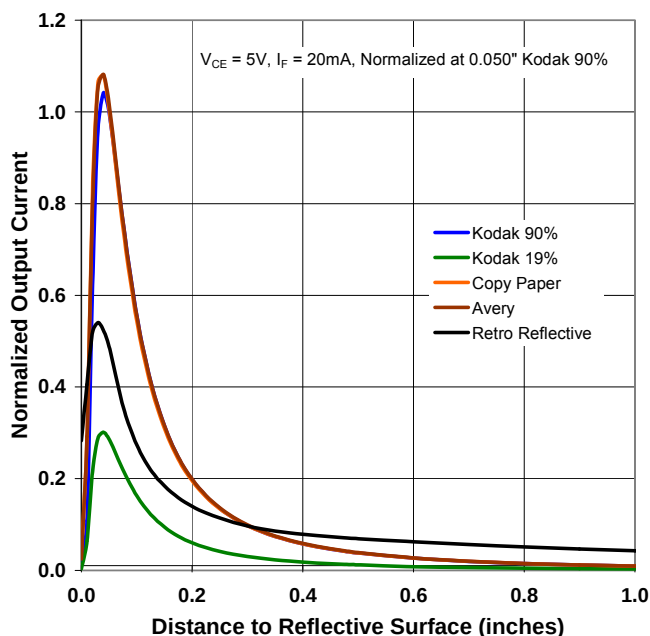
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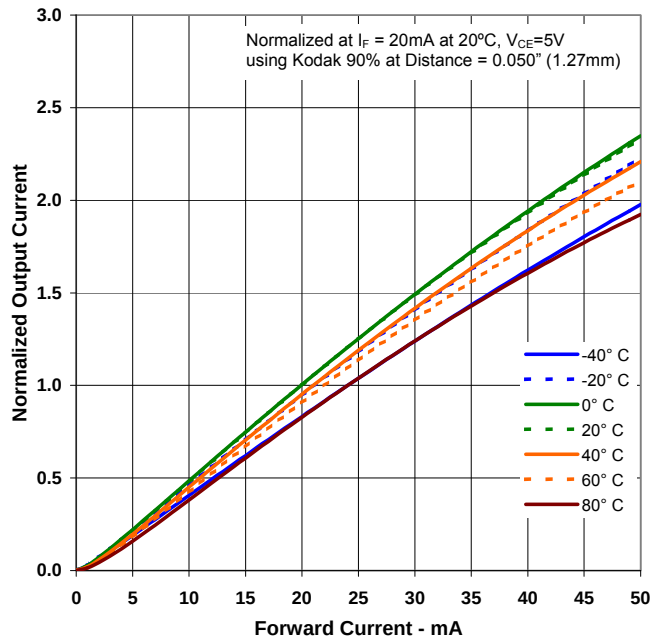
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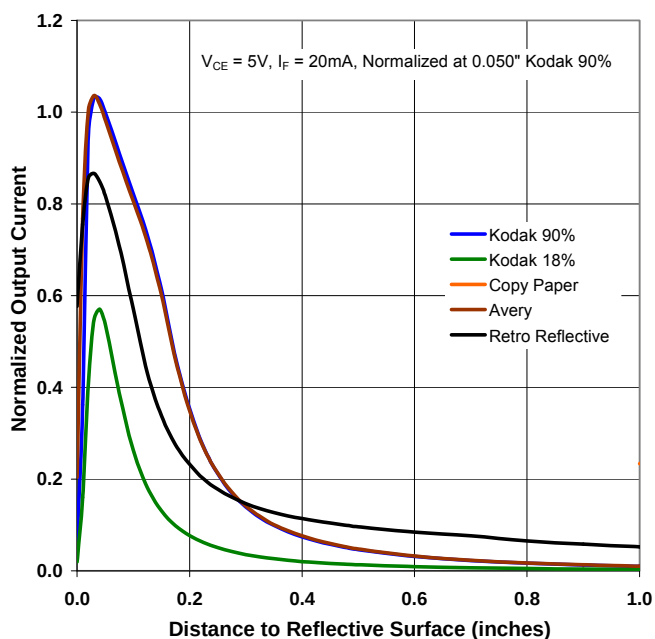
**OPB706 - Normalized Collector Current vs. Object Distance**



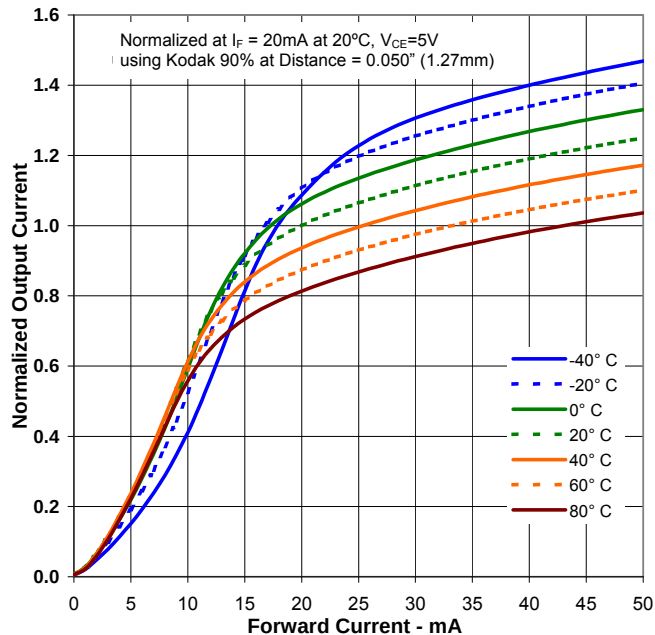
**OPB706 - Output Current vs Forward Current vs Temperature**



**OPB707 - Normalized Collector Current vs. Object Distance**



**OPB707 - Output Current vs Forward Current vs Temperature**



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