

# Reflective Object Sensor

OPB700Z, OPB700ALZ

OPB701Z, OPB701ALZ



## Features:

- Low profile to facilitate stacking
- Low cost plastic housing
- Choice of phototransistor or photodarlington output
- #26 AWG lead wire in 4" (101 mm), or 18" (457 mm) lengths

## Description:

**OPB700** and **OPB700ALZ** sensors consist of an infrared emitting diode and a NPN silicon phototransistor, mounted side-by-side on converging optical axes in a black plastic housing.

**OPB701** and **OPB701ALZ** sensors consist of an infrared emitting diode and a NPN silicon photodarlington, mounted side-by-side on converging optical axes in a black plastic housing.

The interconnect wires for these devices are UL approved #26 AWG, with Teflon insulation, stripped and tinned. The **OPB700** and **OPB701** have 4" (101 mm) wire length while the **OPB700ALZ** and **OPB701ALZ** have 18" (457 mm) wire length.

Custom electrical, wire, 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

| Ordering Information |                     |            |                               |                       |
|----------------------|---------------------|------------|-------------------------------|-----------------------|
| Part Number          | LED Peak Wavelength | Sensor     | Reflection Distance Inch (mm) | Lead Length / Spacing |
| OPB700Z              | 890 nm              | Transistor | 0.200" (5.08mm)               | 4" / 26 AWG Wire      |
| OPB700ALZ            |                     |            |                               | 18" / 26 AWG Wire     |
| OPB701Z              |                     | Darlington |                               | 4" / 26 AWG Wire      |
| OPB701ALZ            |                     |            |                               | 18" / 26 AWG Wire     |



RoHS

### General Note

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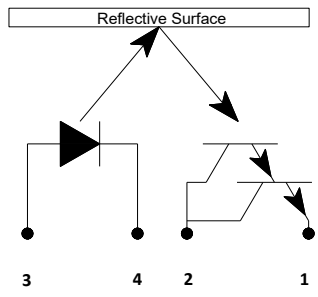
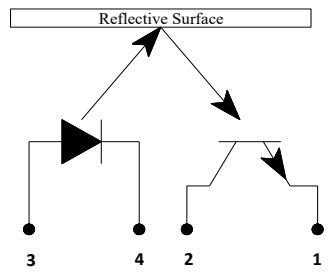
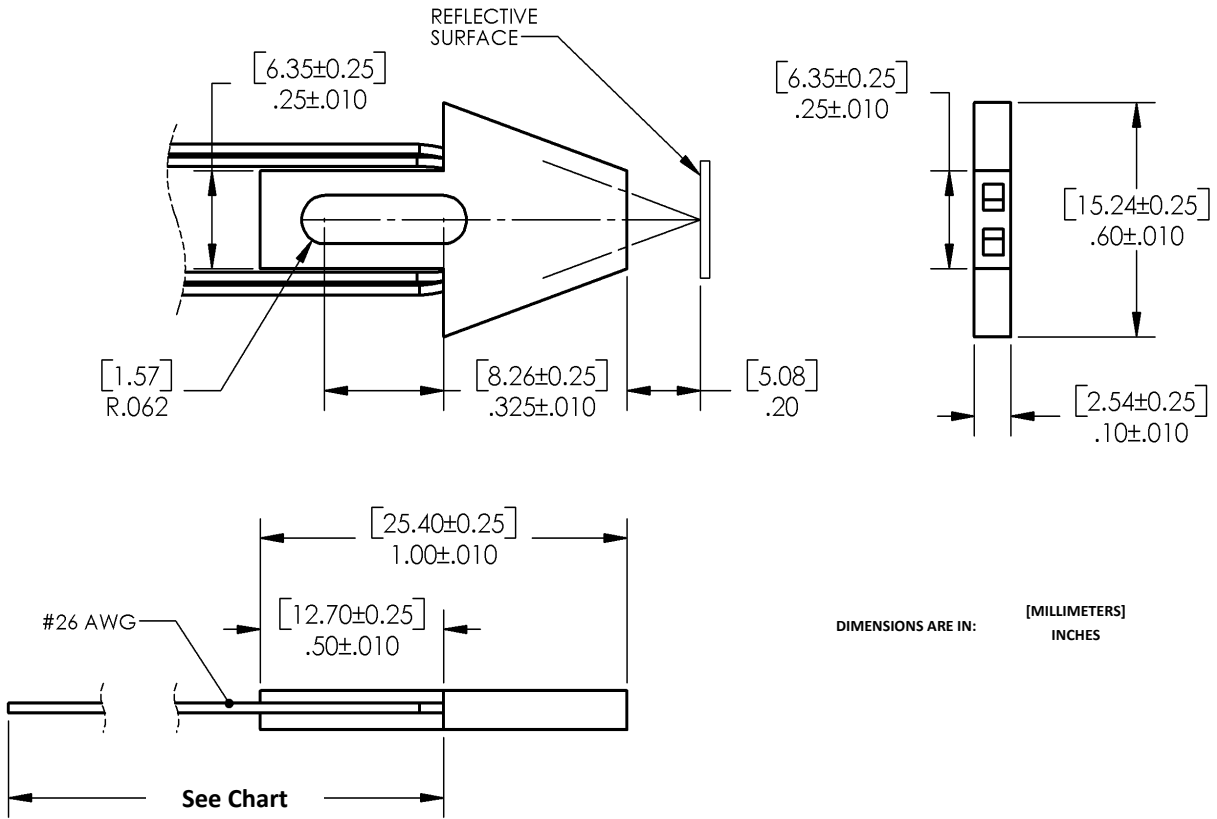
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OPB701Z, OPB701ALZ



## OPB700Z, OPB701Z



| Part Number | Wire Length |
|-------------|-------------|
| OPB700Z     | 4" Min      |
| OPB700ALZ   | 18" Min     |
| OPB701Z     | 4" Min      |
| OPB701ALZ   | 18" Min     |

| OPB701      |         |             |           |
|-------------|---------|-------------|-----------|
| Color/Pin # | LED     | Color/Pin # | LED       |
| Red-3       | Anode   | White-2     | Collector |
| Black-4     | Cathode | Green-1     | Emitter   |

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## Electrical Specifications

| Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |                    |
|---|--------------------|
| Storage Temperature Range   | -40° C to + 125° C |
| Operating Temperature Range   | -40° C to + 100° C |
| Lead Soldering Temperature  | 260° C             |
| <b>Input Diode</b>  |                    |
| Continuous Forward Current  | 100 mA             |
| Reverse Voltage   | 2 V                |
| Power Dissipation <sup>(1)</sup>  | 80 mW              |
| <b>Output Phototransistor</b>   |                    |
| Collector-Emitter Voltage<br>OPB700Z, OPB700ALZ<br>OPB701Z, OPB701ALZ       | 24 V<br>15 V       |
| Emitter-Collector Voltage   | 5 V                |
| Power Dissipation <sup>(1)</sup>  | 50 mW              |

Notes:

(1) Derate linearly 1.07 mW/°C above 25 ° C.

| Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |  |     |     |     |               |  |
|---|--|-----|-----|-----|---------------|--|
| SYMBOL  | PARAMETER                                | MIN | TYP | MAX | UNITS         | TEST CONDITIONS  |
| <b>Input Diode</b>  |  |     |     |     |               |  |
| $V_F$   | Forward Voltage                          | -   | -   | 1.7 | V             | $I_F = 50\text{ mA}$   |
| $I_R$   | Reverse Current                          | -   | -   | 100 | $\mu\text{A}$ | $V_R = 2\text{ V}$   |
| <b>Output Phototransistor</b>   |  |     |     |     |               |  |
| $V_{(BR)CEO}$   | Collector-Emitter Breakdown Voltage      | 25  | -   | -   | V             | $I_C = 100\ \mu\text{A}$   |
|   | OPB700Z, OPB700ALZ<br>OPB701Z, OPB701ALZ | 15  | -   | -   | V             | $I_C = 100\ \mu\text{A}$   |
| $V_{(BR)ECO}$   | Emitter-Collector Breakdown Voltage      | 5   | -   | -   | V             | $I_E = 100\ \mu\text{A}$   |
| $I_{CEO}$   | Collector Dark Current                   | -   | -   | 100 | nA            | $V_{CE} = 10\text{ V}, I_F = 0, E_E = \leq 0.1\ \mu\text{W}/\text{cm}^2$ |
|   | OPB700Z, OPB700ALZ<br>OPB701Z, OPB701ALZ | -   | -   | 250 | nA            | $V_{CE} = 10\text{ V}, I_F = 0, E_E = \leq 0.1\ \mu\text{W}/\text{cm}^2$ |

Notes:

(1) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflecting surface. Reference: Eastman Kodak, Catalog # E 152 7795.

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## Electrical Specifications

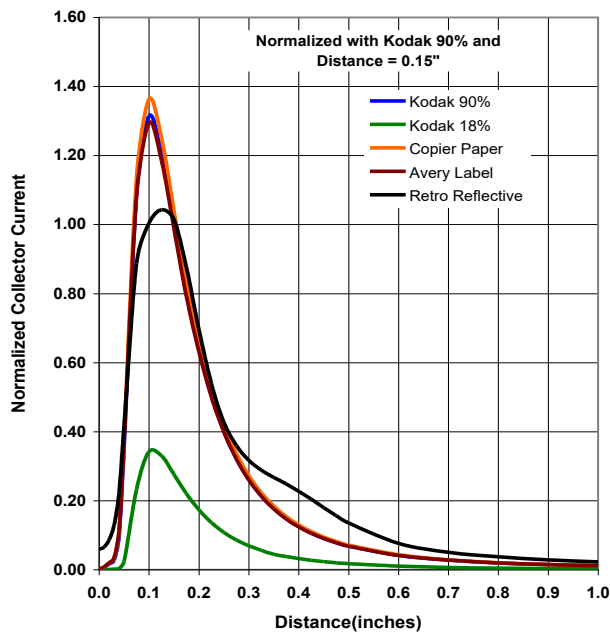
| Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |                    |      |     |       |               |  |
|---|--------------------|------|-----|-------|---------------|--|
| SYMBOL  | PARAMETER          | MIN  | TYP | MAX   | UNITS         | TEST CONDITIONS  |
| <b>Coupled Parameters OPB700Z, OPB700ALZ (Phototransistor)</b>                |                    |      |     |       |               |  |
| $I_{C(ON)}$   | Collector current  | 0.10 | -   | 2.50  | mA            | $V_{CE} = 5.0\text{V}^{(1)}$ , $I_F = 40\text{mA}$                   |
| $V_{CE(SAT)}$   | Saturation Voltage | -    | -   | 0.40  | V             | $I_C = 10\mu\text{A}$ , $I_F = 40\text{mA}$                          |
| $I_{CX}$  | Leakage Current    | -    | -   | 2.00  | $\mu\text{A}$ | $V_{CE} = 5.0\text{V}$ , $I_F = 40\text{mA}$ , NO Reflective Surface |
| <b>Coupled Parameters OPB701Z, OPB701ALZ (Photodarlington)</b>                |                    |      |     |       |               |  |
| $I_{C(ON)}$   | Collector current  | 2.50 | -   | 43.00 | mA            | $V_{CE} = 5.0\text{V}^{(1)}$ , $I_F = 40\text{mA}$                   |
| $V_{CE(SAT)}$   | Saturation Voltage | -    | -   | 1.10  | V             | $I_C = 1.0\text{mA}$ , $I_F = 40\text{mA}$                           |
| $I_{CX}$  | Leakage Current    | -    | -   | 20.0  | $\mu\text{A}$ | $V_{CE} = 5.0\text{V}$ , $I_F = 40\text{mA}$ , NO Reflective Surface |

Notes:

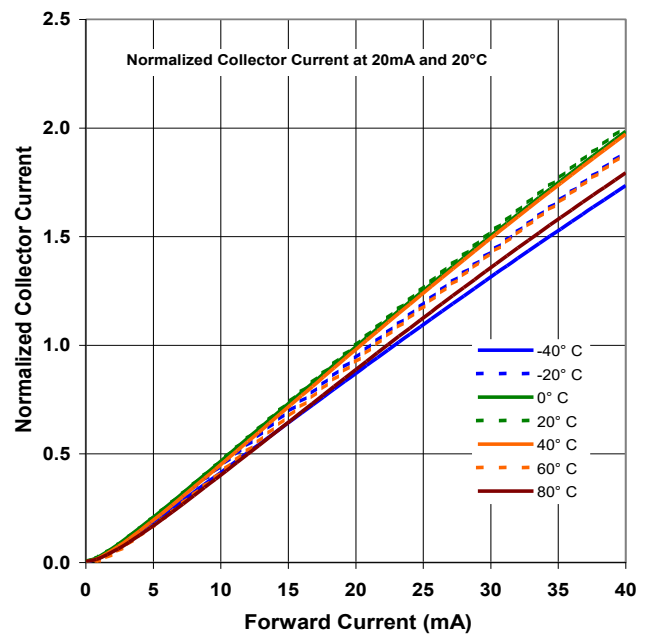
- (1) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflecting surface. Reference: Eastman Kodak, Catalog # E 152 7795.

## Performance

**OPB700 - Normalized Collector Current vs Distance**



**OPB700 - Normalized Collector Current vs Forward Current vs Temperature**



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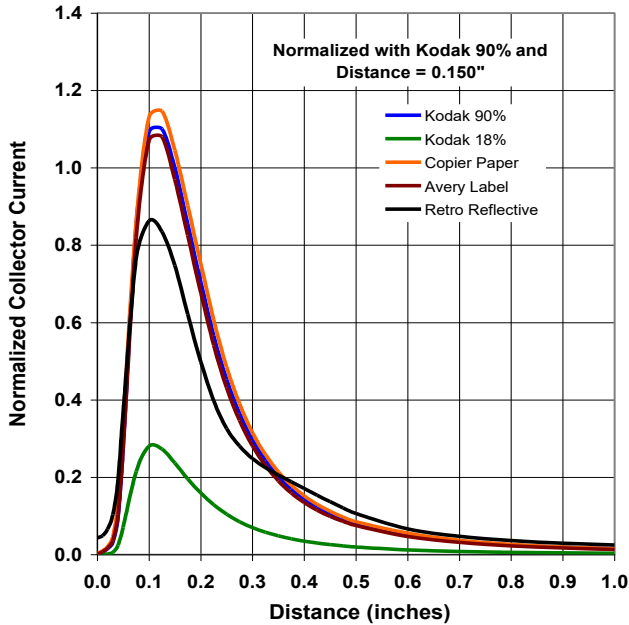
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OPB701Z, OPB701ALZ

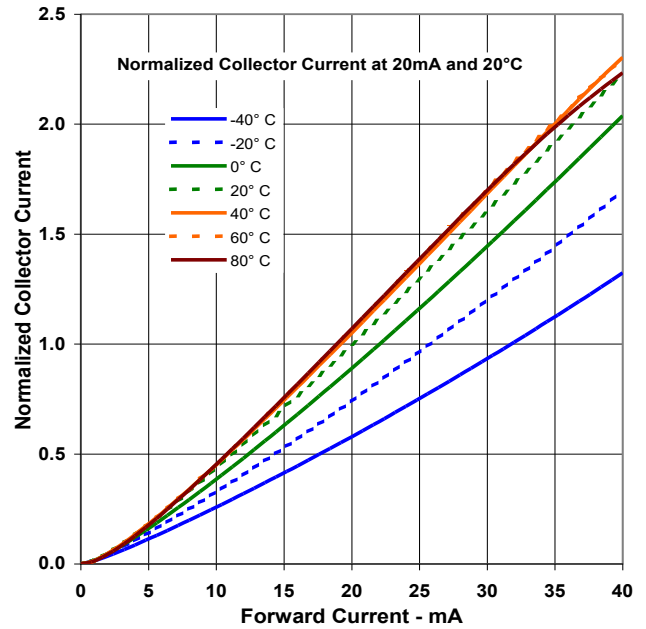


## Performance

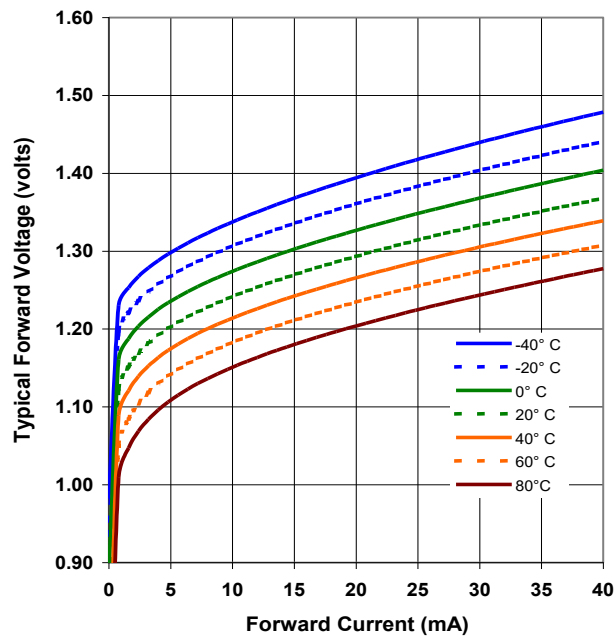
OPB701 - Normalized Collector Current vs Distance



OPB701 - Normalized Collector Current vs Forward Current vs Temperature



LED—Forward Voltage vs Forward Current vs Temperature



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