

# 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.

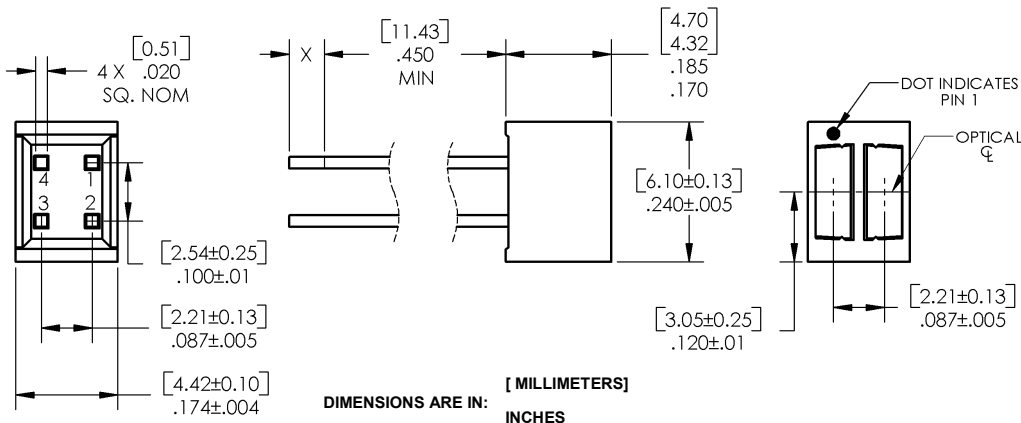
On both **OPB706** and **OPB707**, the LED and Phototransistor / Photodarlington are molded using dark infrared transmissive plastic to reduce ambient light noise. The Phototransistor / Photodarlington responds to light from the emitter when a reflective object passes within its field of view of the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

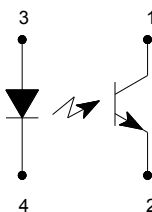
| Part Number | LED Peak Wavelength | Sensor     | Reflection Distance | Lead Length / Spacing     |
|-------------|---------------------|------------|---------------------|---------------------------|
| OPB706A     | 935 nm              | Transistor | 0.050"<br>(1.27mm)  | 0.45" / 0.087",<br>0.100"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



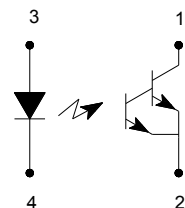
[ MILLIMETERS ]  
DIMENSIONS ARE IN:  
INCHES

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

OPB706



OPB707



RoHS

General Note  
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| Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)                                |                  |
|--|------------------|
| Storage and Operating Temperature Range  | -40° C to +85° C |
| Lead Soldering Temperature [1/16 inch (1.6mm) from the case for 5 sec. with soldering iron] <sup>(1)</sup> | 260° C           |
| <b>Input Diode</b>   |                  |
| 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            |
| <b>Output Phototransistor (OPB706)   Output Photodarlington (OPB707)</b>                                   |                  |
| 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/°C above 25 ° C.
- (3) Derate linearly 1.67 mW/°C above 25 ° C.

# Reflective Object Sensor

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| Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)   |                                      |     |     |     |               |   |
|---|--------------------------------------|-----|-----|-----|---------------|---|
| SYMBOL  | PARAMETER                            | MIN | TYP | MAX | UNITS         | TEST CONDITIONS   |
| <b>Input Diode</b> (see OP165W for additional information)  |                                      |     |     |     |               |   |
| $V_F$   | Forward Voltage                      | -   | -   | 1.7 | V             | $I_F = 20\text{ mA}$  |
| $I_R$   | Reverse Current                      | -   | -   | 100 | $\mu\text{A}$ | $V_R = 2\text{ V}$  |
| <b>Output Phototransistor</b> (see OP505W for additional information)   <b>Photodarlington</b> (see OP535 for additional information) |                                      |     |     |     |               |   |
| $V_{(BR)CEO}$   | Collector-Emitter Breakdown Voltage  | 24  | -   | -   | V             | $I_C = 100\ \mu\text{A}$  |
|   | OPB706<br>OPB707                     | 15  | -   | -   |               |   |
| $V_{(BR)ECO}$   | Emitter-Collector Breakdown Voltage  | 5   | -   | -   | V             | $I_E = 100\ \mu\text{A}$  |
| $I_{CEO}$   | Collector Dark Current               | -   | -   | 100 | nA            | $V_{CE} = 5\text{ V}, I_F = 0, E_E \leq 0.1\ \mu\text{W}/\text{cm}^2$   |
|   | OPB706<br>OPB707                     | -   | -   | 250 |               |   |
| <b>Combined</b>   |                                      |     |     |     |               |   |
| $I_{CX}$  | Crosstalk                            | -   | -   | 200 | nA            | $I_F = 20\text{ mA}, V_{CE} = 5\text{ V}, \text{No reflecting surface}^{(1)}$   |
|   | OPB706<br>OPB707                     | -   | -   | 10  | $\mu\text{A}$ |   |
| $I_{C(ON)}$   | On-State Collector Current           | 500 | -   | -   | $\mu\text{A}$ | $I_F = 20\text{ mA}, V_{CE} = 5\text{ V}, d = 0.05'' (1.27\text{ mm})^{(2)(3)}$   |
|   | OPB706A                              | 500 | -   | -   |               |   |
|   | OPB706B                              | 350 | -   | -   |               |   |
|   | OPB706C                              | 250 | -   | -   | mA            |   |
|   | OPB707A                              | 25  | -   | -   |               |   |
|   | OPB707B                              | 17  | -   | -   |               |   |
| OPB707C   | 10                                   | -   | -   |     |               |   |
| $V_{CE(SAT)}$   | Collector-Emitter Saturation Voltage | 0.4 | -   | -   | V             | $I_F = 20\text{ mA}, d = 0.05'' (1.27\text{ mm})^{(2)(3)}$<br>$I_{C(ON)} = 100\ \mu\text{A}$<br>$I_{C(ON)} = 2\text{ mA}$ |
|   | OPB706                               | 0.4 | -   | -   |               |   |
|   | OPB707                               | 1.1 | -   | -   |               |   |

**Notes:**

- (1) Crosstalk ( $I_{CX}$ ) 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  $-2\ \Omega$  limit.
- (5) All parameters tested using pulse techniques.

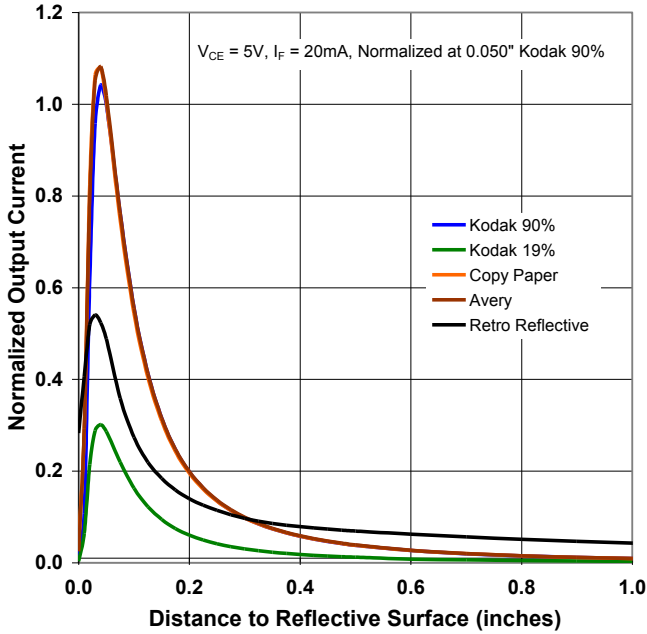
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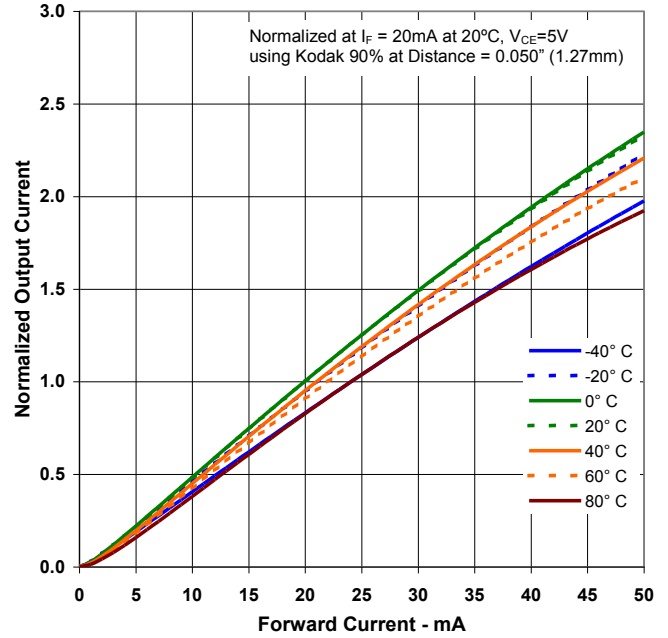
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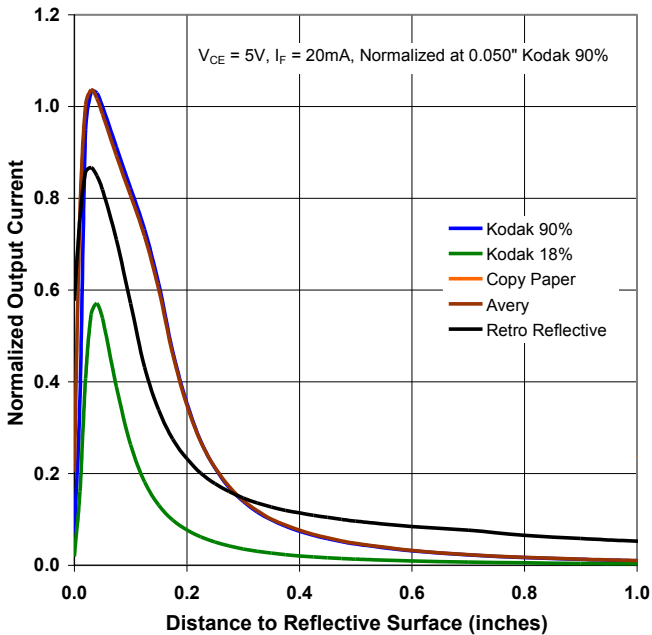
**OPB706 - Normalized Collector Current vs. Object Distance**



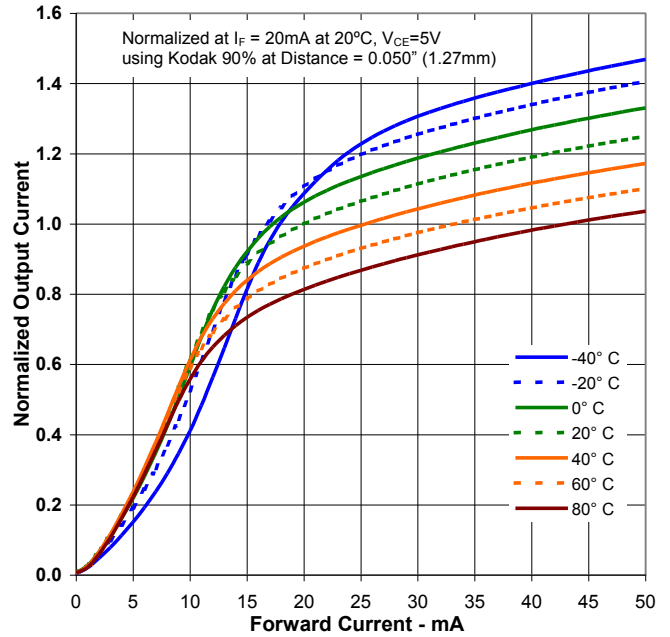
**OPB706 - Output Current vs Forward Current vs Temperature**



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



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



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