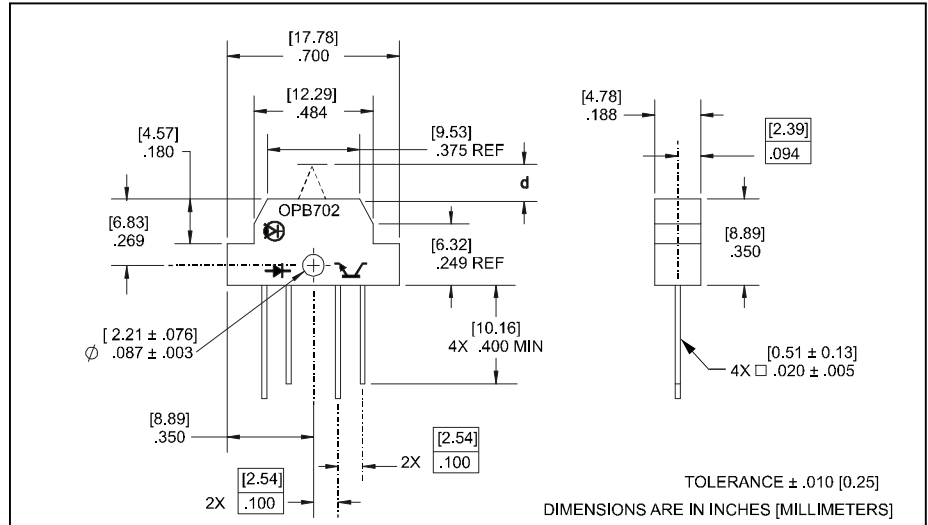
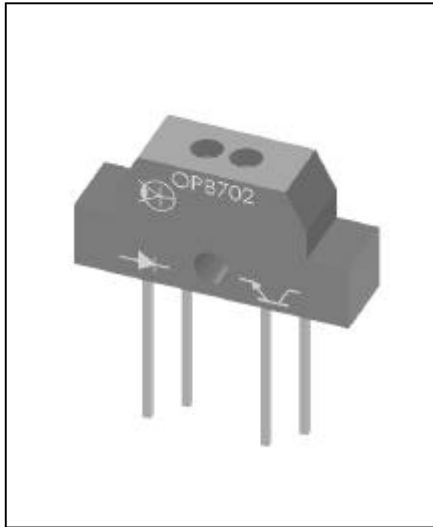


## Reflective Object Sensors

Type OPB702, OPB702D, OPB702R



## Features

- Focused for maximum sensitivity
- Phototransistor (OPB702) or Photodarlington (OPB702D) or Phototransistor with base-emitter resistor (OPB702R)
- Low cost plastic housing

### Description

The OPB702 family consists of an infrared emitting diode and a choice of NPN silicon phototransistor (OPB702), photodarlington (OPB702D), or base-emitter resistor for low light suppression (OPB702R). The IR LED and phototransistor are mounted side-by-side on converging optical axes, in a black plastic housing.

Both parts are constructed using either OP165 or OP265 series LEDs. The OPB702 uses an OP505 type. The OPB702D uses an OP535 type. The OPB702R uses an OP705.

Custom electrical, wire or cabling is available. Contact your local representative or Optek for more information.

**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 [1.6 mm] from case for 5 sec. with soldering iron) | 240° C <sup>(2)</sup> |

### Input Diode

|                                |                       |
|--------------------------------|-----------------------|
| Reverse Voltage . . . . .      | 2.0 V                 |
| Peak Forward Current . . . . . | 50 mA                 |
| Power Dissipation . . . . .    | 100 mW <sup>(1)</sup> |

## Output Photosensor

|                                                      |                       |
|------------------------------------------------------|-----------------------|
| Collector-Emitter Voltage - OPB702 & OPB702R .....   | 30 V                  |
| OPB702D .....                                        | 15 V                  |
| Emitter-Collector Voltage - OPB702 & OPB702D .....   | 5.0 V                 |
| Power Dissipation - OPB702 & OPB702D & OPB702R ..... | 100 mW <sup>(1)</sup> |

**NOTES:**

- (1) Derate linearly 1.67 mW/° C above 25° C.
- (2) RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering.
- (3) d is the distance from the assembly face to the reflective surface.
- (4) Measured using Eastman Kodak gray card. The white side of the card is used as a 90% diffuse reflectance surface. Reference Eastman Kodak, Catalog #E152 7795.
- (5) All parameters tested using pulse techniques.
- (6) Lead spacing controlled at body egress.

**PRECAUTIONS:** Exposure of the plastic body to chlorinated hydrocarbons and ketones such as thread lock and instant adhesive products will degrade the plastic body. Cleaning agents methanol and isopropanol are recommended. Spray or wipe do not submerge.



RoHS

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# Type OPB702

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

| SYMBOL                        | PARAMETER                            | MIN | MAX  | UNITS         | TEST CONDITIONS                                                                                |
|-------------------------------|--------------------------------------|-----|------|---------------|------------------------------------------------------------------------------------------------|
| <b>Input Diode</b>            |                                      |     |      |               |                                                                                                |
| $V_F$                         | Forward Voltage                      |     | 1.8  | V             | $I_F = 20 \text{ mA}$                                                                          |
| $I_R$                         | Reverse Current                      |     | 100  | $\mu\text{A}$ | $V_R = 2.0 \text{ V}$                                                                          |
| <b>Output Phototransistor</b> |                                      |     |      |               |                                                                                                |
| $V_{(BR)CEO}$                 | Collector-Emitter Breakdown Voltage  | 30  |      | V             | $I_C = 100 \mu\text{A}$ , $I_F = 0$ , $E_e = 0$                                                |
| $V_{(BR)ECO}$                 | Emitter-Collector Breakdown Voltage  | 5.0 |      | V             | $I_E = 100 \mu\text{A}$ , $I_F = 0$ , $E_e = 0$                                                |
| $I_{CEO}$                     | Collector-Emitter Leakage Current    |     | 100  | nA            | $V_{CE} = 10 \text{ V}$ , $I_F = 0$ , $E_e = 0$                                                |
| <b>Coupled</b>                |                                      |     |      |               |                                                                                                |
| $I_{C(ON)}$                   | On-State Collector Current           | 50  |      | $\mu\text{A}$ | $V_{CE} = 5.0 \text{ V}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$ |
| $V_{CE(SAT)}$                 | Collector-Emitter Saturation Voltage |     | 0.40 | V             | $I_C = 250 \mu\text{A}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$  |

# Type OPB702D

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

| SYMBOL                        | PARAMETER                            | MIN  | MAX  | UNITS         | TEST CONDITIONS                                                                                |
|-------------------------------|--------------------------------------|------|------|---------------|------------------------------------------------------------------------------------------------|
| <b>Input Diode</b>            |                                      |      |      |               |                                                                                                |
| $V_F$                         | Forward Voltage                      |      | 1.8  | V             | $I_F = 20 \text{ mA}$                                                                          |
| $I_R$                         | Reverse Current                      |      | 100  | $\mu\text{A}$ | $V_R = 2.0 \text{ V}$                                                                          |
| <b>Output Phototransistor</b> |                                      |      |      |               |                                                                                                |
| $V_{(BR)CEO}$                 | Collector-Emitter Breakdown Voltage  | 15.0 |      | V             | $I_C = 1 \text{ mA}$ , $I_F = 0$ , $E_e = 0$                                                   |
| $V_{(BR)ECO}$                 | Emitter-Collector Breakdown Voltage  | 5.0  |      | V             | $I_E = 100 \mu\text{A}$ , $I_F = 0$ , $E_e = 0$                                                |
| $I_{CEO}$                     | Collector-Emitter Leakage Current    |      | 250  | nA            | $V_{CE} = 10.0 \text{ V}$ , $I_F = 0$ , $E_e = 0$                                              |
| <b>Coupled</b>                |                                      |      |      |               |                                                                                                |
| $I_{C(ON)}$                   | On-State Collector Current           | 2.0  |      | mA            | $V_{CE} = 5.0 \text{ V}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$ |
| $V_{CE(SAT)}$                 | Collector-Emitter Saturation Voltage |      | 1.10 | V             | $I_C = 400 \mu\text{A}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$  |

# Type OPB702R

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

| SYMBOL                        | PARAMETER                            | MIN | MAX  | UNITS         | TEST CONDITIONS                                                                                |
|-------------------------------|--------------------------------------|-----|------|---------------|------------------------------------------------------------------------------------------------|
| <b>Input Diode</b>            |                                      |     |      |               |                                                                                                |
| $V_F$                         | Forward Voltage                      |     | 1.8  | V             | $I_F = 20 \text{ mA}$                                                                          |
| $I_R$                         | Reverse Current                      |     | 100  | $\mu\text{A}$ | $V_R = 2.0 \text{ V}$                                                                          |
| <b>Output Phototransistor</b> |                                      |     |      |               |                                                                                                |
| $V_{(BR)CEO}$                 | Collector-Emitter Breakdown Voltage  | 30  |      | V             | $I_C = 100 \mu\text{A}$ , $I_F = 0$ , $E_e = 0$                                                |
| $I_{ECO}$                     | Emitter-Reverse Current              |     | 100  | $\mu\text{A}$ | $V_{EC} = 0.4 \text{ V}$ , $I_F = 0$ , $E_e = 0$                                               |
| $I_{CEO}$                     | Collector-Emitter Leakage Current    |     | 100  | nA            | $V_{CE} = 10.0 \text{ V}$ , $I_F = 0$ , $E_e = 0$                                              |
| <b>Coupled</b>                |                                      |     |      |               |                                                                                                |
| $I_{C(ON)}$                   | On-State Collector Current           | 50  |      | $\mu\text{A}$ | $V_{CE} = 5.0 \text{ V}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$ |
| $V_{CE(SAT)}$                 | Collector-Emitter Saturation Voltage |     | 0.40 | V             | $I_C = 250 \mu\text{A}$ , $I_F = 40 \text{ mA}$ ,<br>$d = 0.150'' (3.81 \text{ mm})^{(3)(4)}$  |

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