Reflective Object Sensors
Types OPB703W, OPB704W, OPB705W

Features
- Phototransistor output
- High sensitivity
- Low cost plastic housing
- Available with lenses for dust protection and ambient light filtration

Description
The OPB703W, OPB704W and OPB705W each consist of an infrared emitting diode and an NPN silicon phototransistor mounted side-by-side on converging optical axes in a black plastic housing. The phototransistor responds to radiation from the emitter only when a reflective object passes within its field of view. Various options allow no lens, blue polysulfone lens for dust protection or offset lens for improved resolution.

Leads are 26 AWG, PVC insulation, 4.5" (114.3mm) minimum length, stripped & tinned.

Absolute Maximum Ratings (TA = 25°C unless otherwise noted)
Storage and Operating Temperature .................................. -40°C to +85°C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 5 sec. with soldering iron]. .......................................................... 240°C (11)

Input Diode
Forward DC Current ................................................. 40 mA
Reverse DC Voltage .................................................. 2.0 V
Power Dissipation .................................................... 100 mW (2)

Output Phototransistor
Collector-Emitter Voltage ........................................... 30 V
Emitter-Collector Voltage ......................................... 5.0 V
Collector DC Current ............................................... 25 mA
Power Dissipation .................................................... 100 mW (2)

Notes:
(1) RMA flux is recommended. Duration can be extended to 10 sec. max when flow soldering.
(2) Derate linearly 1.82 mW/°C above 25°C.
(3) d is the distance from the assembly face to the reflective surface.
(4) Lower curve is based on a calculated worst case condition rather than the conventional 2σ limit.
(5) All parameters tested using pulse technique.
(6) Crosstalk is the photocurrent measured with current to the input diode and no reflecting surface.
(7) Measured using Eastman Kodak neutral white test card with 90% diffuse reflectance as a reflecting surface. Reference: Eastman Kodak, Catalog #1257765.

DESCRIPTION

<table>
<thead>
<tr>
<th>Model</th>
<th>Lens Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPB703W</td>
<td>No Lens</td>
</tr>
<tr>
<td>OPB704W</td>
<td>Blue Polysulfone Lens</td>
</tr>
<tr>
<td>OPB705W</td>
<td>Offset Lens</td>
</tr>
</tbody>
</table>

For RoHS compliant devices add "Z" to the end of the part number: OPB703WZ
## Types OPB703W, OPB704W, OPB705W

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

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>MIN</th>
<th>MAX</th>
<th>UNITS</th>
<th>TEST CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_F )</td>
<td>Forward Voltage</td>
<td>1.70</td>
<td></td>
<td>V</td>
<td>( I_F = 40 \text{ mA} )</td>
</tr>
<tr>
<td>( I_R )</td>
<td>Reverse Current</td>
<td>100</td>
<td></td>
<td>( \mu A )</td>
<td>( V_R = 2.0 \text{ V} )</td>
</tr>
</tbody>
</table>

### Output Phototransistor

- \( V_{B|E|C} \) Collector-Emitter Breakdown Voltage: 30 \( V \) \( I_{CE} = 100 \text{ \( \mu A \)} \)
- \( V_{B|R|E|C} \) Emitter-Collector Breakdown Voltage: 5.0 \( V \) \( I_{EC} = 100 \text{ \( \mu A \)} \)
- \( I_{CE} \) Collector Dark Current: 100 \( nA \) \( V_{CE} = 10 \text{ V}, I_F = 0, E_o = 0 \)

### Combined

- \( I_{C\left(ON\right)} \) On-State Collector Current
  - \( \text{OPB703W} \): 200 \( \mu A \)
  - \( \text{OPB704W} \): 200 \( \mu A \)
  - \( \text{OPB705W} \): 100 \( \mu A \)
  - \( V_{CE} = 5 \text{ V}, I_F = 40 \text{ mA} \), \( d = 0.15 \text{ in. (3.81 mm)}\)\(^{(3)}\)\(^{(7)}\)
- \( I_{CX} \) Crosstalk
  - \( \text{OPB703W} \): 20 \( \mu A \)
  - \( \text{OPB704W} \): 20 \( \mu A \)
  - \( \text{OPB705W} \): 10 \( \mu A \)
  - \( V_{CE} = 5 \text{ V}, I_F = 40 \text{ mA} \)\(^{(6)}\)

### Typical Performance Curves

- **Reflective Surface Collector Current vs. Diode Forward Current**
- **Diffused Surface Collector Current vs. Diode Forward Current**
- **Normalized Collector Current vs. Ambient Temperature**
- **Normalized Collector Current vs. Object Distance**
- **Rise and Fall Time vs. Load Resistance**
- **Test Condition**

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

Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006  (972)323-2200 Fax (972)323-2396

11-17