

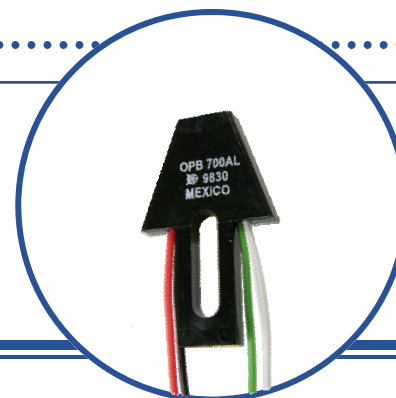
# Reflective Object Sensor

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 PTFE 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

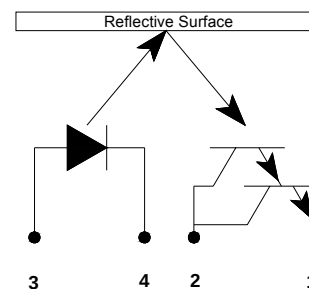
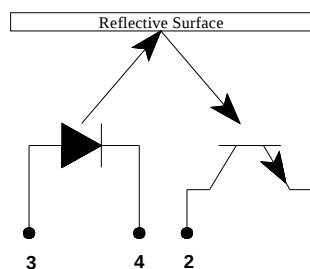
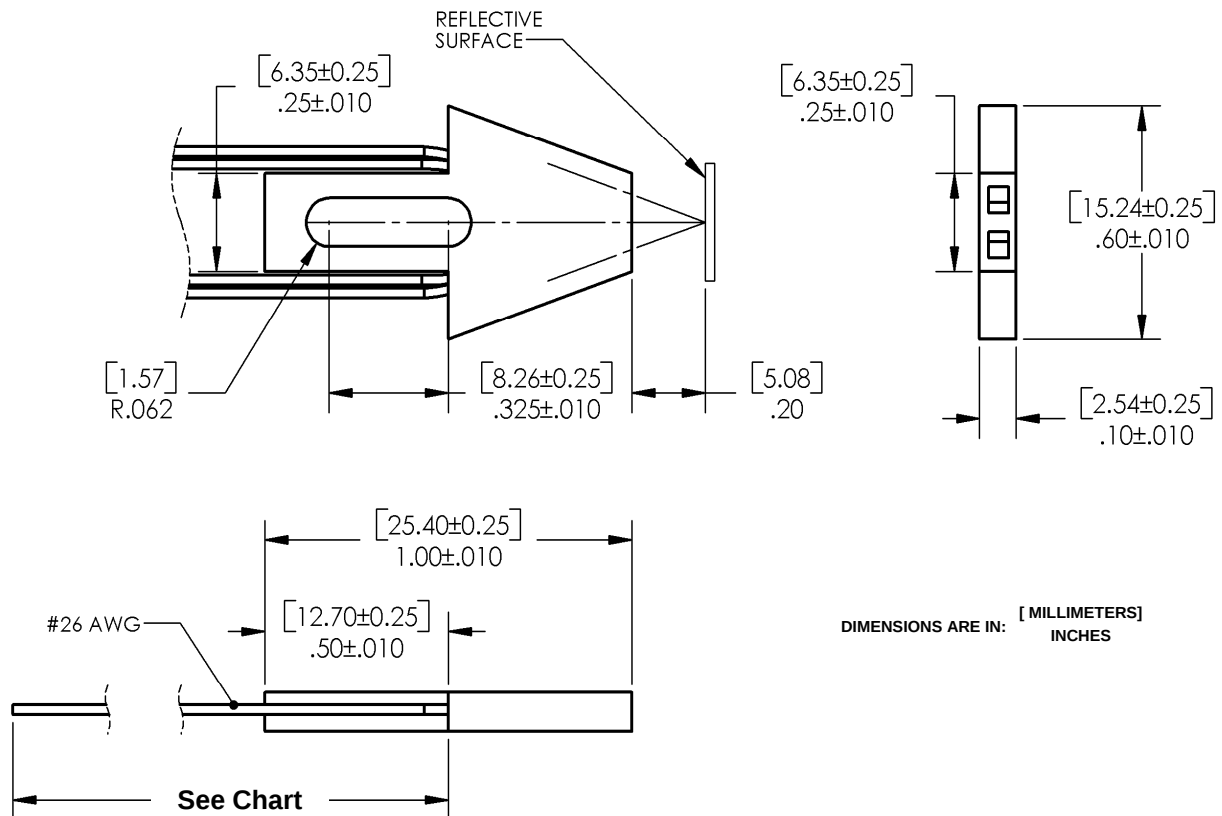
| Ordering Information |                     |            |                               |                       |
|----------------------|---------------------|------------|-------------------------------|-----------------------|
| Part Number          | LED Peak Wavelength | Sensor     | Reflection 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**

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

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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**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             |

**Input Diode**

|                                  |        |
|----------------------------------|--------|
| Continuous Forward Current       | 100 mA |
| Reverse Voltage                  | 2 V    |
| Power Dissipation <sup>(1)</sup> | 80 mW  |

**Output Phototransistor**

|                                                                       |              |
|-----------------------------------------------------------------------|--------------|
| 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       |
|--------|-----------------|-----|-----|-----|---------------|-----------------------|
| $V_F$  | Forward Voltage | -   | -   | 1.7 | V             | $I_F = 50 \text{ mA}$ |
|        | Reverse Current | -   | -   | 100 | $\mu\text{A}$ | $V_R = 2 \text{ V}$   |

**Output Phototransistor**

|               |                                                                                 |          |        |            |          |                                                                                                                                                      |
|---------------|---------------------------------------------------------------------------------|----------|--------|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage<br>OPB700Z, OPB700ALZ<br>OPB701Z, OPB701ALZ | 25<br>15 | -<br>- | -<br>-     | V<br>V   | $I_C = 100 \mu\text{A}$<br>$I_C = 100 \mu\text{A}$                                                                                                   |
|               | Emitter-Collector Breakdown Voltage                                             | 5        | -      | -          | V        | $I_E = 100 \mu\text{A}$                                                                                                                              |
| $I_{CEO}$     | Collector Dark Current<br>OPB700Z, OPB700ALZ<br>OPB701Z, OPB701ALZ              | -<br>-   | -<br>- | 100<br>250 | nA<br>nA | $V_{CE} = 10 \text{ V}, I_F = 0, E_E = \leq 0.1 \mu\text{W}/\text{cm}^2$<br>$V_{CE} = 10 \text{ V}, I_F = 0, E_E = \leq 0.1 \mu\text{W}/\text{cm}^2$ |

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

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

**Coupled Parameters OPB700Z, OPB700ALZ (Phototransistor)**

|               |                    |      |   |      |               |                                                                  |
|---------------|--------------------|------|---|------|---------------|------------------------------------------------------------------|
| $I_{C(ON)}$   | Collector current  | 0.10 | - | 2.50 | mA            | $V_{CE} = 5.0V^{(1)}$ , $I_F = 40\text{mA}$                      |
| $V_{CE(SAT)}$ | Saturation Voltage | -    | - | 0.40 | V             | $I_C = 10\mu\text{A}$ , $I_F = 40\text{mA}$                      |
| $I_{CX}$      | Leakage Current    | -    | - | 2.00 | $\mu\text{A}$ | $V_{CE} = 5.0V$ , $I_F = 40\text{mA}$ ,<br>NO Reflective Surface |

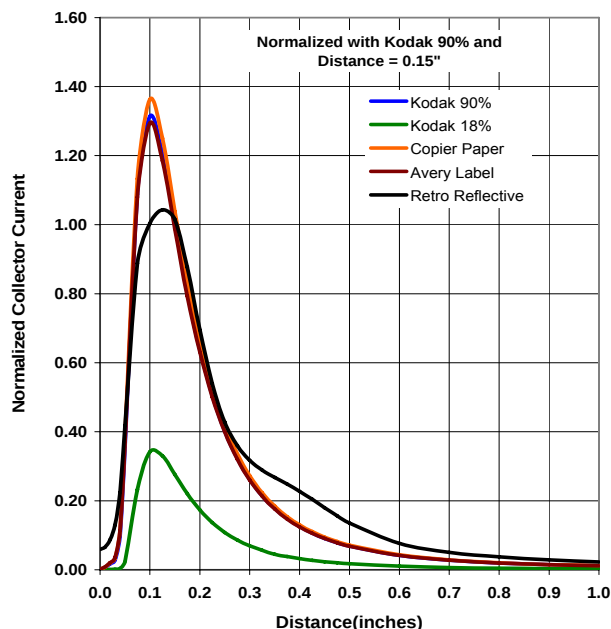
**Coupled Parameters OPB701Z, OPB701ALZ (Photodarlington)**

|               |                    |      |   |       |               |                                                                  |
|---------------|--------------------|------|---|-------|---------------|------------------------------------------------------------------|
| $I_{C(ON)}$   | Collector current  | 2.50 | - | 43.00 | mA            | $V_{CE} = 5.0V^{(1)}$                                            |
| $V_{CE(SAT)}$ | Saturation Voltage | -    | - | 1.10  | V             | $I_C = 10\mu\text{A}$ , $I_F = 40\text{mA}$                      |
| $I_{CX}$      | Leakage Current    | -    | - | 20.0  | $\mu\text{A}$ | $V_{CE} = 5.0V$ , $I_F = 40\text{mA}$ ,<br>NO Reflective Surface |

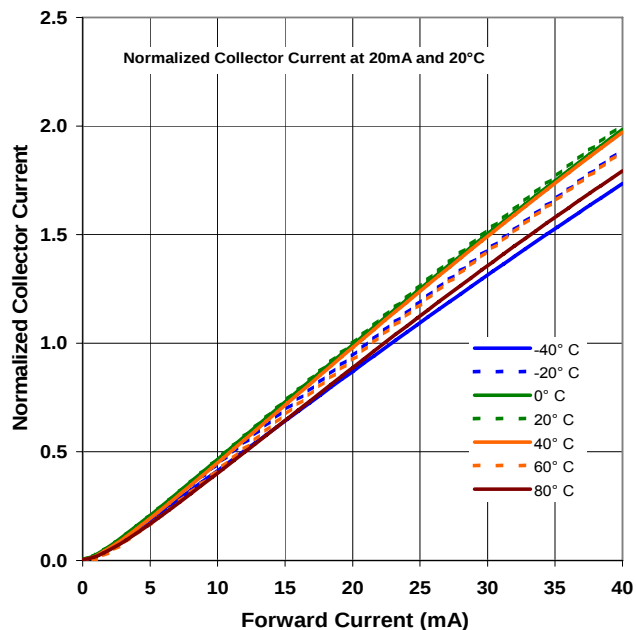
Notes:

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

**OPB700 - Normalized Collector Current vs Distance**

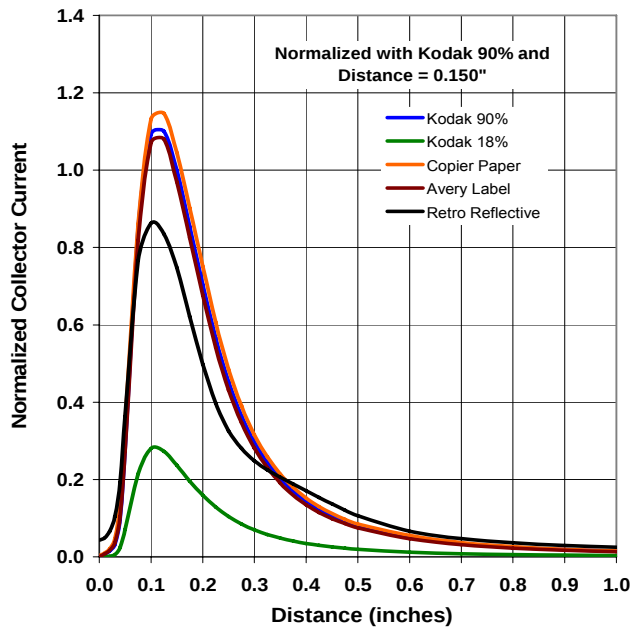


**OPB700 - Normalized Collector Current vs Forward Current vs Temperature**

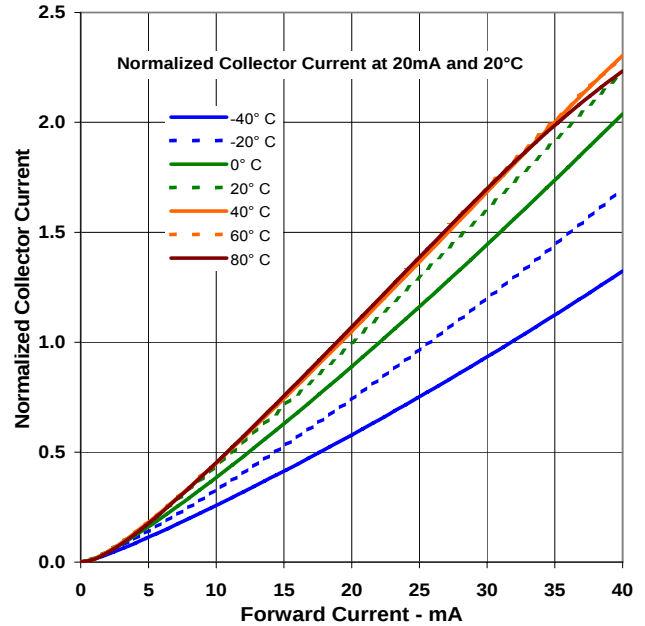


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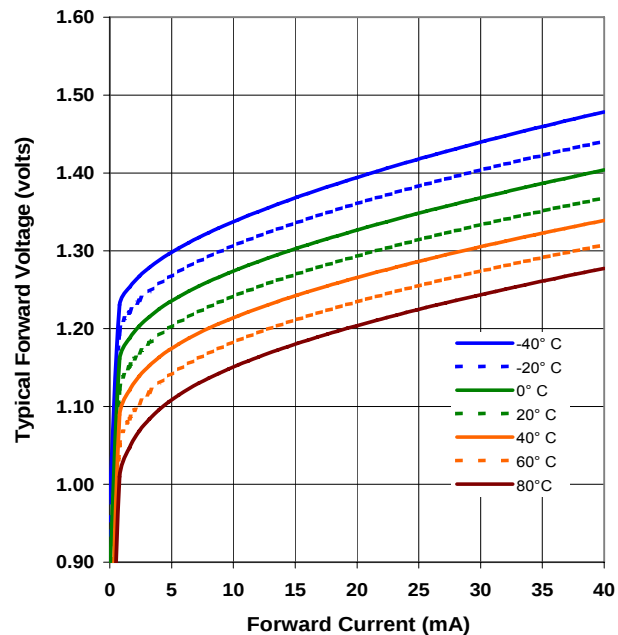
OPB701 - Normalized Collector Current  
vs Distance



OPB701 - Normalized Collector Current  
vs Forward Current vs Temperature



LED—Forward Voltage vs Forward Current  
vs Temperature



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